



Financing and investment trends

The European wind industry in 2019

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This report summarises financing activity in the European wind sector from 1 January 2019 to 31 December 2019. Unless stated otherwise this includes the then 28 EU Member States and the following countries: Belarus, Georgia, Kosovo, Montenegro, Norway, Russia, Serbia, Switzerland, Turkey and Ukraine.

It includes investment figures for the construction of new wind farms, refinancing transactions for wind farms under construction or operation, project acquisition activity, company acquisitions and capital market financing. Rounding of figures is at the discretion of the author.

New asset figures pre-2019 have been restated from previous publications.

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TEXT AND ANALYSIS:

WindEurope Business Intelligence

Guy Brindley

EDITORS:

Daniel Fraile, WindEurope

Colin Walsh, WindEurope

DESIGN:

Lin van de Velde, Drukvorm

INVESTMENT DATA:

Clean Energy Pipeline

IJ Global

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PHOTO COVER:

Courtesy of Philipp Grytz

MORE INFORMATION:

policy@windeurope.org

+32 2 213 18 68

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EXECUTIVE SUMMARY

In 2019 the wind energy industry invested €52bn in Europe, €19bn of which was for the financing of new wind energy projects. The remaining €33bn included investments in new assets, refinancing transactions, mergers and acquisitions at project and corporate level, public market transactions and raised private equity.

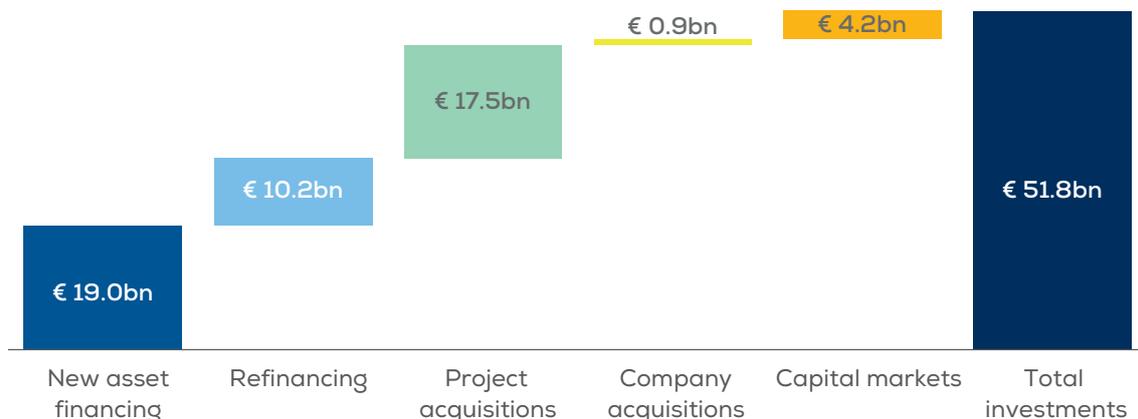
Investments in new onshore wind farms alone were €13.1bn which will finance the construction of 10.3 GW of new projects. This was the second highest capacity financed in a year on record.

Governments and policy makers see the technology as a major driver to transition from fossil fuels and conventional power assets. Onshore wind is a mature and

proven technology attracting a wide variety of investors. Cost-competitiveness and reduced risk perceptions in offshore wind have attracted domestic and international investors looking to diversify their portfolios and align with their sustainability targets.

Wind energy projects make an attractive investment and in the long-term there should be plenty of capital available to finance them. In the short-term the global economic situation resulting from the COVID-19 pandemic is uncertain and delays to the financing of new farms are inevitable. It is important that EU and national economic recovery plans are aligned with the European Green Deal and as far as possible limit any delay to the transition to a low-carbon society.

FIGURE 1
European wind energy investments in 2019 per asset class (€bn)



Source: WindEurope

2019 annual figures

- Europe raised a total of €51.8bn for the construction of new wind farms, refinancing operations, project and company acquisitions as well as public market fundraising.
- Total investments in wind energy were comparable with the previous 3 years. However, 2019 saw approximately €5bn less investment than 2018.
- €19bn was raised for the construction of new wind farms in Europe, 24% less than in 2018.
- New capacity financed (11.7 GW) was also comparable with recent years, but significantly less than the record 16 GW financed in 2018.
- Investment in new onshore wind projects were solid with €13.1bn, 68% of the total investments in wind power in Europe and the second highest capacity financed in a year with 10.3 GW.
- Investments in new offshore wind farms totalled €6.1bn (including €0.5bn floating offshore). This was the lowest amount invested and capacity financed in a year since 2012.
- There were over 130 Final Investment Decisions (FIDs), including just 4 offshore wind projects, announced in 25 countries.
- Project acquisitions, where investors purchase (a share of) a wind energy project, were €17.5bn, slightly down on the €19.6bn in 2018.
- Banks extended €20.3bn in non-recourse debt for the construction and refinancing of wind farms, continuing the high level of activity seen since 2016.
- Non-recourse debt accounted for 49% of all investment in new onshore and 77% of all investment in new offshore wind farms, highlighting the importance of banks in wind energy financing.
- Wind energy was the largest investment opportunity in the power sector in Europe.

Country highlights

- Spain financed the most wind energy in 2019, both in terms of capacity financed and amount invested. 28 onshore projects reached final investment decision (FID) with an average investment of €1m per MW.
- Northern and Western Europe still hold the bulk of new investments with €11.5bn, 60% of the total capital raised for the construction of new wind farms in Europe.
- France saw its first FID for an offshore wind project for the 480 MW Saint Nazaire offshore wind farm.
- Germany overtook the UK to have the greatest project acquisition volumes in 2019 with €4.9bn changing hands (1.7 GW). 90% of the investment was in offshore wind. The UK was the second largest market for project acquisitions with €3.8bn (1.2 GW) of transactions taking place (68% offshore wind projects).
- Investments in South East Europe (SEE) remain low. With a total of €0.6bn, the SEE region represents only 3% of the total new assets financed in Europe, down from 4% in 2018 and 16% in 2017.

Investment trends

- In the medium-term, low interest rate levels are likely to remain and the large number of lenders active in the market should provide favourable conditions for raising debt.
- In the short-term uncertainties from the global COVID-19 pandemic is likely to lead to reduced liquidity in debt markets as lenders focus on managing their liquidity and will be less keen to lend more capital.
- Debt remains instrumental in wind energy financing with non-recourse debt providing 58% of all capital raised for new wind energy projects.
- 2019 was a record year for the refinancing of onshore wind farms with €6.1bn of activity. Overall, 2019 saw the second highest amount of refinancing activity (after 2018).

- 71% of the capital raised for new wind energy projects was on a project finance basis from approximately half of the projects reaching FID in 2019.
- Interest rate premiums continue to fall for offshore wind financing.
- The sustainable finance framework is being developed to reorient capital flows towards sustainable activities and investments.
- The two-sided Contract for Difference (CfD) provides revenue stabilisation, attracting cheaper financing and facilitating the build-out of renewable power at the lowest cost to society.

Policy highlights

- The European Green Deal will add some concrete measures (i.e. legislation and funding) behind Europe's ambition to become the first carbon-neutral continent by 2050.
- The European Climate Law will enshrine carbon neutrality by 2050 into law.
- The Sustainable Europe Investment Plan, the investment pillar of the Green Deal, will aim to mobilise at least €1tn of public and private capital over the next decade.
- The European Investment Bank (EIB) is set to become Europe's Climate Bank, ending financing for all unabated fossil fuels from 2021 and committing 50% of its financing to climate action and sustainability by 2025.

Investment Outlook

- Interest rates are set to remain low in 2020. Under normal circumstances, this would mean it is a good time to borrow for long-term investments. The depth of the economic fall-out from the COVID-19 pandemic will determine how quickly markets return to some sort of normality.
- Global economic growth is likely to be weak due to uncertainties arising from COVID-19 and international trade wars, in particular.
- In the longer term, growing merchant risk exposure in wind power projects will likely change the landscape and investor profiles in wind energy financing.

WIND ENERGY FINANCE BASICS

Debt and equity

The two main sources of capital in wind energy finance in Europe have been sponsor equity and debt. Sponsor equity refers to a traditional equity investor, typically the owner(s) of the project and/or the developer. Equity capital faces the highest risk in the project, because the owners are the party responsible for bringing the initial concept idea through development, construction and commercial operation. In addition, the owners are also the last investors to be liquidated in case of a project default. Because of the tough requirements that equity capital faces, the returns are also higher.

Debt refers to a contractually-arranged loan that must be repaid by the borrower. The lender has no ownership shares in the company or project. However, it has some collateral coverage as a financial protection in case the project is unable to meet the debt repayment schedule. In the case of project default, the lenders are the first party to be liquidated, before equity-type investors. As such, debt is generally considered a lower-risk investment and therefore comes with lower-cost financing compared to equity.

There are two major types of debt in wind energy finance: construction debt and refinancing debt. Construction debt is raised for the purpose of financing new assets. Refinancing debt is raised for the purpose of financing construction debt at a longer maturity and/or lower interest rate.

Corporate finance and project finance

The proportion of debt and equity in a project, as well as the way they are used, will determine the capital or financial structure of the project. There are two types of financial structures: corporate finance and project finance. In a corporate finance structure, investments are carried on the balance sheet of the owners and project sponsors. Debt is raised at corporate level, with the lenders having recourse to all the assets of the company to liquidate a non-performing project. The project management and many of the contractual obligations are internalised with the owners and project sponsors. Corporate finance is therefore quicker and usually less expensive than project finance.

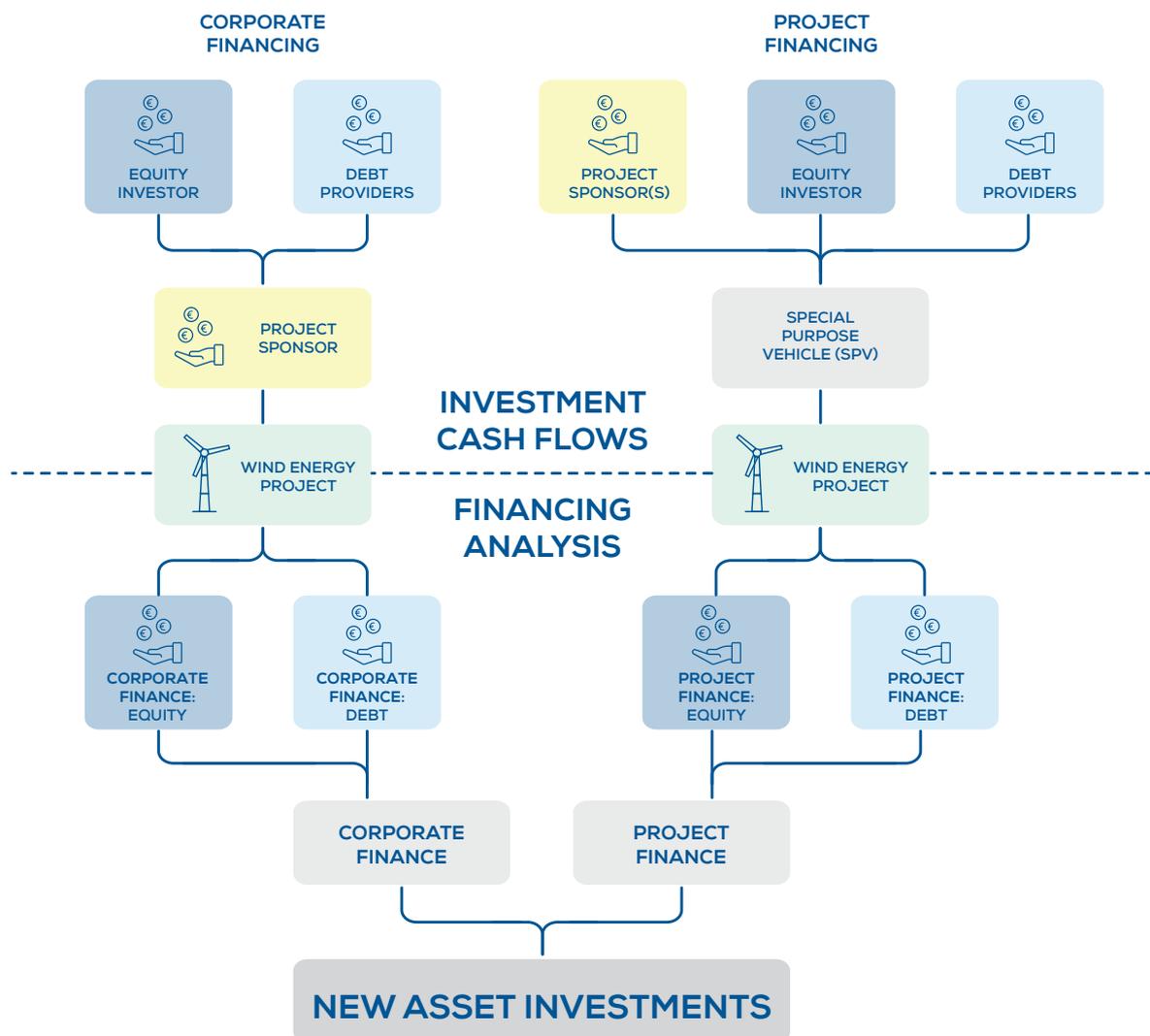
In a project finance structure, typically called non-recourse finance, the investment is carried off the balance sheet of the original owners and project sponsors. The investment or the project is turned into a separate business entity called a Special Purpose Vehicle (SPV) with its own management team and financial reporting, capable of raising debt on its own. Because debt is raised at project level, the lenders do not have recourse to the company assets of the owners and project sponsors in cases of a project default. Due to increased contractual obligations and a more sophisticated risk management structure, project finance can be more expensive and lengthier to finalise than corporate finance.

Debt-to-equity ratios in a project finance transaction may vary considerably depending on the project specifics, availability of capital and risk profile of the project owners. For wind projects they range between 70-80% debt and 20-30% equity.

A company's capital structure will be determined by its particular risk profile, size and industry sector. Power producers and utilities with a large balance sheet will opt for a corporate finance structure and bring the project through construction as a single player. Fundraising will occur at corporate level through debt and equity vehicles alike.

Unlike utilities, independent power producers with smaller balance sheets and those companies whose primary business is not wind energy have better project finance capabilities. In a project finance structure, partnerships are key from a very early stage. Fundraising will occur at project level, through debt and equity vehicles alike. Project owners will need to form consortia to provide the required equity whereas lenders will come together to provide syndicated project loans on the debt side.

FIGURE 2
Corporate Finance vs. Project Finance



Source: WindEurope

Raising debt and equity

The project owners and sponsors can raise capital for project development from different sources. These may include own-balance sheet financing, external private investors, funding from commercial banks and public capital markets. The latter in particular has become more prominent for raising both debt and equity in wind energy financing.

Debt is usually raised through the issuance of bonds either at corporate or project level. Where a bond is issued at corporate level, the proceedings go for the financing of a portfolio of projects. The bond can carry the 'green' label when the portfolio of projects it is financing is made exclusively of renewable energy investments. Where the bond is issued at project level, the proceedings are used for the specific renewable energy project and are therefore 'green'. Project bonds are issued on behalf of the SPV and are usually part of a non-recourse, project finance structure.

A bond is considered investment grade if its credit rating is a minimum of BBB- by Standard & Poor's or a minimum of Baa3 by Moody's. Investment grade bonds are considered by rating agencies as likely to meet payment obligations for investors.

Capital availability for wind power projects

The financial markets have supported the growth of the wind sector with a strong liquidity on both debt and equity. The financing conditions of low interest rates, cost improvements and further trust gained in the technology have all contributed to a healthy deal flow of projects.

Debt liquidity has been available from construction phase with new financing and refinancing transactions in major markets. Lenders include a variety of bank and non-bank institutions such as Export Credit Agencies (ECAs). Multilateral Development Banks (MDBs) and other International Financial Institutions (IFIs) have also provided debt liquidity where commercial bank financing has not been available. International banks have also strengthened their presence in the European wind sector and introduced more competition to the sector. Japanese banks, driven by a prolonged low-interest-rate environment in their domestic market, feature predominantly in the top lending institutions for European wind power projects.

On the equity side, institutional investors are also bidding more aggressively for wind assets. Interest in the technology has picked up significantly from both institutional and strategic investors who are now looking at wind projects for steady, predictable returns to meet long-dated liabilities. Much like with the banks, investor appetite for the technology applies to both greenfield and existing assets. However, as confidence grows in the sector and a positive track record continues, investors are also targeting more greenfield projects earlier in the construction phase.

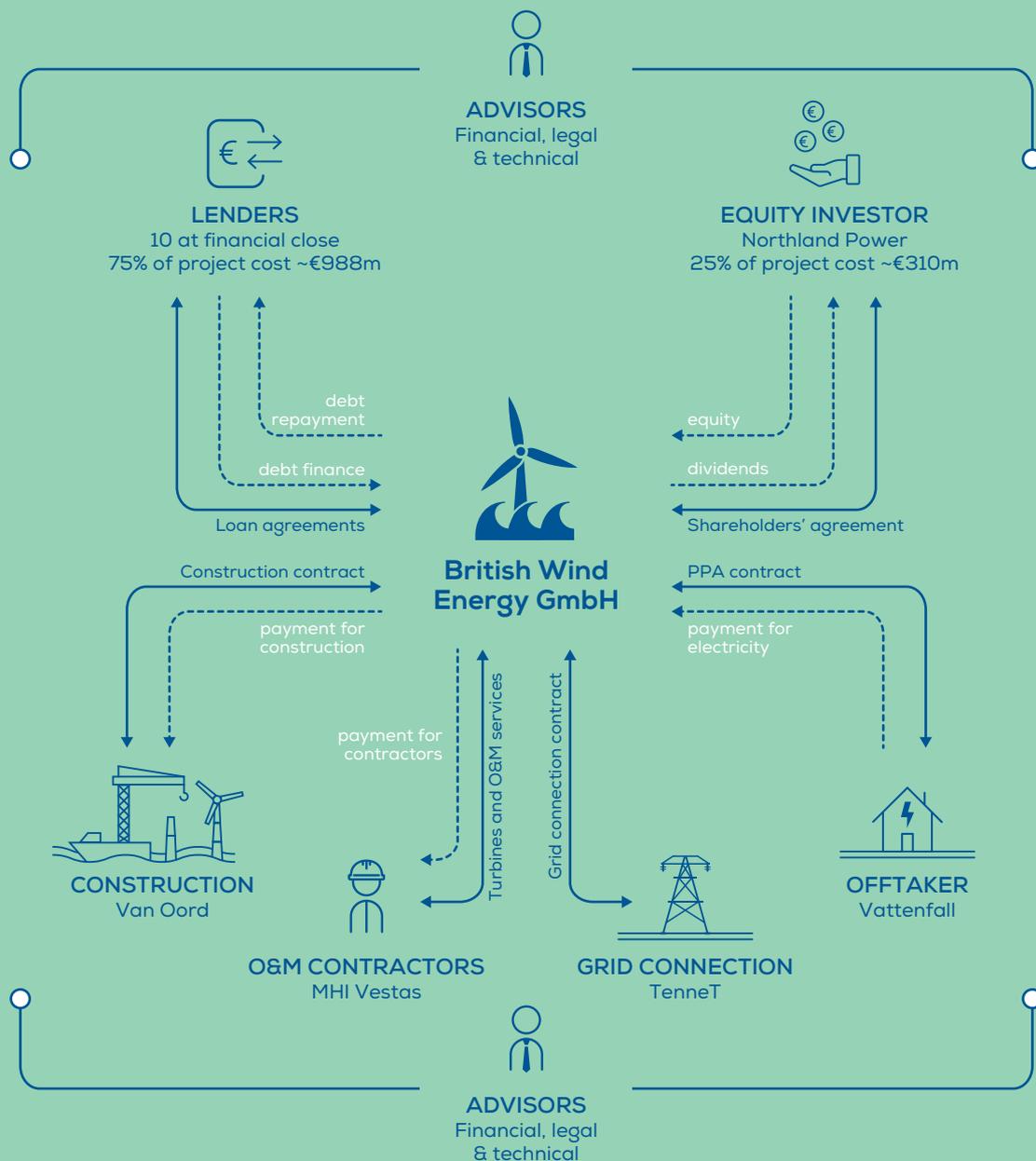
SUMMARY

- Projects can be financed on the balance sheet of a company – **corporate finance**
- Capital can be raised with equity (**issuing company shares**) or debt (**bonds issued by the company**), the proceeds of which can be used to develop a wind farm
- Projects can also be made into a "company" in their own right with a Special Purpose Vehicle (SPV) structure – **project finance**
- Capital can be raised with equity (**issuing shares in the project**) or debt (**banks lend to the project on a non-recourse basis**), the proceeds of which can be used to develop the wind farm
- Debt is repaid from project revenues. If the project fails to repay the debt, banks do not have recourse to the project sponsors' assets for compensation, only the assets of the project itself

FIGURE 3
Example of financing structure for typical offshore wind farm

EXAMPLE OF FINANCING STRUCTURE
FOR TYPICAL OFFSHORE WIND PROJECT

252 MW | 31 Turbines | €1.3 bn



Source: Green Giraffe

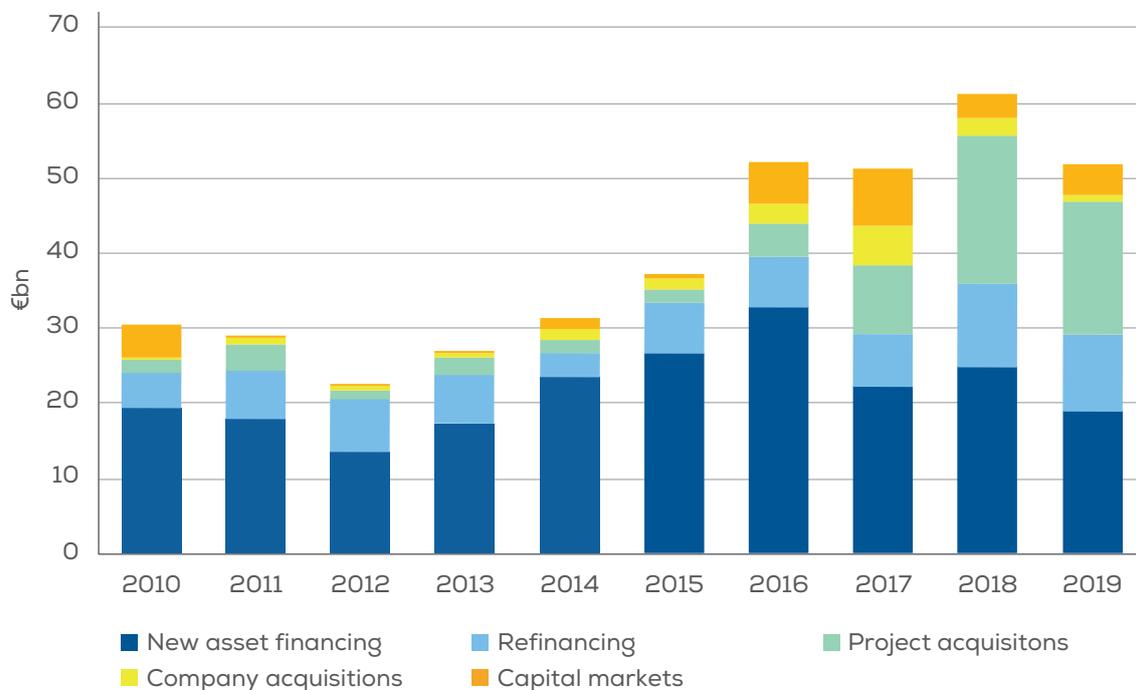
1.

INVESTMENT NUMBERS IN 2019

1.1 WIND ENERGY INVESTMENTS

FIGURE 4

Total wind energy investments in Europe 2010 – 2019 (€bn)



Source: WindEurope

Wind energy saw €51.8bn in financing activity in 2019. This represents an 18% decrease from 2018. With €19bn of investments, new asset financing remains the biggest category within wind energy investments. Project acquisitions totalled €17.5bn.

New asset financing for wind power projects was 30% lower than 2018, when almost €25bn of new assets were financed. Offshore wind farms reaching final investment decision (FID) in 2019 required a relatively high capital expenditure (“CAPEX”) leading to a slightly lower capacity financed compared with the previous 3 years.

Project acquisitions, where investors purchase (a share of) a wind energy project, were also down from €18.9bn in 2018 to €17.5bn in investment activity in 2019, a 6% decrease. However, 2018 and 2019 saw significantly more

wind project acquisitions (by value) than all other years on record.

Sector maturity and technology competitiveness have brought in more investors as equity partners in projects, particularly from the financial services industry.

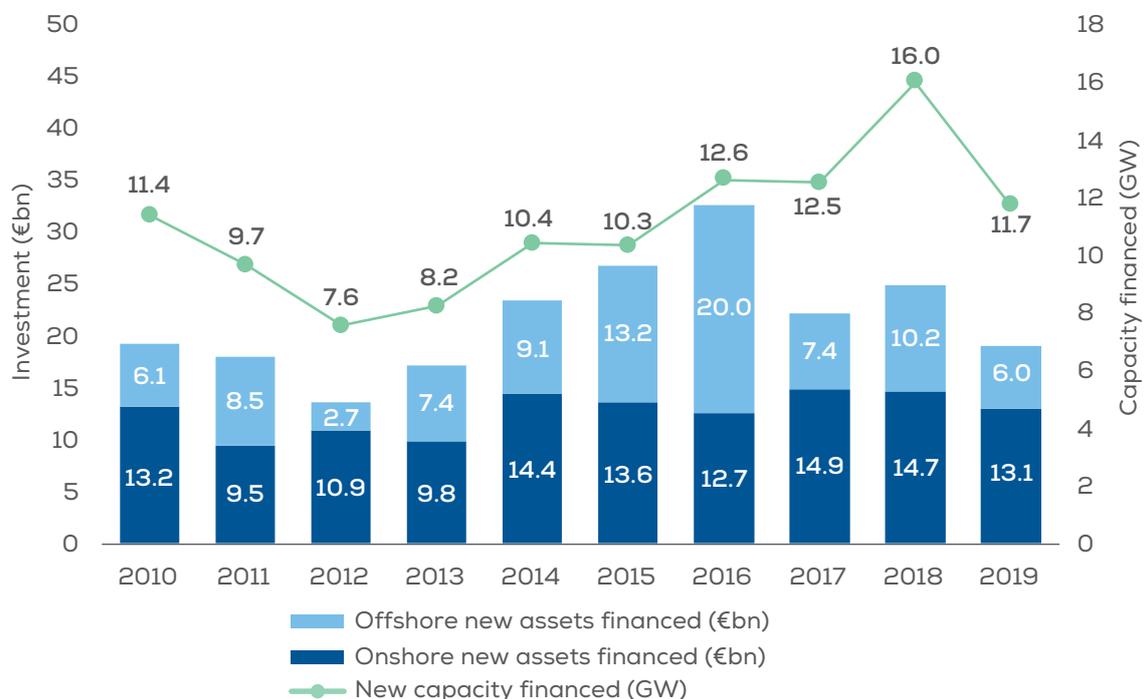
With €0.9bn, company acquisition deals were lower in value than the previous 5 years perhaps signalling a slow-down in the consolidation phase the wind energy industry has experienced in recent years across the supply chain.

Companies continue to make use of the low interest rate environment and liquidity in the financial markets by raising debt and equity via capital markets, raising €4.2bn in 2019, a 27% increase on 2018. 90% of the capital raised was in the form of green bonds.

1.2 NEW ASSET FINANCE PER COUNTRY

FIGURE 5

New asset finance in wind energy 2010 – 2019 (GW and €bn)¹



Source: WindEurope

1. Analysis of the history of installed capacity in Europe indicates that a number of FIDs are not made public and new asset investment figures are likely to be understated

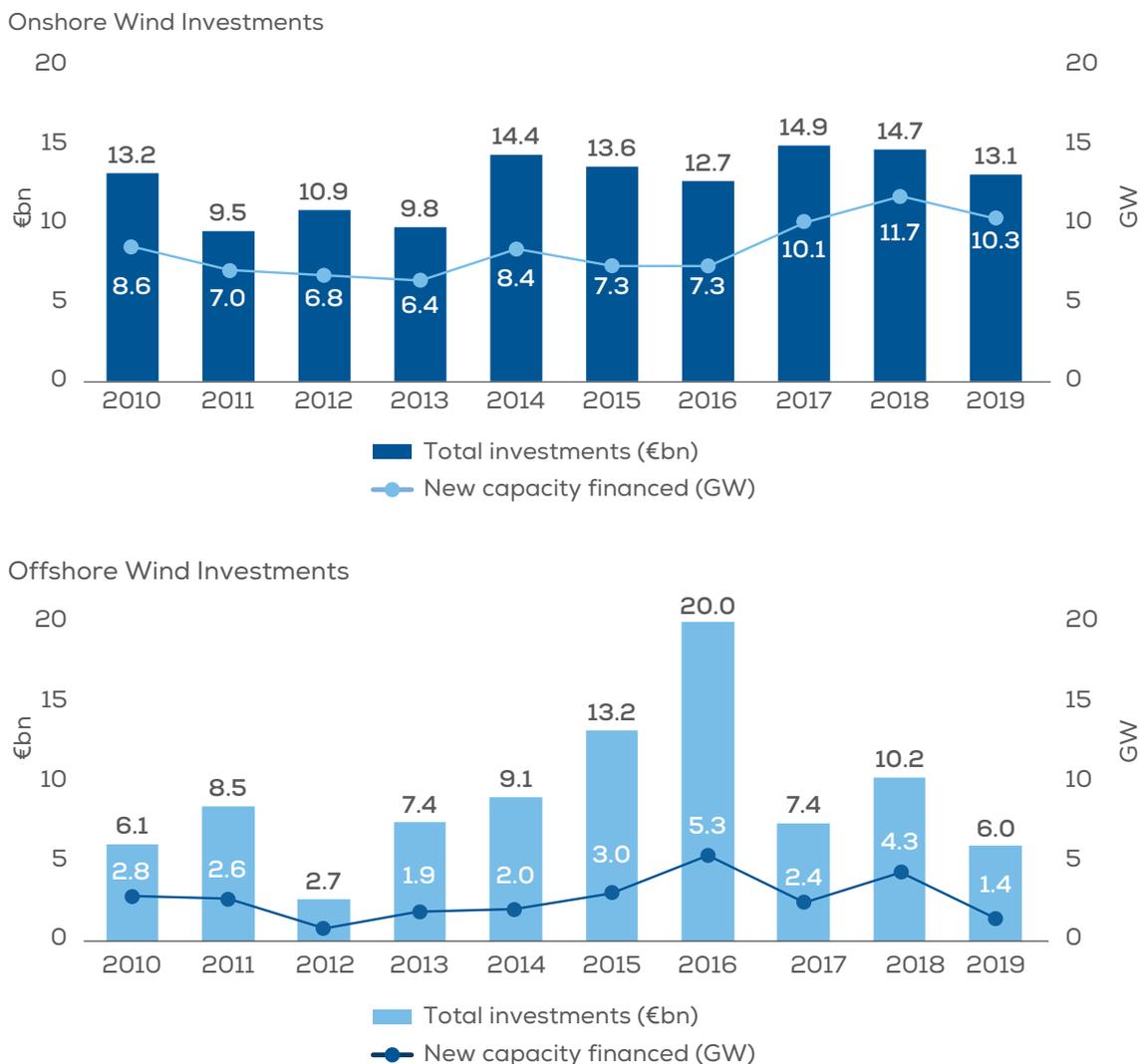
Investments in new assets were at their lowest level since 2013. Onshore wind financing was fairly solid at €13.1bn, seeing the second most onshore capacity financed in a year (10.3 GW). Offshore wind new asset financing was down over 40% on 2018, for 4 projects amounting to just 1.4 GW, the lowest capacity since 2012. However, given the small number of (relatively larger) offshore projects, financing amounts can be volatile year-on-year.

New capacity financed in 2019 totalled 11.7 GW, comparable with 2016 and 2017 (12.6 GW and 12.5 GW respec-

tively)² but significantly lower than the record 16 GW of projects reaching FID in Europe in 2018. There were FIDs for 132 new projects in 25 countries, 128 of which were for onshore wind farms.

€3.9bn (21% of the total €19bn of investments in new assets) were in non-EU countries with an average capital expenditure for onshore wind of €1.4m per MW financed, only slightly more than EU countries which averaged €1.3m per MW.

FIGURE 6
New asset finance in wind energy per technology 2010-2019 (€bn)



Source: WindEurope

2. Investment and capacity financed figures pre 2019 have been restated

Onshore wind saw 128 projects reaching FID with an average capacity of 80 MW, fewer than the 161 onshore FIDs (average 73 MW) in 2018.

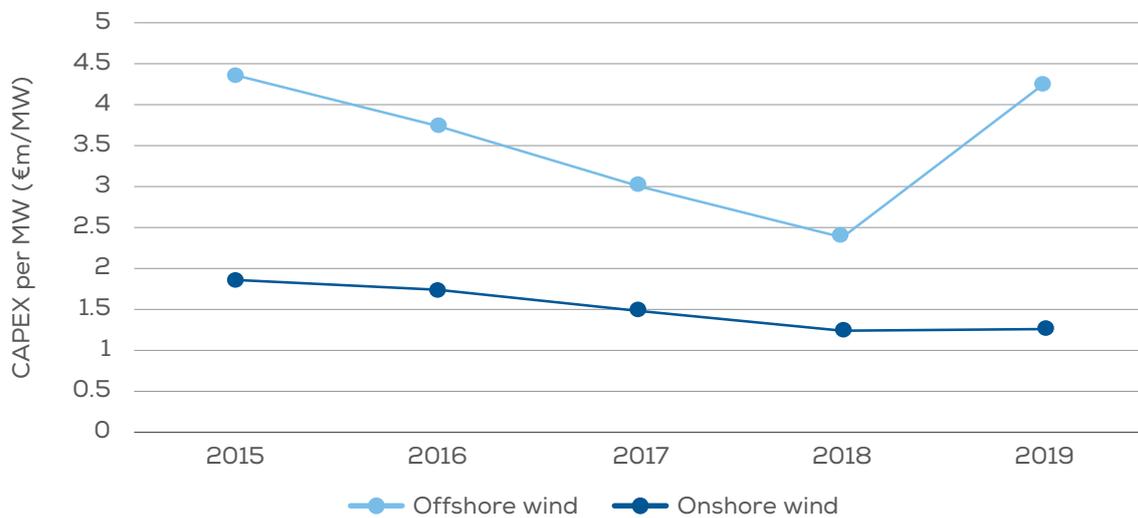
Investments in new onshore wind farms in Germany were down from €0.8bn for 23 new wind farms in 2018 to just €0.3bn for 8 wind farms in 2019, and from €2bn – €3.5bn between 2013 and 2017. Problems with the permitting procedure for new projects in recent years have resulted in a slowing market, but there are signs that the German government is taking steps to resolve this³.

In **offshore wind**, investments in new projects were the lowest since 2012 at €6bn, less than one-third of the record €20bn⁴ seen in 2016. However, since offshore wind projects are fewer and generally larger than onshore, investment statistics can be volatile and therefore emerging trends should be treated with a degree of caution.

Capacity financed was lower than previous years as cost reduction trends reversed in 2019 and projects were financed with higher CAPEX than has typically been the case in recent years.

FIGURE 7

Capital expenditure per MW financed in wind energy 2015-2019 (€/MW)



Source: WindEurope

3. For detailed information on the German market and permitting situation, see the latest National Policy and Regulatory Developments report (for members only)
4. Updated new asset financing figure

CAPITAL COST TRENDS

Capital expenditure per MW for new onshore assets fell from 2015 to 2018. In 2019, capital expenditure was on average €1.3m per MW, the same as in 2018.

Spain accounted for over 20% of all onshore FIDs with 28 new projects, at an average CAPEX of €1m per MW. The CAPEX seen in Spanish projects is lower than the average. Besides the good wind conditions and the strong domestic supply chain, there was a large pipeline of projects under development waiting for a financing opportunity since 2013, when the government withdrew any support to the sector - until auctions resumed in 2016.

Capital expenditure per MW for new offshore wind farms also decreased between 2015 and 2018. However, 2019 saw a reversal of that trend. 3 of the 4 projects reaching FID were financed with a CAPEX of €5m per MW or more, unusually high compared with other projects reaching FID in recent years.

One of these projects was Hywind Tampen, an 88 MW floating offshore wind farm. Given this new technology is currently in the pre-commercial phase, higher CAPEX than bottom-fixed technology is expected. An understanding of the risks involved is essential for lenders to price risk correctly and as experience grows, financing costs are likely to come down (at the time of writing there has been no non-recourse debt issued for floating wind) which will likely attract more investment. As the technology matures, more investors should be attracted allowing further build-out and established supply chains and economies of scale should provide the CAPEX reductions witnessed in bottom-fixed offshore. On top of this, the sector is leveraging the relevant experience and established supply chains with bottom-fixed turbines, as well as those from the oil and gas sector with years of experience managing floating structures. We therefore expect floating wind costs (financing and capital expenditure) to reduce at a faster rate.

That being told, the higher CAPEX of Hywind Tampen does not significantly influence in the average CAPEX per MW for offshore wind farms considering its relatively low capacity compared with the other 2 offshore wind farms financed in 2019. The 450 MW Neart na Gaoithe offshore wind farm in Scotland and the 480 MW Saint Nazaire offshore wind farm, the first to reach FID in France, were also both financed at over €5m per MW.

Neart na Gaoithe is set in the Firth of Forth. With an average water depth of over 50m, the foundations will be jackets, which tend to have higher associated costs than monopiles, possibly a factor in the higher than average CAPEX for the wind farm. Neart na Gaoithe received support at the 2015 auction round in the UK and it has been financed at €5.1m per MW, including transmissions infrastructure to shore.

Saint Nazaire is the first commercial offshore wind farm in France and was financed at €5.0m per MW. The design of the tender which was launched in 2011 specified that wind turbine factories for the project had to be built on French territory (resulting in higher capital expenditure for the project). We expect to see the same higher CAPEX in other French wind farms winning in the same tender (for example Fécamp and Courseulles-sur-Mer). In addition, the authorisation procedure for the project did not allow the developer to use the most recent turbines, preventing savings from technological developments (although this procedure has now been modified and other wind farms should not be so restricted). Finally, the nature of the seabed, which is particularly hard, means that installation time is expected to be longer than average.

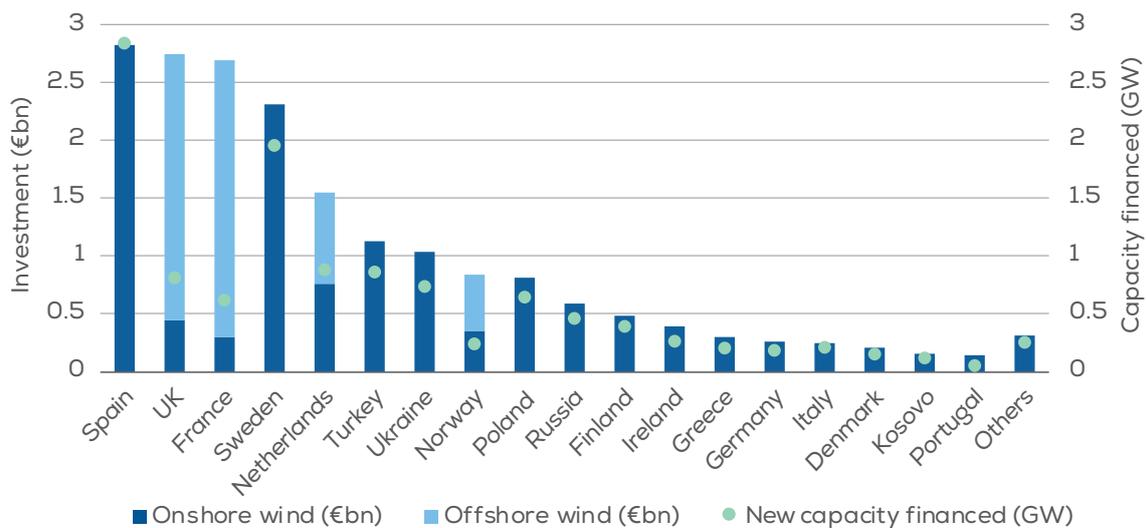
The reasons for higher capital expenditures are specific to the site of the projects and (with the exception of those wind farms mentioned above) we might expect in future years to see offshore wind CAPEX revert to levels seen in recent years.

INVESTMENT TRENDS PER COUNTRY

New wind energy investments in 2019 took place in 25 countries. The top three investor countries owned 43% of FID announcements in 2019 and 2018, compared with 64% in 2017 and 73% in 2016. However, different European wind energy markets are maturing at different rates

and there has been an unhealthy concentration of new installations in recent years. There continues to be a significant number of countries in Europe which are not attracting investment and have no new installations.

FIGURE 8
New asset finance in wind energy per country in 2019 (€bn and GW)



Source: WindEurope

Spain was the biggest investor in 2019 with €2.8bn of investments in the onshore wind sector representing 15% of total financing activity for the construction of new onshore and offshore wind farms in Europe.

Northern and Western Europe still holds the bulk of new investments with over 60% of the capital raised for new wind farms in Europe (€11.5bn). The UK, France and Sweden saw investments in new wind farms totalling more than €2bn and the Netherlands over €1.5bn.

In many EU markets there are currently no wind investments, despite these countries having significant potential for further expansion of wind power. National energy policies and lack of a stable regulatory environment have affected both the level of investment and financial commitments in half of EU Member States. This is the case in **South East Europe (SEE)**, where Investments remain low.

Investor confidence has been slow in recovering mainly due to macroeconomic and political factors. With a total of just €0.6bn, a reduction in investments for the second year running, the SEE region represents only 3% of the total new assets financed in Europe.

However, other markets are picking up. Clearly the potential in the Spanish wind energy sector is bearing fruit with almost a quarter of the capacity financed in Europe in 2019. Poland also saw an impressive amount of new asset financing with €0.8bn financing 630 MW of new onshore wind at €1.3m per MW (the average for onshore wind in Europe). Spain and Poland are likely to be strong markets in future years. The Spanish draft National Energy and Climate Plan (detailing a Member State's plans to decarbonise their economies) is targeting a capacity of 50 GW onshore by 2050 with auctions of 2 GW annually between 2021 and 2030. Poland held an auction for 2.2 GW for onshore wind in 2019 with a further 2 auctions planned for 2020.

Of the €19bn investment in new projects, €3.9bn (21%) were in **non-EU countries**: Turkey, Ukraine, Norway, Russia, Montenegro, Belarus and Switzerland. This is down from €5.2bn in 2018 but remains the same proportion of overall financing of new wind energy projects at 21%. Turkey had the most investment in the non-EU countries

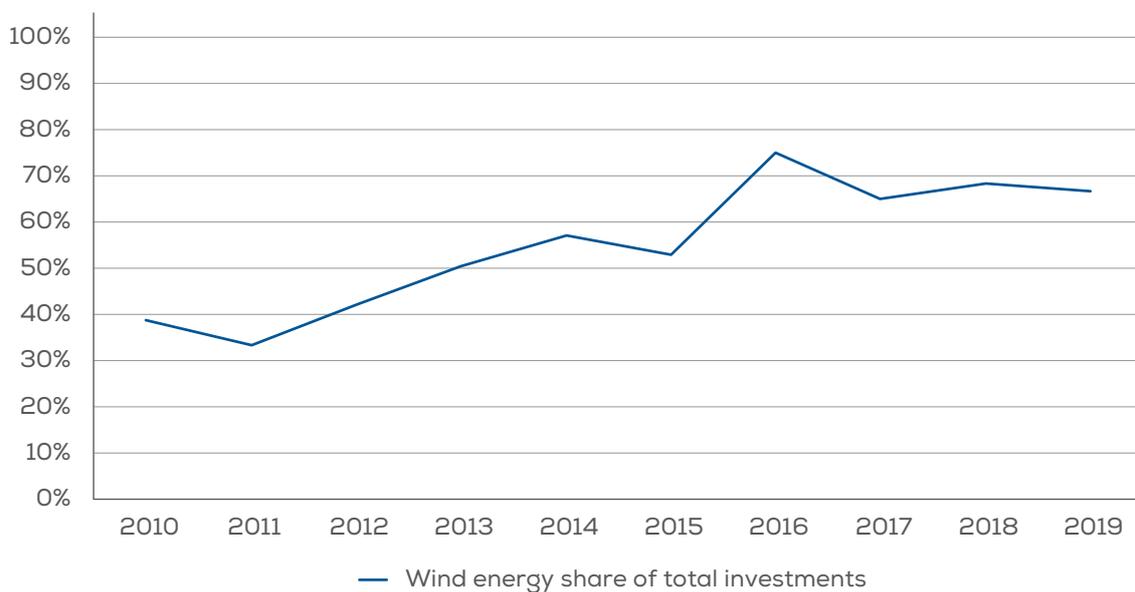
with €1.1bn, followed by Ukraine with €1bn and Norway at €0.8bn.

Onshore wind capital expenditure for these countries averaged €1.4m per MW financed, slightly more than EU countries which averaged €1.3m per MW.

INVESTMENT TRENDS IN THE POWER SECTOR

FIGURE 9

Share of wind in new utility-scale renewable power capacity investments in Europe 2010-2019



Source: WindEurope

In 2019 wind energy again represented around two-thirds of renewable energy investments in new utility-scale power generation capacity (i.e. this does not include investments in solar rooftop capacity). Onshore wind alone accounted for 46% of the market.

In our analysis we have included only investment in new power generation capacity and not in energy infrastructure.

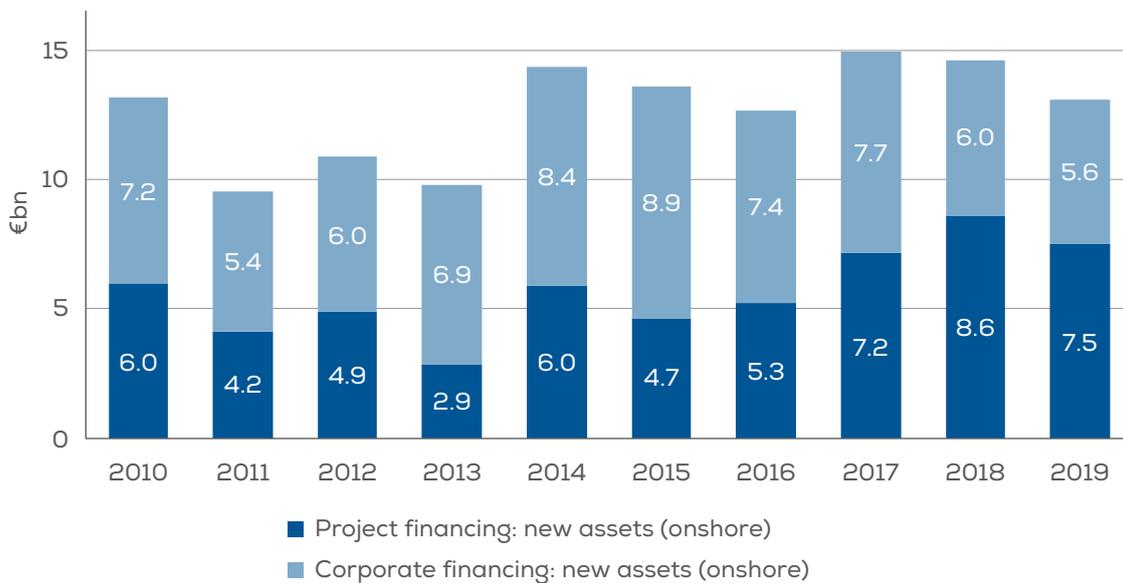
Overall, the share of investments in new wind power generation capacity increased from just over 30% in 2011 to around 75% in 2016 and have been between 65% and 70% per year since.

2.

SOURCES OF FINANCE IN 2019

2.1 ONSHORE FINANCING

FIGURE 10
Onshore wind corporate and project financing 2010-2019 (€bn)



Source: WindEurope

Investments in onshore wind projects are traditionally evenly divided between corporate and project finance. Corporate financed projects are financed on the sponsor's balance sheet, meaning they raise the capital themselves – typically by raising corporate debt, issuing shares or using working capital. Because project management and contractual obligations are internalised, the process of raising capital is more straightforward than project finance and can be more efficient in terms of time and cost. Project financing facilitates the development of larger

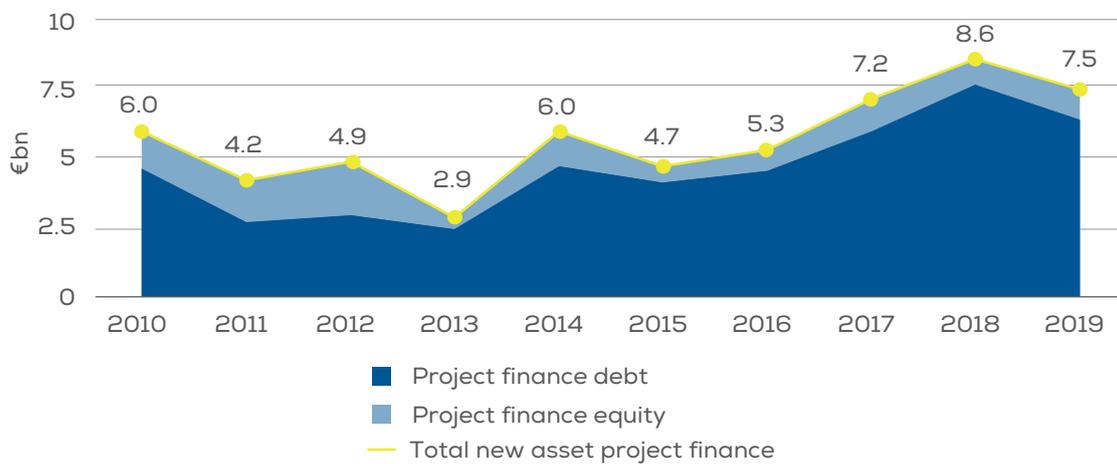
projects since a number of sponsors can own the project in a Special Purpose Vehicle (“SPV”) structure and debt is lent by banks to the project rather than the sponsors (the lenders do not have recourse to the sponsors' assets).

Final investment decisions totalling €7.5bn or 57% of onshore wind projects were financed on a project finance basis in 2019 and these projects had an average capacity of 98 MW. Corporate financing of onshore projects totalled €5.6bn with an average capacity of 68 MW.

PROJECT FINANCING – ONSHORE

FIGURE 11

Onshore new asset project finance debt and equity 2010-2019 (€bn)



Source: WindEurope

Debt typically provides lower returns than equity since in the event of bankruptcy it is repaid before equity and is therefore a lower risk investment. From a project sponsor's point of view this means that raising debt is a cheaper method of financing than equity financing (particularly in the low interest rate environment). More mature technologies are able to raise more debt capital because banks understand and can price risk and a proven track record of successful projects increases confidence.

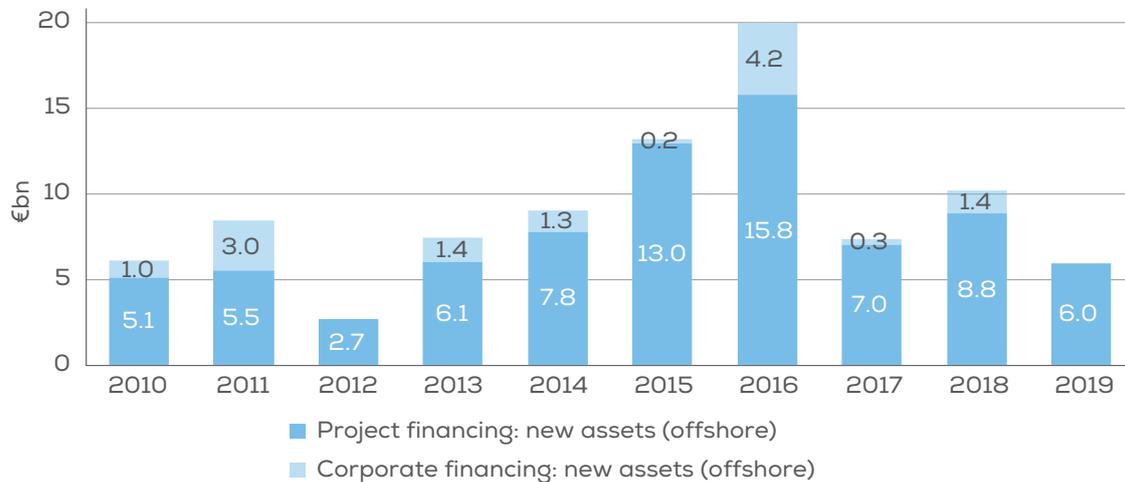
Since around 2013, capital raised for new onshore wind farms on a project finance basis has been around 90%, illustrating that banks are comfortable with extending loans for the majority of the wind farm capital expenditure. This suggests that the technology is mature and represents a safe investment.

Traditionally projects have been supported by national government support schemes, often providing a fixed price for electricity produced once connected to the grid. This has offered revenue stability for those projects and allowed developers to secure high debt ratios and cheap financing. Support schemes in Europe have now changed from fixed tariffs to market-based schemes (*see section 3.4 on revenue stabilisation*).

WindEurope is monitoring how changes in support are affecting debt ratios and how this may affect the cost of financing. Look out for updates in our future reports

2.2 OFFSHORE FINANCING

FIGURE 12
Offshore wind corporate and project financing 2010-2019 (€bn)



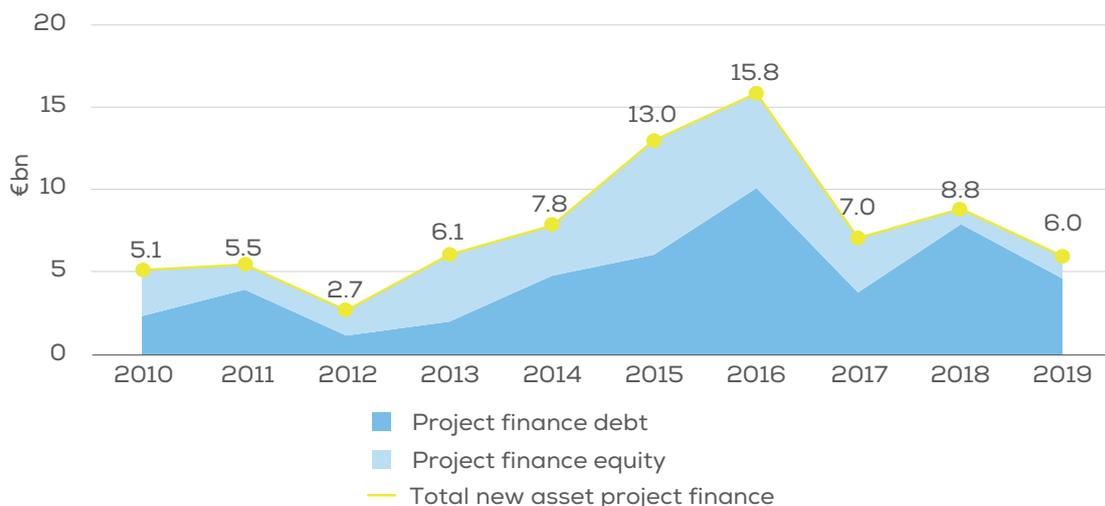
Source: WindEurope

Investments in offshore wind projects are traditionally dominated by project finance because offshore wind farms tend to be very large and there are limited numbers of developers able to finance the high capital requirements on their balance sheets.

Final investment decisions totalling €6bn of offshore wind projects were 100% financed on a project finance basis in 2019. Projects reaching FID had an average capacity of 350 MW, similar to the 357 MW in 2018 and significantly larger than onshore wind projects.

PROJECT FINANCING – OFFSHORE

FIGURE 13
Offshore new asset project finance debt and equity 2010-2019 (€bn)



Source: WindEurope

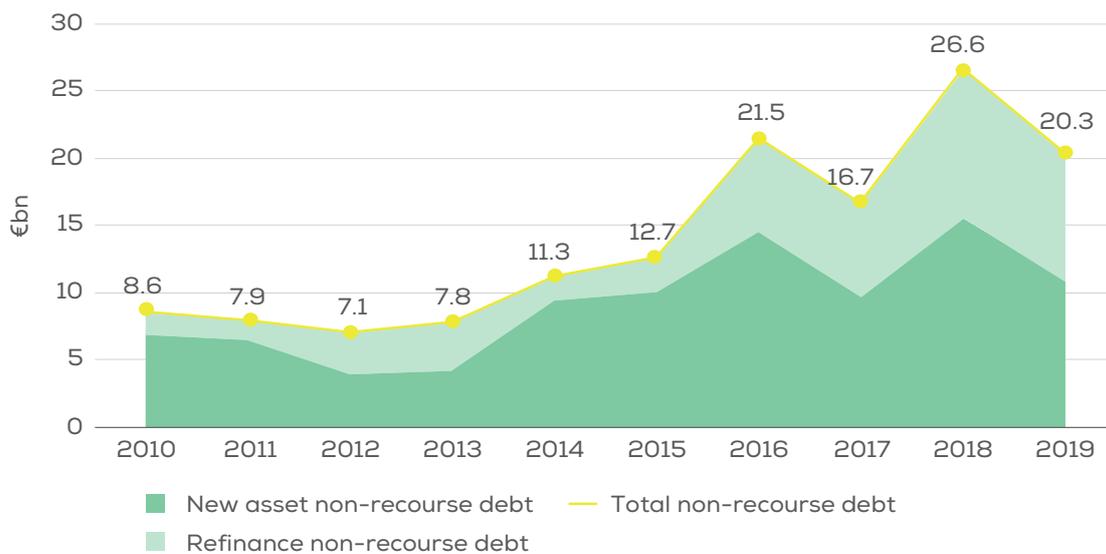
As discussed in the previous section, mature technologies are able to raise more debt capital and more efficiently finance projects.

Recent years have seen a lower proportion of equity financing in offshore wind energy project finance, demonstrating increased confidence in the technology. In particular since 2016, project finance debt ratios have increased from around 60% to between 80% and 90%.

2.3 NON-RECOURSE DEBT FINANCING

FIGURE 14

Non-recourse debt, new assets and refinancing 2010-2019 (€bn)



Source: WindEurope

There has been overall growth in debt financing since 2012. Emerging new business and ownership models have diversified the pool of investors in wind energy and unlocked the potential for long-term sources of finance from banks, institutional lenders and Export Credit Agencies (ECAs). This has led to a significant amount of affordable debt, in particular in the form of non-recourse financing.

When a wind energy project is commissioned, its risk profile changes significantly. The risks present during construction are replaced by operational risks. This impacts the probability of repaying lenders. In addition, lenders specialise in pricing risks at various stages of the development of a project. It is therefore common for a project to restructure its debts upon completion.

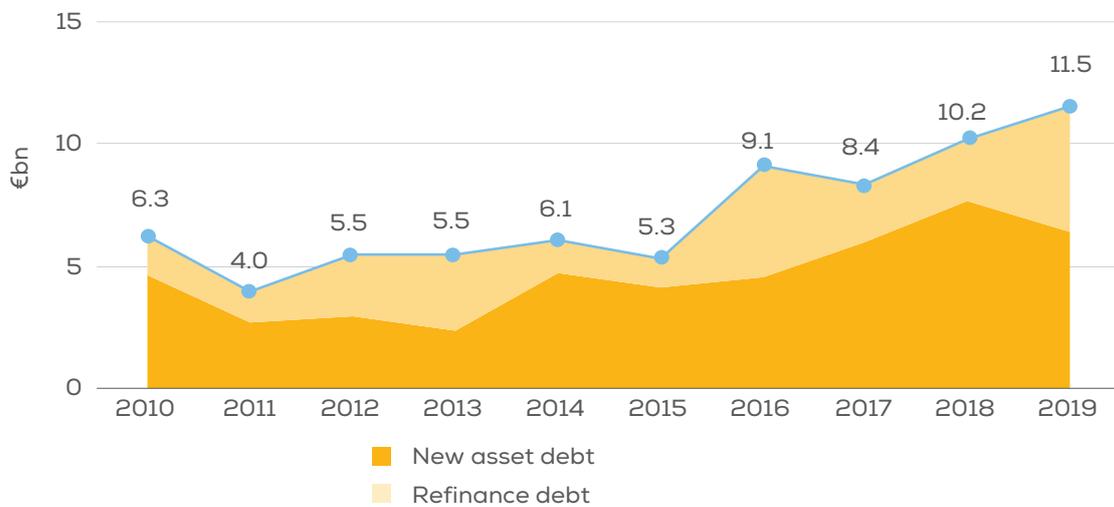
For example, banks might provide debt to cover the construction of the wind farm, which typically takes 1-2 years for onshore projects and 2-3 years for offshore wind pro-

jects. During this period the wind project is not producing any revenue. Additionally, there are risks such as losses from accidents or delays in construction (by bad weather, for example). Once the wind farm has been commissioned, the risks of construction are transferred to operation.

Since there are fewer potential losses and risks for operational wind farms, these can attract better interest rates. The restructuring of debt in this way is known as refinancing.

In 2019 €20.3bn in non-recourse debt was raised: €11bn for the construction of new projects and €9.3bn for the refinancing activities of wind farms. The proportion of non-recourse debt extended for the refinancing of wind farms has increased steadily over the last 5 years from around 20% in 2015 to 46% of total non-recourse debt extended in 2019.

FIGURE 15
Non-recourse financing debt in onshore wind projects 2010-2019 (€bn)

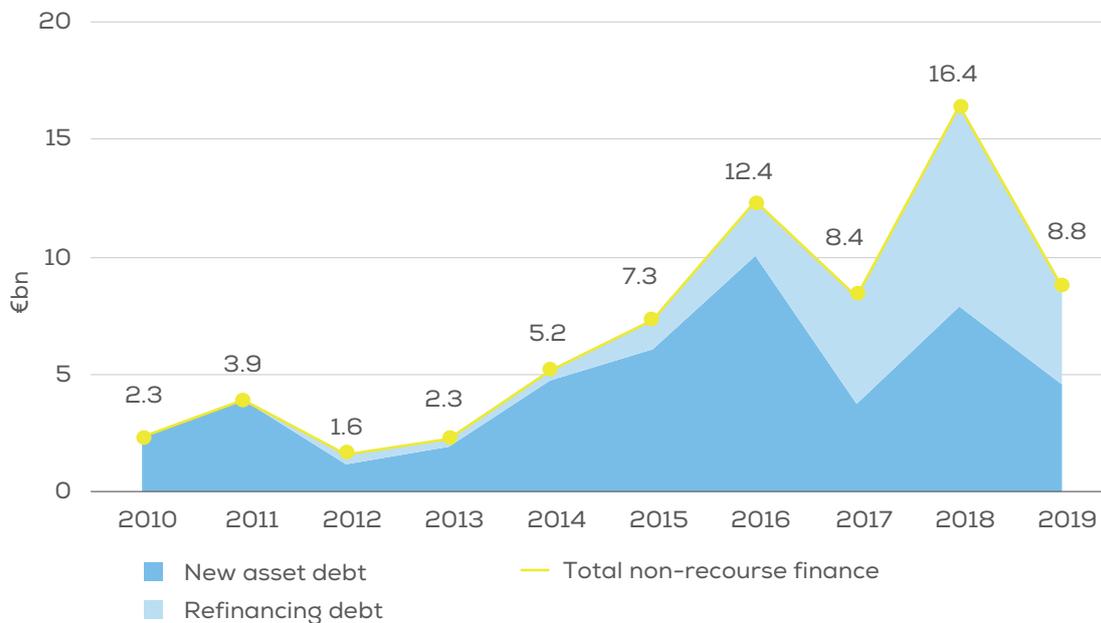


Source: WindEurope

Non-recourse debt extended for the financing of new onshore wind farms and refinancing has in general been increasing since 2011. In 2019, a record €11.5bn of non-re-

course debt was lent for onshore wind, including €5.2bn for refinancing, also a record.

FIGURE 16
Non-recourse debt financing in offshore wind projects 2010-2019 (€bn)

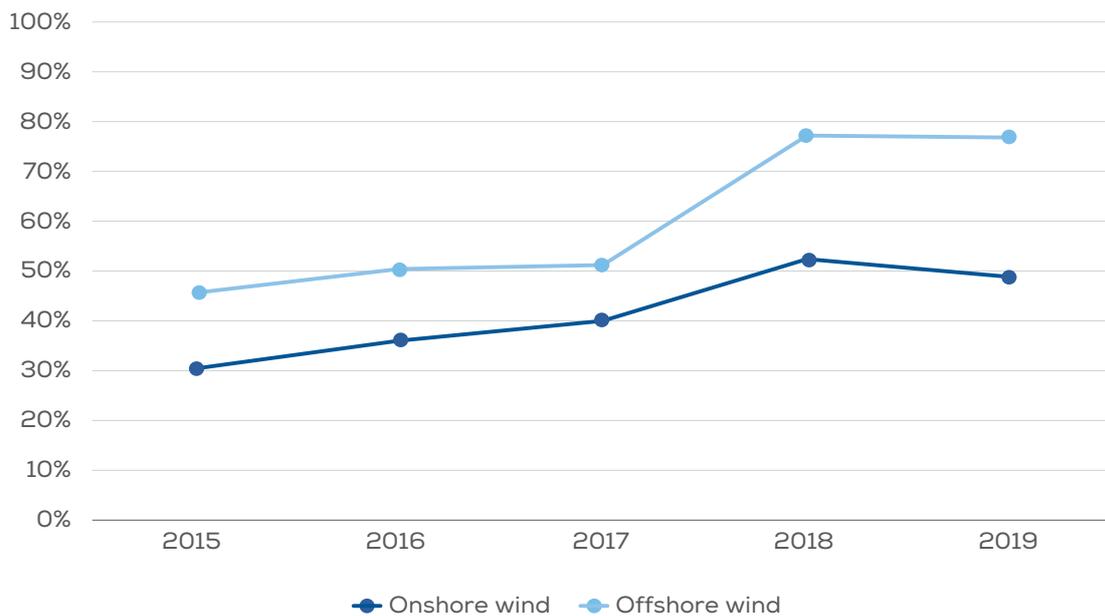


Source: WindEurope

The recent overall growth in non-recourse debt has been driven by the offshore market, which saw a record €16.4bn extended in 2018 and €8.8bn in 2019. For the first year since 2012, there was less non-recourse debt raised for offshore wind than onshore wind. This is a result of both lower investments and refinancing in offshore wind in 2019 and the record amount of non-recourse debt raised for the financing and refinancing of onshore wind farms.

Debt financing conditions continue to be favourable with low interest rates and plenty of lenders and, as the market matures, developers are taking advantage to refinance their loans. This, and the completion of large offshore projects since 2016 such as the London Array (630 MW), Race Bank (573 MW), Galloper (353 MW) and Dudgeon (402 MW), has led to the development of the refinancing of the offshore wind market in recent years.

FIGURE 17
Share of non-recourse debt in new asset finance 2015-2019



Source: WindEurope

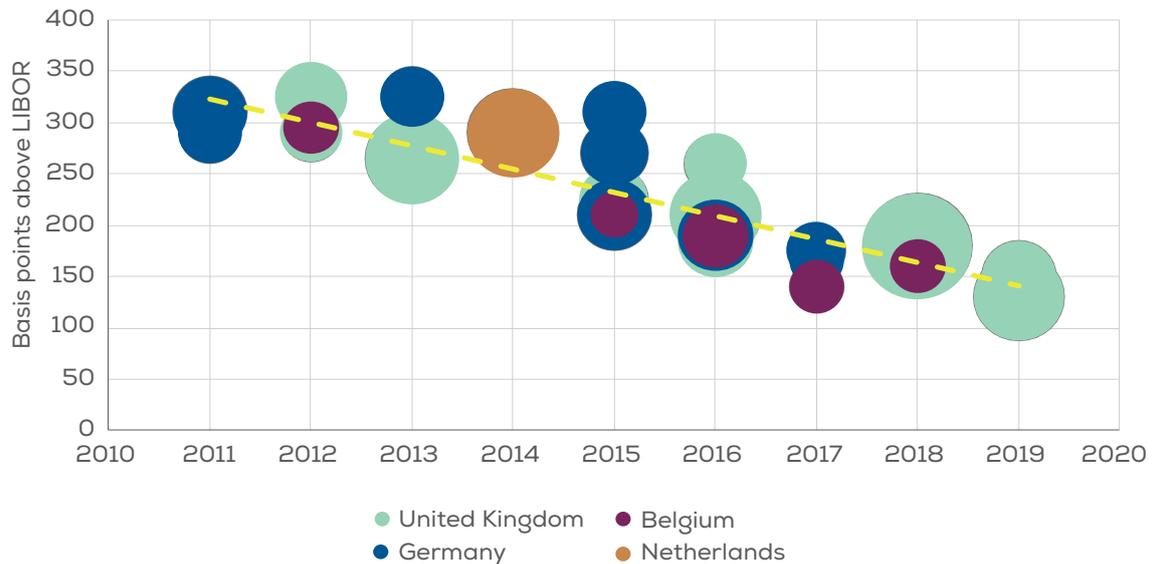
Lending from banks on a project finance basis has been critical to the development and build-out of wind energy projects. Larger projects are able to take advantage of economies of scale to produce wind farms with historically low capital expenditure and higher proportions of debt have allowed lower financing costs, resulting in cheaper renewable energy for society.

The importance of non-recourse debt continues to grow and now accounts for around 50% of all capital raised for new onshore projects and almost 80% for offshore.

As mentioned previously, it is essential that government support schemes recognise the importance of stable and predictable revenues (through appropriate market-based support schemes) for the continued high levels of non-recourse debt and low financing costs of wind energy projects.

FIGURE 18

Interest rates for offshore projects: basis points above LIBOR per MW financed 2010-2019



Source: WindEurope

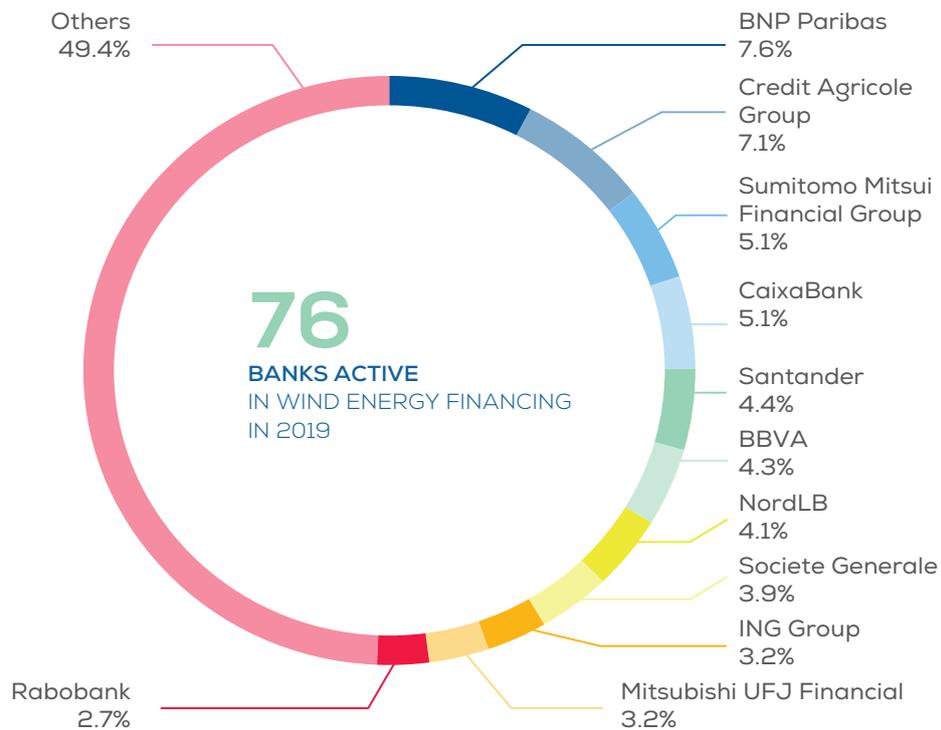
The debt markets have supported construction activity on attractive terms. Transactions in 2019 continued to reflect the general trend of easing loan terms when it comes to pricing, maturity and tranche. The low interest rate environment has provided wind energy projects with competitive financing and lower financing costs. Larger projects are now able to fundraise under more favourable market conditions. The risk premium charged by lenders has been consistently falling as the offshore wind market matures and lenders become more comfortable with the risks.

Figure 18 suggests that offshore wind farms in Belgium have been able to achieve lower risk premiums earlier than other countries in the sample. However, it should be noted that the data sample is very small and so has very little (if any) statistical significance.

Over 76 lenders were active in 2019, up from 67 in 2018, including multilateral financial institutions, export credit agencies and commercial banks. As confidence grows in the European wind sector, international banks continue to strengthen their presence in the market.

FIGURE 19

Market share of banks in wind energy financing in 2019



Source: WindEurope

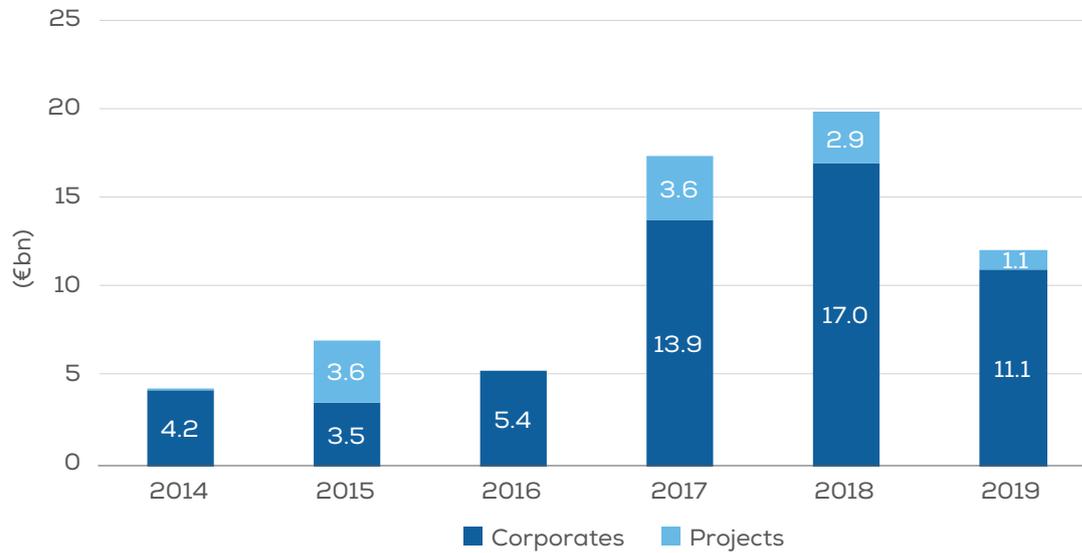
2.4 GREEN BONDS

Bond issuances have been an important part of debt financing for wind energy projects. However, only a fraction of the €12.2bn of new issuances in 2019 were exclusively raised for wind energy projects (€1.1bn). Green bonds for wind energy and renewable portfolios including wind saw strong growth between 2016 and 2018. The funds raised from these bond issuances serves to finance renewable energy portfolios, including wind power projects and offshore transmission lines.

2019 issuances, however, were down on 2018. The majority of the issuances (91%), a total of €11.1bn, came from corporate bonds. Amongst the top issuers are Enel with €5.4bn, Engie with €2.5bn and TenneT with €1.8bn.

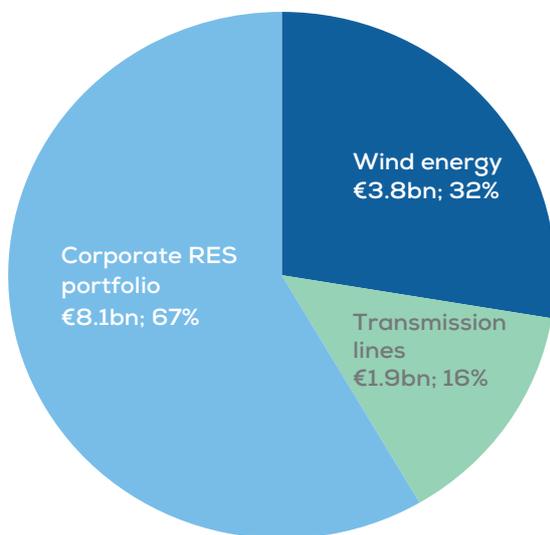
Ørsted issued green senior bonds with a value of over €1bn to invest in the Hornsea 2 offshore wind farm off the coast of England.

FIGURE 20
Green bond issuances 2014-2019 (€bn)



Source: WindEurope

FIGURE 21
Green bond issuances in 2019 by technology



Source: WindEurope

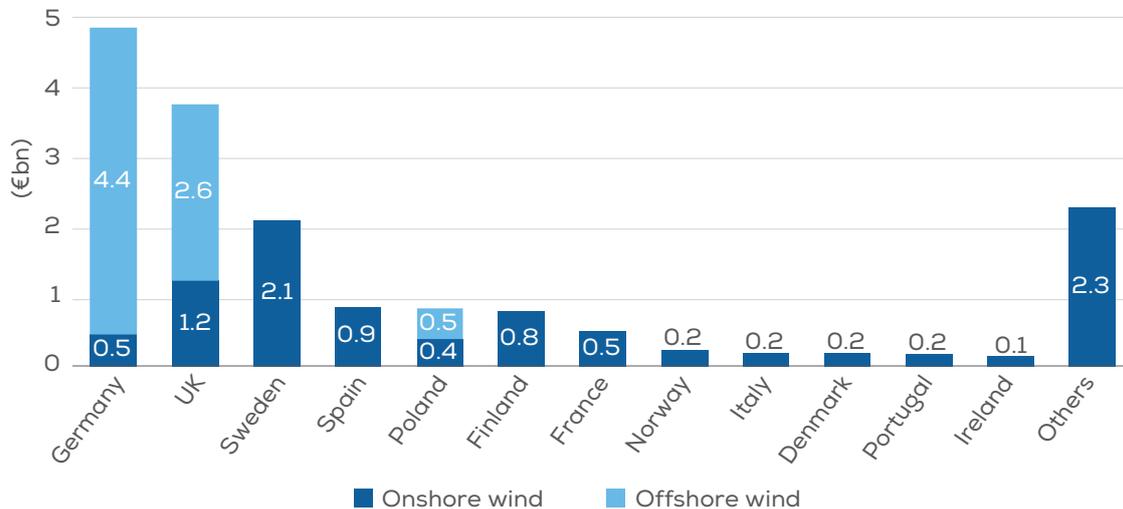
32% of the green bond issuances in 2019 came from companies exclusively operating in the wind industry, either through project or corporate bonds (for those companies operating uniquely in the wind energy sector).

Corporate RES portfolio refers to renewable energy portfolios which include wind energy but are not exclusively wind-based.

2.5 PROJECT ACQUISITIONS

FIGURE 22

Project acquisitions by country in 2019 (€bn)



Source: WindEurope

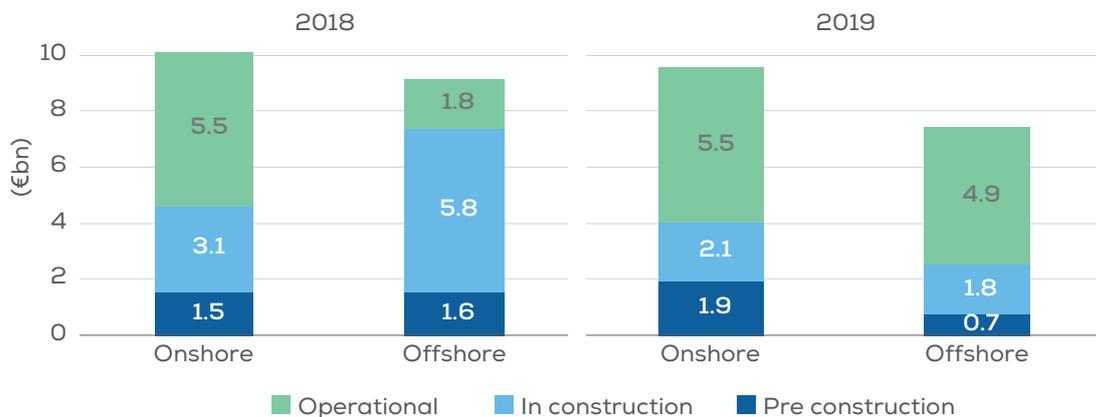
Project acquisition activity in 2019 totalled €17.5bn, slightly less than the €19.6bn changing hands in 2018 but still significantly more than the years before 2018. The German market saw the most acquisition activity in monetary terms as (shares of) some large offshore wind farms changed owners, including Gode 1 (330 MW), Veja Mate (402 MW) and BARD 1 (400 MW).

In terms of the capacity of projects acquired, 14.9 GW of projects were acquired, 6% less than the 15.9 GW (including projects in the pre-development phase) acquired in 2018.

€2.6bn was paid for 6.3 GW of projects in the pre-development or development stage, €3.9bn for 3.2 GW of projects in the construction phase and €10.4bn was paid for 5.6 GW of operational wind farms.

FIGURE 23

Project acquisition activity by project phase (€bn)



Source: WindEurope

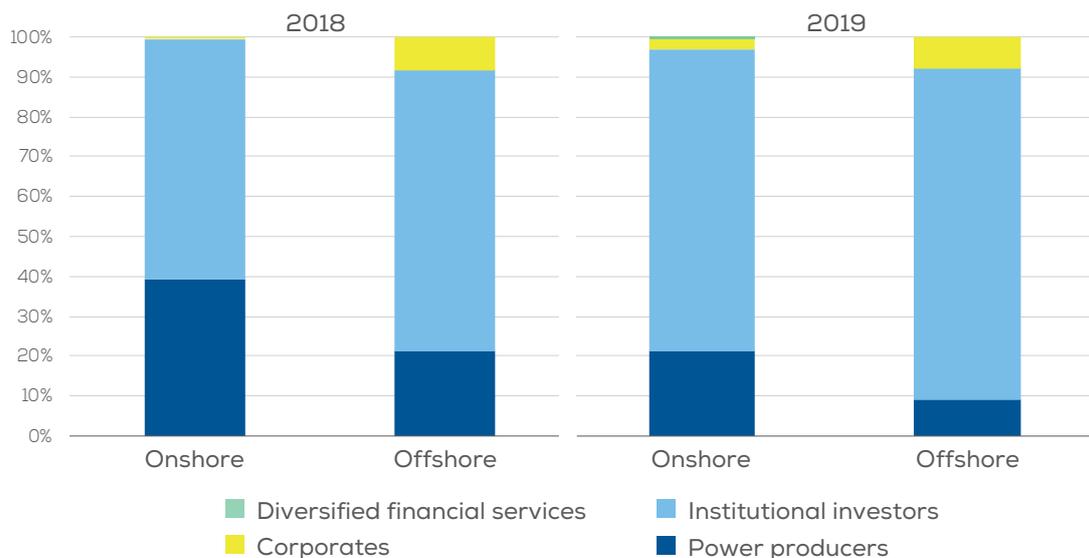
In both 2018 and 2019, acquisitions amounts were lower in offshore wind than onshore wind which had many more transactions (around 80% of the transactions were for onshore wind farms).

In 2019 operational wind farms were subject of the majority of transactions. Institutional investors (banks, as-

set managers, pension funds, etc.) which have typically invested in operational wind assets (where risks are well understood and returns tend to be stable over long-time horizons) acquired the largest proportion of wind farms.

Power producers acquired around half of project capacity in the pre-development and development stage.

FIGURE 24
Project acquisition activity by type of investor in 2019 (€bn, %)



Source: WindEurope

2.6 CORPORATE RENEWABLE PPAS

The corporate sourcing of renewable electricity via Power Purchase Agreements (PPAs) has been growing steadily since 2015. Corporates have a variety of different drivers for looking to source power from renewables, but the possibility to lower and fix electricity costs is a major part of the rationale for these deals. A recent survey of 1,200 companies across six countries showed that, of those sourcing renewables, 92% of them are doing so in order to reduce energy costs⁵.

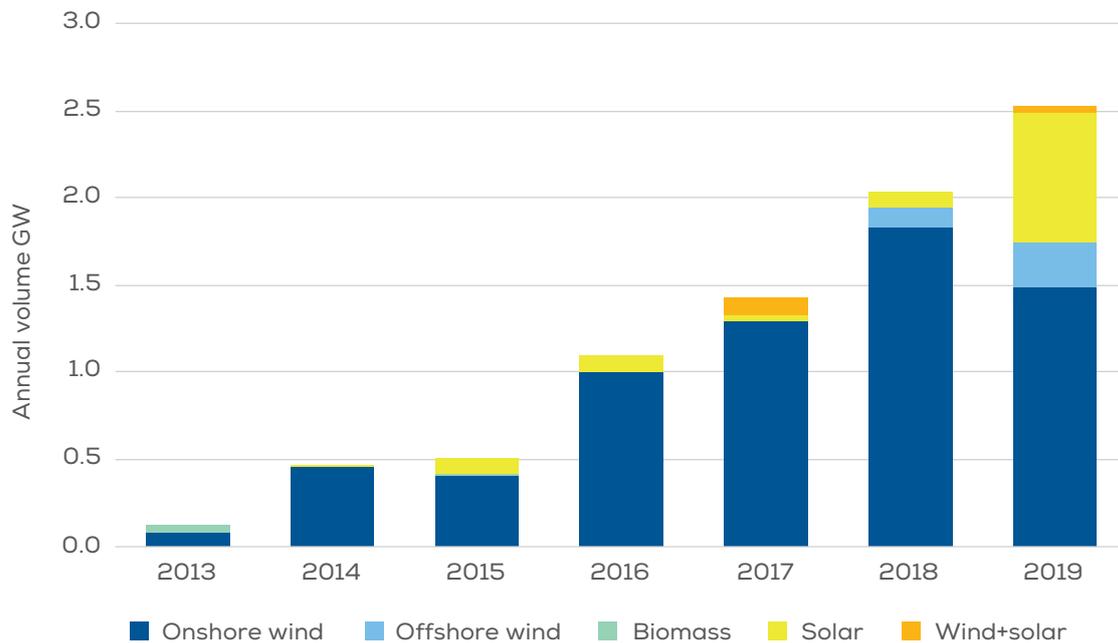
2019 was another record for contracted volumes of renewable electricity via corporate PPAs in Europe with over 2.5 GW in wind and solar power projects. 85% of the contracted capacity of renewable corporate PPAs has been

provided by wind power projects. This is largely because much of the activity has been focused in Norway, Sweden and the UK; all countries with a high wind resource. Additionally, wind projects are typically larger than solar PV projects, allowing corporate buyers to procure larger volumes of power in single transactions. However, in 2019 solar photovoltaic ("PV") PPAs accounted for almost 30% of the contracted capacity.

Wind energy is very well placed among other low-carbon technologies to accommodate corporates' needs for renewable electricity due to its modular scale, cost-competitiveness and risk profile.

5. BayWa r.e. Energy Report 2019, published in partnership with the RE-Source Platform. Available here: <https://www.baywa-re.de/en/energy-report-2019/>

FIGURE 25
Renewable energy corporate sourcing through PPAs (GW)



Source: WindEurope

There are different models of corporate engagement. The most important that have been used in wind energy can be broadly summarised in two segments: investing directly in projects and owning the underlying asset, or acting as an off-taker through PPAs.

From a corporate's perspective, acting as an off-taker is a feasible model to control costs over long periods of time (at times up to 20 years), diversify energy sources and meet sustainability targets. Owning the asset may come with certain cost-of-capital implications for corporates. This is not only due to the large pay-back period for wind energy projects, but also due to increasing competition for ownership in wind energy assets. Corporates not operating in the wind sector might find it challenging to execute renewable contracts at better prices when compared to power producers or other businesses with more experience.

Corporate renewable PPAs also come with certain benefits for generators. Price visibility over a long period of time and a guaranteed off-taker are important to lower the cost of debt financing. Lenders would typically need downside protection (a floor) in project revenues to en-

sure debt repayment obligations are met. As such, they tend to prefer lower revenues over a long period of time – matching the loan term – rather than higher but uncertain revenues.

Therefore, as the Feed-in Tariff support schemes across European countries are no longer available, countries with market-based schemes will likely see the volume of corporate renewable PPAs increase in the near future. Elements of merchant financing that are starting to emerge in the wind sector will require some form of additional revenue stabilisation through support schemes, corporate renewable PPAs, and other hedging instruments.

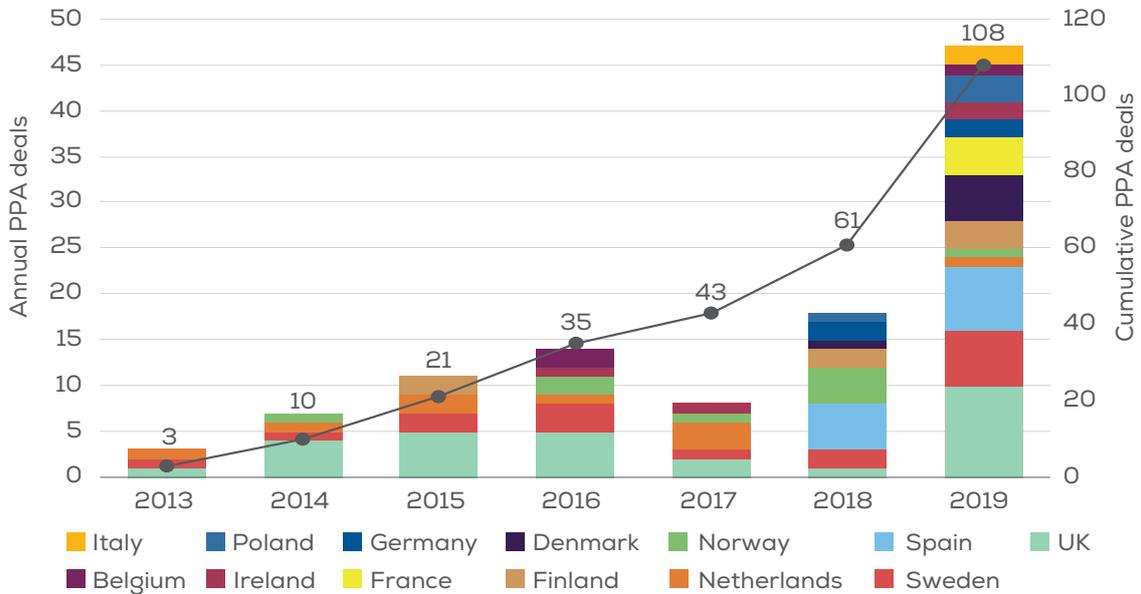
Corporate renewable PPAs until recently have been limited to a handful of countries. Since 2017, there have been corporate PPAs signed in 6 additional countries for the first time: Poland, Germany, Denmark, Spain, Italy and France.

The new Renewable Energy Directive mandates Member States to identify and remove administrative barriers to corporate PPAs and facilitate their uptake in their National Energy and Climate Plans which set out their Climate & Energy policies from 2021 to 2030.

This, coupled with developers' need for revenue stabilisation (with the phase out of Feed-in-Tariffs) and a growing demand for renewable electricity from corporates, is pro-

viding the impetus for growth in corporate PPAs in terms of contracted volumes, geographical coverage and numbers of deals.

FIGURE 26
Number of corporate renewable PPAs by country and year 2013-2019

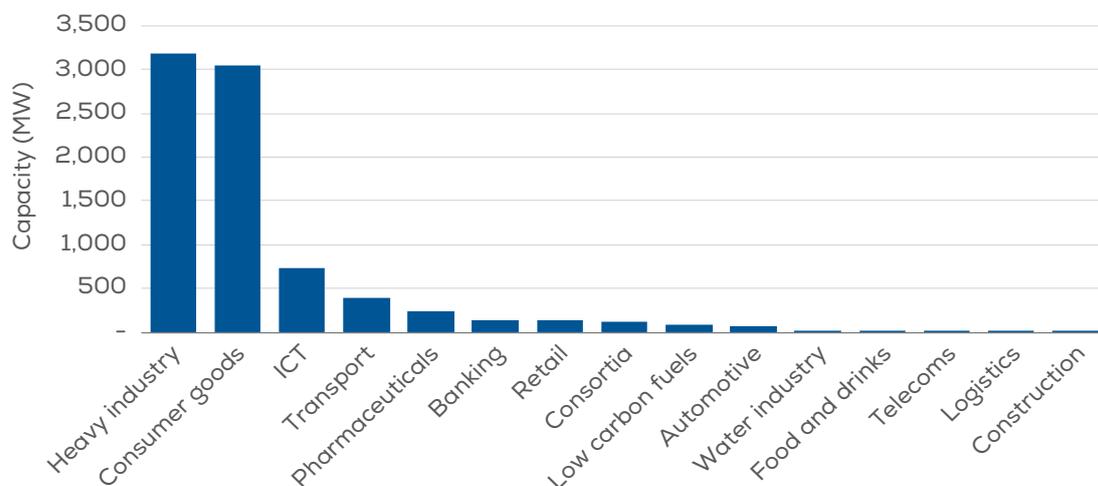


Source: WindEurope

47 corporate PPAs were signed in 2019 alone, 44% of all corporate PPAs signed in Europe to date. This includes the 793 MW contracted in Europe by Google (633 MW for wind energy) and the consortium of UK universities

contracting volumes from wind farms across Scotland and Wales. Covestro became the second chemicals company (after AzkoNovel) to sign a corporate PPA.

FIGURE 27
Renewable energy corporate PPAs by sector (MW)



Source: WindEurope

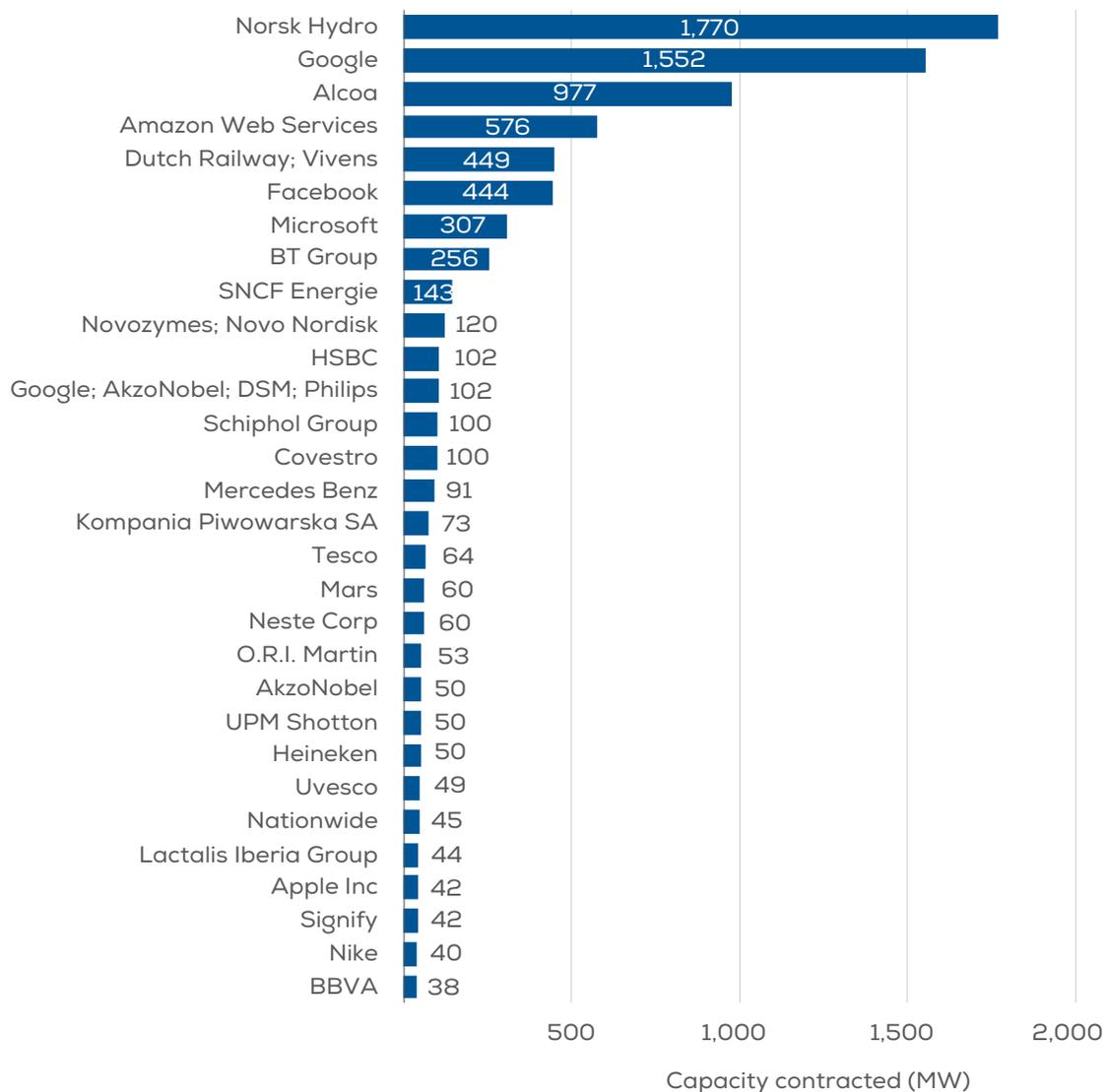
Demand for renewable electricity is coming from a wide variety of industrial sectors and recent years have seen a diversification in off-takers signing PPAs. Automotives, pharmaceuticals, logistics, water and consumer goods are the latest sectors to join this group.

Heavy industry and ICT have contracted the majority of corporate renewable PPAs in Europe. Aluminium smelters Norsk Hydro and Alcoa have contracted a cumulative wind energy capacity of 2.7 GW. Based in the Nordics, they

have traditionally signed long-term PPAs with hydropower and therefore have the in-house expertise and experience to be able to develop renewable PPAs with wind energy.

Many of the ICT data centres are also based in the Nordics where lower temperatures allow more efficient cooling. Amazon Web Services, Google, Microsoft and Facebook have contracted over 1.7 GW of wind power in the Nordics.

FIGURE 28
Corporates contracting renewable electricity via PPAs in Europe (MW)

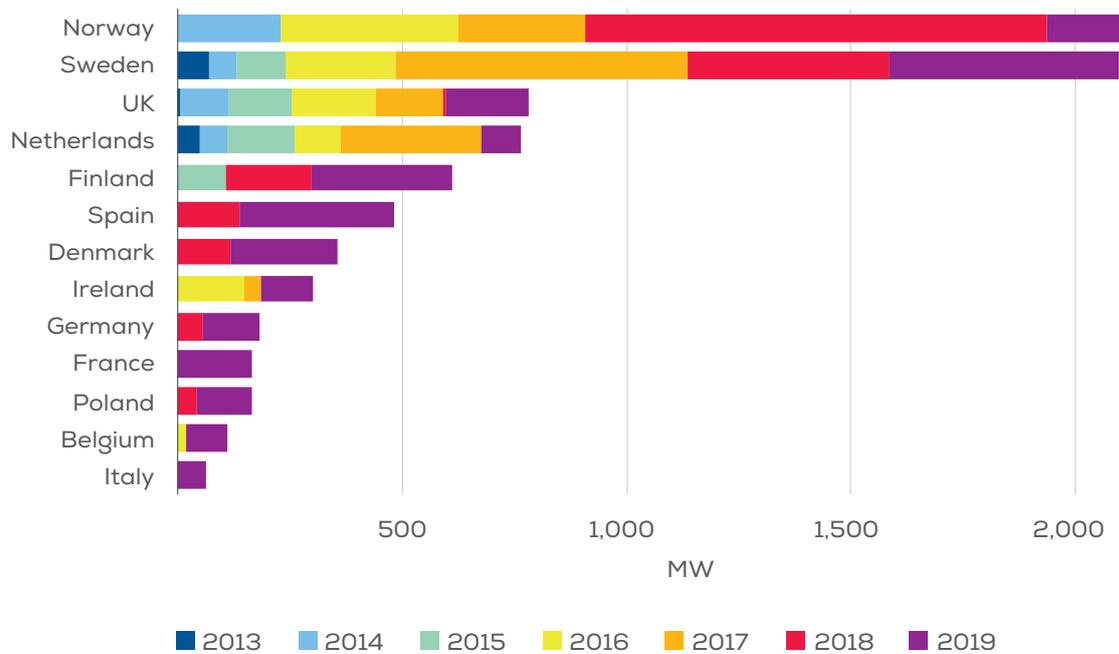


Source: WindEurope

Dutch railways achieved their goal of covering all their trains' power needs in the Netherlands with renewable electricity by 2017.

BT Group have contracted a cumulative capacity of 256 MW in PPAs, 249 MW of which involves the power from onshore wind farms in the UK.

FIGURE 29
Renewable energy corporate PPAs by country (MW)



Source: WindEurope

The Nordic region, followed by the UK and the Netherlands, are the biggest markets for such deals. What these markets have in common is a good track record in renewable energy development, coupled electricity markets,

sufficient demand for green electricity from corporates and a lack of explicit regulatory barriers to sign corporate renewable PPAs.



Photo: Jason Bickley

3.

POLICY AND INVESTMENT OUTLOOK

3.1 EUROPEAN GREEN DEAL

In December 2019 European Commission President Ursula von der Leyen unveiled the European Green Deal, the headline political project of the new European Commission (2019-2024). It aims to respond to EU citizens' demands for politicians to act on the global climate crisis by putting some concrete measures (i.e. legislation and funding) behind Europe's ambition to become the first carbon-neutral continent by 2050.

The Commission's proposal seeks to enshrine the ambition of climate-neutrality by 2050 into law in the first **European Climate Law**. The proposal has been submitted to the European Parliament and the Council under the standard legislative procedure. By September 2020, the Commission will submit proposals to boost the current greenhouse gas (GHG) emission targets for 2030 up to 50%-55%, from 40% today.

An increase in the GHG savings target will logically require a revision for all related targets, including the current 32% renewables target and the 32.5% energy efficiency target by 2030, along with the supporting policy measures.

Europe will tighten carbon emission caps and put an even higher price on the carbon that European companies emit in their production processes. Since many of our international partners will not uphold comparably high standards, additional costs will be incurred for EU businesses, making them less competitive internationally. To address the balance, the European Union plans to implement a **Carbon Border Adjustment Mechanism** to tax imports of products that have been produced in countries with lower emission standards at our borders. This will be applicable for some sectors only.

Linked with the Carbon Border Adjustment Mechanism, the **EU's Industrial strategy** will focus on how to uphold Europe's industrial and technological leadership in the face of international competition. It will include a sustainable product policy with "prescriptions on how we make things" in order to use fewer materials, and ensure products can be reused and recycled. The strategy will give special attention to those energy-intensive industries like steel and cement that serve as suppliers to many other sectors – wind energy included.

In the immediate term, the new European Commission is assessing the final **National and Energy and Climate Plans** (NECPs) that Member States were required to submit by 2020. The NECPs form the framework outlining climate and energy goals, policies and measures required to meet climate and energy targets from 2021 to 2030. The NECPs will have to be updated in 2023 to integrate higher climate ambitions and revised sectorial legislation.

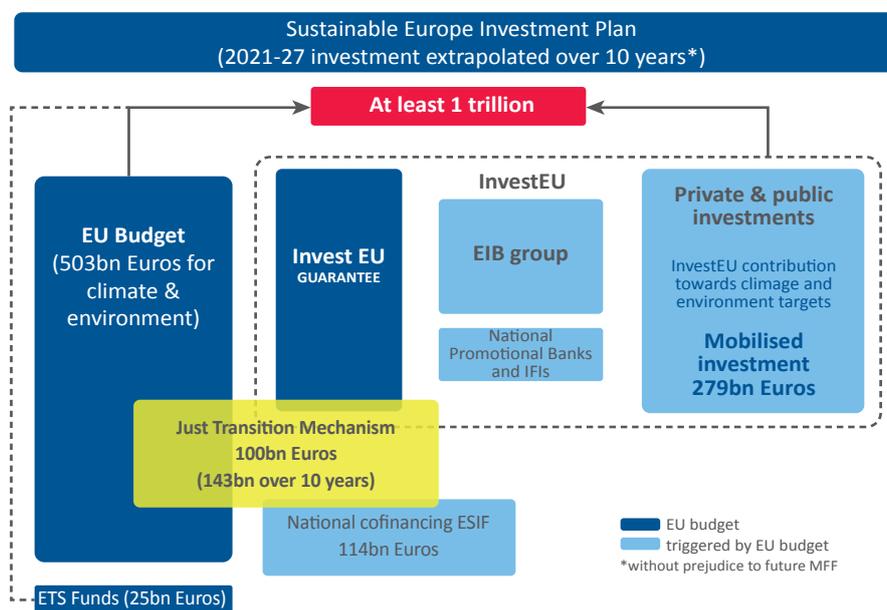
lise at least €1 trillion of sustainable investments from the public and private sectors over the next decade.

SUSTAINABLE EUROPE INVESTMENT PLAN

The Sustainable Europe Investment Plan is the investment pillar of the European Green Deal and will aim to mobi-

lise at least €1 trillion of sustainable investments from the public and private sectors over the next decade.

FIGURE 30
The Sustainable Europe Investment Plan



The numbers shown here are net of any overlaps between climate, environmental and Just Transition Mechanism objectives.



The **EU Budget** will provide €503bn for climate and environment spending between 2021 and 2030 triggering additional national co-financing of €114bn.

The **InvestEU Programme** builds on the Investment Plan for Europe, the Juncker Plan (mentioned below in the **section 3.2**), and aims to mobilise **€279bn** of private and public investments in climate and environmentally sustainable investments. It will also bring together a multitude of EU financial instruments (including the European Fund for Strategic Investments) under one structure, simplifying

EU funding processes and making them more efficient and flexible. Part of the structure will include the **InvestEU Guarantee** which will help reduce risk in financing and investment operations. The European Investment Bank (EIB) will implement 75% of InvestEU and provide technical support to projects under the **InvestEU Advisory Hub**.

Finally the **Just Transition Mechanism** will help the regions most heavily dependent on fossil fuels with the aim of leaving no one behind. The mechanism will combine financing from the EU budget, co-financing from Member States and

contributions from InvestEU and the EIB to reach approximately €143bn over the period from 2021-2030.

In addition to (and separate from) the EU budget, the **Innovation and Modernisation Fund** will also contribute to

the Green Deal. The Fund will be financed with revenues from the auctioning of carbon allowances under the Emissions Trading Scheme (ETS) and will provide at least €25bn for the development of climate mitigation technologies.

3.2 EUROPEAN INVESTMENT BANK

The European Investment Bank (EIB) is the European Union's long-term financing institution, a Member State owned entity which offers financing and advisory services to help boost the European economy.

In 2019 the bank held its largest ever consultation on its future energy lending policy. This was approved in November 2019. It will align all the EIB Group's activities with the Paris Agreement from 2020, ending the financing of unabated fossil fuel projects by the end of 2021 (including gas) and strengthening their support of renewables and energy efficiency.

The strategy adopted includes supporting €1 trillion of investment in climate action and sustainability between 2021 and 2030, increasing its share of financing in this area to 50% in 2025 and from then on. The EIB will support the implementation of the European Sustainable Investment plan, contributing to InvestEU through the InvestEU Guarantee, the Just Transition Fund and through grants, loans and advisory services. The EIB is set to become the Climate Bank of the European Union.

EUROPEAN FUND FOR STRATEGIC INVESTMENT (EFSI)

The EFSI is one of the three pillars of the Investment Plan for Europe (also known as the Juncker Plan), established by the EIB Group (the EIB and the European Investment Fund) and the European Commission in 2015 to revive investments after years of stagnation in growth following the global financial crisis in 2008.

The fund was designed to unlock additional investments of at least €500bn by 2020, focusing (amongst other things) on strategic infrastructure (digital, transport and energy).

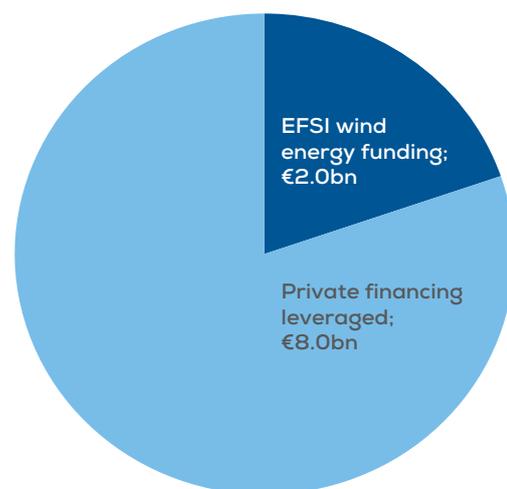
€10bn worth of investments in wind energy projects took place between 2015 and 2019 with the support of EFSI. The EFSI provided €2bn from direct investments which leveraged a further €8bn in private financing.

70% of the EFSI investments concerned offshore wind attracting €6bn of private investment.

The EIB has provided significant support to wind energy, particularly for offshore wind in recent years, crowding in financing and helping the technology reach a level of maturity where renewable power can be produced at compet-

itive prices. Given its policy to fund energy innovation and renewables from 2021, we hope it will strongly support the development of floating offshore wind and unlock the potential of deeper waters and more challenging seabeds.

FIGURE 31
Wind energy funding from the European Fund for Strategic Investments (EFSI)



Source: WindEurope

3.3 SUSTAINABLE FINANCE

The European Union is strongly committed to the Paris Agreement, supporting a transition to a low-carbon and sustainable economy. In order to achieve its goals, it has recognised the need to channel capital towards environmentally sustainable activities and is at the forefront of developing a financial system that encourages sustainable investments. It is estimated that in order to achieve the 2030 targets an investment gap of €260bn a year needs to be plugged.

As part of the Green Deal described in section 3.1 above, the Commission has presented the European Sustainable Investment Plan which aims to unlock €1tn of sustaina-

ble investments over the next decade. A sustainable finance framework is important to manage these goals by reorienting capital flows towards sustainable investment, mainstreaming sustainability into risk management practices and fostering transparency and long-termism.

The European Commission has developed an [action plan on sustainable finance](#) with key steps including establishing a clear and detailed EU classification system (taxonomy) for sustainable activities, establishing EU labels for green financial products and strengthening transparency of companies' environment, social and governance (ESG) policies.

EU CLASSIFICATION FOR SUSTAINABLE ACTIVITIES – THE TAXONOMY

There is more and more awareness from society about the importance of tackling climate change. The demand for green or sustainable investments has been growing. But there is currently no common definition of what constitutes sustainable activities or investments.

The objective of the Taxonomy is to provide clarity and transparency on environmental sustainability to investors, financial institutions and companies to enable informed decision-making and foster investments in environmentally sustainable activities.

The Taxonomy will not only apply to green sectors but will also set thresholds to enable the transition of polluting sectors. These thresholds will be built as much as possible on existing market practices and will take into account the latest policy and technological developments and innovations.

For an economic activity to be on the list of sustainable activities it must comply with 4 conditions:

1. Substantially contribute to one of the 6 environmental objectives:
 - a. Climate change mitigation
 - b. Climate change adaptation
 - c. Sustainable use and protection of water and marine resources
 - d. Transition to a circular economy, waste prevention and recycling
 - e. Pollution prevention and control
 - f. Protection of healthy ecosystems
2. Do no significant harm to any of the objectives in 1
3. Comply with minimum social safeguards
4. Comply with quantitative or qualitative Technical Screening Criteria

Technical screening criteria allow precise and granular determination of which activities in a given economic sector would qualify as sustainable.

EU GREEN BOND STANDARD

The Action Plan for sustainable finance involves establishing EU labels for green financial products. The Technical Expert Group (TEG) published its recommendations for the development of an EU Green Bond Standard in March 2019. The TEG proposes that the Commission creates a voluntary EU Green Bond standard to encourage market participants to issue and invest in EU green bonds.

Key recommendations are:

- Alignment with EU Taxonomy – proceeds of EU Green Bonds should finance or refinance activities/ investments deemed sustainable under the Taxonomy.

- Publication of a Green Bond Framework – detailing the scope and content for issuers to provide details on the proposed use of proceeds, its green strategy and processes at issuance.
- Mandatory reporting – periodical reporting of use of proceeds and environmental impacts.
- Mandatory verification – confirming conformity with the standard.

Any type of listed or unlisted bond or capital market debt instrument issued that is aligned with the EU Green Bond Standard should be considered an EU Green Bond.

The European Commission will decide on whether to accept the recommendations of the TEG.

3.4 REVENUE STABILISATION

The European wind industry until recently benefited from support in the form of Feed-in-Tariffs (FiTs) whereby national governments offered a fixed price for electricity provided by wind farms, regardless of the prevailing wholesale price of electricity, providing revenue stability for developers and lenders. This has allowed cheap financing and promoted the development of the wind energy sector, resulting in economies of scale and impressive cost decreases. Now that the technology is cost-competitive and its share is significant, support from national governments has been changed to market-based instru-

ments through auctions, ensuring a competitive environment and sustaining further cost reductions.

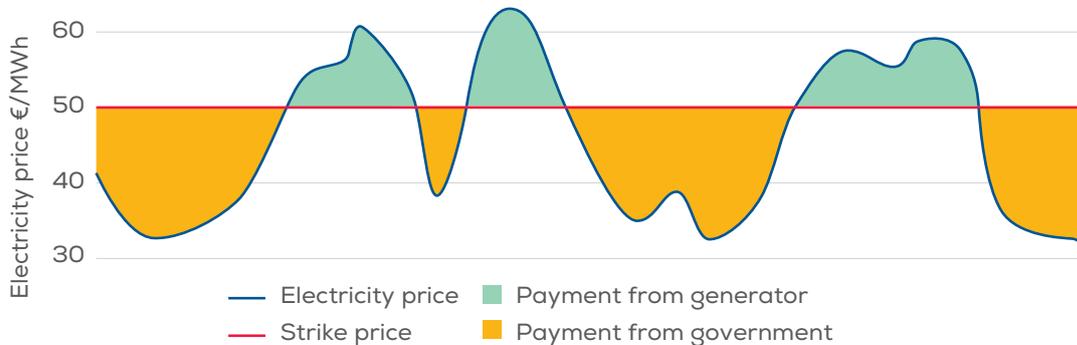
However, there are few investors and lenders who are comfortable with merchant risk yet (the risk arising from uncertain future volumes and prices) and support schemes which do not provide some form of price stabilisation risk reducing the flow of cheap capital to the sector. The increased costs of financing will ultimately result in higher costs to society for renewable power.

TWO-SIDED CONTRACT FOR DIFFERENCE (CFD)

A well-designed energy- and market-based revenue stabilisation mechanism such as the two-sided CfD is the best way to support renewable energy investors. These mechanisms must strike the right balance between investors' need for certainty and lower costs for society.

Under a two-sided CfD a strike price is agreed between the developer and government (usually via a competitive auction). If the wholesale electricity price falls below the agreed strike price, the government will pay the difference between the strike price and the wholesale electricity price to the developer. However, at times when the wholesale electricity price is higher than the strike price, the wind farm compensates the government.

FIGURE 32
Revenue stabilisation from two-sided CfD



Source: WindEurope

The two-sided CfD does remove up-side potential (because the electricity price is capped) but also downside risk by providing a price floor. This removes price uncertainty for the generator and therefore reduces the variability in project revenues. The revenue certainty provided allows projects to attract cheap financing and provide renewable electricity at a lower cost to society.

It also has the advantage that participants in the bidding process do not have to forecast power prices years into the future. The need for long-term forecasts leads to the so-called ‘winners curse’ by favouring those with the most optimistic views of the world or aggressive bidding strate-

gies. Badly priced or aggressive bids could lead to stranded investments and higher financing costs.

As mentioned in section 2.6, corporate PPAs can also provide developers with long-term price visibility and this has likely led to the increase in the European PPA market in recent years. However, currently the number of corporates with a sufficient credit rating (and able to commit to such long-term energy contracts) is limited. Innovative contract structures and credit support will need to be developed to take full advantage of the corporate and industrial sectors’ potential for supporting renewable projects.

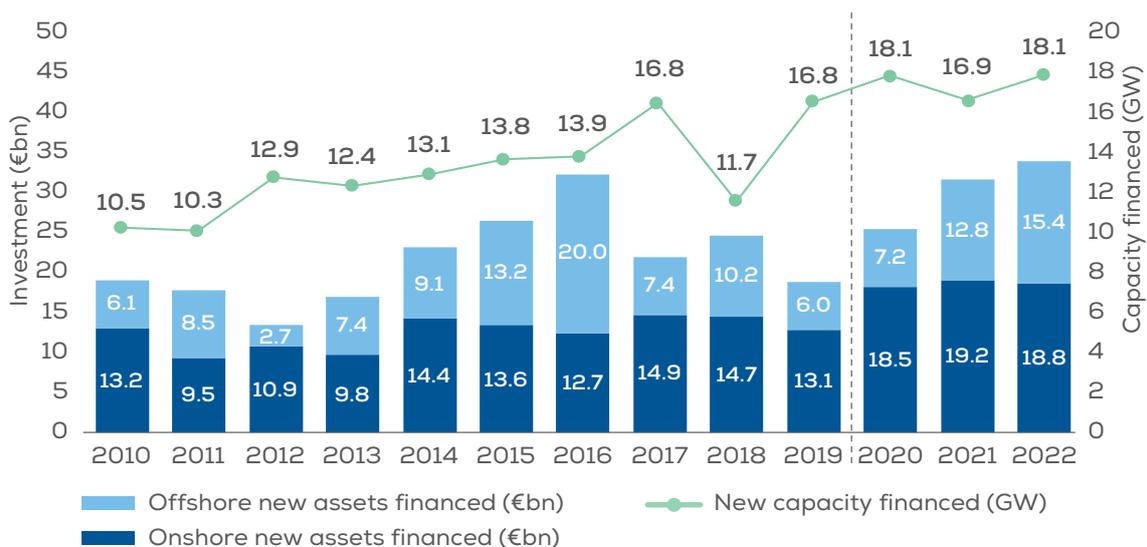
3.5 INVESTMENT OUTLOOK

The pace of onshore wind deployment has been impacted by permitting issues in recent years. Nevertheless, it remains the cheapest form of new power generation and will be an instrumental part of the transition to a low-carbon society. Poland awarded 2.2 GW of support for projects in 2019 which will be reaching FID in 2020 and 2021. Assuming an average CAPEX per MW of €1.3m, this could result in investments of €2.8bn over the next couple of years, excluding investment in projects which will gain support in this year’s two planned auctions.

Over 16 GW of capacity was awarded support through renewable energy auctions in 2019. Almost 7 GW (44%) of the auctioned capacity was in offshore wind.

Germany awarded almost 2 GW, France 1.1 GW, the Netherlands more than 780 MW and Greece and Italy almost 500 MW of support for onshore wind in 2019. Further afield, Turkey auctioned 1 GW of capacity for onshore wind in 2019.

FIGURE 33
Investment outlook to 2022 (€bn)



Source: WindEurope

The UK is likely to continue to attract investments in offshore wind, awarding 5.5 GW of support in 2019. With a further 6 GW to be issued in 2021 there is a clear pipeline of projects and support from the two-sided CfD. France and the Netherlands also look likely to grow their offshore markets with a clear schedule of auctions in the coming years.

While FIDs in Germany were a record low in 2019 (see Figure 8 New asset finance in wind energy per country, 2019 (€bn and GW)), there are signs that the German govern-

ment is taking steps to address permitting issues which would allow the market to rebound.

According to our projected wind installations and using an average CAPEX per MW for new onshore and offshore wind projects, financing needs could approach €94bn (including projects awarded support in 2019 yet to reach FID) between 2020 and 2022. This would represent approximately 60 GW of new wind energy capacity.

COVID-19

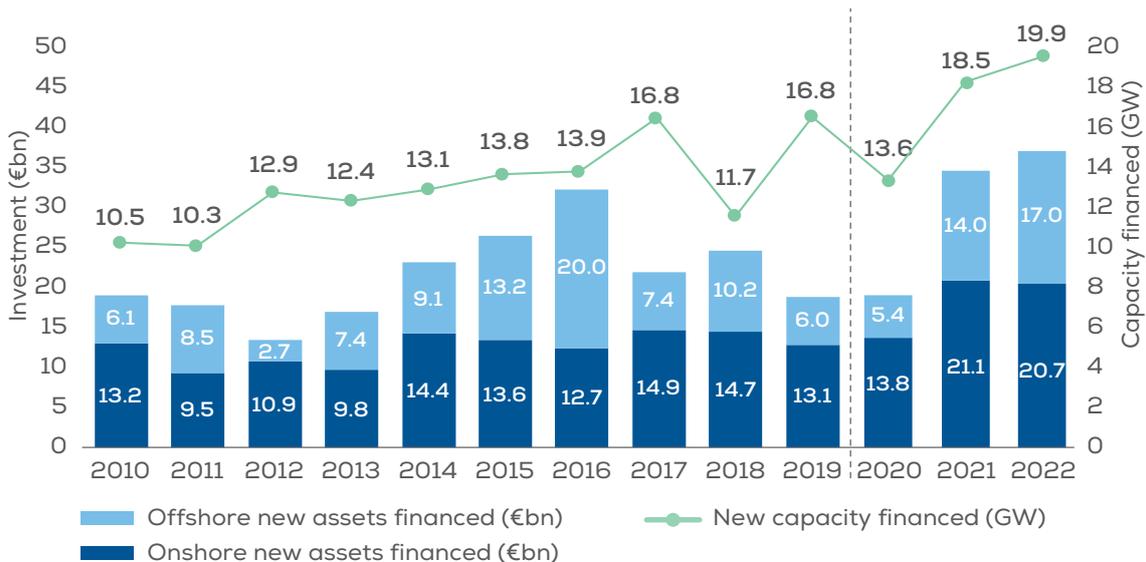
The European wind industry is the global leader in the wind turbine market, realising projects in more than 80 countries world-wide. As such, our companies rely on both European and global supply chains for raw materials and components. The COVID-19 virus is impeding international trade, creating delays and uncertainties for different industrial sectors. As the number of infections rises, the European wind industry is likely to be impacted.

First analysis suggests that COVID-19 will have moderate effects on international supply chains for wind energy. A knock-on effect of a slowdown in China's manufacturing

output is already visible in other countries. With COVID-19 we are likely to see delays in the development of new wind farm projects which could lead to developers missing the deployment deadlines in countries' auction systems. Governments will need to be flexible on how they apply their rules.

Figure 35 illustrates how a simple delay of 3 months in construction of wind farms and in the financing of projects by 2021 may affect the outlook, assuming the market fully recovers in 2020 and is able to compensate for the slow down in the following years.

FIGURE 34
Investment outlook to 2022 allowing for a 3-month delay from COVID-19



Source: WindEurope

FINAL THOUGHTS

Financial markets will continue to support wind energy projects with similar loan pricing, maturity and other commercial terms. Given current international trade difficulties resulting from the trade war between the USA and China, Germany's manufacturing and automotive decline and Brexit, 2020 is unlikely to see strong economic growth. With the additional slowdown likely to result from the COVID-19 pandemic, it is very unlikely that central banks will be increasing interest rates in 2020 (increasing interest rates helps control the rate of inflation arising from strong economic growth). Borrowing costs will therefore remain low, making it a good time to take on debt for long-term investments.

In the longer term, wind asset owners will have to address the merchant element in wind power projects. WindEurope expects that by 2030 more than 25% of the wind installed capacity will be fully exposed to market risk⁶.

While banks are used to dealing with portions of merchant financing, institutional equity investors may find it challenging to adapt to the new reality. This underscores the importance of financing solutions that capture the nature of merchant risk and stabilise the revenue flows in these projects.

Europe's wind energy sector is strategic for the EU economy. Wind energy already meets 15% of Europe's power demand. However, Europe is not building enough wind energy to deliver the European Commission's Green Deal. Last year, installations were up 27% compared with 2018, but the rate of installations needs to double to reach the goals set out in the Green Deal. Revenue stabilisation from government support schemes and other business models such as corporate renewable PPAs will allow the sector to support the transition at the lowest cost to society.

6. WindEurope (2017), The value of hedging: New approaches to managing wind energy resource risk

GLOSSARY

- **Asset finance:** includes all infrastructure investments in onshore and offshore wind farms, including refinancing transactions.
- **New asset finance:** includes all infrastructure investments in the construction of new onshore and offshore wind farms, excluding refinancing transactions.
- **Final Investment Decision (FID):** the final decision to go ahead with the project once the permitting and financial arrangements are in place.
- **Capital markets:** refers to activities that gather funds from the issuance of shares and bonds.
- **Venture capital and private equity (VC/PE):** refers to the provision of long-term equity financing to emerging companies as a direct investment.
- **Mergers and acquisitions:** includes company merges and acquisitions as well as the acquisition of interest in onshore and offshore wind projects.
- **Corporate finance / on-balance sheet financing:** includes all investments in wind power generating and transmission assets financed either through the equity of project owners or through debt raised at corporate level.
- **Project finance / off-balance sheet financing:** includes all investments in wind power generating and transmission assets where the project debt and equity used to finance the project are paid back from the cash flow generated by the project (as opposed to the balance sheet of project owners). To this end, projects are a spin-off as a separate entity.
- **Non-recourse debt:** debt raised in project finance transactions.
- **Syndicated loan:** a loan provided and structured by a group of lenders.
- **Green bond:** corporate bond, the proceedings of which will be used to finance a portfolio of renewable energy projects. Unless specified, the use of money is often unallocated.
- **South East Europe (SEE):** Geographical region of Europe including Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Kosovo, Macedonia, Romania, Serbia and Slovenia.
- **Project bond:** includes bonds issued at project level, the proceedings of which will be used to finance a specific project.
- **Initial Public Offering (IPO):** the very first sale of stock issued by a company.
- **Corporate renewable power purchase agreement (PPA):** a long term bilateral agreement for the purchase of power from a specific renewable energy project, where the power off-taker is a corporate as opposed to a power producer.
- **Weighted Average Cost of Capital (WACC):** The WACC is calculated as weighted average of the cost of debt (the interest rate charged by lenders), the cost of equity (compensation required by shareholders for bearing risk of ownership) and the cost of any other category of capital (preferred stock, long-term debt etc.). It represents the cost to a business of raising capital and is a measure used to assess whether to invest in a new project.

WindEurope is the voice of the wind industry, actively promoting wind power in Europe and worldwide. It has over 400 members with headquarters in more than 35 countries, including the leading wind turbine manufacturers, component suppliers, research institutes, national wind energy associations, developers, contractors, electricity providers, financial institutions, insurance companies and consultants. This combined strength makes WindEurope Europe's largest and most powerful wind energy network.

Wind[•]
EUROPE

Rue Belliard 40, 1040 Brussels, Belgium
T +32 2 213 1811 · F +32 2 213 1890
windeurope.org