REA Draft Response to BEIS' Call for Evidence: Enabling a High Renewables, Net Zero Electricity System

Maintaining growth in renewable deployment to meet Net Zero targets

1. ***How is the industry currently approaching developing renewables projects without CfDs? In what ways might non-CfD backed projects obtain revenue from wholesale and other markets, and secure investment?***

The subsidy-free part of the power industry currently relies on corporate Power Purchase Agreements (PPAs). These depend on getting a good PPA from a bankable offtaker. For many developers this is a very suitable arrangement, however developers need a long-term stable company who is willing to factor in a volatile wholesale price, to partner with. One of the things government could do to further enable this market, for instance, as is done in Norway, is to underwrite the offtaker's side in agreements. So that, for instance, if the original contractor is unable to continue buying the power after a certain period of time, such as after 5 years, the Government will step in and buy the power. PPA's are unsuitable for standalone energy storage plants, as much of the revenue (and consumer value) from energy storage comes from optimizing the time at which energy storage discharges power onto the grid, rather than mere export of the power. Government could also offer better support to renewables by directly buying more power from renewables – the Government is the biggest purchaser of power in the country and should use that purchasing power to support our energy transition to Net Zero.

Some developers can also secure funds through other routes, such as pension funds – however such investors are usually very preferential to income streams that will provide stable and secure returns, so Government underwriting PPA's would encourage investment. In addition, pension funds have specific rules precluding investments in renewables on 'technical risks' grounds, which if reformed, could help open up the market We welcome the news that the Government is reviewing these rules as announced in the Spring Budget. Pension funds should be enabled to invest in renewables directly. Government also needs to investigate the underwriting of renewable PPAs, to encourage investment in the sector, ultimately leading to many more 'subsidy free' renewable developments, driving the prices down and benefiting the end consumer.

Non-CfD backed projects also obtain revenue from ancillary services and balancing markets. However, the case for investment based on a revenue stack is limited by restrictions on contract duration under article 6 EU 2019/943. There is also an increased risk associated with the commercial frameworks for the procuration of these revenues, which are fairly new, and procurement discontinuation precedents. Balancing market revenue is also prone to volume risk. Of course, for energy storage projects not developed alongside renewable generation, more bespoke solutions may be necessary, for instance, see the REA's upcoming paper on Longer-Duration Energy Storage.

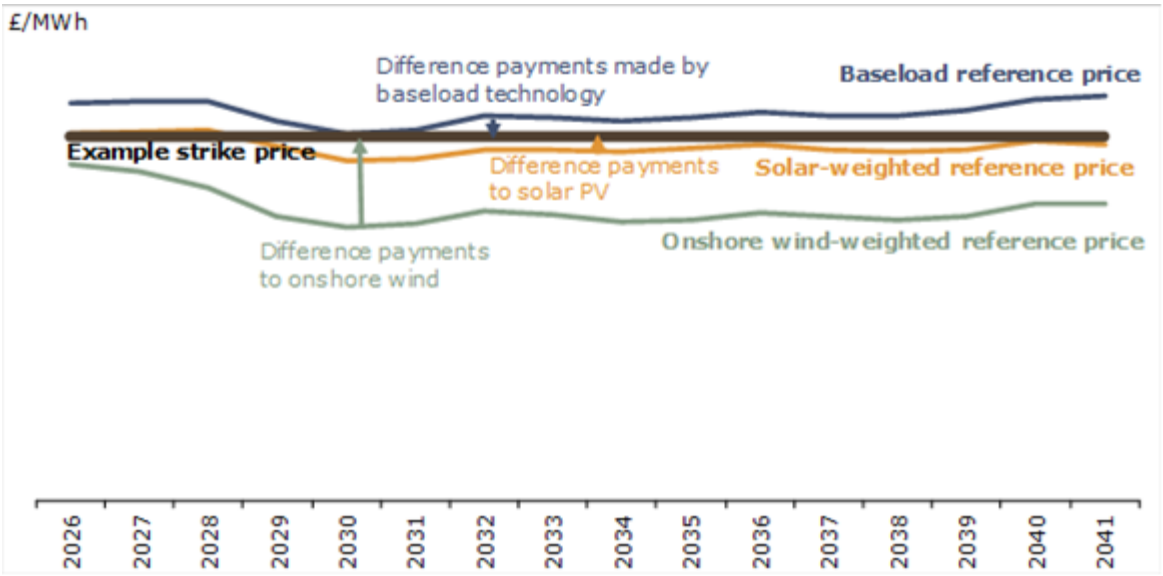
In the case of Advanced Conversion Technologies, many projects are now focused on the development fuel target within the Renewable Fuel Obligation. For many ACT developers the CfD is no longer seen as a viable route to market due to the qualification and efficiency requirements being overly onerous for the purposes of power production.

2. ***What do you consider to be the effects of increased low-carbon deployment on future wholesale power prices and renewable capture prices?***

REA's view is that the future wholesale power price is forecast to be much lower than today due to the significantly lower running costs of renewable generation compared to fossil fuel generation. This is a significant benefit to the system overall.

However, there will also be greater price volatility due to the system relying on higher levels of variable generation. This will mean that renewable generators' revenue is more vulnerable to price troughs. Renewable capture prices are likely to be lower than the average wholesale power price across all periods in the year (baseload wholesale power prices).

See the below graph illustrating this:



Credit: AFRY, 2021

Some things to note:

1. A mix of technologies is needed, note large amounts of solar would do the same to the solar weighted reference price
2. There is value in additional revenue streams to wind at times of low prices which would bolster wind capture prices e.g. from longer duration storage
3. We are not detracting from onshore wind, it is clearly a low cost low carbon technology and an important part of a zero carbon energy mix

The associated AFRY thought piece is available here:

https://afry.com/en/newsroom/news/renewables-support-costs-pot-1

It is important that some long-term, stable, investment signals remain in the UK market to enable longer term investment outside of wholesale prices.

3. ***How viable will investment in new renewable projects based primarily on wholesale prices be in future? Could this investment case be supported if there was more extensive deployment of flexible assets such as storage?***

There will be a continued need for a CfD mechanism. Small-scale renewable projects can be financed to some extent, by equity. However larger-scale projects are likely to find development challenging without CfDs due to the reluctance of lenders and the risks of relying on the wholesale price and ancillary and balancing services revenue. The long-term price security provided by a CfD contract, even if at a price around or below wholesale prices, makes CfD a bankable route to market, enabling projects to deploy where wholesale price fluctuations would be seen as too risky by many financiers.

Clearly, much more energy storage is also needed – this will improve system stability, while also enabling energy storage operators to optimise the times at which they release electricity on to the grid. Energy storage also reduces grid reinforcement costs. Co-location of energy storage with renewables therefore increases the financial viability of a site and its investment case.

4. ***How much longer after the 2021 allocation round should the current CfD be used? Is a price based on a short-run marginal cost market the most effective basis for a long-term renewables contract?***

The report from the Laura Sandys-led 'Re-Costing Energy' project examines this issue. This concludes that there is a need to move to considering power as a service, rather than only valuing the KWh produced (REA was a sponsor of this report). As the adoption of technology like smart meters and smart devices increases, the daily demand profile will change, as whenever possible, some consumers may shift their demand to low tariffs. More value should be placed on supplying power at the right time, including on the ability to supply inertia, ancillary and other services. The capital costs of some renewable generation projects are high, while running costs are very low, and so with a lower wholesale power price, more financial incentives (and the removal of disincentives) should encourage supplying power at optimal times for the grid.

Government should also consider the role of the CfD in delivering new innovative technologies. Bioenergy Carbon Capture and Storage is identified by the CCC as of strategic importance to realise the UKs net zero ambitions. The CfD could play an enduring role, combined with a payment for negative emissions, in seeing green house has removal technologies delivered.

5. ***Are there any changes or alternatives to the wholesale market that might facilitate merchant deployment?***

As discussed in our response to Question 1, the Government should consider underwriting corporate PPAs to reassure investors who are considering entering into a PPA.

The Government should also consider how salami-slicing of contracts could be avoided for energy storage and consider creating a new subset of long-duration contracts of at least 15 years to provide investor confidence. OFTO rules that actively prevent offshore wind farms benefitting from storage should be changed. The Government could also consider providing support for first-of-a-kind commercial plants to defray financiers' "technical risk". When inviting tenders for services, the Government could consider doing so on a matrix so each plant can propose all the services that they can provide profitably.

6. ***How can market participants be encouraged to provide contracts to secure low cost investment in renewables?***

As previously discussed in Questions 1 and 5, the Government should consider underwriting corporate PPAs to encourage investors to aid confidence in contracts, and should also consider other items discussed in our response to Question 5.

REA is also producing a paper which addresses this issue regarding longer-duration energy storage and identifies appropriate solutions for longer-duration energy storage. We are happy to provide this upcoming paper for more information.

Ensuring overall system costs are minimised

7. ***How could intermittent renewable generators change their operating or investment behaviour to respond to wholesale price signals?***

The market must accelerate the growing levels of investment in energy storage and flexibility, at standalone, new and existing sites. This will enable renewable generators to gain maximum financial reward by delivering power to the grid at the times when the electricity supplies to the grid are low relative to demand, and likewise will enable energy storage providers to take energy off the grid at times when electricity supplies to the grid are high relative to demand, and sell it back at a higher price.

The OFTO scheme could also be amended to enable renewable generation to benefit from onshore flexible assets.

REA uses the term ‘variable’ rather than ‘intermittent’ renewables, as the variation in supplies can often be forecast and factored in to future modelling.

8. ***What would be the impact on the cost of capital of introducing greater exposure to the market price for power?***

Recent changes to the balancing mechanism have made the troughs and peaks of the balancing system costs much greater and have increased volatility. In the past, the balancing system did not see negative pricing, and power prices would never go up beyond a few hundred pounds. Nowadays, there are very high levels of fluctuation. A volatile balancing mechanism makes renewable generation much less attractive to investors since it is difficult to estimate the revenue. Overall, finance providers prefer investments to offer stable and predictable income, and anything that jeopardises this will deter investors.

9. ***In your view which of the potential options for providing increased exposure to market signals offers the greatest benefit to the consumer? Are there any other options that we should be considering?***

The REA believes that more value should be placed on supplying power at the right time and that the CFD should be adapted to encourage the deployment of more flexible renewable electricity generation. Increasing the demand for "flexible" generation will promote and increase competition for flexibility services and ultimately help reduce overall costs to consumers for the provision of those services.

As part of the considering the options described on page 16 of the Call for Evidence, BEIS should also consider introducing a premium for exporting during a specified peak window.

The REA and REA members would welcome further consultation and close stakeholder dialogue with BEIS on the development and evaluation of these options to promote greater flexibility from CfD generators.

Some consumers will benefit from increased exposure to market price signals, as it will enable them to optimise the use of smart meters and flexible technologies such as EV charging, and home energy storage. However, there will be other consumers, particularly those in fuel poverty and without access to flexible technologies, who would not benefit from time of use tariffs. Time of use tariffs are beneficial overall, as they can enable consumers to achieve lower electricity bills by shifting their time of demand, however should be expanded carefully and should not be forced on consumers.

10. ***Should CfD generators be incentivised to account for flexibility and wider system impacts, and/or to provide balancing services to the system operator? How could this be achieved?***

REA released a paper on a 'Market Stability Mechanism CfD' a few years ago. The idea is that this would incorporate the wider system costs and benefits of particular renewable generation sources, alongside an effective carbon price and better reflect the whole system impacts and benefits of new projects. It should incentivise more flexibility assets on the system, more dispatchable renewables, and enable more efficient choices by generators.

In principle, we believe this would still be suitable, however the mechanism would need further development and discussions. Any mechanism allowing a more rounded cost to emerge for particular projects would be welcome. This could encourage development of more storage at CfD projects, while the Balancing Mechanism would continue to encourage output at certain times. The OFTO scheme should also be amended as discussed in Question 7, to enable offshore wind operators to connect to the grid through onshore flexible assets.

The 'Re-costing Energy' project also examines this issue and proposes a more overarching shift to payments for energy as a service rather than on a '£/MWh' commodity basis.

11. Should the CfD mechanism incentivise minimum grid stability requirements (in CfD plants) to minimise system costs and help ensure secure and stable operation? How could this be achieved and what are the barriers?

As discussed in our response to Question 10, a Market Stability Mechanism within the CfD mechanism, should incentivise the provision of secure and stable operation and minimise system costs.

Some developers' current management is effective at present for procurement of stability services. At present the National Grid ESO is making strides to procure ongoing stability services and this is welcome. In future, some thought could be given to see whether it would be useful to procure stability services through a revised CfD or this way.

There is a need for flexible and responsive regulation in order to prevent stifling innovation in emerging technologies.

Some members would argue that prices should include factors for inertia and dispatchability.

12. Do CfD projects receive the right incentives to locate in the optimum locations?

Arguably no, as the CfD purely incentivises location based on price alone. However, to consider other factors major system changes would be required. These would need to give any locational signals apart from the cost of power. Locational signals are, however, already reflected to some extent in the grid connection and use of system charges that developers pay. Therefore, some grid connection and usage signals are already built into the system. REA would be interested to see the Government explore this further.

13. Are there actions which Government should consider, outside of Ofgem's current electricity network charging reviews, to help incentivise efficient market behaviour regarding the location of renewable assets?

REA would support a 'System architect' model being deployed to help provide strategic oversight of grid network planning. Some countries, such as in Denmark, have a system architect to develop the grid network, which proactively identifies where renewables work best and then designs the grid around them. REA would see merit in exploring this approach in the UK. Under such a system, grid reinforcement happens in advance rather than after the fact. To reduce the costs of infrastructure development and ensure effective use of our natural resources, the UK needs more advanced proactive planning of the grid-system, taking a whole systems approach. Building ahead of need reduces unexpected and unplanned costs and could reduce the cost overall.

See also REA's upcoming paper on Longer-Duration Energy Storage.

14. Should the CfD do more to enable the sustainable growth, cost reduction and competitivity of UK supply chains and how could this be achieved?

Supply chain plans are an existing mechanism which perform some of this work. For the most part, however, these apply to offshore wind and the Government should consider

whether this should be expanded to more projects. This could help to further develop the UK skill-base and encourage growth along the supply chain in the UK.

The Government should also look at options to accelerate the development of flexible assets at all scales, from (but not exclusive to) EV charging and batteries in the home, to grid-scale batteries, to large-scale, long-duration energy storage. Developing this industry now, through tax support, removal of regulatory and market barriers, creation of a new market mechanism for longer-duration energy storage, and direct investment where appropriate, will be vital to encouraging the growth of UK supply chains in this area.

Supporting and adapting to innovative technologies and business models

15. ***What are the benefits of renewable projects using multiple low carbon technologies or being co-located with low-carbon flexible assets? Should the CfD support these projects and why?***

There are lots of benefits to such co-located sites. Such sites bolster grid stability, and can access extra income streams, provide inertia, and supply other services. However, location of the assets is important in maximising these benefits. Location has an impact on the potential revenue from flexibility services and delivery of stability services. Sector coupling applications involving electricity/heating/cooling can be very location-specific and can operate most effectively near industrial demand centres. One problem that is faced by co-located sites is the so-called 'salami-slicing' of contracts, and if the CfD were to support sites to more easily stack revenues from multiple services that would be a step to removing this barrier to wider development of co-located flexible assets and renewable generation.

16. ***What are the benefits of projects with assets in different locations, including projects paired with flexible assets? Should the CfD support these and why?***

Projects which use hydrogen electrolysers alongside off-shore wind, could possibly deliver good system benefits, but this area needs to be developed further.

17. ***What changes would Government need to make to the Contract for Difference regime to facilitate the coordination of offshore energy infrastructure, what would be the benefits and costs of making them, and could there be a similar case for other renewable technologies?***

Please see answers above. A member view is that the OFTO rules that actively prevent offshore wind farms benefitting from storage should also be changed.

18. ***What changes would Government need to make for the Contract for Difference to facilitate deployment of offshore wind as part of a hybrid offshore wind interconnector project, and what would be the benefits and costs of making them?***

No response submitted.

19. ***What role could international renewable projects play in our future generation mix in GB? Are there benefits to supporting these projects with government schemes and how could this be achieved?***

REA does not favour the idea that the UK should offer CfD contracts to international renewable projects at this time. Under this idea, the area where a site is developed would not receive the benefit of the power generated. Furthermore, the UK would miss out on tax revenue streams from the projects such as business rates and would also lose the job growth benefits.

There are also political challenges for the UK and for 'host' localities associated to such projects, similar to those around interconnectors. For instance, if a renewable generation plant is developed in a neighbouring country to the UK, to supply power to the UK, but the wider region is experiencing an extreme weather event, all regional countries are likely to be experiencing similar pressures if they are all transitioning to Net Zero. This could put a plant in the host country in the position of supplying power to the UK, while the country in which the plant is located is experiencing a sharp drop in supply. The pressure would be to supply the locality rather than UK, therefore putting pressure on UK supplies and creating political tensions in other countries, neither of which is desirable.

20. ***Should part-built projects continue to be eligible to compete for CfDs after the fourth allocation round? Are we considering the right implications and what are your views on these?***

REA's view is that part-built projects should be able to participate. Much of the costs of the project may already have been sunk, and developers have taken on financial risk, while valuable grid capacity has been allocated. This is a waste if that capacity is unused, and it seems reasonable that such projects should be permitted to bid in. However, we acknowledge that such projects would be likely to have a lower cost within the auction than those starting from scratch, which would give them an advantage in the auction and make such projects much more likely to be successful. The Government should carry out scoping work to identify how many such sites there are, and what the impact of inclusion in the auctions would be, as there is currently limited data on this.

21. ***Can cost savings be achieved by developing extensions to existing projects, if so, how great are these cost savings, and what is the justification for these projects being supported through CfDs or any other government mechanism?***

Cost savings can certainly be achieved by developing extensions to existing projects, by using existing grid connections and infrastructure. Permitting extensions to participate in the CfD auctions would present more opportunity for financial efficiency for both developers and consumers.

Extensions could also include the development of carbon capture and storage technologies on existing CfD bioenergy infrastructure. Such developments should be supported as pathway to delivering negative emissions which are critical to the delivery of the UK's net zero ambitions.

22. Similarly, can cost savings be achieved by repowering older projects, if so, how great are these cost savings, and what is the justification for these projects being supported through CfDs or any other government mechanism?

Yes, cost savings can be achieved by re-powering older projects as developers will often still own or lease the land and existing infrastructure is in place. It is logical for developers to use such sites. However, there are still significant upfront costs to repowering as developers need to pay for the new equipment and associated infrastructure replacement, where appropriate. Like part-built projects, on the whole these would tend to be cheaper than new build projects, so Government would need to consider the impact on competition within the auctions, on prices, and consider which pots would be appropriate for such projects to bid into.

Landfill Gas

BEIS should consider whether repowering of landfill gas sites should be allowed within the CfD mechanism

As things stand, BEIS' policy is that landfill gas sites will no longer receive support under the Renewables Obligation from April 2027. Organic matter in landfill sites will generally decompose anaerobically, producing methane which is many times more harmful than CO2 in terms of climate change. Existing sites are already engineered to high standards and there is very little more that can be done to prevent methane production or slip other than actively extracting the methane. These additional actions have significant costs and the current incentives to capture methane and burn it to produce renewable electricity have been highly effective at incentivising operators to maximise the methane captured. These sites will continue to produce methane for many years after they have stopped taking waste.

A report (Final Costs and Climate Change Impacts of Current and Future Landfill Operations) recently published by Defra shows that it is not generally economically viable to generate electricity from landfill gas in the absence of financial support.

Given that gas production from landfill sites is steadily declining, it would make sense to support the capture and use of landfill gas for as long as possible. Allowing re-powering of landfill gas sites within the CfD policy would be one possible option. If this route is taken, we would be happy to discuss the practicalities further. Consideration would also need to be given to whether the current minimum capacity requirement of 5MW capacity is appropriate.

For the avoidance of doubt, this is not an argument in support of sending organic matter to landfill in future. The Government's policy is clear that it intends to send as little organic material to landfill as possible. This is about dealing with the legacy of material that has already been landfilled and where landfill cannot be avoided in the short and medium term.