

# Aligning the stars

Asset owners & energy  
investment toward Net Zero

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## Foreword



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Partner

### *Infrastructure and politics are inextricably linked.*

It's no surprise that slogans abound: "build back better", "build back greener" and "levelling up" frame the current conversation about infrastructure in the UK. The government does have a big role here and they have delivered some clear direction for investors in recent months, signalling decades of radical change in the energy industry to achieve Net Zero, which we build on in this piece.

We believe the vast scale of change required to meet this commitment will reshape the energy and infrastructure landscape in ways we are only just beginning to appreciate. For example, a quadrupling of offshore wind generation in just a decade alongside the rollout of electrification infrastructure to support a ban on petrol cars.

We believe the right partnerships here between the public and private sectors can absolutely produce win/win outcomes for consumers, taxpayers, and asset owners,

but this is by no means guaranteed - bad examples exist too. In this piece, we explore some of what we've learnt advising both asset owners and energy companies over the last decade, and what we can learn for the coming decades of our low-carbon transition.

"Unlocking private capital" is an oft-heard cliché, but we think this is misleading and frames the discussion the wrong way. The doorway between private investment and infrastructure has been wide open for the last decade - with UK asset owners investing c£45 billion<sup>1</sup> in infrastructure assets from offshore wind, to biomass, solar and sewers, alongside asset owners from the Netherlands, Australia, Canada and more. This is important as we believe solely focusing on persuading asset owners is not what's needed. Bringing forward enough of the right assets at the right risk/return levels and in sufficient quantity will interest a range of global asset owners, but this is not straightforward.

*Your kettle, your washing machine, your cooker, your heating, your plug-in electric vehicle - the whole lot of them will get their juice cleanly and without guilt from the breezes that blow around these islands.*

Boris Johnson  
October 2020



<sup>1</sup>The Investment Association : Investment Management in the UK 2019-2020 <https://www.theia.org/sites/default/files/2020-09/20200924-imsfullreport.pdf>



## Foreword continued

A business-as-usual scenario from here would see UK asset owners continue to invest as they have done over the last decade, perhaps doubling their allocations to economic infrastructure from £35bn to £70bn over the next decade. This would leave a vast £100bn investment gap relative to what's needed over the next decade alone.

A more optimistic scenario, where new assets can be aimed specifically at the needs of different asset owners ([detailed on page 17](#)) which sees UK asset owners investing alongside the UK government and global asset owners to expand their allocations to energy infrastructure could successfully meet the £125bn needed over the next decade, and the £350bn required in total before 2050 for the Net Zero transition.

*A business-as-usual investment scenario leaves a large gap. This can be bridged by aiming assets specifically at needs of asset owners.*





# Key findings

## Conclusions for investors

There will continue to be vast investment opportunities in the energy sector with LCP estimating that **£12bn per year for the next 30 years – £350bn in total** – will need to be invested in a range of generating technologies

The range of energy assets available to invest in is wide and includes regulated assets such as the pipes and cables that transport gas and electricity through to nascent technologies such as hydrogen production – investors should be open-minded to the different types of investments available, and the different stages of investment (for example greenfield vs operating assets)

The revenue from power assets like offshore wind farms will be influenced by the buildout of new projects. Investors should understand this fully to optimise and expand portfolios

Mature renewable energy technologies such as wind and solar will continue to represent the biggest investment opportunity over the medium term, and the re-admission of onshore wind and solar to the next round of Contracts for Difference (CfD) auctions will stimulate more supply of projects

*We believe the combination of political will, emerging technologies and a need for capital will offer a tremendous investment opportunity to investors able to embrace the vision and complexity.*

The newest technologies such as battery storage or Carbon Capture, Usage and Storage (CCUS) may take years to become investible, but over time may become legitimate asset classes. It is worth understanding the key drivers of these assets from an early stage as the drivers may seem quite alien and hard-to-understand at first. Better to get to grips with these early rather than at the point of investment

Be open to the benefits of accepting some construction risk in projects where technologies are more established, in return for being an equity partner from the start rather than only buying operational assets in the secondary market where prices will be higher and returns lower





# Key findings

## Conclusions for the energy industry

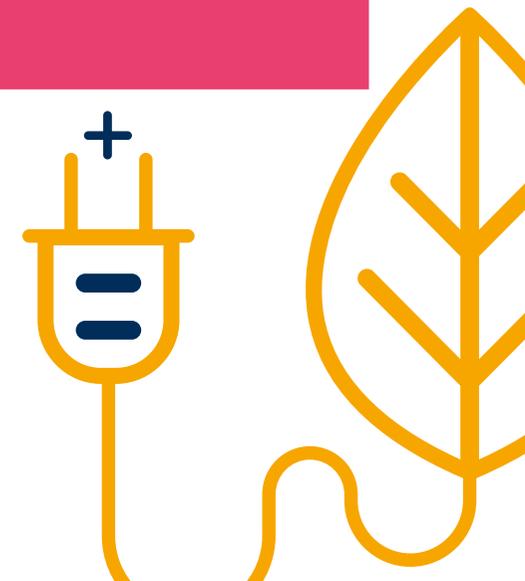
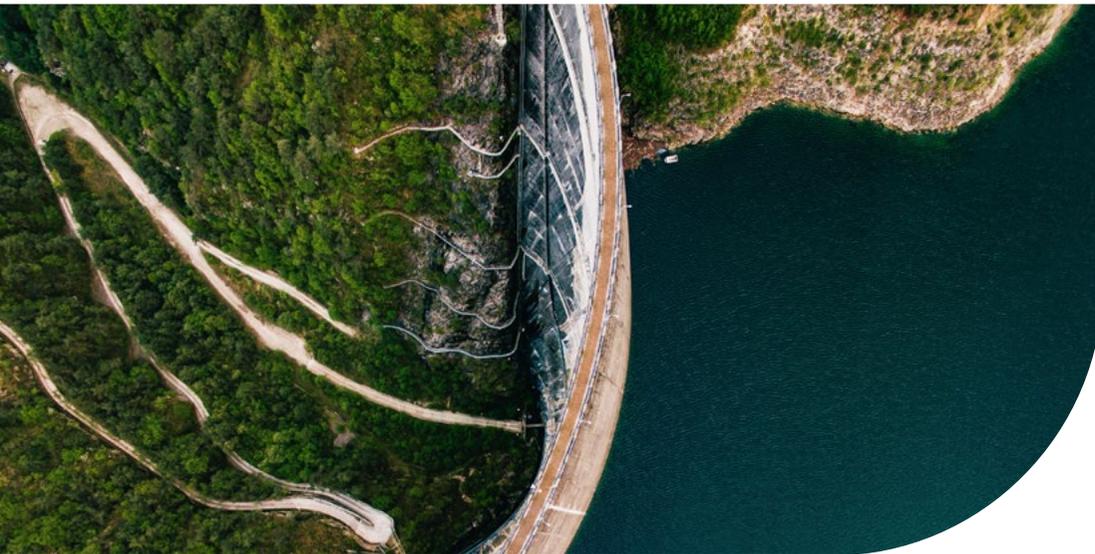
There is a huge amount of private capital seeking good long-term investments which is likely to be open to investing in UK energy infrastructure

Surveys suggest<sup>2</sup> that **only 10% of European Asset Owners have an allocation to infrastructure**, with an average allocation of 3%, suggesting scope for this to increase

In the past, one blocker has been a mismatch of timescales between investors and industry: be patient and work to bridge the gap between deal-making timescales and institutional investor timescales on diligence and decision making

Developers should divest projects to make more assets available to end investors over time. Today less than 30% of UK offshore wind assets are in the hands of long-term investors<sup>3</sup>; we believe there is investor demand for far more

Consider different types of financing asset packaging for example bonds as opposed to equity to suit the maturity of technologies, and the appetites of different investors. With 69% of the £1.7trn UK DB<sup>4</sup> market invested in bonds, this is arguably where the largest domestic asset appetite exists



<sup>2</sup> Mercer European Asset Allocation Insights 2020 [https://www.uk.mercer.com/content/dam/mercer/attachments/private/6010897a-WE%20EAAS%202020\\_FIN\\_KR.pdf](https://www.uk.mercer.com/content/dam/mercer/attachments/private/6010897a-WE%20EAAS%202020_FIN_KR.pdf)

<sup>3</sup> Source: Crown Estates Operational Report 2019 <https://www.thecrownestate.co.uk/media/3515/offshore-wind-operational-report-2019.pdf>

<sup>4</sup> Source: PPF Purple book 2020 [https://www.ppf.co.uk/sites/default/files/2020-12/35988\\_PPF\\_Purple\\_Book\\_20\\_SinglePages\\_FINAL.pdf](https://www.ppf.co.uk/sites/default/files/2020-12/35988_PPF_Purple_Book_20_SinglePages_FINAL.pdf)



# Key findings

## Conclusions for government

A business-as-usual progression of private investment will leave a yawning gap of £100bn over the next decade compared to what is needed. Yet with careful design and targeting of investments, we believe this gap could be bridged

**The current suite of market mechanisms has been successful in deploying large amounts of low carbon and firm power projects.**

The structure of these mechanisms has reduced the cost of capital and therefore the price of these projects. Government should continue to use these to attract the investment needed to deliver Net Zero

It is important that CfD auctions deliver the capacity increases needed to meet Net Zero commitments and maintain attractiveness of assets to investors. Our modelling (see appendix) shows that **without support, renewable energy assets become much more risky propositions** as power prices fluctuate and more renewables come online

Caution needed with mandate for National Infrastructure Bank to avoid crowding out private sector finance



Ensure the National Infrastructure Bank is not at risk of being sold off (like the Green Investment Bank), which would then compete against UK asset owners to bid up prices

Recognise that UK investors are far from a single homogeneous group. Different assets will appeal to different segments

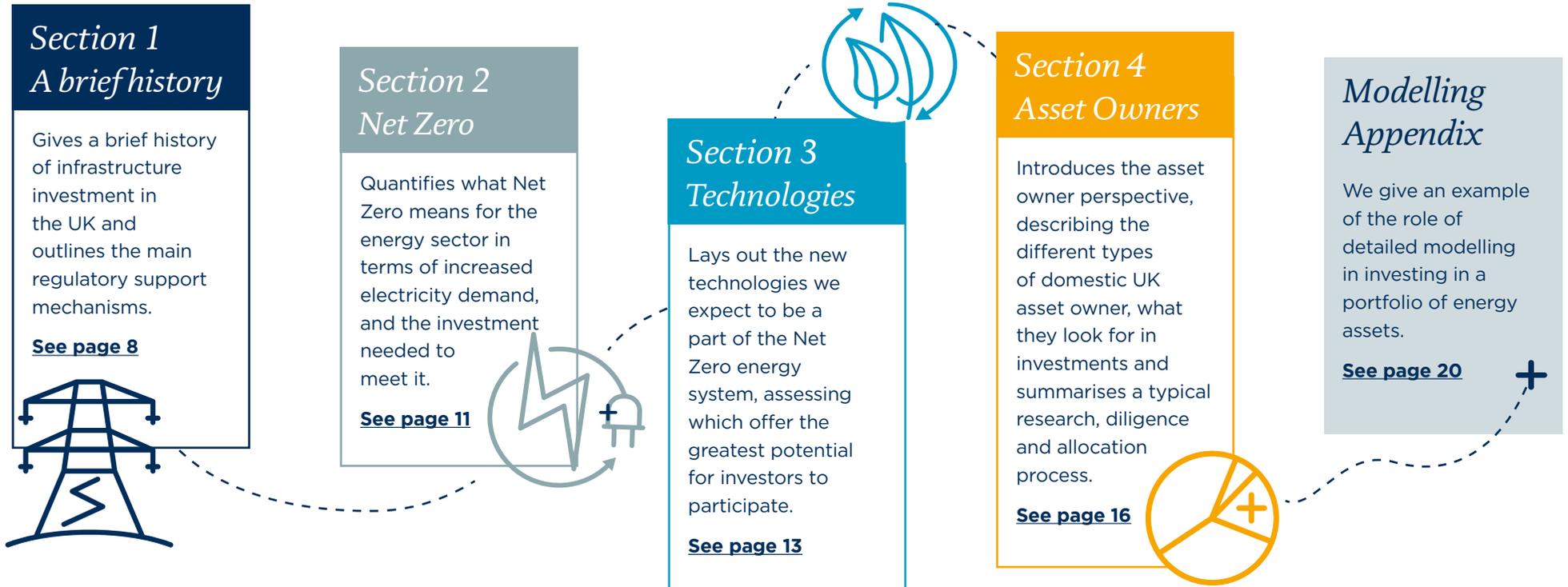
Address issues that have dis-incentivised UK infrastructure investors in the past: political uncertainty, threat of nationalisation, politicisation of regulators and failure of large contractors

Be open to new approaches for private / public partnership particularly those put forward by investors with good experience of making these work<sup>5</sup>

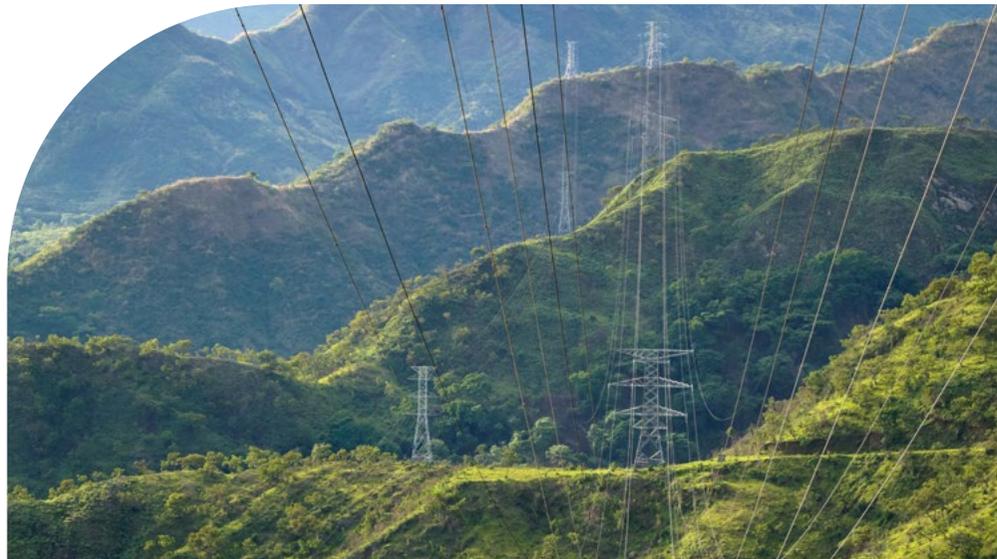
<sup>5</sup> <https://www.ipe.com/home/guest-viewpoint-david-neal-ifm-investors/10050248.article>



# Overview of this paper



*We outline key takeaways for government, the energy industry and asset owners in getting to productive partnerships that stand the best chance of getting good outcomes for all.*





## Energy infrastructure investing in the UK: a brief history

Investment in UK energy infrastructure has changed significantly following privatisation of the sector. The private equity that initially allowed the sector to move away from state ownership continues to play a role in the development of new power assets, but more diverse sources of capital are now available thanks to new market mechanisms and maturing technologies both reducing risk. On the investor side, infrastructure has become a much more mainstream asset class than it once was with a range of institutional offerings now available with more investor-friendly fund terms and lower complexity than in previous times.

To build and finance renewable energy projects, several support mechanisms were developed. These primarily consisted of the Renewables Obligation (RO) for large-scale projects and the Feed-in Tariff (FiT) for small-scale projects. These provided investors with a steady revenue as both schemes were government-backed for a 20-year period. Healthy rates of return and low risk allowed investors to get behind the renewable power agenda with 23GW and 7GW of renewable capacity built through the RO and FiT respectively.

Many investors, including some large UK Defined Benefit (DB) pensions schemes, were able to make good early equity investments in these technologies which fundamentally gave them de-risked, secure income streams, once the mechanisms were fully understood. Indeed, these mechanisms have been recognised globally making these assets highly sought-after and the list of investors in UK offshore wind assets includes many of the largest investors in the world<sup>6</sup> including those from Canada, Australia, Denmark, the Netherlands, China and Japan, illustrating just how global the market for investment assets is these days.

<sup>6</sup> Source: Crown Estates Operational Report 2019 <https://www.thecrownestate.co.uk/media/3515/offshore-wind-operational-report-2019.pdf>

<sup>7</sup> See for example Greencoat UK Wind plc, The Renewables Infrastructure Group plc and Bluefield Solar Income Ltd

**One challenge has been the limited availability of assets in the sector. With £2trn of UK DB pension scheme assets, and £500bn held by just the top 20 largest funds who tend to be those more commonly able to make allocations to these projects, the assets that were made available have been quickly snapped up.**

These investments have ended up in the hands of individual investors in some cases and proved very popular. Many well-known investment trusts have emerged investing in solar and wind assets, several of which have gathered more than £2bn in assets each<sup>7</sup>.

The sheer demand for these assets is illustrated by the persistent trading at substantial premiums to net asset value of 10% or more.



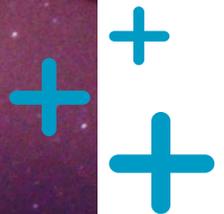
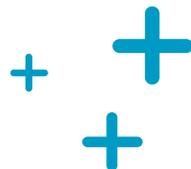


## Section 1 continued

### *As technologies matured...*

With renewable technologies now mature and current market mechanisms lowering risk even further, we see infrastructure funds taking a much bigger role in the market. The reduced cost of capital available from these providers is proving beneficial for renewables as the cost of projects continues to decrease. Net Zero requires a significant increase in renewables even compared to today's level, meaning that securing cheap capital is one of the biggest factors in keeping costs down for consumers.

The maturing of this market has changed the picture for investors, with returns potentially lower and risks (such as price risk) higher. At the same time, the volume of global capital chasing deals in the secondary market has caused highly competitive bidding processes that drive down future returns. This has allowed other types of investors to participate (such as debt investors) as more renewable projects have issued inflation-linked debt which is attractive to a different cohort of investor such as more mature DB pension funds.



### *Stars aligned*

**All this brings us to a point which we think is very favourable to investment in new projects – there is good familiarity and high demand from investors as evidenced by competitive bidding and low yields, at exactly the time when the government has plotted a radical course to decarbonisation requiring a lot of investment.**

**If managed and supported properly there is ample private capital willing to support the decarbonisation transition laid out by the government.**



## Section 1 continued

### Current market mechanisms

The current suite of market mechanisms used to build low carbon projects and provide security of supply include:

#### Contracts for Difference (CfD)

This mechanism is set to continue to play a large role in bringing forward the amount of low carbon capacity needed for our decarbonisation targets. Investors are given 15 years of price certainty under this mechanism, with generators provided a fixed price for every MWh generated.



#### Capacity Market (CM)

The CM is used to ensure there is enough generation capacity available to meet demand. CM contracts are also awarded for up to 15 years for new build assets, giving investors certainty regarding future revenue. But while a CfD provides revenue on a volume basis, the CM provides a fixed annual payment for installed capacity.



#### Regulated Asset Base (RAB)

The RAB model (which has traditionally been used to control the revenue collected by monopoly companies such as the electricity and gas networks) is now being looked at as a way to bring forward capital intensive projects such as new nuclear<sup>8</sup> which would benefit from the reduced risk provided by this mechanism. The RAB effectively provides a very stable framework for capital expenditure by offsetting a regulated return that is recovered through consumers' energy bills. This is governed by a politically independent regulator. Due to the level of construction risk with nuclear projects the RAB can provide revenue during this stage to attract investors that otherwise wouldn't be able to provide capital until the plant became operational.



The RAB effectively provides a very stable framework for capital expenditure by offsetting a regulated return that is recovered through consumers' energy bills.



<sup>8</sup> RAB model for nuclear: <https://www.gov.uk/government/consultations/regulated-asset-base-rab-model-for-nuclear>

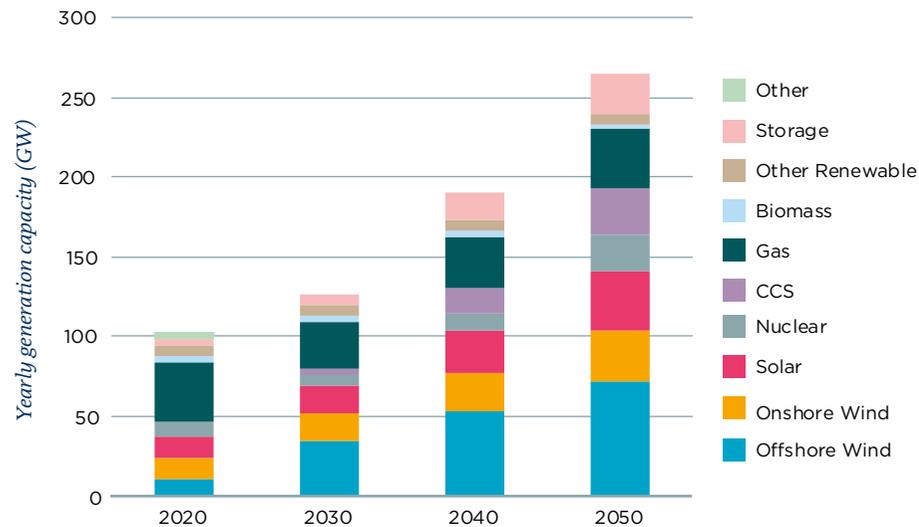


We estimate that the total level of investment needed for new generation assets alone will be £350bn by 2050.

## What Net Zero means for the power sector

Decarbonising the power sector will require a significant increase in the total amount of installed capacity on the system. This is due to both the intermittency of technologies such as wind and solar, and the increased demand for electricity as other sectors decarbonise through electrification. Currently, the GB power system has just over 100GW of power plant connected to it, with gas generation making up the largest share. **LCP's central scenario for reaching a Net Zero power system forecasts that this installed capacity will exceed 250GW**, with renewables making up the majority of this capacity. As traditional fossil fuel generation is phased out, there will be a need for new generation technologies to be developed such as bio-energy, natural gas with CCUS and hydrogen to balance our need for a decarbonised system with security of supply. All of these require the right market framework if we are going to unlock the financing needed to fund this transition.

**Figure 1: Current and future installed generation capacity in GB: Big increases in electricity generation are required from a mix of technologies.**



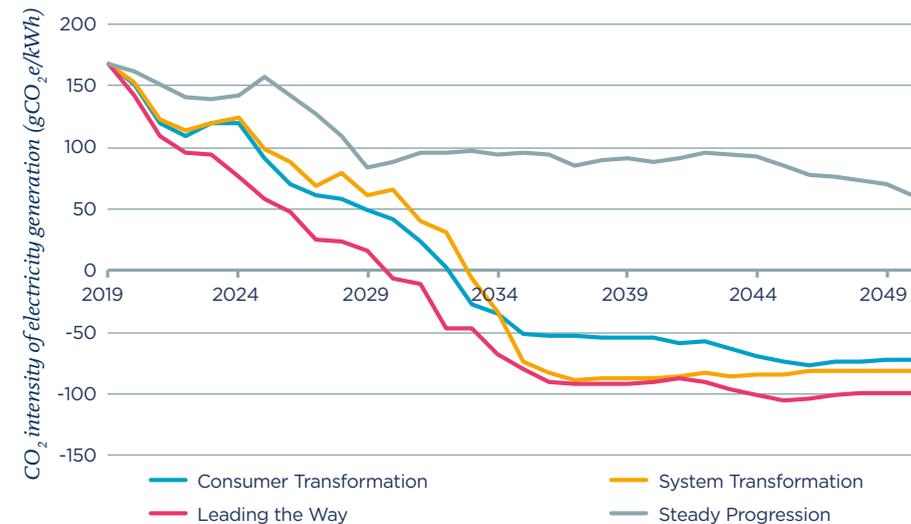
Source: LCP Energy Analytics Net Zero Scenario

### Total investment required

The cost of building a low carbon power system is significant - we estimate that the total level of investment needed for new generation assets alone will be £350bn by 2050. This would require nearly £12bn to be invested every year between now and 2050. On top of this investment in power generation assets, there will also need to be sizeable investment in electricity networks to allow the increased volume of electricity to be delivered around the country, as well as the gas network being transformed to support hydrogen being used as the primary gas.

These numbers are large, but viewed alongside the size of just the UK pension industry with £2trn of assets in DB schemes and £0.5trn in defined contribution schemes, ought to be eminently achievable if the right assets can be brought to market at competitive risk/return levels.

**Figure 2: Power sector carbon intensity: Under several scenarios, the UK Power Sector becomes net-negative by mid 2030s.**



Source: National Grid Future Energy Scenarios 2020



£18bn

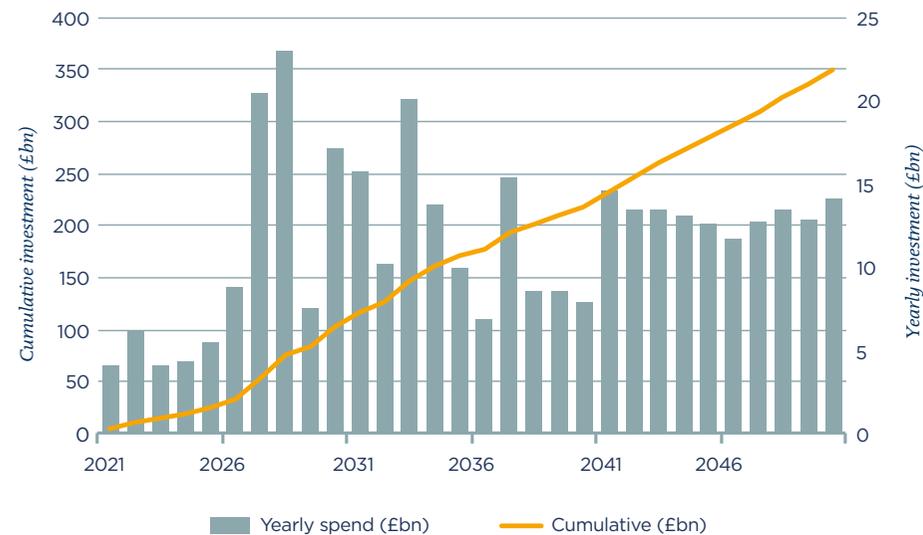
Bloomberg NEF reported that £18bn (\$26bn) of investment had taken place into renewable energy in the UK in 2020



## Is there demand for assets?

This equation is often (wrongly in our view) framed as a lack of demand from investors that needs to be stoked. This gets the situation backward – the problem has in fact been a lack of supply of assets at the right risk return levels in face of huge global demand for assets. This is an important point for policymakers to grasp. The key here is not to mistake the timeline of institutional investor diligence and decision-making for a lack of demand.

**Figure 3: Required investment in power generation**



Source: LCP Energy Analytics Net Zero Scenario

<sup>9</sup> The Investment Association INVESTMENT MANAGEMENT SURVEY 2019-20

<sup>10</sup> Energy Transition Insights Report 2021, Bloomberg NEF

<sup>11</sup> <https://doggerbank.com/press-releases/dogger-bank-wind-farm-a-and-b-reaches-financial-close/>

## What is the current rate of investment?

This is difficult to pin down precisely but the Investment Association<sup>9</sup> (IA) reported that its members had £45bn invested in infrastructure assets as of 2020, of which 78% was in economic infrastructure including energy. The IA reported that this figure had increased by £10bn in the last year. Bloomberg NEF<sup>10</sup> reported that £18bn (\$26bn) of investment had taken place into renewable energy in the UK in 2020, the majority of this consisting of financing of large offshore wind projects like the £5.5bn Dogger Bank project<sup>11</sup> (the world's biggest). This includes investment from listed energy companies, and bank lending.

This suggests that the required annual investment rates are possible, but the difficulty remains in extrapolating single-year rates to a multi-decade period.

**This underlines the need for long-term asset owners to be participating in the investment to keep sustaining the levels of new investment required over long periods.**





## New opportunities announced in the Energy White Paper

The Energy White Paper commits the UK to a huge amount of change across the energy sector in order to achieve Net Zero, and nearly all of these either directly or indirectly impact the power sector. While some changes are already well underway (such as the ambition of deploying 40GW of offshore wind by 2030), others, such as the aim to build a commercially viable fusion power plant by 2040, are a little more ambitious.

With every section of the Energy White Paper containing new investment opportunities, what are the areas to watch in the power market?



**Hydrogen and Carbon Capture, Utilization and Storage (CCUS)** are widely viewed as necessary if we are going to meet our carbon commitments as hydrogen can replace natural gas used in industrial processes, shipping, backup generation, and possibly heating. Hydrogen has long been talked about and had even fallen a bit out-of-fashion but the Energy White Paper places this firmly at the centre of decarbonisation efforts over the next 30 years.

The Government has committed to creating four industrial clusters that will include the deployment of 5GW of low-carbon hydrogen production and at least one power CCUS project, along with the carbon transport and storage facility to remove and store the carbon. These clusters will allow this new clean energy infrastructure to be shared between generators, with the aim of reducing costs and making CCUS and hydrogen a key part of the UK's decarbonisation framework. Scotland also announced<sup>12</sup> that it is focusing its efforts on supporting the development of hydrogen production capability to meet an ambition of at least 5GW of renewable and low-carbon hydrogen production capacity by 2030.

Hydrogen networks as an investment or asset class might sound a little far-fetched at this stage, but a recent Hydrogen ETF launch by LGIM<sup>13</sup> perhaps provides an indicator of the future.

<sup>12</sup> Developing Scotland's hydrogen economy: statement by the Energy Minister: <https://www.gov.scot/publications/ministerial-statement-developing-scotlands-hydrogen-economy/>

<sup>13</sup> <https://www.investmentweek.co.uk/news/4026975/lgim-launches-europe-hydrogen-etf>

<sup>14</sup> See for example LCP Vista Autumn 2020 Renewable Energy 2.0 <https://lcpuk.foleon.com/vista/lcp-vista-autumn-2020/renewable-energy-v20/>

<sup>15</sup> Bloomberg NEF: Energy Transmission Investment Trends 2021



### **Bio-energy with Carbon Capture and Storage (BECCS) and Direct Air Carbon Capture and Storage (DACCS)**

are also being given increased prominence due to the ability of these technologies to deliver negative emissions by actively

removing greenhouse gases from the atmosphere. These technologies will allow the power system to be net negative in the 2030s which will be key to the UK meeting Net Zero. These technologies could generate an income for investors by earning carbon credits for the carbon they capture.

For investors, this represents a very nascent technology at the earliest stage of implementation. If the right market mechanisms are brought to bear this could represent an opportunity similar to the first tranches of offshore wind power, but this will require significant diligence and risk appetite. We may see this become more mature over the next decade, so for growth investors with long time horizons it may be worthwhile investing time and resource to fully understand these projects early on<sup>14</sup>. The key drivers of these investments are likely to be completely different from those commonly found in other asset classes which could make them seem quite alien at first, and there is a good amount of complexity to understand. However, those asset owners that are able to deal with this could be rewarded with attractive investment opportunities over time.

This idea may seem futuristic, but in other countries investment is already starting in this area with Bloomberg NEF estimating that global investing jumped to \$3bn in this area in 2020<sup>15</sup>.



## Section 3 continued



# 2030

A ban on petrol and diesel cars is due to come into effect in 2030, meaning the uptake of electric vehicles is forecast to increase dramatically



### Electrification

Electrification will play a major role in decarbonising the economy, with a ban on petrol and diesel cars from 2030 meaning the uptake of EVs is forecast to increase dramatically. Heat pumps are also forecast to make up a significant amount of home heating solutions with the Department for Business, Energy and Industrial Strategy (BEIS) committing to install from 30,000 per year to 600,000 per year by 2028. The efficacy of both EVs and heat pumps compared to fossil fuels mean that overall energy usage goes down across the economy, but electricity demand will increase meaning that more generation will be needed.

The supporting infrastructure for making these changes also represents significant opportunities, whether it be installing heat pumps, building EVs, deploying the charging network or creating smart systems to manage the electricity being used to help balance the grid. Aside from the increase in renewable generation that will be needed to provide power to these sectors, there will also be a huge opportunity for EVs and heat pumps to support system operability with vehicle to grid and smart charging alone having the potential to provide the majority of balancing actions for the power system in the future.

This has the potential to be among the more scalable new technologies from an investor perspective given the size of the market so may well be worth investors understanding and following developments.



### Smart systems

The structure of the electricity system is changing with BEIS recognising that we are quickly moving away from a centralised system dominated by big thermal generation and passive customers. The increase in decentralised renewable generation, active consumers and the potential for local markets means the system needs to become more dynamic and designed to accommodate this new world. Achieving this will be a challenge with data availability needing to be dramatically improved and new business models developed to ensure the transition to a smart system is achieved.



### Storage

To us, this seems to be another new technology ripe for longer-term institutional investor involvement due to the scale of projects needed. The role of storage technologies is to balance the system and provide backup generation during periods of low renewable output. The volume of operational batteries has been rapidly growing as they can operate across a number of markets and have unique characteristics that make them intrinsically useful. While battery storage capacity has been growing overall, the majority of this is less than 1-hour duration. We are seeing more long-duration batteries starting to come online now, due to the revenues they can achieve in arbitraging the power markets.

There has been less progress with other long-duration storage technologies that will be crucial when we have several days of low renewable output. Today batteries can only store power for several hours, therefore, longer duration storage will also be needed if we are to function with an energy system with substantial amounts of intermittent power. A nuance with wind power is that when wind is low it can be low for several days at a time, pointing towards a need for backup power for longer periods on a wind-reliant system. The Energy White Paper announced support for the world's largest "Cryogenic" energy storage plant which is one technology that could help address this issue. Other technologies such as pumped storage can also provide long-duration storage but the framework to deploy these projects will need to be looked at if they are to be built.

Private money has poured into battery "Gigafactory" projects in Europe alongside government backing such as those in Sweden and Poland. Under the Brexit trade deal the UK now has 6 years to establish a domestic industry in an area seen as both growing and strategic<sup>16</sup>, but the UK is behind the curve with ground to make up.



## Section 3 continued

Storage could be significantly scalable to a large investment base. For example, large-scale battery projects have recently been announced in Australia where existing projects have experienced very favourable returns on investment<sup>17</sup>. There is significant complexity to understand in terms of the revenue streams available to batteries and the key drivers that will impact the profitability of a battery investment<sup>18</sup>.



### New nuclear

The history of new nuclear development in the UK over the last decade has been difficult, to say the least. Substantial capital costs, risk of overruns, a complicated regulatory environment and difficulty in agreeing the value of support from the Government can all be attributed to why several projects failed to get off the ground. The debate continues with the construction of Hinkley Point C progressing and commercial arrangements for Sizewell C still in negotiation. However, the Energy White Paper confirms that nuclear is an essential part of the power mix going forward.

Successful application of the RAB for new nuclear projects could unlock considerable institutional investor appetite in the short to medium term as the RAB provides revenue during the construction phase. We've seen this mechanism applied in the water sector with investment being highly sought-after. Another focus area for the Government includes modular nuclear reactors with the Government providing £385 million in an Advanced Nuclear Fund for the next generation of nuclear technologies.



The history of nuclear in the UK has been difficult. The Energy White Paper confirms that nuclear is an essential part of the power mix going forward.



### Offshore wind

This is one of the most established renewable technologies and has seen the bulk of the investment to date. We believe it will continue to be the largest-scale investment opportunity. The Energy White Paper confirms previous announcements of a large ramp-up of the capacity generation coming from offshore wind over the next decade. With the support mechanisms tapering off it is very important for investors to understand the potential risks and returns in new projects in these areas. The negative price event<sup>19</sup> that occurred last April is evidence that investors need to approach projects carefully and understand the nuances of the CfD mechanism including any future uncertainty around it<sup>20</sup>.

Further analysis in the modelling appendix of this paper suggests that extending the CfD mechanisms to support the capacity build-out is crucial, and without it investors would be left with far riskier propositions.

The size of the assets is one potential barrier here which has meant they are often only investible to the very largest asset owners, hence why overseas pension funds have been more active here as there are many more overseas pension funds with upward of £50bn in assets compared to UK funds.



### Onshore wind and solar

Onshore wind and solar are mature renewable technologies and are also set to grow in capacity but due to constraints, these are expected to deploy in smaller volumes compared to offshore wind. Important recent news was these technologies re-inclusion in the next round of CfD auctions taking place in 2021 which may create more supported investible opportunities coming to market and is likely to drive increased "greenfield" development of these projects. For investors, these may form part of a rounded renewables portfolio and the evolving regulatory picture illustrates the need for careful consideration of the mix of technologies being held.

<sup>17</sup> Source: Bloomberg NEF

<sup>18</sup> <https://www.lcp.uk.com/energy/publications/is-battery-storage-a-good-investment-opportunity/>

<sup>19</sup> <https://theenergyst.com/the-positives-of-negative-power-pricing/>

<sup>20</sup> <http://www.frontier-economics.com/uk/en/news-and-articles/articles/article-i7847-impact-of-negative-pricing-on-renewable-support/>



## What do investors look for?

Energy infrastructure has become a prominent investment opportunity for many investors as the growth of the sector is set to soar and the range of assets available to invest in allows investors to specialise in a niche area or diversify over several technologies. While early renewable projects provided higher rates of return, renewable projects in the UK today are subject to auctions to secure contracts.

As technologies have matured the auction prices for energy have come down: this represents a boon for consumers and the government's long-term strategy, but represents a double-edged sword as it potentially reduces the returns available for investors. This may be reasonable if the risks of a more mature technology are also reduced, but this equation requires a careful balancing act from policymakers.

The stable, inflation linked revenue available through these projects still attracts lots of interest from various finance providers. Challenges have been created not from a lack of available finance but instead due to the size of some projects. Orsted has been at the forefront of this issue as the size of its projects have grown. Its early projects were divested to allow the company to develop its pipeline to avoid a gap between the project completing and starting the next. Initially, the 50% divested share of a project would go to one of two equity partners but the size of its schemes now (up to 200 times the size of its original projects) means that it had to rethink its finance options and bring in lenders who act as traditional financiers rather than owning any equity. These lenders take on less risk and as a result, have a lower return<sup>21</sup>.



There are potentially at least three distinctly different groups of investors that need to be considered:

- **Debt investors:** There is huge demand from maturing DB pension schemes for investment-grade debt (especially long dated and inflation linked) in a world of low bond yields. This would likely be relevant to only the more mature technologies in the mix. In these cases, this could be a preferred method of financing as the demand could be very large,
- **Existing equity investors:** Some of the largest UK DB schemes remain open and hence growth-focused investors. Several have built up significant portfolios of equity stakes in directly invested UK renewable assets. These investors will be keen to understand the right balance of different technologies and how the future evolution will affect their portfolio
- **Prospective equity investors:** Other DB schemes and also some large Defined Contribution (DC) schemes are likely to be interested in higher risk/return propositions in more nascent technologies. The key here will be helping investors diligence these assets and being patient with the decision making process.

As the renewable sector matures and evolves we expect to see a much wider and richer range of assets that will suit the timelines and risk profiles of a whole range of investors.

<sup>21</sup> <https://orsted.co.uk/clean-growth/financing-the-biggest-offshore-wind-farms-in-the-world>



## Section 4 continued

### All investors are not the same

**Different asset owners will seek quite different types of assets. Understanding decision making cycles is key.**

A key question is construction risk. Historically this has been avoided by long-term investors who have tended to purchase operational assets with secure income streams from the developers or in the secondary markets. For some asset-owners, this may continue to be the preferred approach but there may be a growing argument to consider accepting some construction risk in order to be an equity partner from the start of a project rather than buying assets in the secondary market. This needs to be balanced against a clear line of sight to a stable operating income in an established technology in order for investors to back a greenfield proposition. David Neale, CEO of IFM investors (a large infrastructure fund owned by pension schemes) recently made this point in an interview<sup>22</sup>.

**Table 1: Summary of UK asset owners and allocation today**

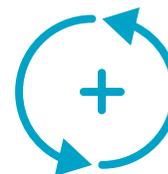
Asset Owner Type	Assets (£bn)	Bonds (£bn)	Equity (£bn)	Source
Corporate DB Schemes	1,700	1,173	340	<a href="#">PPF Purple Book 2020</a>
LGPS DB Schemes	272	68	163	<a href="#">ONS LGPS Funds data</a> The Investment Association
DC Pension Schemes	450	135	270	<a href="#">Willis Towers Watson Global Pension Asset Survey 2019</a> <a href="#">Investment Association 2019 Report</a>
Life Insurers	1,700	613	436	<a href="#">The ABI</a>
<b>Total</b>	<b>4,122</b>	<b>1,989</b>	<b>1,209</b>	

<sup>22</sup> <https://www.ipe.com/home/guest-viewpoint-david-neal-ifm-investors/10050248.article>

In order to generate the entirety of the £350bn of new investment needed in generation assets we believe is required to reach Net Zero from long-term asset owners this would require UK asset owners on average increasing energy infrastructure allocations by 8% of today's total asset value, which is unrealistic.

If investment took place equally alongside global asset owners and the government, this would equate to an increase in allocation of c3% - which we think is achievable if the assets match the demand from asset owners illustrated in the table: ie, a focus on fixed income as well as equity assets.

In practice, listed energy companies are likely to provide investment as well, particularly in early-stage technologies. But the sheer scale required in areas like offshore wind and storage suggests that significant participation from long-term asset owners will be necessary to meet the target.



#### The investor diligence and decision making cycle

It is important for the energy industry and government to understand the process institutional investors will tend to follow before allocating capital, in order to avoid frustration.

1. In many cases, the first stage would be to build the case for a strategic allocation to the asset class. This would often need to be approved by an investment committee or Trustee board, who would receive training from their in-house investment team, external manager or consultant and want to see a comparison and up-to-date analysis of the risk/return properties of the overall asset class compared to the rest of their portfolio. This is an extensive piece of work that would need to happen months or years before investment could take place. A good understanding of the characteristics of the asset would need to be built up which is difficult in the case of the more nascent technologies where data may be scarce or non-existent. It can be hard for energy market players to devote the time and resources to this education/familiarisation piece when deals are pressing.



## National Infrastructure Bank: promises and challenges

2. Once the allocation has been made, some investors will need to appoint third-party fund manager(s) to manage the allocation (some of the largest UK investors have internal teams who can play this role, but even internal teams may need to hire specialists to look at new areas). This process is likely to take a number of months. Once a manager is appointed the terms of the mandate will need to be agreed such as the allowable allocations to different technologies and assets, and the overall objectives of the mandate. In some cases, the investor may be allocating to an existing fund where these have already been determined.
3. Once a manager has been given a mandate to invest in the asset class that manager can then conduct due diligence on individual assets for incorporation into the portfolio, a process which itself could take months.

Overall this timescale could look like anything from 6-18 months from initial interest to capital being ready to invest into projects. This clearly presents a significant gap compared to typical deal-making timescales which may need a different approach and mindset to bridge. There are good reasons to think the institutional timelines can be shortened now: in some cases, new strategic allocations may not be required if new assets fall under the remit of existing commitments, and/or can be managed by managers and teams already in place. But overall the energy industry and policymakers would be well advised to appreciate, and work to bridge this mismatch in timelines in order to cater to newer investors in the area.

### The role of a National Infrastructure Bank

The Energy White Paper announced the creation of a National Infrastructure Bank and there are clear reasons why this represents a positive development:

- Provide financing to newer technologies that are likely to remain un-investible to institutional asset owners

- Act as a cornerstone investor on key projects giving greater execution certainty and making the process more efficient, this has certainly been lacking at times in the past which has been a barrier to projects getting off the ground

In addition, we see another potential advantage here of using a National Infrastructure Bank to be a potential backer of bonds issued to finance projects, which makes them potentially eligible for the large liability-driven investing programs pursued by most DB pension schemes and which add up to over £700bn in assets. This could work in a similar way to the current Network Rail bond issue which is popular with DB pension schemes.

We also see some significant potential unintended consequences of this which need to be managed. This includes:

- **Crowding out of the private sector:** Cheap public-sector financing could easily crowd out equity investment from the private sector, particularly if the speed of decision making was misunderstood as a lack of demand, this would be a missed opportunity.
- **Impact of cheap debt:** Low cost debt financing could result in projects borrowing excessively which makes the equity investment more risky than it needs to be. The government could also use the National Infrastructure Bank to invest in new technologies that are deemed too risky by the rest of the investment community – with consumers picking up the bill if these projects fail.
- **Competition:** The Green Investment Bank, which had similar aims to the National Infrastructure Bank, and was sold off to Macquarie in 2017<sup>23</sup>, now bids against UK investors for infrastructure assets. The government should take steps to ensure this can't or won't happen again. To reiterate our earlier point, we believe it would be a mistake to interpret the diligence and decision making of institutional investors as a lack of demand, and hence regulate to stoke additional demand through a publicly financed vehicle.

<sup>23</sup> <https://www.bbc.co.uk/news/uk-scotland-scotland-business-40974251>



## Section 4 continued

### Conclusion

**The UK's energy transition over the last decade has been a success.** Between 2010 and 2019 the share of electricity provided by renewable technologies has increased from 6.8% to 37.1%. At the same time, the cost of deploying these technologies has dramatically fallen. This is partly due to reliable and understood market mechanisms reducing risk and presenting attractive opportunities for investors.

**Offshore wind** was still seen as an emerging technology a decade ago and is now considered a mature technology. Along with onshore wind and solar, it will make up the majority of power generation in the future with investors able to finance projects through well-understood mechanisms such as the CfD. New technologies are now at a similar stage to where today's mature technologies began, these will benefit from the same roadmap that led to cost reductions in other technologies.

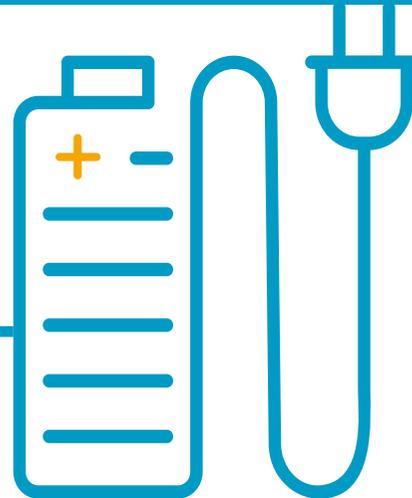


### What are long-term investors looking for in order to consider early investment in new technologies?

1. Suitable market frameworks to support the commitment of long-term capital into secure-income assets like RO and FiT did for early years of renewables
2. Ways to support early stage development capital in newer (nascent) sectors where no commercial model – to attract investors given the higher risks. Pension schemes are not natural venture capitalists

If the energy strategy is well managed, the UK stands to continue to be an attractive destination for investors with a range of investment opportunities available across the energy market. The total level of investment needed for new generation assets alone will be £350bn by 2050 with significant investment needed across other sectors that need to decarbonise. The Energy White Paper sets out the most comprehensive overview of the direction the sector is heading that we have seen, which allows both industry and investors to come forward with the solutions needed to decarbonise the economy and provide the investment needed to make this a reality.

**The changes seem a bit like 3D chess:** more renewables and electrification increases intermittency risk but at the same time we are reducing the more reliable fossil fuel power, and older nuclear plants are reaching end of life. Brexit may complicate getting electricity from Europe and battery storage/ hydrogen are still unproven. Will the changes be managed well? It is hard to say for sure, but we believe with the ideas described in this paper as a guide to bringing asset owners, the energy industry and government a little more aligned there is a good chance the answer could be yes.





# Modelling appendix

## Support matters

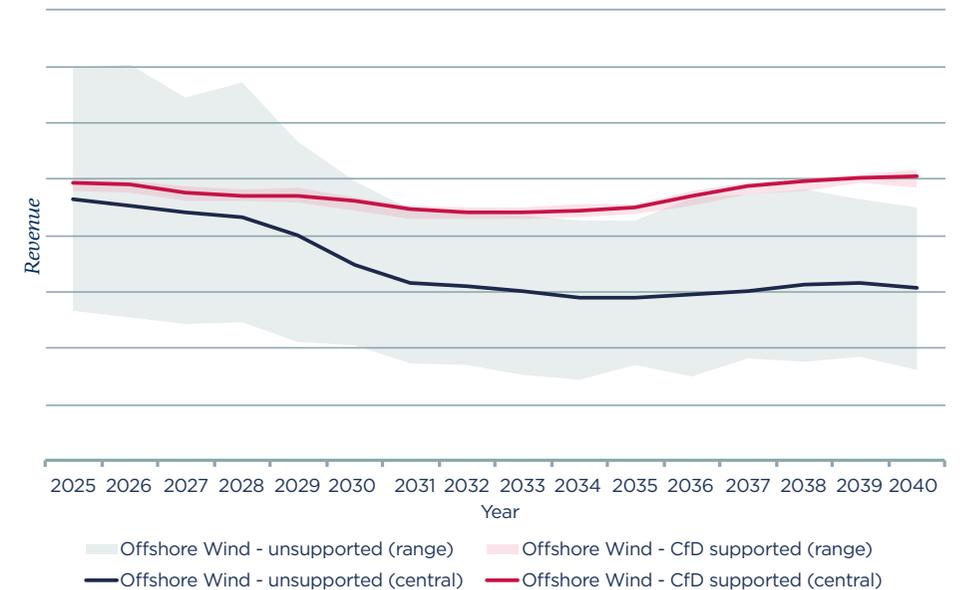
One key feature of renewable energy investments over the next decade is the presence of government support mechanisms, as we have already discussed.

These support mechanisms are instrumental in attracting investment into energy infrastructure, as they reduce the risks investors face, and ensure projects can deliver a stable, secure level of income. This has historically been attractive to investors, and the support mechanisms used to date (described earlier) have been a success.

A major plank of the support mechanisms as described on page 10 has been the Contract for Difference (CfD) which guarantees investors a set price for the power generated, which removed power price risk for their investment. That guaranteed level, which is determined by auction, started high but has fallen significantly in recent years due to advancements in technology and increased competition, resulting in a few small-scale projects going ‘subsidy-free’. Today, there is a very real decision to be made as to whether a new project should be undertaken on a “supported” or “unsupported” basis. Indeed, the target build-out capacity exceeds the current capacity of the CfD auctions, suggesting to us that this will become a more and more crucial decision.

In this exhibit, we analyse revenue forecasts for a new build offshore wind asset with and without support mechanisms.

**Figure 4: Offshore wind revenue forecasts**



Source: LCP Energy Analytics

This chart shows how LCP’s forecasts for a generic new build offshore wind asset vary with the presence of a CfD across a range of scenarios. With a CfD (pink line), investors forego potential upside but can expect reasonable levels of return with high levels of stability across a range of scenarios. This is attractive to investors looking for a secure income stream, and also for investors in project debt. With an unsupported, merchant approach (blue line and grey area), investors are exposed to the volatility of the markets and the deployment of other technologies, bearing significantly greater risks but offering greater upside potential.





## Modelling appendix continued

Under LCP's central scenario, the unsupported asset's central projection is consistently below that of the supported asset due to high levels of wind deployment assumed under a Net Zero pathway, increasing competition and cannibalisation of revenue streams. Other factors such as commodity prices and demand levels play a large role in the range of revenues that the unsupported asset may expect to receive, while the CfD supported asset is largely protected from these.

In terms of investor return, if the CfD support asset is targeting a 6% return on investment (real), the equivalent unsupported asset's potential ranges from +9% to loss making across these scenarios.

This underlines the importance of ensuring that enough support is available to continue making these assets attractive to investors.

This level of risk exposure relative to upside gain has been unattractive to investors in the main, with minimal unsupported wind deployment in the pipeline, so ensuring the CfD regime has a high enough capacity cap and budget to support the ambition of offshore wind deployment will be crucial in attracting the investment required.

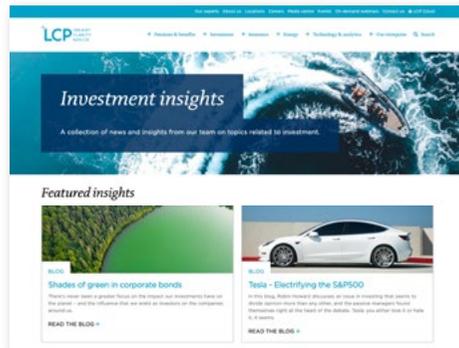
*In terms of investor return, if the CfD support asset is targeting a 6% return on investment (real), the equivalent unsupported asset's potential ranges from +9% to loss making across these scenarios. This underlines the importance of ensuring that enough support is available to continue making these assets attractive to investors.*





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