The Rt Hon Claire Perry MP Minister of State
Department of Business, Energy and Industrial Strategy
1 Victoria Street London
SW1H 0ET

10th January 2019

Dear Minister,

We, the undersigned, congratulate you on the publication on November 19th, 2018 of the draft budget notice for the third CfD allocation round for “Less Established” technologies.

In combination with your commitment to hold CfD auctions every two years during the 2020s, the progression of the third allocation round brings a degree of welcome certainty to the vibrant and successful renewable energy sector in the United Kingdom.

As major actors in creating this success story we recognise the significance of clear policy and strong investment signals. Consistent policy frameworks have been critical in building and then maintaining our global position as an attractive market for investment.

We also recognise that the bar is being raised on the pace and scale of decarbonisation, with steepening demands imposed by the carbon budgets. Meeting these budgets now becomes more challenging given the backdrop of rapidly changing macro political and economic circumstances. In that context, we ask the government to urgently re-examine its policy for mature and established renewable technologies, and to consider reopening support for grid-scale onshore wind and solar PV through a revised CfD Floor structure.

Projections show that significant capacity needs to be delivered from these technologies if we are to achieve the decarbonisation pathway to 2050. Currently, the government assumes that this can be delivered at scale without material policy support. Whilst there have been significant reductions in costs in onshore renewable technologies, this does not make investments credible in projects if they are to rely predominantly on wholesale power price signals.

As costs fall, modelling may show that long-term wholesale power revenues over the life of an asset will deliver a positive return on investment. However, project funding from banks and other risk-averse investors still requires insulation against short-term, substantial swings in wholesale power prices.

Appetite for this wholesale power price risk amongst debt investors has, if anything, reduced rather than increased. With greater deployment of renewables, the outlook for the captured price of wind and solar gets more pessimistic over time, and this is now feeding through into long-term price projections used in financial models. In addition, the wholesale markets are becoming ever more volatile. From our experience of working with major providers of capital, such as

banks and other risk averse investors, they are unlikely to invest large amounts of capital in projects which face these kinds of risks.

The lack of revenue stabilisation will significantly reduce the bankability of grid-scale onshore wind and solar PV and make it inconceivable that our power sector decarbonisation objectives can be achieved.

We see a way through the impasse. We have developed the idea of a CfD Floor as an alternative policy pathway to support onshore renewables. This is an elegant solution that will deliver very low costs to the consumer (if any at all) and will create a bankable pathway to power sector decarbonisation.

The enclosed paper accompanying this letter explains the necessity of adopting such a model, how it would work, and the benefits it will deliver. Representatives of our group would welcome the opportunity to discuss our proposals with you or senior officials at the earliest opportunity, noting the relevance to the ongoing five-year Electricity Market Reform review and the anticipated white paper during 2019.

Yours sincerely,

Gareth Miller

CEO, Cornwall Insight

Supporting organisations:

Airvolution

Broadview Energy

Eneco

Foresight Group

Fred Olsen Renewables

Jones Lang Laselle, Energy Infrastructure and Advisory

Lightsource

Non-Fossil-fuel Purchasing Authority

Renewable Energy Association

Solar Trade Association

ANNEX – THE CFD FLOOR

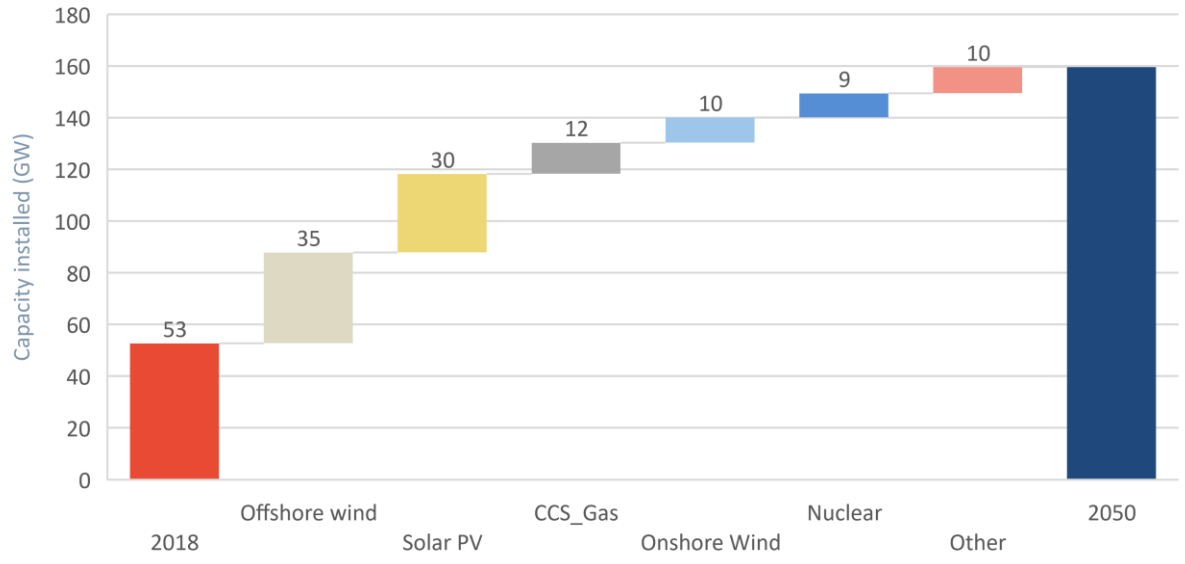
New investment challenge

It is imperative that an adequate entry and repowering investment signal is sent to established onshore renewable technologies. Whilst offshore wind will play a very significant role in delivering new low carbon capacity, it will need to be supplemented by other technologies.

In July 2018, Crown Estate data indicated an offshore wind pipeline of 23.8GWs, of which 5.1GWs is currently under construction or subject to an award of policy support. As a result, as at July, the UK had 17.7GWs of offshore wind in the pipeline, of which only 7.9GWs had planning consent, with 2.4GWs in planning and 7.4GWs pre-planning. In 2019 the Crown Estate is expected to lease out a further 7GWs of sites for offshore wind development, but there will be a time lag between those awards and achieving the planning consent necessary so that projects can participate in CfD auctions.

Aside from the finite level of the current offshore wind pipeline, credible industry projections also recognise that a balanced portfolio of low carbon generation sources will be required. National Grid produced analysis as part of its 2018 Future Energy Scenarios (FES) which showed that for its "Two Degree" case, which is most compatible with 2050 targets, there is a 107GW gap between the 53GWs of low carbon capacity that we have today and the 160GWs that may be required in 2050.

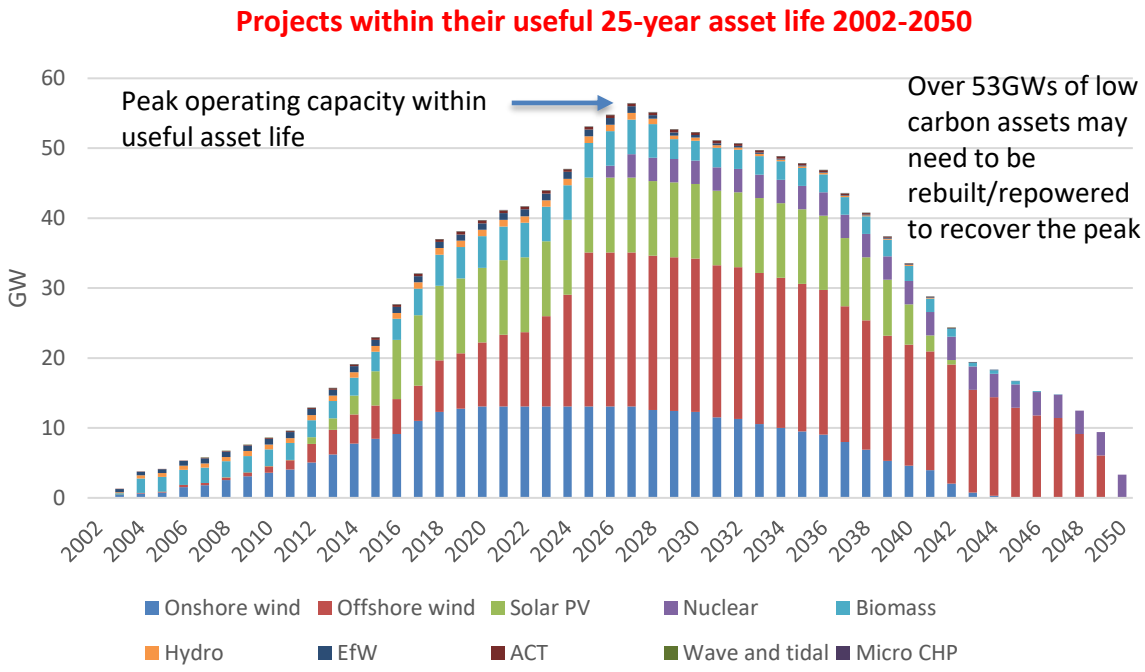
Waterfall of capacity 2018-2050, National Grid "Two Degrees" future energy scenario



Source: National Grid FES, Two Degrees, Cornwall Insight

In the National Grid "Two Degrees" scenario, 35GWs of this gap is bridged by offshore wind. The remainder comes from an array of technologies that are currently without substantial policy support to underpin investment – including 30GWs of Solar PV and 10GWs of onshore wind.

The scale of the challenge is even greater given the age of the existing 53GW low carbon fleet. Existing nuclear plants will encounter difficult decisions in the early-mid 2020s and are due to go off-line during the next decade. By our analysis, by 2050 every renewable power plant currently operational or committed to today will have exceeded their useful 25-year asset life. Without a meaningful signal to repower or rebuild these sites they may close.



Source: National Grid FES, Two Degrees, Cornwall Insight

In summary, it is conceivable that all the 160GWs under National Grid's "Two Degree" FES scenario in 2050 will need to raise new investment, 53GWs in terms of repowering or replacement and 107GWs of new build generation.

To provide some perspective, 160GWs is four times the level of capacity that has been delivered since 2001 under the Renewables Obligation (2001), small-scale Feed-in Tariff (2011) and CfD (2014). The challenge in front of us to mobilise investment is immense. We contend that is unlikely to be met if use of CfDs is ring-fenced for less-established technologies, with the considerable balance being delivered through subsidy-free projects. This is because of two constraints:

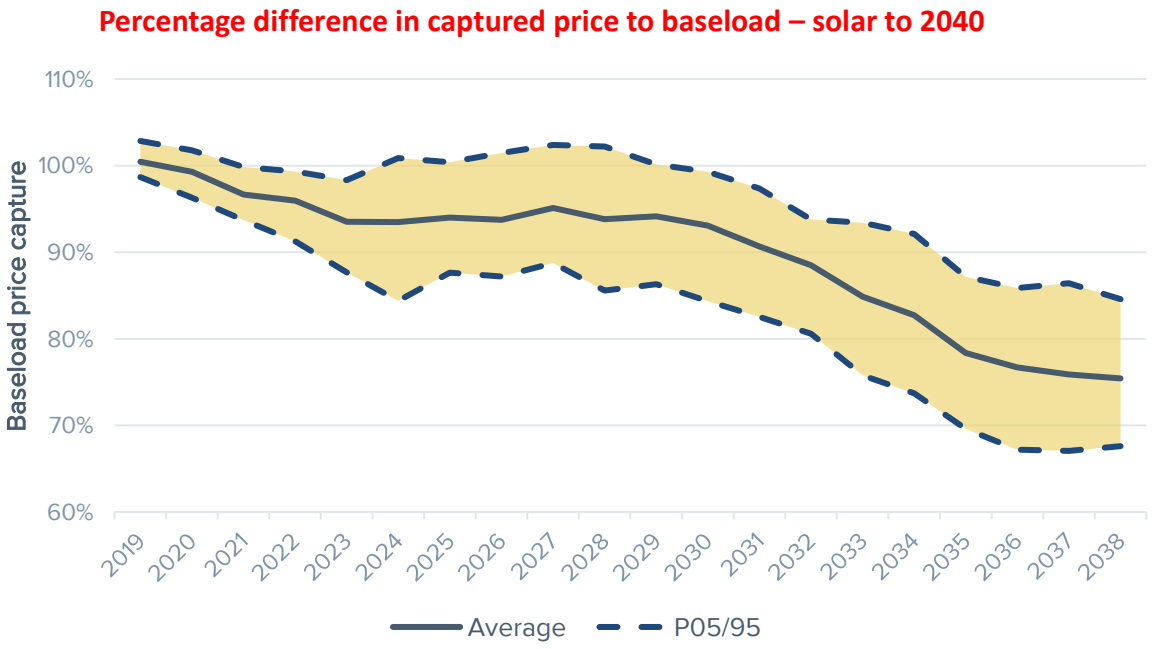
- **Power price cannibalisation**—the captured prices for renewable technologies are trending downward, reducing the ability of wholesale power markets to deliver adequate returns; and
- **Insufficient capital investment**—the traditional and very successful financing model for renewables is incompatible with projects that rely only on wholesale power prices to determine cashflows and revenues.

Power price cannibalisation

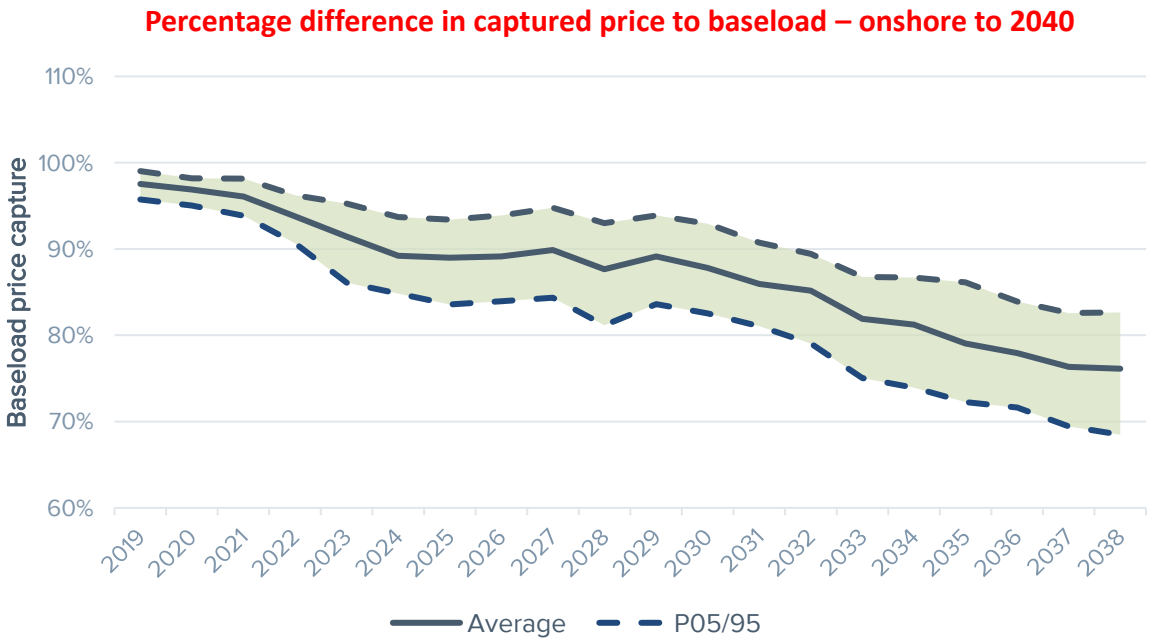
Renewable power output from wind and solar is highly correlated to weather. For example, when it is windy, and particularly at times outside of peak demand, the level of output from the UK wind fleet creates substantial downward pressure on wholesale market power prices. The higher the level of wind capacity on the system, the greater the magnitude of this effect. The same is true of Solar PV, albeit there is a marginal softening of the impact by virtue of solar generation tending to peak with demand.

This means that wind and solar PV generators will "capture" a price that is below the average price in the market for baseload generation. The phenomenon has come to be labelled "price cannibalisation". It is not unique to the UK, being a signature of other markets where there is high, weather driven, renewable deployment such as Germany.

It is now commonly anticipated that, even with the advent of battery storage, price cannibalisation will intensify. Cornwall Insight analysis for wind and solar shows this occurring in our modelled simulation of power prices. Whilst gas and carbon will remain a price setting in the near term, in the medium to long term, the changing generation mix means the influence on power prices from these commodities diminishes. We foresee significant cannibalisation occurring within the next decade, and thus seriously impacting investments during the 25-30 year asset life of new onshore renewable projects.



Source: Cornwall Insight



Source: Cornwall Insight

Even with continued reductions in technology costs, and strategies such as co-locating batteries, this effect will place considerable pressure on investment cases and cashflows for "subsidy-free" solar PV and onshore wind.

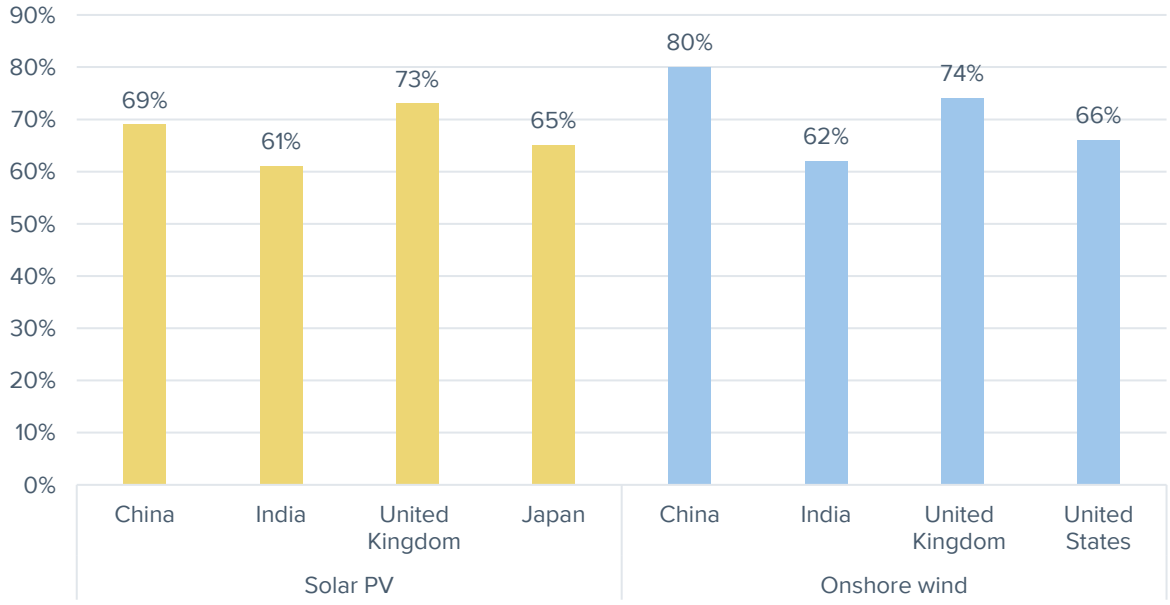
This is problematic given the need to build a further 40GWs of capacity across these two technologies under the FES projection. It will also diminish returns on investment for repowering projects.

Financing subsidy-free renewables

Project finance lenders have played a significant role in driving the growth in low carbon capacity to date. IRENA's "Global Landscape of Renewable Energy Finance 2018" mapped the global financing landscape. It illustrates the powerful role that debt plays in driving investment in renewable power. The data shows that loans, the vast majority of which are project finance debt transactions, made up 60% of the $201.8bn dollars invested into renewables globally between 2009-2017.

IRENA data also shows that average debt-to-equity ratios for onshore wind and Solar PV hover between 60% and 70% globally, with distinct country variations. For the UK, on average, debt comprises 73% and 74% of total funding for subsidised Solar PV and onshore wind transactions respectively.

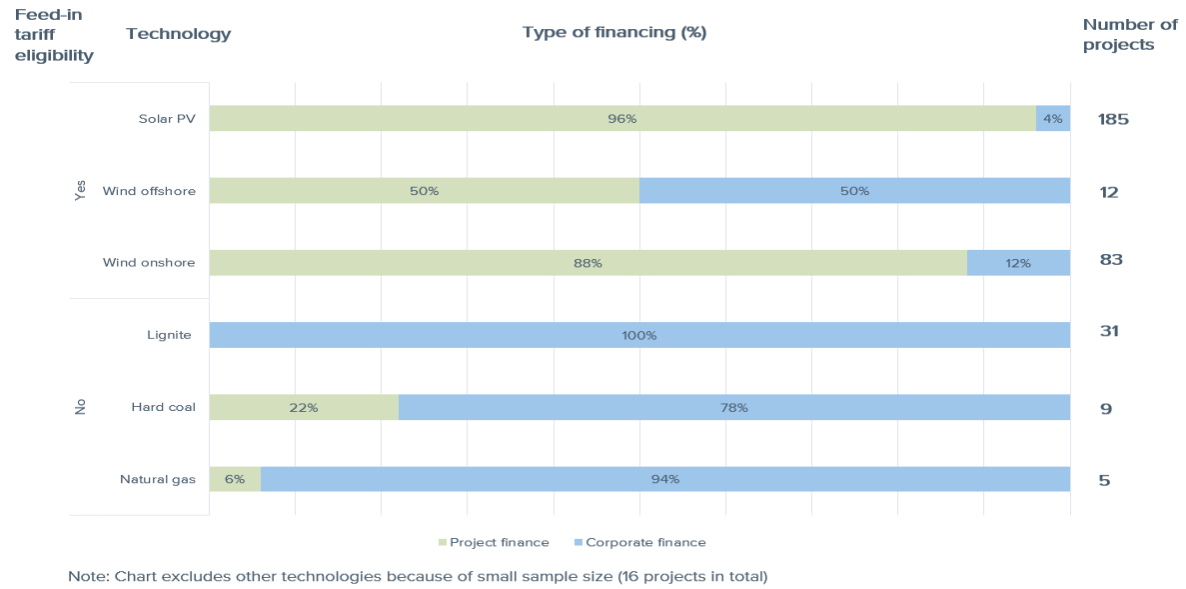
Debt % of project funding: solar PV and onshore wind in different markets



Source: IRENA, Global Landscape of Renewable Energy Finance 2018

The scale of investment by project finance banks would not have occurred without policy support being present to de-risk a significant proportion of project cashflows. Results of a study published in Energy Economics in January 2018 examined the capital structure of 341 projects out of 468 new power projects between 2010-2015 in Germany. It revealed how significant policy support is in attracting non-recourse project finance debt into energy generation investment, illustrating this through the higher volume of transactions, and higher debt levels in technologies where tariffs are available.

German energy financing proportions by revenue stabilisation



Note: Chart excludes other technologies because of small sample size (16 projects in total)

Source: Energy Economics Volume 69, January 2018, "The Importance of Project Finance for Renewable Energy Projects". 341 projects (73%) out of 468 new power projects 2010-2015

There are good reasons for banks to be attracted to revenue stabilisation policies which reflect how project finance loans are structured:

- **To keep financing costs and risks manageable project finance loans are amortising**—loan capital is repaid in accordance with a fixed repayment schedule, typically every six months, alongside interest payments owed on the outstanding total debt balance. Banks will not back-end loan repayments, and in the meantime forego the ability to take cash generated to reduce their risk. A failure to make a payment instalment is a default, and this creates an impaired loan that attracts significant, heightened costs for the bank providing the loan by way of set aside collateral to cover the risk of non-payment.
- **To continually evaluate risk cashflow covenants are tested regularly—**banks use debt service cover ratios to test the level of buffer of cash generated over the level of debt serviced as a key indicator of the financial health of the renewable energy project.

In assessing whether to make a loan, banks require a financial model to give them comfort that in a range of downside scenarios there will be enough projected cash to repay the entire loan, comfortably meet each six-monthly instalment, and deliver satisfactory debt service cover ratios.

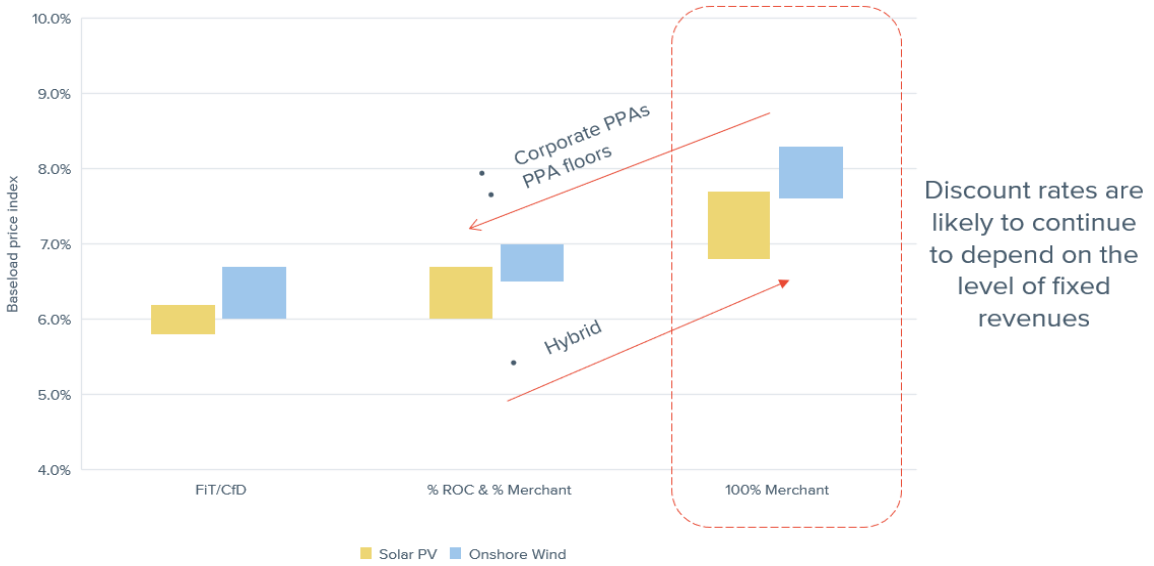
Financial models for subsidy-free projects will utilise price forecasts that factor in price cannibalisation and will also – increasingly, as a result of the changing projected generation mix – factor in volatility in power prices.

There will be inherent uncertainty in these price forecasts relating to the frequency and magnitude of price movements. This will encourage lenders to be prudent in the value assumptions they attribute to wholesale power price revenues, or their weighting in how they size the debt facility. This will mean either banks will lend less, and at a higher cost, or they won't lend at all.

Lower debt levels mean more equity committed to fund construction, and a consequential negative impact on equity investor returns. Less banks willing to lend at all means lower capital flowing into the sector.

At the same time, equity investors' return expectations will rise to reflect higher risk. To substantiate this, a report by the financial accounting, advisory and auditing firm Mazars in August 2018 supports this view, highlighting an upward trend in discount rates used to value onshore wind and solar PV projects related to increasing levels of wholesale power price risk.

Discount rates for subsidy-free versus RO and CfD, onshore wind and Solar PV



Source: Mazars, subsidy-free renewables in the UK: Have we reached the tipping point? August 2018

This report noted the general market view that lenders will struggle to lend to subsidy-free projects without a shift in credit committee mind-sets. This means initially, without policy support, utility PPAs and corporate PPAs will need to play a significant role in providing some degree of revenue stabilisation to projects if banks are going to invest heavily.

Will the PPA market stimulate required investment?

It is unlikely that suitable support will be forthcoming from the commercial PPA market. Many PPA providers will now offer long term (10-15 year) contracts that are typically required to underpin investment in these projects. The level of liquidity of offers in this market is good. But today, these contracts have floor prices of between £10-20/MWh which are insufficient to allow projects to raise the level of debt required to reach a reasonable rate of return.

The low levels of debt that could be supported by utility PPA floors means a greater share of investment in a project comes from equity, lowering the rate of return to unsustainable levels. Utility floor price levels reflect a PPA provider's own concerns about the influence of price cannibalisation. Setting floor prices too high could create margin risk for commercial PPA providers.

There are often mechanisms which allow generators to fix prices periodically within such PPAs. However, given the level of the price fix cannot be known at the time in which investment is made to fund the construction of the project, such mechanisms do not influence the level of debt raised.

The Corporate PPA market has been identified as a stimulus for wind and Solar PV to flourish outside the CfD. Corporate PPAs tend to see business buyers fix a long-term price for an offtake with a renewable generator, with a licensed

supplier providing trading and balancing services in the background. Some Corporate PPA transactions have already been closed in the UK, mostly for extensions to existing subsidised renewable power stations.

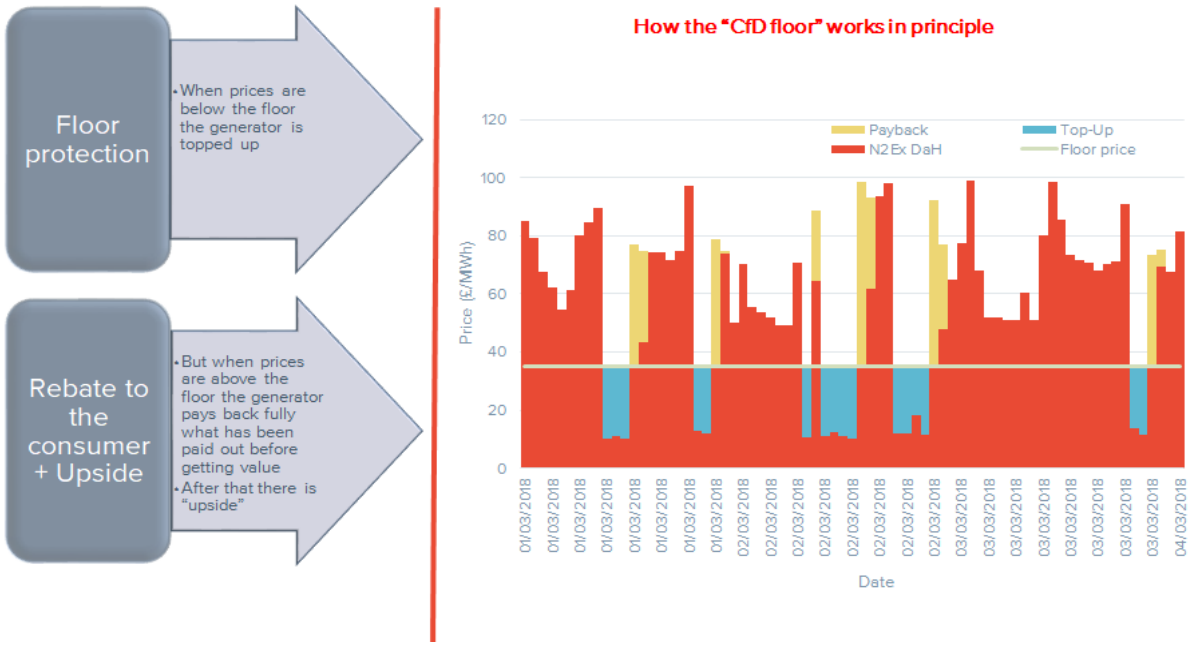
It is highly likely that Corporate PPAs will deliver some new build projects, particularly in prime development locations. However, prices agreed in Corporate PPAs are currently not at levels that will deliver a large volume of projects. Companies will struggle to agree prices that exceed their long run view of market wholesale power values, or to fix for periods commensurate to debt maturities. In addition, whilst there is significant demand from generators and developers for corporate PPAs, there is not yet matching levels of supply. Where appetite is shown, it is for scale projects where the costs invested in due diligence and transaction documents yield maximum efficiency benefit to the buyer.

Finally, hopes that the Capacity Market will provide a transformative bankable support for new or repowering renewables projects are likely to be misplaced if the recently published parameters and methodology for de-rating renewables are eventually adopted.

The CfD Floor

To bridge the gap between the government's policy objectives and what the market is being asked to deliver we recommend that the government explores the implementation of a CfD Floor. This structure is based on a simple premise that the generator will receive protection against wholesale reference prices below a guaranteed floor price (in £/MWh), and would only be able to realise upside in power prices above the floor price to the extent any sums received under the floor had been fully repaid first. An illustrative example is shown below:

Illustrative example of the CfD Floor



Source: Cornwall Insight

To avoid the unnecessary administrative burden of reconciling and settling individually for every half-hourly period, settlement against the floor would be based around 30 six-month reconciliation periods over the 15-year payment term of the CfD.

At the end of each six months, using actual metred volume, the following processes would be undertaken:

- **Determining the total theoretical floor price payments—**the Low Carbon Contracts Company (LCCC) would determine the theoretical total money earned (£s) by the generator in the preceding six months had the market price always been at the CfD Floor price *("Total Required Floor Payments")*.
- **Determining amounts paid to the generator through the market**—the LCCC would then calculate the total actual money earned (£s) by the generator during the preceding six months using real market prices (*"Total Market Payments"*)
- **Determining the level of floor price payments—**if the *Total Required Floor Payments* exceed the *Total Market Payments* then the generator would be paid the difference (the *"Floor Difference Payment"*).
- **Determining the level of payment above the floor—**if *Total Required Floor Payments* are less than *Total Market Payments* then the *Floor Difference Payment* is zero, and the positive difference is retained by the generator *("Floor Outperformance Value")*. This is subject to treatment of floor payments the generator has previously received but not yet repaid.
- **Repaying floor price payments made**—whenever *Floor Difference Payments* are made to the generator at a six-month reconciliation point it would create a liability against the generator (*"Floor Price Liability").* Repayment of all or part of the *Floor Price Liability* would become due at the next six-month reconciliation point, with the generator obliged to pay lesser of the *Floor Outperformance Value* and the *Floor Price Liability*. Any residual *Floor Price Liability* would be rolled forward to future six monthly reconciliations, forming part of the *Floor Price Liability*.

Benefits of a CfD Floor

This model would deliver several advantages over reinstituting CfD auctions for established technologies, and more generally when compared to the current CfD scheme.

These are:

- **Lower strike prices**—bidders would be aiming to secure a floor that covers their fixed costs and debt repayments rather than a price which delivers their total return. Government could model the Administered Floor Price to cap bids at a level it believed would enable the delivery of the top quartile of projects, considering the impact of floor prices on raising debt and improving equity rates of return. This will require further evidence based and modelling verification, but discussions with developers suggest onshore wind floor prices could be in the region of £30-35/MWh in 2011-12 values for highly efficient projects. This is compared to Administered Strike Prices for offshore wind of £53-56/MWh in 2011-12 values announced for the third allocation

round. The lower level of the floor price relative to even the lowest Administered Strike Prices set by government in auctions to date creates a compelling case to adopt this model if the intention is to minimise the cost of decarbonising the power sector.

- **Lower risk of subsidy**—not only will lower prices result in a greatly reduced frequency of supplier levy funded payments needing to be made to CfD generators, the CfD Floor is designed to ensure that any costs incurred were recouped. This is provided for through a pay-back mechanism which ensures the value of floor payments is recovered from generators when prices are above the floor before they receive any related upside. The subsidy, if arising at all, acts like a working capital facility, and would not be expected to result in long term, sunk subsidy cost to consumers
- **Attracting low cost of capital investors—**through protecting against the negative impacts of wholesale power price volatility it will be compatible with the risk appetite of the traditional and substantial providers of capital to this sector.
- **No material changes to CfD structure—**these benefits could be delivered with minimal changes to how CfDs are auctioned, contracts are administered, levy payments collected, and payments settled to generators. The contract payment mechanism would need to be adapted to accommodate payment against a floor price rather than a fixed price. An amended CfD contract could be auctioned and settled in a fashion compatible with the regulatory and institutional design of the current CfD, with minimal required changes.