

European Offshore Wind – what does the future look like?

DLA PIPER

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Methodology

In the third quarter of 2019, Acuris Studios, on behalf of DLA Piper, surveyed 50 senior executives based in Europe on the topic of Europe's offshore wind infrastructure. Respondents were from banks and financial institutions, private equity, funds, telecommunications corporates, energy and utilities corporates, and offshore wind operators and developers that had either invested debt (25) or equity (25) into at least one European offshore wind project in the previous 24 months.

The survey included a combination of qualitative and quantitative questions and all interviews were conducted over the telephone by appointment. Results were analysed and collated by Acuris Studios, and all responses are anonymised and presented in aggregate.

Introduction

The story of offshore wind in Europe is remarkable by any standards. In the space of little more than a decade, some 4,500 turbines have been deployed across the North Sea, the Baltic and the Atlantic. Europe installed 2.6GW of new offshore wind energy capacity in 2018 alone.

Subsidies have played a big part in getting the industry to where it is today. So has technology. The power output of individual turbines has doubled in the past five years. In the next five years, it is likely to double again.

The sector has also reaped the benefits of prolonged low interest rates, which have reduced the cost of debt financing. In parallel with this, offshore wind has been helped by rapidly changing investor appetites as both debt providers and equity investors have raced to meet sustainability targets.

The maturity of the sector – and confidence in the technology – is attracting increasing numbers of new equity investors prepared to take construction risk. In parallel with this, opportunities are opening up in new geographies including Poland and Turkey. France, meanwhile, recently announced financial close of its first offshore wind farm.

Offshore wind continues to be a magnet for investors. Long-term, offshore wind capacity is set to increase at least 15-fold over the next two decades, according to the International Energy Agency. In the shorter term, investment in new build is softening – at least for now. In tandem with this, the proportion of secondary transactions and refinancing deals is rising. Meanwhile, investors are increasingly gearing up for subsidy-free opportunities as auction bids continue to plummet.

But what does all this mean for the market? Where are investments being made, how confident are investors and how is the sector reacting to the wider economic factors?

We explored these questions, and more, and are delighted to launch this report to outline in more detail how we see the market developing.



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Key findings

- According to Acuris publication Inframation, 2018 was a record year in terms of the number and value of transactions in European offshore wind projects.
- In 2018, the number of transactions increased 32% year-on-year to 37, and the total value of transactions increased annually by 68% to hit €25.7 billion.
- 100% of all respondents believe that Brexit uncertainty has negatively impacted the offshore wind development and acquisition markets in the UK and Europe.
- 92% of debt providers and 84% of equity investors think floating offshore wind technology will begin to dominate Europe's offshore wind industry in terms of new projects in 10 years' time.
- Debt providers most commonly say that the biggest growth in primary investment for new offshore wind project developments in Europe over the next two years is mostly likely to be seen by Turkey (44%), followed by Germany (36%). A majority of equity investors also point to Germany (60%).
- 80% of debt providers and 72% of equity investors expect policies and regulation in Europe surrounding offshore wind projects to become more challenging over the next 24 months.
- 74% of respondents agree that there will be significant growth in the number of subsidy-free offshore wind projects in Europe over the next 24 months.

2018
record year for number
and value of
European transactions

€25.7 billion
spent on European
projects in 2018

Biggest investment
growth in
Turkey and Germany



1. Market activity

Europe's offshore wind sector enters a new phase

2018 was a record year for offshore wind transactions in Europe. Volume and value surged to new highs: the number of deals increased 32% year-on-year to 37, while the total value of transactions leapt 68% to nearly €25.7 billion (Figure 1).

Winds of change?

Data from Inframation shows that there was an overall rise in the volume and value of transactions for offshore wind projects between 2008 and 2018. However, data for the first half of 2019 suggests this pattern is changing.

First, the value of transactions is decreasing. Only €9.6 billion in deal value was recorded in the first three quarters of 2019, a 60% drop on the same period the year before.

Second, volume is levelling out rather than rising. There were 25 deals between the first and third quarters of 2019, only one more

than was recorded in the equivalent period the year before.

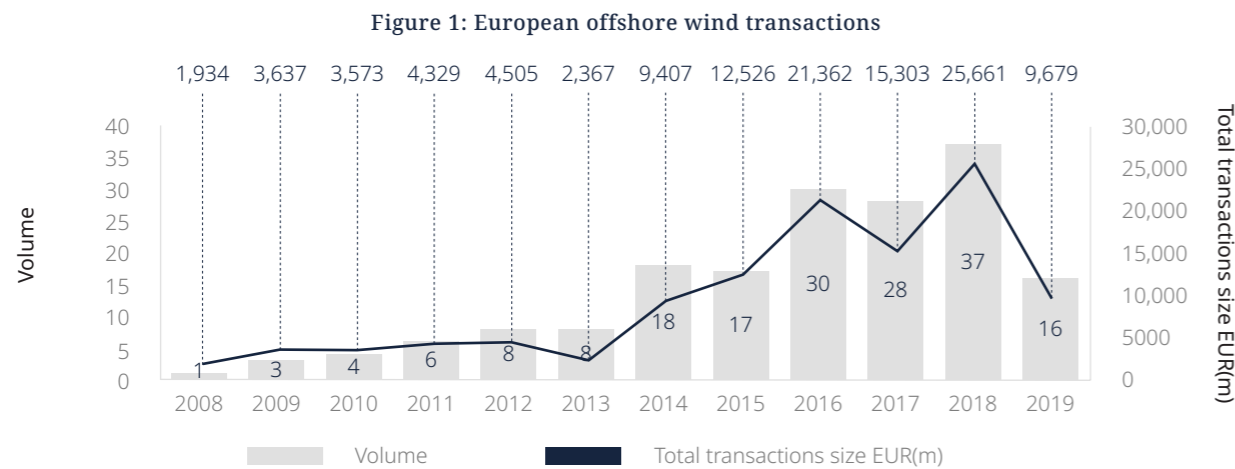
So why the slowdown? Aside from the fact that last year was unusually busy, market maturity looks to be a major factor. Offshore wind is making a rapid transition from being predominantly greenfield (dominated by new build) to a mixture of greenfield and brownfield (with a greater proportion of refinancing and secondary transactions).

"We've seen a little less new-build activity so far in 2019 than in previous years – particularly in the UK as the build-out phases of the previous bidding rounds is working through," says Stephen Jennings, Head of Energy and Natural Resources, MUFG.

"What we've seen so far this year is a greater degree of activity in terms of acquisitions of minority stakes in offshore wind farms, and more refinancing of existing deals."

New build: volume expectations subdued

Looking at new-build volume first – and focusing on projects with a capacity of 50MW and above (roughly the equivalent of nine turbines or more) – both debt providers and equity investors in this study expect to take on fewer



Source: Inframation Group (correct as of 09/10/2019)

projects over the next two years. The figures show that only 40% of debt providers expect to finance three or more projects over the next 24 months versus 60% over the past two years (Figures 2 and 3). The picture is similar with equity investors: only 24% expect to invest in three or more projects in the next two years compared to 36% over the last two years.

While this suggests that the new-build market is softening in terms of overall volume, the lower levels of activity anticipated by respondents could also reflect the higher levels of competition they face from new entrants in an increasingly crowded debt and equity marketplace. The overall level of decline expected by respondents therefore does not necessarily imply a similar degree of contraction across the new-build market as a whole.

New build: value under pressure

Both equity investors and debt providers expect to invest less in new-build projects over the next two years. Looking at equity investors first, 25% have no plans to invest anything at all over the next two years. In the previous two years, by contrast, 100% had invested something (Figure 4). Looking to the next two years, equity respondents expect less activity in the €51 million-€500 million bracket. Above and below this, however, the expected allocations are unchanged.

Although debt providers also expect to invest less, the pattern is distinctly different. First, none are planning to step aside from the market: 100% of them expect to provide finance for projects over the next two years. (Figure 5). Second, the proportion

of respondents who expect to make investments in the €51 million-€250 million and €501 million to €1 billion brackets actually increases.

Overall, however, the figures suggest that debt providers expect to see a slightly bigger decline in investment over the next two years than their equity counterparts. One likely reason for debt providers expecting a bigger drop in new-build value is that greenfield is their main hunting ground, so any decrease in volume there would have a disproportionate impact on them. *"Debt financing is needed when the market is nascent, but a lot of the projects are now built out,"* says Natasha Luther-Jones, Global Co-Chair, Energy and Natural Resources, DLA Piper. *"There are also a lot of banks chasing the same deals."*

As well as competition for investable opportunities, another factor eating into new-build value in Europe could be the growing attraction of the

Figure 2: How many European offshore wind projects with a capacity of 50MW or more in development did your organisation [invest in/finance] over the past 24 months?

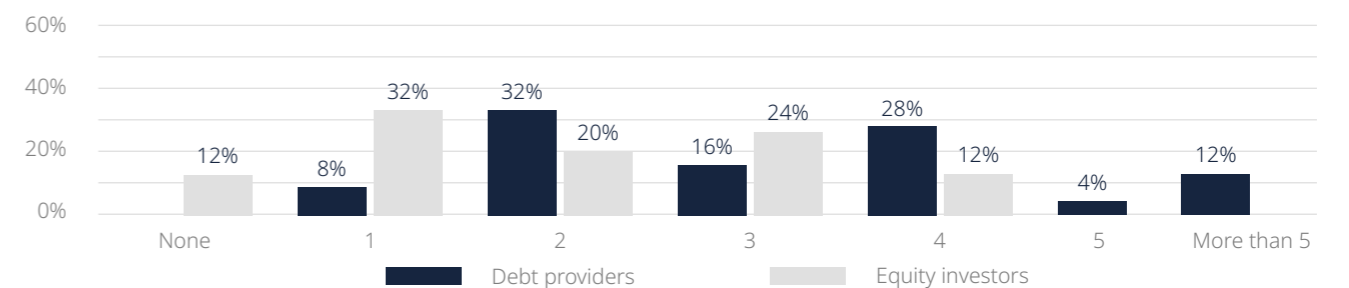
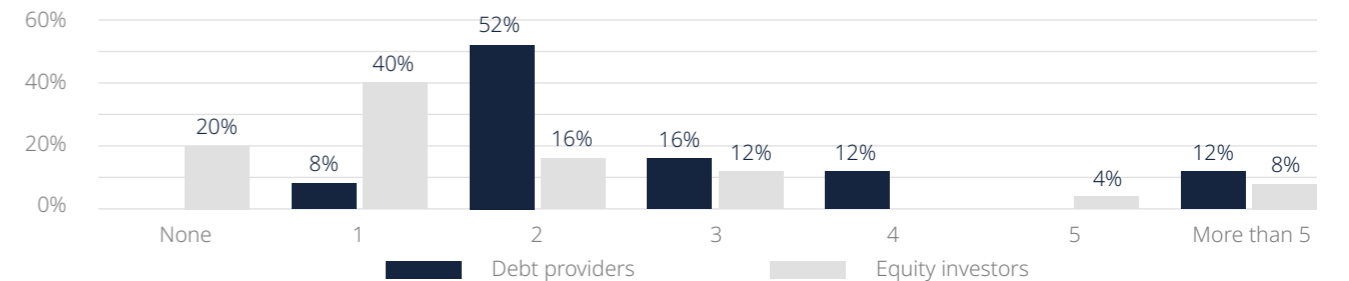


Figure 3: How many European offshore wind projects with a capacity of 50MW or more in development do you expect to [invest in/finance] over the next 24 months?



global offshore wind market (see also Chapter 2, Global potential). **“If you look at the pipeline in Europe, it’s not as exciting as what you see in Japan or Taiwan or even the US. China also looks promising.”** says Nacim Bounouara, Partner, DLA Piper.

Looking at respondents’ value expectations for the entire market (not just their own specific investment expectations), both debt providers and equity investors think that the overall value of investment in new build will decrease over the next two years compared to the last two years.

Equity investors’ expectations for new build are broadly more positive than those of debt providers. While

44% expect value to decline, nearly a quarter (24%) expects value to increase over the next two years, while 32% of them think it will remain unchanged (Figure 6).

Debt providers, by contrast, take a more downbeat view about the market as a whole. More than two-thirds (68%) predict that value of investment in new build will drop, while 24% think it will stay the same. Only 8% anticipate an increase in value, albeit within a higher growth range (10-29%).

M&A volume gap

Turning to the question of M&A activity, equity and debt respondents are divided on whether volume will rise or fall. Debt providers expect volume to drop: only 56% expect to take part in a deal over the next two years versus 64% over the past 24 months. None anticipate taking part in more than three transactions (Figures 7 and 8).

Equity investors, by contrast, expect to participate in more deals. While the proportion expecting to take part in deals over the next two years is the same as for the previous 24 months (60%), there is an uptick in

the number of projects expected: 12% expect to take part in four or more deals versus 8% over the past 24 months.

M&A value prospects

Both respondent groups expect an overall decline in M&A value over the next two years. While the picture is complex, sentiment is slightly less downbeat among equity investors who are naturally much more active than debt providers when it comes to acquisitions.

Looking at equity investors first, while they expect to take part in more M&A deals in the coming 24 months, equity investors are expecting a proportion of less valuable deals. The data shows high levels of consistency between past performance and anticipated future activity at the lowest and highest ends of the value spectrum. Delving into the detail, the proportion of equity respondents who report investing €2.5 billion or more in M&A over the past 24 months is identical to the proportion expecting to invest €2.5 billion over the next 24 months (Figure 9). The pattern is repeated at the opposite (lower) end of the scale, with identical percentages for €51 million-€250

million (both 40%), and “no deal” (both 10%).

The only real change is in the central range: equity investors expect to see an uptick in transactions with a value of €251 million-€500 million but a downturn in deals worth €501 million to €1 billion.

This is consistent with the higher number of smaller transactions to be expected in a mature market. Brownfield opportunities abound and growing confidence in the technology is luring in new types of investors.

“We’ve seen a rise in the number of investors that are willing to come into the market, particularly in the operational phase,” says Jennings. **“Those involved through the development stage are then churning their stakes to financial investors once the projects are into steady state operation. That’s freeing up capital to allow them to then reinvest in new projects going forward.”**

Turning to debt providers, the data suggests a contraction in the value range of M&A transactions with no respondents expecting to invest more than €1 billion over the next two years (Figure 10). It is also interesting to note that the proportion of debt providers who

expect to be inactive is higher for the next two years (13%) than for the past two (7%).

Despite the squeeze, there is evidence of increased activity in mid-range transactions: while the proportion of anticipated M&A deals worth €51 million-€250 million is down, those in the €251 million-€500 million and €501 million to €1 billion brackets are up.

Looking at respondents’ value expectations for the market as a whole (not just their own specific investment expectations), both groups of investors think the overall value of M&A investment will decrease over the next two years compared to the last two years. But again, it is a mixed picture.

Equity investors are apparently more pessimistic about the overall direction of the M&A market than debt providers: a majority (60%) of equity investors expect the overall level of investment in offshore wind M&A will decrease while 28% think it will be unchanged (Figure 11).

By contrast, debt providers are slightly less gloomy with only 48% expecting overall value to drop. Meanwhile, 40% expect the market to remain the same with a further 12% predicting an increase in M&A value of 10% or more.

Figure 4: Equity investors
What approximate value of investment (including debt investment) did your organisation allocate to the development of European offshore wind projects based in Europe over the past 24 months?
(b) And what do you expect will be allocated over the next 24 months?

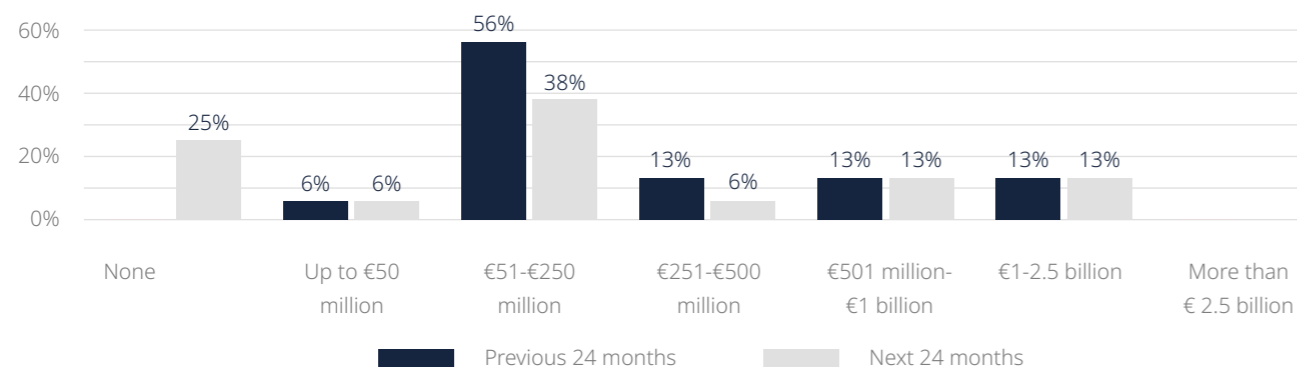


Figure 5: Debt providers
What approximate value of investment (including debt investment) did your organisation allocate to the development of European offshore wind projects based in Europe over the past 24 months?
(b) And what do you expect will be allocated over the next 24 months?

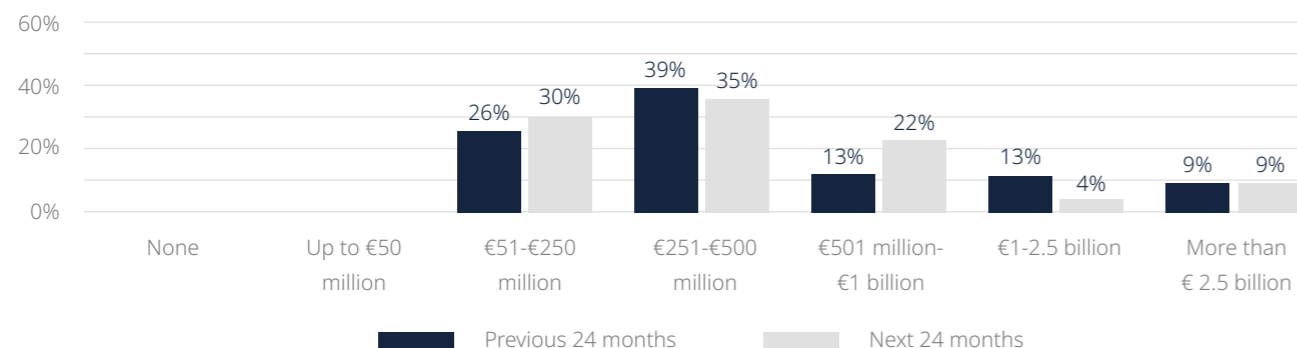


Figure 6: How do you expect the overall value of investment (including debt investment) for the development of new offshore wind projects based in Europe over the next 24 months will compare to that of the previous 24 months?

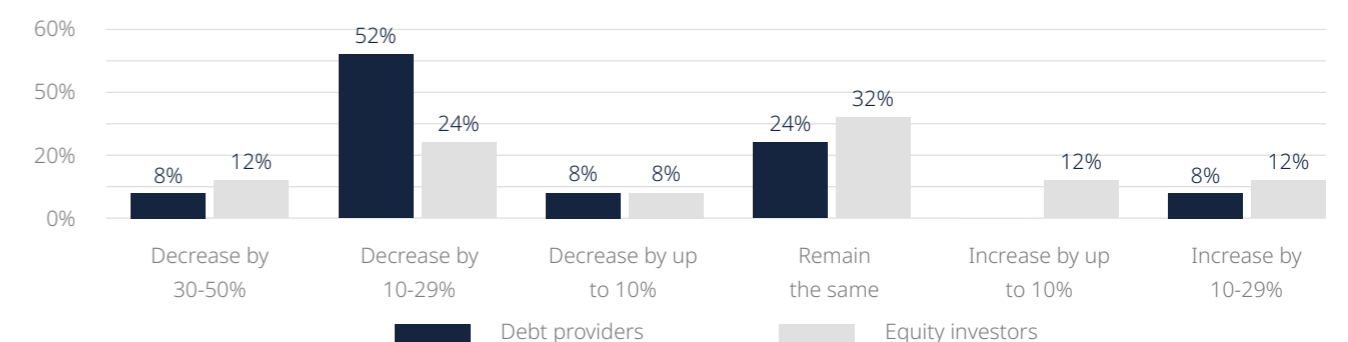


Figure 7: How many M&A deals in European operational offshore wind projects did your organisation [complete/finance] over the past 24 months?

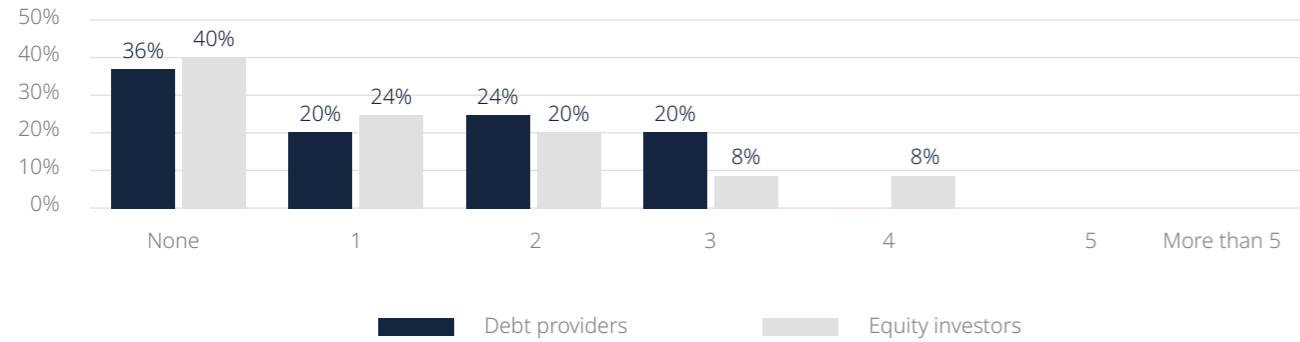


Figure 8: How many M&A deals in European operational offshore wind projects do you expect to [complete/finance] over the next 24 months?

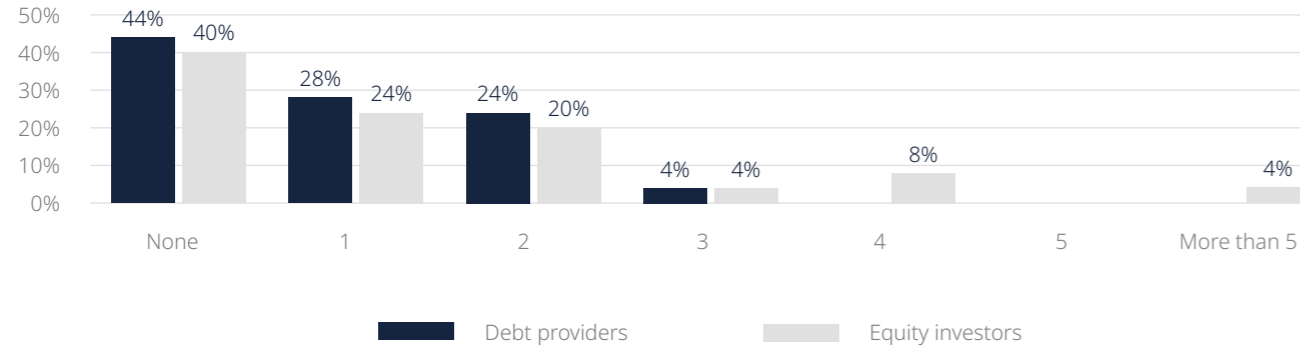


Figure 9: Equity investors

What approximate value of investment (including debt investment) did your organisation allocate to M&A deals in operational offshore wind projects based in Europe over the past 24 months?
(b) And what do you expect will be allocated over the next 24 months?

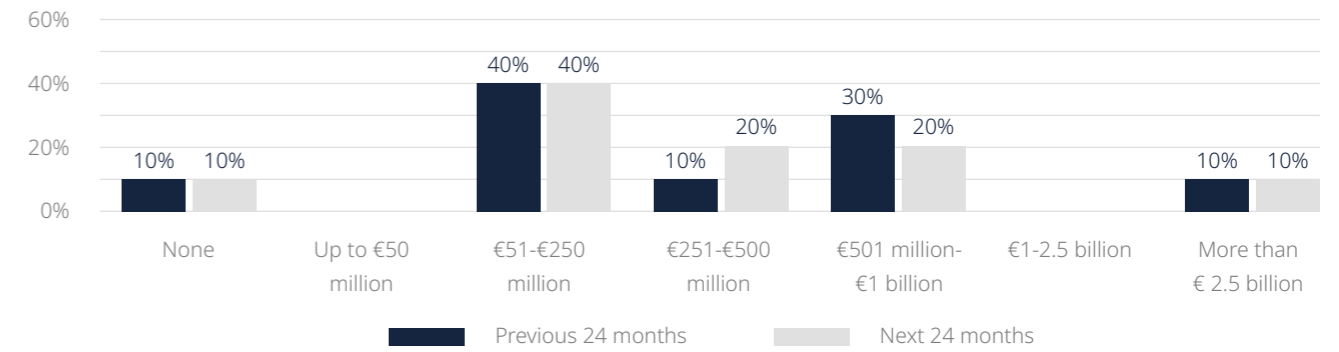


Figure 10: Debt providers

What approximate value of investment (including debt investment) did your organisation allocate to M&A deals in operational offshore wind projects based in Europe over the past 24 months?
(b) And what do you expect will be allocated over the next 24 months?

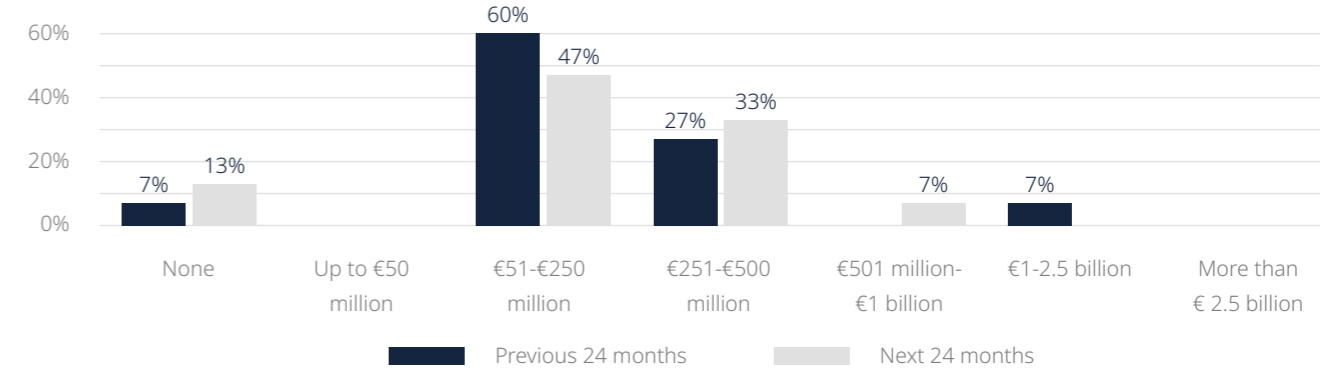
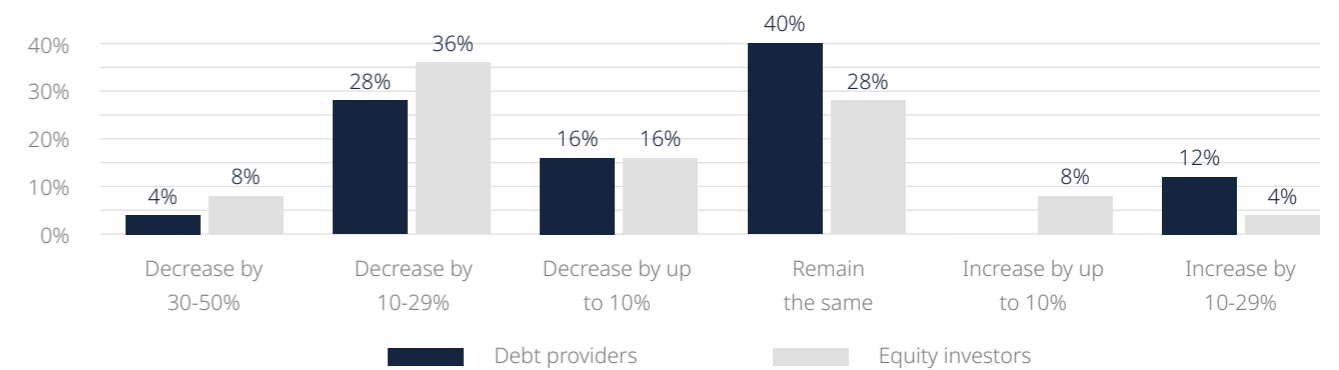


Figure 11: How do you expect the overall value of investment (including debt investment) for the acquisition of operational offshore wind projects based in Europe over the next 24 months will compare to that of the previous 24 months?



2. Choosing the investment

Equity investors set their sights on early-stage projects

Debt providers are a dominant force in Europe's offshore wind market – especially at the development stage of projects. However, the offshore sector is attracting increasing numbers of equity investors prepared to take early-stage risk.

“The rate of return for investments in the offshore wind space is perhaps slightly higher and more interesting compared to other renewable segments,” says Bounouara. *“So it’s still a bit more attractive to investors compared to other renewables.”*

Survey data shows that equity investors are active in both new build and secondary transactions. A majority (52%) were M&A investors in operational (brownfield) projects in their most recent investment, while 44% took development risk in a greenfield project (Figure 12).

By contrast, debt providers unsurprisingly focused almost exclusively on greenfield in their

most recent deal. None of the debt respondents in the survey are M&A investors in operational assets.

The trend towards equity investors targeting projects earlier in the construction phase looks likely to gain momentum, particularly as developers branch out into new and trickier geographies.

“You’ll have equity investors willing to get in at the very early stages in some of the new jurisdictions – particularly equity investors looking for higher yields. These projects will naturally have lower levels of commercial debt in them, increasing the potential for equity,” says Jennings.

Bankable geographies

Looking at the attractions of specific jurisdictions, the UK and Germany – Europe's offshore wind giants – stand out in terms of bankable investment opportunities (Figure 13). Germany takes the top spot, cited by 84% of equity investors and 64% of debt providers. The UK is also seen as highly bankable by equity investors (52%) although it is less popular with debt providers (36%).

France is a top choice for 48% of debt providers and 36% of equity investors. On the face of it, this is

surprising: France has yet to deploy any operational wind capacity and its history with offshore wind has been plagued by setbacks. However, 2019 looks to be a turning point. In June, the government announced plans to double its offshore wind target and more recently, the country's first offshore wind project reached financial close.

“Investors are expecting more projects and at a quicker pace,” says Bounouara. *“France has the advantage of starting later than everyone else, so people know how to deal with the risk associated with projects.”*

New build prospects

Germany stands out as the country expected to see the biggest growth in primary investment in offshore new build over the next two years – especially by equity investors (Figure 14). One factor likely to be giving heart to investors is the German government's recent decision to raise the 2030 target for offshore wind generation from 15GW to 20GW. Meanwhile, permitting problems for new onshore projects could be encouraging investors to look to offshore opportunities instead.

Turkey and Poland both achieve high rankings in the new-build league table. Turkey is highlighted by 44% of debt providers and 32% of equity investors, while Poland is

chosen by 44% of equity investors and 28% of debt providers.

Both Turkey and Poland are newcomers to offshore wind, so risks and rewards are amplified. *“For investors who think these are the next new markets with potential scale, it’s best to get in there early and take the benefit of the higher yields – some investors will go that route. Others will have lower demand requirements from a returns perspective and might wait until projects have been developed and look to come in later on,”* says Jennings.

Nearly a quarter (24%) of both debt providers and equity investors think France will see the biggest growth in primary investment. Meanwhile 20% highlight Spain, despite challenges posed by the depth of the seabed and concerns about coastal amenity.

Figure 12: Which of the following best describes your role in your most recent European offshore wind project investment?

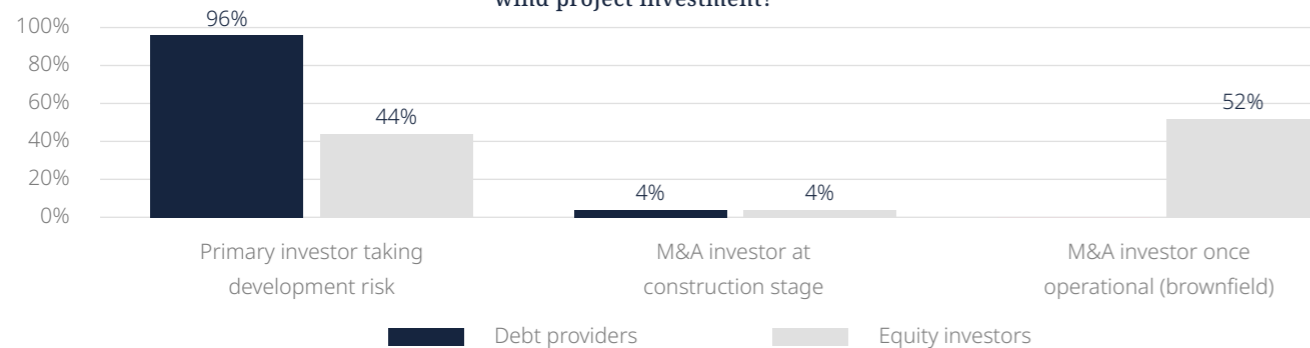


Figure 13: Which European countries do you think will offer the most “bankable” investment opportunities for new offshore wind project developments over the next 24 months? (Top 3 answers shown)

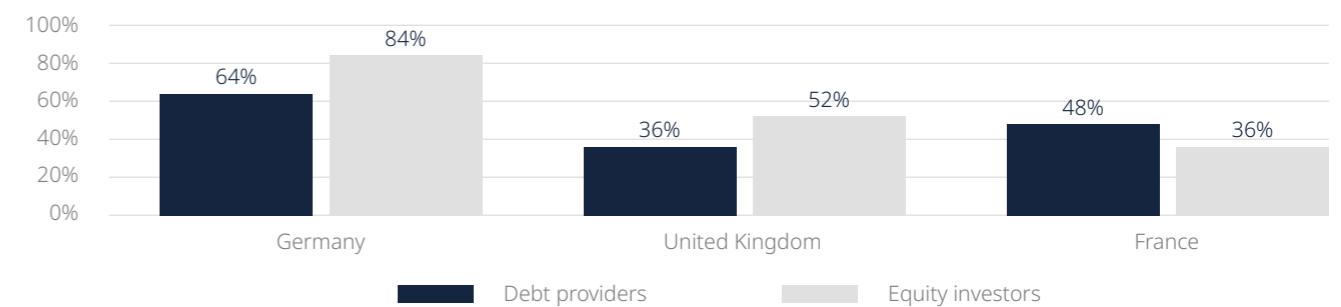
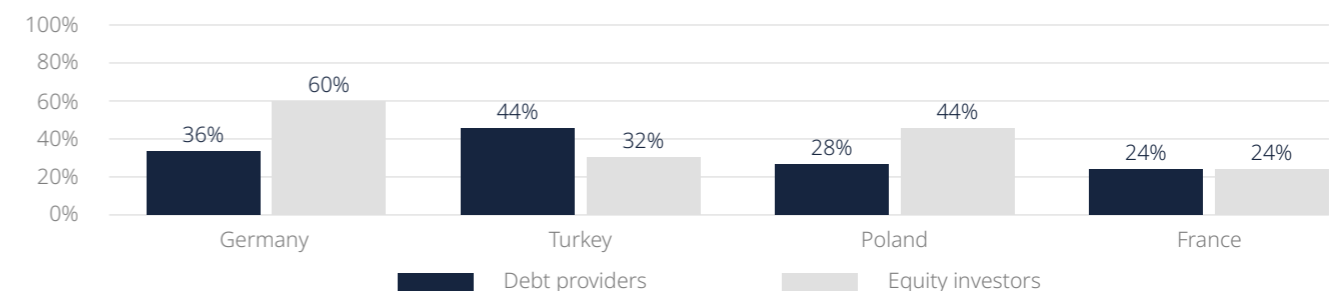


Figure 14: Which European countries do you think will see the biggest growth in primary investment for new offshore wind project developments over the next two years? (Top 4 answers shown)



M&A opportunities

Turning to M&A growth prospects, Germany again tops the list: 88% of equity investors and 84% of debt providers expect Germany to see the biggest growth in M&A investment over the next two years (Figure 15). Given the maturity of Germany's offshore wind sector and its size – the country accounts for about 40% of all offshore capacity – brisk secondary dealmaking is only to be expected.

Prominence is given to France, highlighted by 40% of equity

investors and 32% of debt providers. As noted above, France does not yet have any operational offshore windfarms. Investors are clearly anticipating a high degree of early-stage churn once projects get underway and are keen to acquire early footholds.

The UK makes a relatively poor showing when it comes to M&A growth expectations, despite being the world leader in offshore wind. Just 24% of equity investors and 36% of debt providers expect to see the biggest growth in M&A transactions taking place in the UK. Brexit uncertainty is likely to be a factor, although it is interesting to note that the UK offshore sector has proved resilient to date.

Global potential

When it comes to investing outside of Europe, a majority of respondents see significant potential in the offshore wind markets in South Korea (74%), Japan (70%) and Taiwan (56%). However, it's the USA that stands out the most amongst respondents, with 92% saying they see significant investment potential for offshore wind projects in the country, and a majority of 54% who say that their organisation is either certain or highly likely to be investing in offshore wind projects over the next 24 months there (Figures 16 and 17).



Figure 15: Which European countries do you think will see the biggest growth in M&A investment in offshore wind projects over the next two years? (Top 4 answers shown)

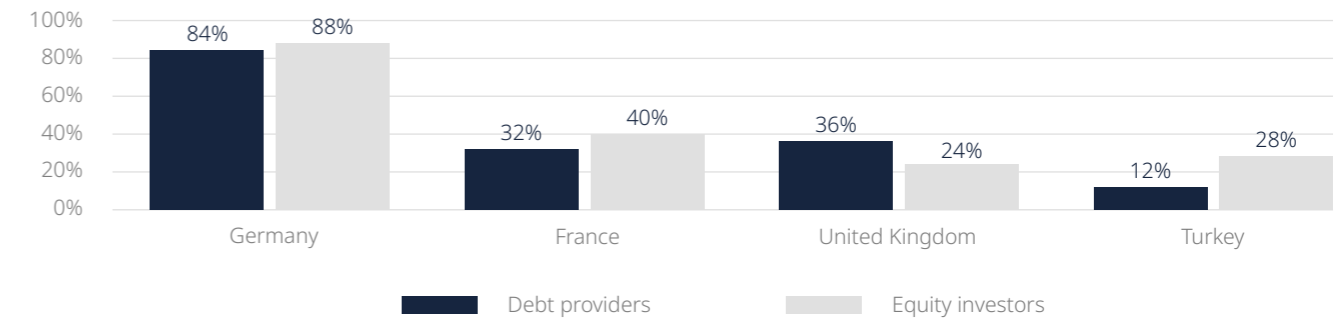


Figure 16: Rate the following non-European countries on the potential they present to cross-border investors of offshore wind projects

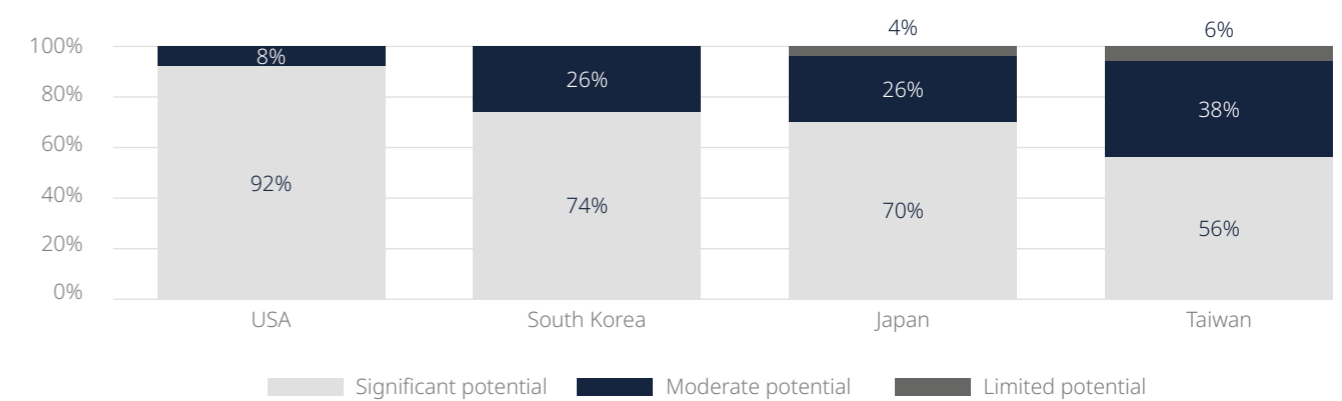
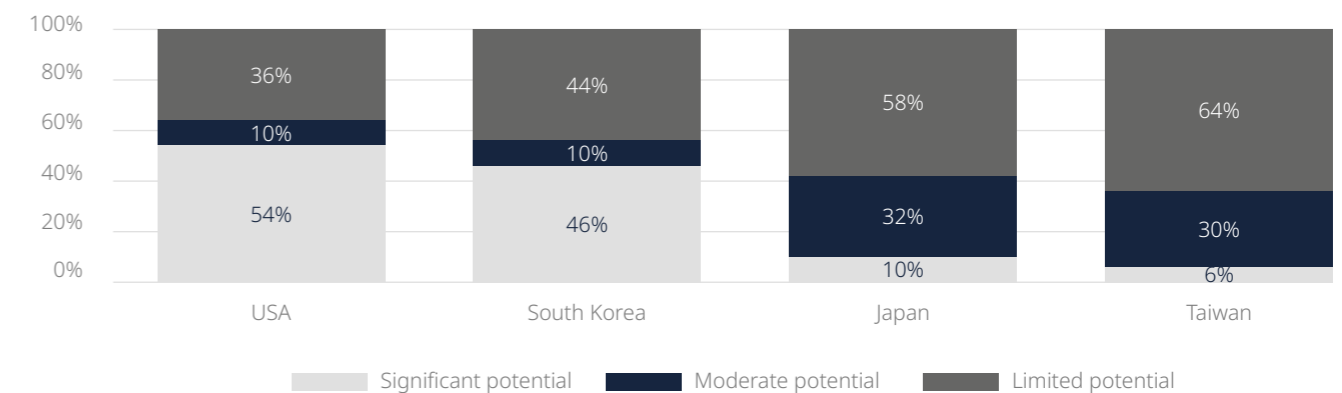


Figure 17: What is the likelihood that your organisation will be investing in offshore wind projects in these countries over the next 24 months?



3. Industry expectations and views

Investor appetites are evolving – and so are the challenges facing the sector. Falling costs, proven technology and impeccable green credentials make offshore wind an increasingly tempting target for mainstream investors. Despite this, respondents expect sector experts – developers, utilities and specialist funds – to remain a dominant force, at least over the next two years.

Equity investor profiles

Looking at greenfield first, renewable energy operators/developers are expected to be the biggest investors in pre-operational projects by 80% of equity investors and 76% of debt providers (Figure 18). Specialist renewable/energy investment funds come next, cited by 48% of equity investors and 40% of debt providers. Banks and financial institutions (many of whom have developed sector expertise over the past decade) are also seen as likely candidates.

Sector specialists are also expected to dominate in the M&A arena (Figure 19). Again, renewable operators/developers take the top spot, cited by 96%

of equity investors and 100% of debt providers. Energy/utilities corporates are next, mentioned by 56% of debt providers and 32% of equity investors.

Beyond this, the picture is fragmented with respondents mixed on who will provide the highest level of investment. Pension funds make a surprisingly small showing: many invest indirectly via listed and private market infrastructure managers, which could be why so few respondents mention them.

IRR outlook

The IRR of offshore wind is being squeezed as competitive bidding pushes the strike price of projects ever lower. Respondents' expected IRR for equity investment in pre-operational developments in 2019 is notably lower than the average rates stated by them for 2018 (Figure 20). Equity investors expect an average

IRR of 8.4% for 2019 (9.3% in 2018), while debt providers anticipate an IRR of 7.8% for 2019 (8.4% in 2018).

“If you want to have a higher IRR, you need to look at offshore wind in emerging markets or new markets like Taiwan,” says Bounouara. *“Those will have a higher IRR compared to the European market, which is more mature now.”*

Figure 18: Over the next 24 months, which type of equity investor do you think will provide the biggest value of investment in... (a) pre-operational offshore wind developments in Europe? (Select two)

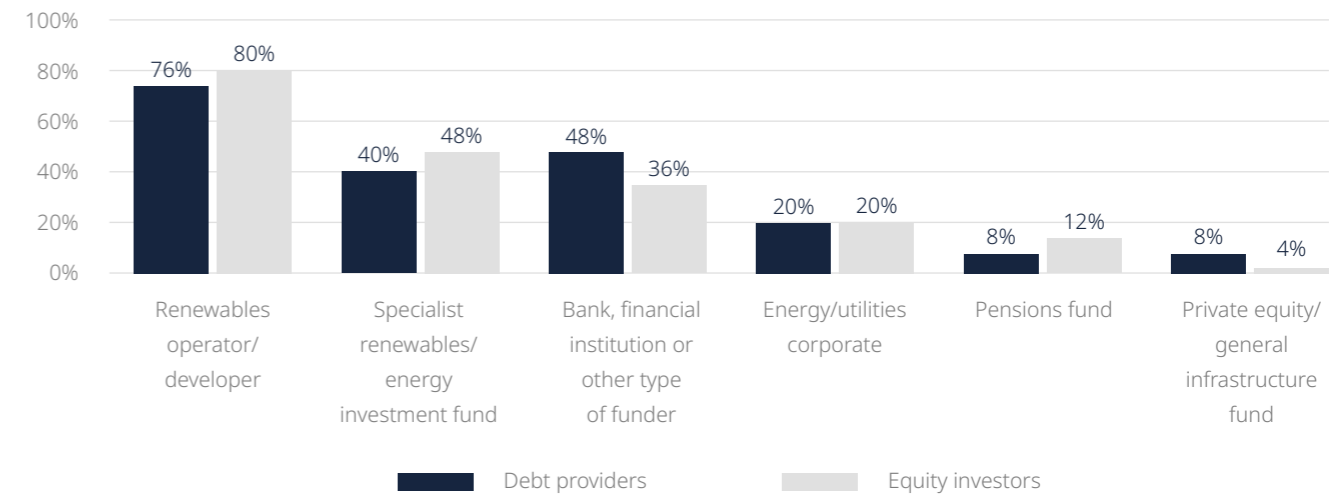


Figure 19: Over the next 24 months, which type of equity investor do you think will provide the biggest value of investment in... (b) M&A in operational offshore wind projects in Europe? (Select two)

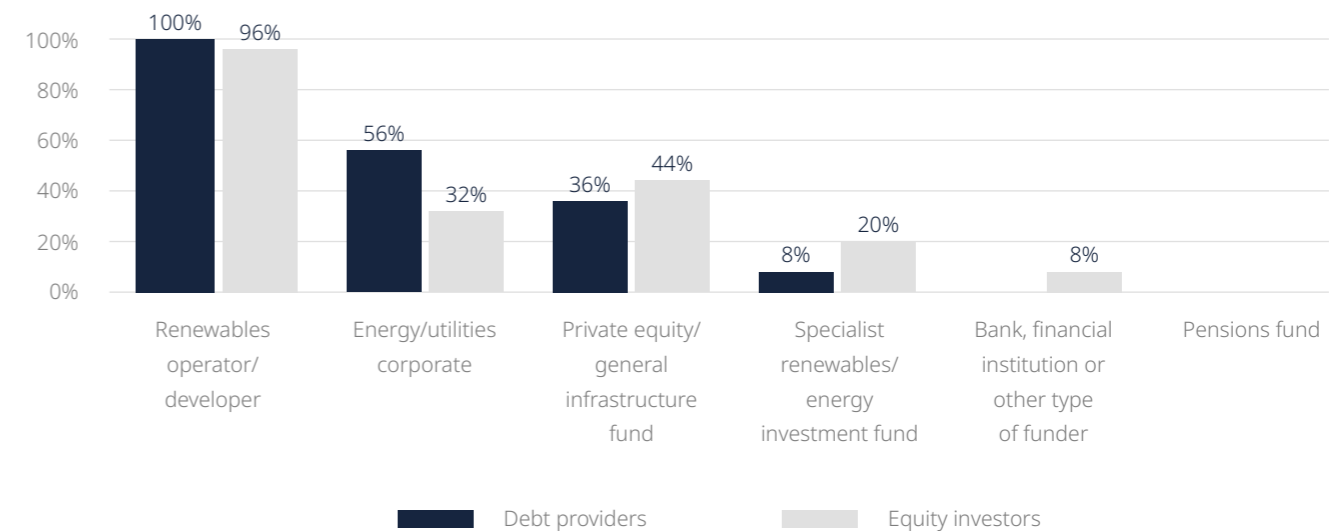
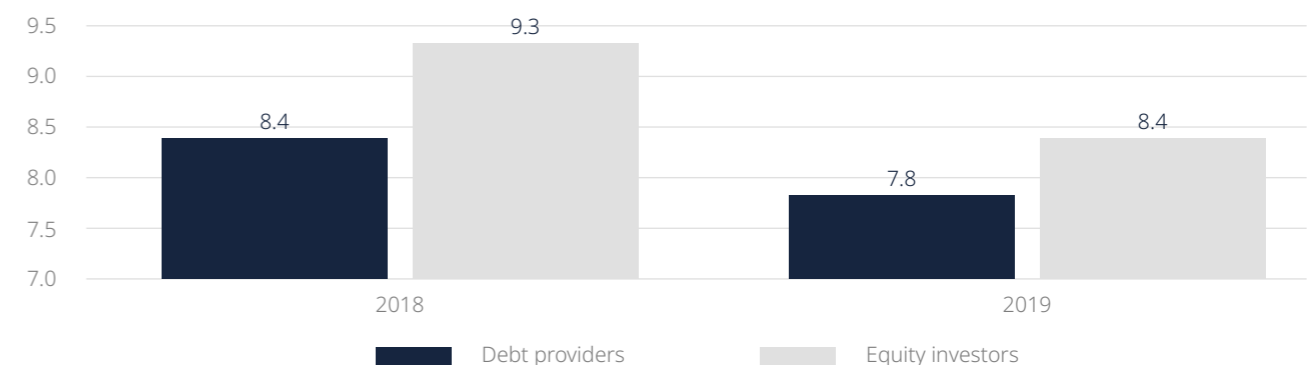


Figure 20: On average, what do you think the IRR was for equity investors of pre-operational European offshore wind developments in 2018? And what do you think it will be in 2019? (Mean of all responses shown)



Regulation: challenges in sight

Most debt providers (80%) and equity investors (72%) expect policies and regulation surrounding offshore wind to become more challenging over the next two years. Moreover, 44% of debt providers expect regulation will become significantly more challenging (Figure 21).

Speaking on behalf of their organisations, more than half of respondents (52% each) say the biggest obstacles to investing in offshore wind is the complexity and restrictiveness of policies and regulation (Figure 24). Political and economic uncertainty (cited by 40% each) is also a concern.

Brexit is also playing on investors' minds. All respondents believe that uncertainty surrounding Brexit has negatively impacted the offshore wind markets in the UK and Europe since the referendum in June 2016, with 40% of debt providers going as far as to say that they believe the negative impact has been significant.

Long-term revenue and IRR stability is highlighted as an obstacle by 36% of equity investors and 44% of debt providers. Decreasing subsidies are likely to be a factor. The outcome of the UK's latest offshore wind auctions underlines the direction of travel: the winning bids were so low that subsidies may not be needed.

"Given market developments, governments are questioning whether they will need to subsidise offshore wind in the future," says Luther-Jones. **"The industry will increasingly take on more market risk as it moves towards subsidy-free projects."**

Even with subsidies, hazards remain – particularly if developers bid low. **"Auction prices are falling quite substantially. Bidders are building in future technology improvements that haven't happened yet. So there is still an element of risk,"** says Luther-Jones.

Staying with subsidies, 92% of equity investors and 88% of debt providers say that the offshore wind farm they most recently invested in or financed applied for government subsidies, such as contract for difference (CFD) payments (Figure 23). However, only about half

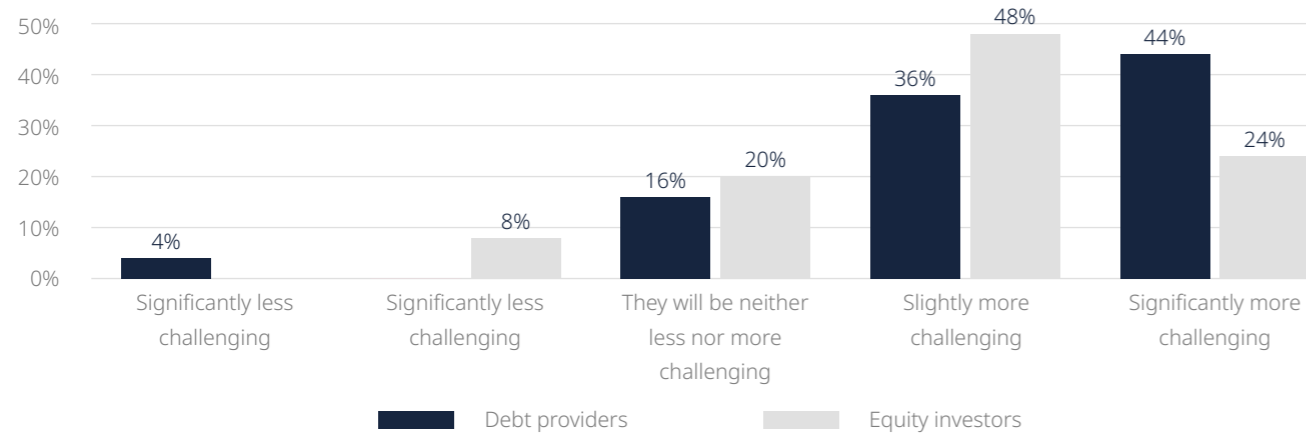
of these respondents say their applications were successful.

All respondents agree that the decreased cost of offshore wind technology over the past five years has helped to offset declining government subsidies. Indeed, 40% go as far as to say that the lower cost of technology has played an essential role in helping the sector remain an attractive investment prospect (Figure 26).

Looking ahead, investors are unanimous in their opinion that costs will fall by at least 6% over the next two years. Debt providers (60%) and equity investors (80%) expect offshore wind technology start-up costs will come down by 11-15% over the next 24 months, while a minority predict reductions of 16-20% (Figure 27).

Reasons for lower costs include bigger turbines (15MW turbines are now on the cards), installation efficiency improvements and the opportunity (in some cases) to achieve cost efficiencies by extending existing wind farms, rather than starting from scratch.

Figure 21: In general, do you think policies and regulation in Europe surrounding offshore wind projects will become more or less challenging over the next 24 months?



The road to subsidy-free

Nearly three-quarters of respondents agree that there will be significant growth in the number of subsidy-free projects (Figure 28). This proportion is surprisingly high given the small number of such projects awarded so far. On the other hand, it confirms that investors are thinking positively

about the shift towards market-oriented support mechanisms.

Financing new offshore wind on the basis of merchant risk alone is unlikely to appeal to most investors, certainly at current wholesale prices. So it's not surprising that corporate power purchase agreements (PPAs) are seen as attractive. Debt providers (84%) and equity investors (88%) expect the total contracted capacity of corporate PPAs in two years' time will be higher than that

in 2018, with over a third of equity investors expecting the relative increase in contracted capacity to be significant (Figure 29).

The shift to a fewer subsidies industry will mean new challenges for investors. **"Equity has varying degrees of risk it can take depending on the risk appetite of investors,"** says Bounouara. **"Whereas from a debt perspective, you probably have less flexibility to fund projects."**

Figure 22: In your opinion, has Brexit uncertainty negatively impacted the offshore wind development and acquisition market in the UK and Europe since June 2016?

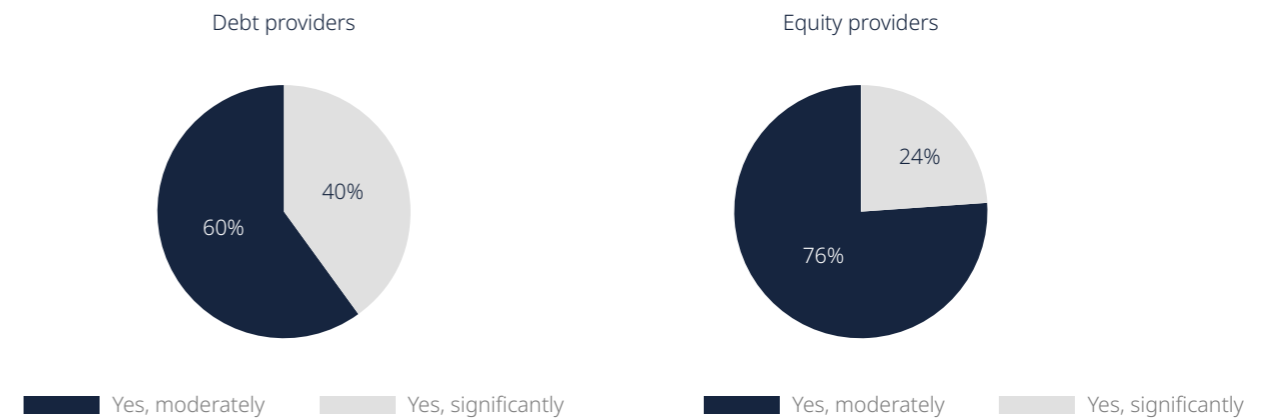


Figure 23: Did the offshore wind project you most recently [invested in/financed] apply for government subsidies (e.g. contract for difference payments)?

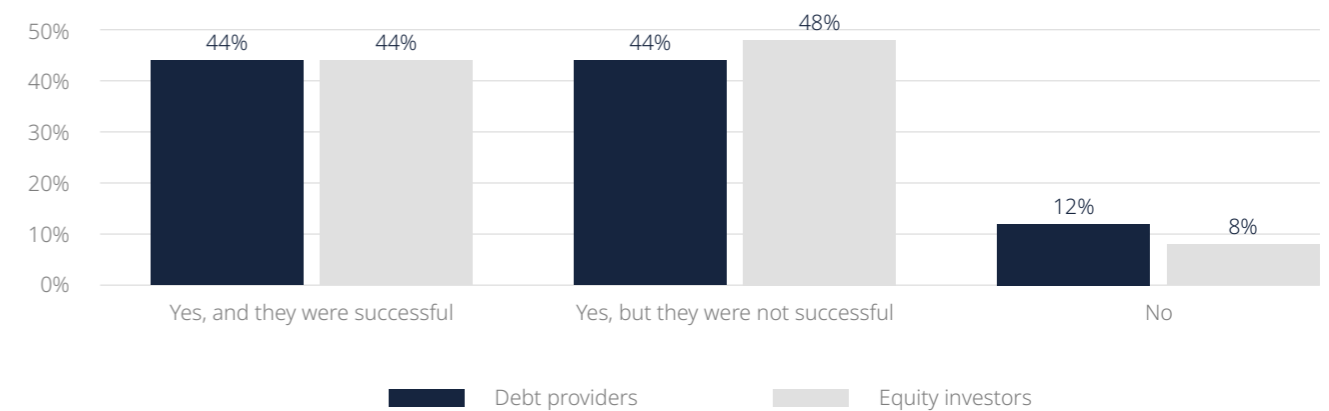


Figure 24: What do you consider to be the biggest obstacles to investing in offshore wind projects in Europe for.... (a) your organisation? (Select top three)

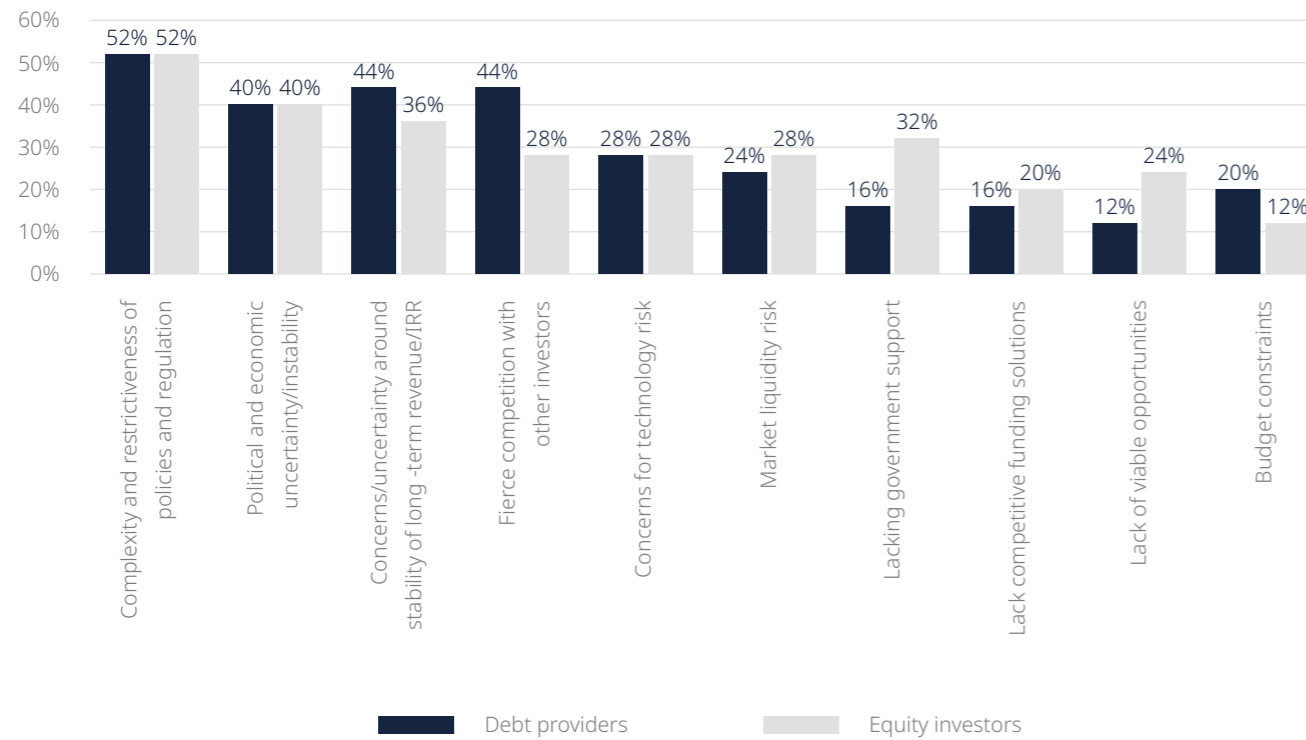
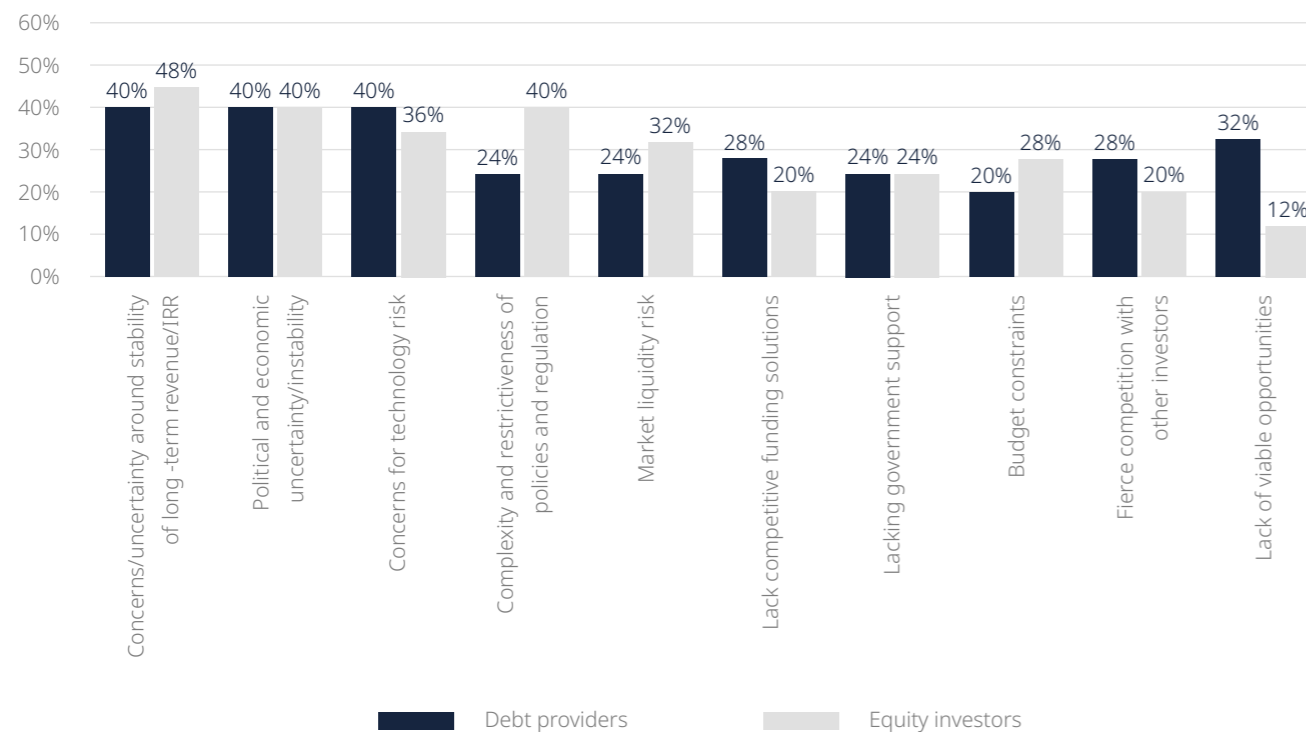


Figure 25: What do you consider to be the biggest obstacles to investing in offshore wind projects in Europe for.... (b) investors in general? (Select top three)



On the horizon

New technologies will be needed if subsidy-free is to become a reality. Floating offshore wind (FOW) is likely to be one of them.

Floating windfarms can be sited in deeper waters further out to sea where wind speeds are higher. This makes it especially interesting for countries with deep territorial waters and significant wind resources. Among these are France, Ireland, Portugal, Spain and the UK.

Majorities of debt providers (92%) and equity investors (84%) think that this fast-emerging technology will begin to dominate offshore wind projects ten years from now (Figure 30).

Figure 26: To what extent do you believe that the decreased cost of offshore wind technology over the past 5 years has helped to offset the decreased revenue in government subsidies over the same period to help the sector remain an attractive investment prospect

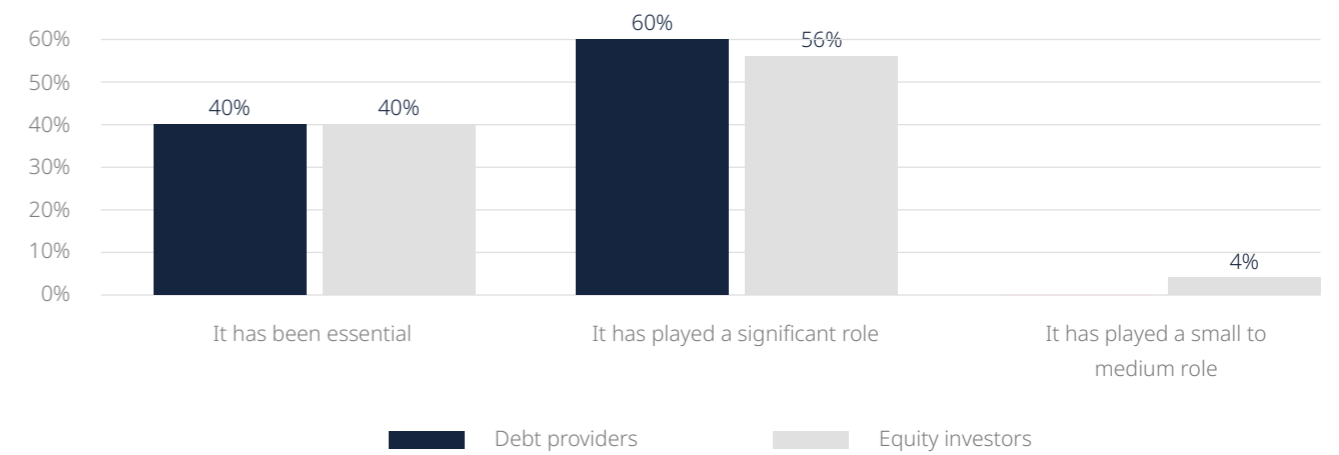


Figure 27: Do you expect offshore wind technology start-up costs to reduce further over the next 24 months?

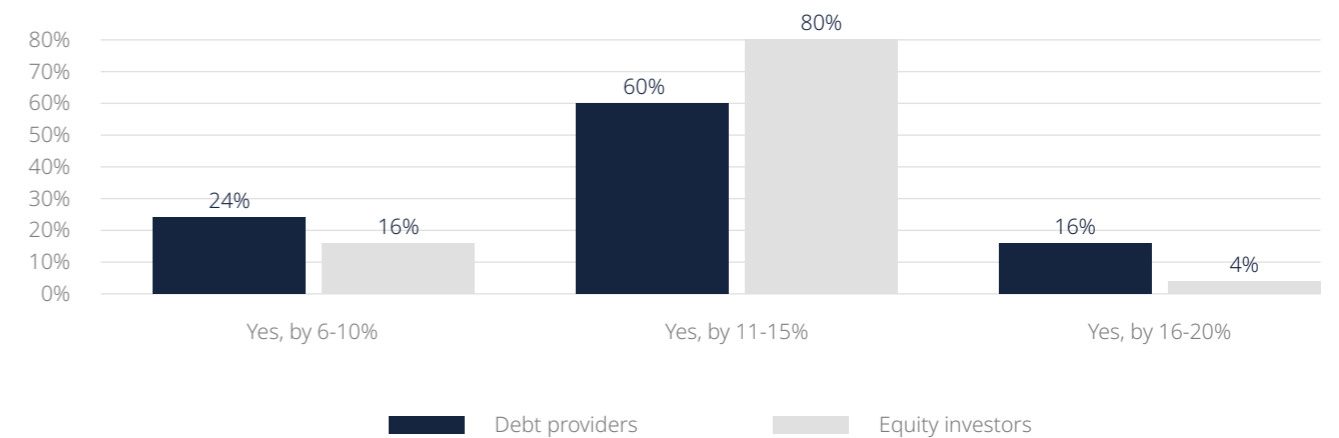


Figure 28: Do you agree or disagree that there will be significant growth in the number of subsidy-free offshore wind projects in Europe over the next 24 months?

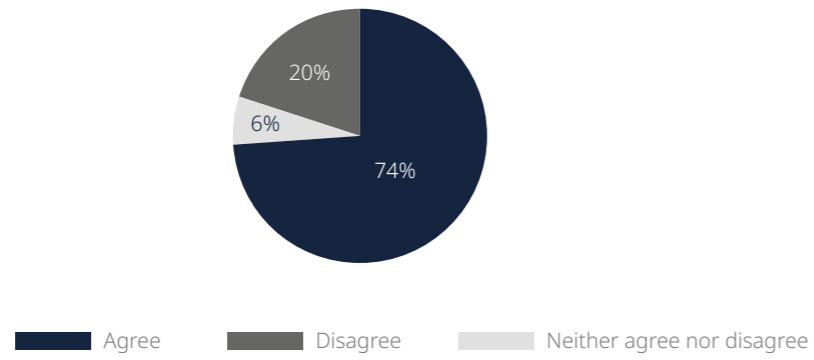


Figure 29: How do you expect contracted capacity of corporate PPAs with offshore wind farms in Europe in two years' time will compare with those in 2018?

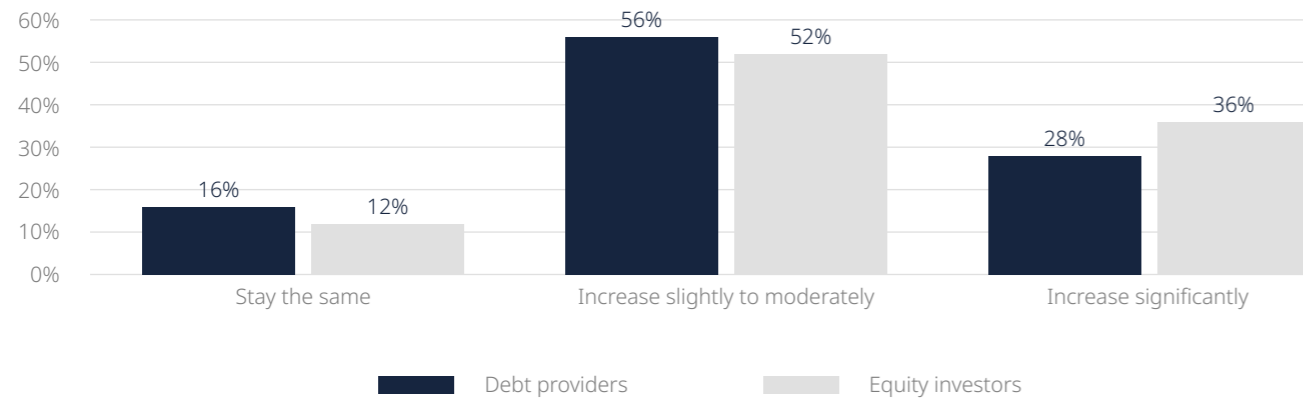
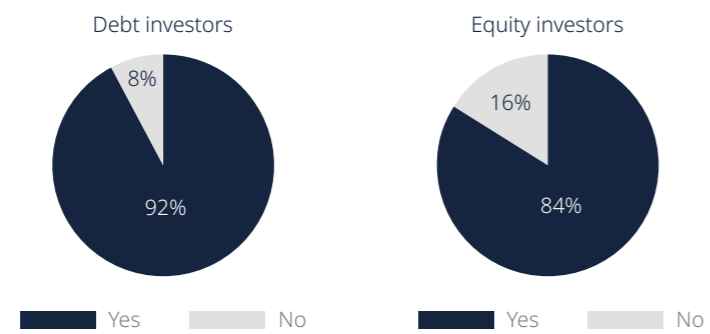


Figure 30: Do you think that in 10 years' time, floating offshore wind technology will begin to dominate Europe's offshore wind industry in terms of new projects?



Conclusion

Offshore wind in Europe has come a long way in a short space of time. With more than 18GW of zero-carbon power deployed in little over a decade – enough to power more than 20 million homes – the success of offshore wind has surprised even sceptics.

But big challenges lie ahead. The shift from subsidies to merchant risk and PPAs will clearly be a huge change for the sector. Yet developers in the Netherlands and the UK have recently shown that they are ready to embrace subsidy-free projects.

Subsidised or unsubsidised, the outlook for the sector is overwhelmingly positive. Globally, research from the International Energy Agency suggests that offshore wind energy has the capacity to increase 15-fold by 2040 and become a US\$1 trillion business.

In Europe, only a fraction of the offshore resource potential has so far been tapped. Respondents in this survey point to Turkey and Poland as promising candidates for offshore wind expansion. Beyond this lies a vast global market that encompasses the USA, South Korea, Japan and Taiwan.

Contact

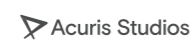
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Moreover, technological innovation will continue to drive down the levelised cost of energy. The next generation of turbines, for example, are likely to have a capacity of 15MW – twice the current level. The development of floating offshore wind, meanwhile, will allow developers to push out into deeper waters than ever before.

Underpinning this are constant improvements in the efficiency of supply chains, the benefits of accumulated expertise and – above all – high levels of equity and debt liquidity. All of this bodes well for the future offshore wind.



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