

White Paper

Growing Up: Onshore wind's place in a competitive, low carbon power generation system

October 2015

At a Crossroad – the UK Power Market

The UK is at a pivotal moment in the development of its power system as it makes the transition to a 21st century low carbon generation system based largely on gas, nuclear and renewables. The current situation is complex, as policy decision makers try to manage the energy trilemma:

- **Maintain security of supply** as older fossil fuel power assets are retired;
- **Transition to a low carbon**, more diverse energy mix
- **Ensuring affordability**, managing the impact on consumers' bills.

Significant progress has been made towards meeting the UK's carbon reduction commitments particularly in the power sector, where emissions fell by 18 percent between 2013 and 2014, the largest reduction since reporting began in 1990. This can largely be attributed to the stable policy regime, underpinned by mechanisms such as the Renewables Obligation and the small scale Feed-in Tariff. Due to the momentum created in the deployment of the major renewable energy technologies, onshore and offshore wind are well placed to increase their share of the electricity mix from 20 percent in 2014 to around 30 percent by 2020 and further potential post-2020.

Looking ahead to the 2020s, with affordability now central to the energy policy agenda, there is a need to revisit how progress towards decarbonisation can be most economically achieved. However, the risks to successfully achieving this transition increase significantly after 2020, with price signals that are not sufficient to ensure the build out of necessary generation capacity to meet demand, and uncertainty around associated budget – particularly the Levy Control Framework (LCF)

necessary to achieve 2030 decarbonisation targets.

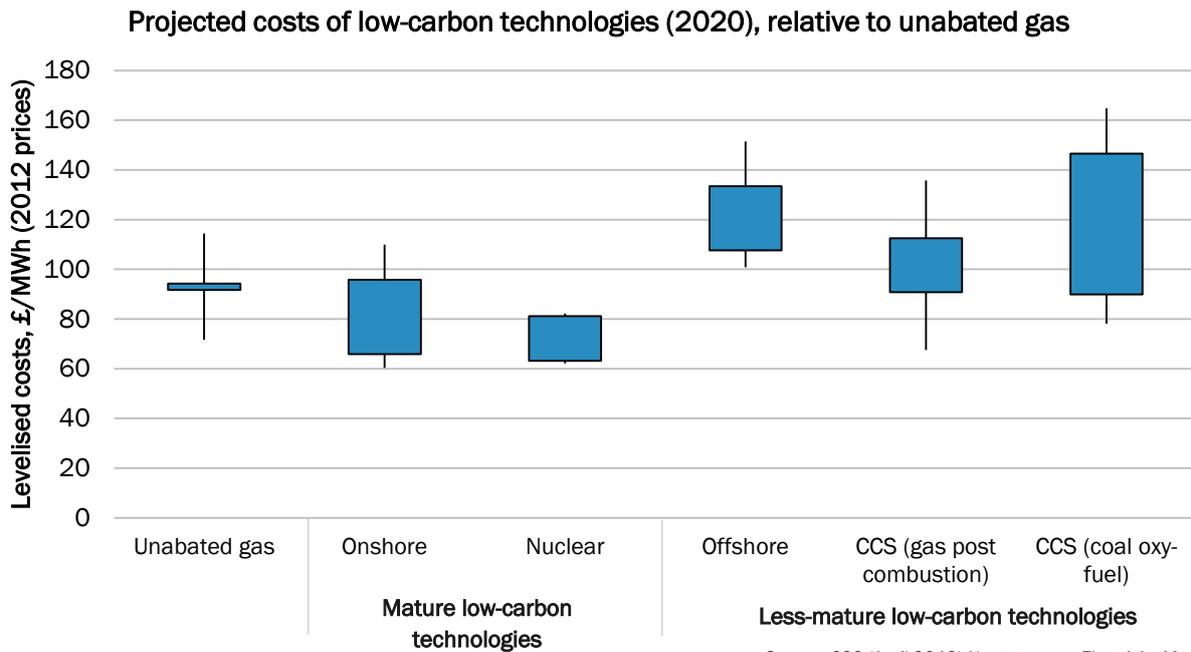
Politically, support for the transition to low carbon power sources appears to be strong. However, there is public concern over high retail power prices, as well as opposition to new onshore wind from a vocal minority of the government's support base (according to polls around 24% of Conservative supporters) due to concerns over visual impacts.

Through the Energy Market Reform (EMR) launched in 2011, the UK has developed a series of tools aimed at creating a generation mix that will allow it to meet carbon targets at the lowest possible price and keep the lights on. These tools include the Contracts for Difference (CfD) mechanism, the carbon price floor, the capacity market and emissions performance standards.

This FTI Consulting position paper sets out a series of recommendations which would allow generators, developers, equipment manufacturers, investors and the government to align their objectives and work together towards unified solutions to these challenges.

Onshore wind's role in the UK's future power mix

The Conservative government, which took power in May 2015, did so with a clear manifesto commitment to end new subsidies for onshore wind. The Secretary of State has moved quickly to introduce primary legislation to bring about the early closure of the Renewables Obligation (RO) with the inclusion of grace periods – subject to the legislative process – to ensure well progressed projects (i.e. with planning consent, designated grid connections and evidence of land rights) can still



secure support and thus not undermine investor confidence.

While there is some debate around the final amount of capacity that will be deployed under the RO, FTI concurs with government estimates that factoring in a further 750 MW that has been allocated under the CfD – onshore wind capacity is likely to fall within the 11-13 GW band which the government has established under the lead scenario in its 2020 EMR delivery plan by 2019.

While the UK will continue to see a level of deployment consistent with recent history through 2017, there are two major questions for the period ahead:

1. How much onshore wind energy will be deployed post 2017 and into the 2020s?
2. Given the UK government has reiterated its commitment to meeting its carbon targets, what are the cost implications of including, or indeed excluding onshore wind, in future CfD allocations?

Early indications suggest that the government may intend to exclude onshore wind from the CfD, at least in its present form, although it does recognise that onshore wind will continue to make up an important part of the UK’s generation mix.

In FTI’s view, there are a series of clear economic reasons to continue to include onshore wind within a “stage 2” CfD framework and to avoid any moves that could create an investment hiatus in the years after 2019 and negatively impact price development.

A. Onshore wind has reached grid parity with gas generation, and is ready to go further

In 2014, 19.2 percent of electricity generated was from renewable sources of which onshore wind was the single largest component, generating 18,333 GWh, 5.5 percent of total electricity generated in the UK. Onshore wind prices have shown a steady degression in levelised cost of energy (LCOE) terms over the last decade. The CfD mechanism has created an appropriate mechanism for a rapid price degression. In the last CfD allocation, the lowest price onshore wind projects had a price of £79.99/MWh¹ – average prices were 17-18 percent lower than the reserve price, and developers are confident that prices can go significantly lower. A number of major industry

¹ <https://www.gov.uk/government/statistics/cfd-auction-allocation-round-one-a-breakdown-of-the-outcome-by-technology-year-and-clearing-price>

participants believe that the CfD should be transformed into an “investment enabling” contract intended to de-risk investment and facilitate financing through providing predictability on prices, thereby reducing the cost of capital. Such a CfD would have a net neutral, and potentially even a net positive effect on the Levy Control Framework.

The Committee on Climate Change (CCC) notes in its latest progress report to Parliament that “the appropriate comparator is not the wholesale electricity price, but the alternative means of providing generation. Where this is unabated gas generation, its costs should be judged across its lifetime, assuming it would face the full costs of its emissions.” The CCC goes on to note that under the government’s central scenarios for carbon and gas prices “onshore wind at a cost of £80/MWh should be considered subsidy free from around 2020.”²

Major generators, however, are confident that onshore wind can go even further. By establishing a price ceiling of £80/MWh for the next allocation, generators consider that prices can fall to £75/MWh in the short term, and as low as £65/MWh in future auctions. This will make onshore wind more cost effective than new build gas and establishes the basis for the CfD to be considered not as a subsidy, but as a price stability mechanism aimed at securing optimal conditions for investment and finance in the long term.

Appearing in front of the Commons Energy and Climate Committee on 21 July, the Secretary of State mentioned that she had been approached by several major developers that were interested in “developing onshore wind projects without subsidy.” FTI’s consultation with generators indicates that this sentiment is widely shared in the industry. Companies are interested in establishing a collaborative and proactive approach with government to ensure a rapid development towards “subsidy free” CfDs, which would provide long term investment signals at no extra net cost to

the consumer. Given that onshore wind is cost-competitive with gas fueled new-build, it is the fixed price component of the CfD mechanism that would enable projects to achieve investment, rather than any additional subsidy.

The government’s central projections are for a wholesale electricity price in 2025 of £67/MWh, (compared to £51/MWh in 2014), with a carbon price of £55/tCO₂ and a wholesale gas price of 72 pence/therm (compared to 46 pence/therm currently). As the CCC says, this scenario already implies that “onshore wind at a cost of £80/MWh is likely to be subsidy-free from the 2020s.”

FTI Consulting proposes that, in partnership with government, the wind industry can cross the line into a subsidy-free world before that.

In order for this to happen, however, the onshore wind industry needs and clear stable regulatory framework with foresight of the timing of and ability to participate in forthcoming auctions, providing they have the necessary level local public support.

B. Onshore wind plays a key role in keeping costs low within the CfD mechanism

Onshore wind is the cheapest source of low carbon generation. On purely economic arguments, it should play a critical role in containing the carbon budget and getting the most of each penny spent in terms of CO₂ reduction.

The government created the CfD mechanism as part of the Energy Market Reform process initiated in 2011 to create greater transparency around support for clean technologies and to facilitate steady price depression. The original design for the scheme was to have a period where funds from the LCF were allocated to different technology “pots”, followed by a progression to technology neutral auctioning. Technologies supported so far through the CfD – either through bilateral mechanisms or through the auction system - have included offshore wind, - onshore wind, solar PV and biomass, while an allocation for nuclear power from the Hinkley Point plant has been agreed, with final details being negotiated.

² (CCC Progress Report to Parliament 2015 pp19-20 https://www.theccc.org.uk/wp-content/uploads/2015/06/6.737_CCC-BOOK_WEB_030715_RFS.pdf)

Onshore wind projects have so far seen some of the highest volumes of allocations within the CfD at some of the lowest prices³. The fact that onshore wind competes in allocations with solar PV, CHP and other “established technologies” in Pot1 means that competitive pressure is exerted on these latter technologies by the falling price of onshore wind. Conversely, making onshore wind ineligible for CfD allocations would remove this competitive pressure, significantly raising the outturn price and the costs to the final consumer.

C. Alternatives to onshore wind are constrained

According to the National Grid’s “Gone Green” Scenario⁴ the UK will need to meet an annual total demand for energy of around 362TWh by 2030, and will need peak capacity of around 66 GW. This will require a total installed capacity of 136 GW, of which 98 GW will have to be low carbon capacity.

A number of scenarios developed by the CCC on the government’s EMR process⁵ foresee onshore wind accounting for installed capacity of 25 GW, double the capacity forecast to be deployed by 2020. It is significant that onshore wind’s contribution remains stable, even in the CCC’s “Ambitious nuclear”, “Ambitious CCC” and “Ambitious Energy Efficiency” scenarios. This reflects the almost total phase out of coal from the system by 2030 in all instances and constraints

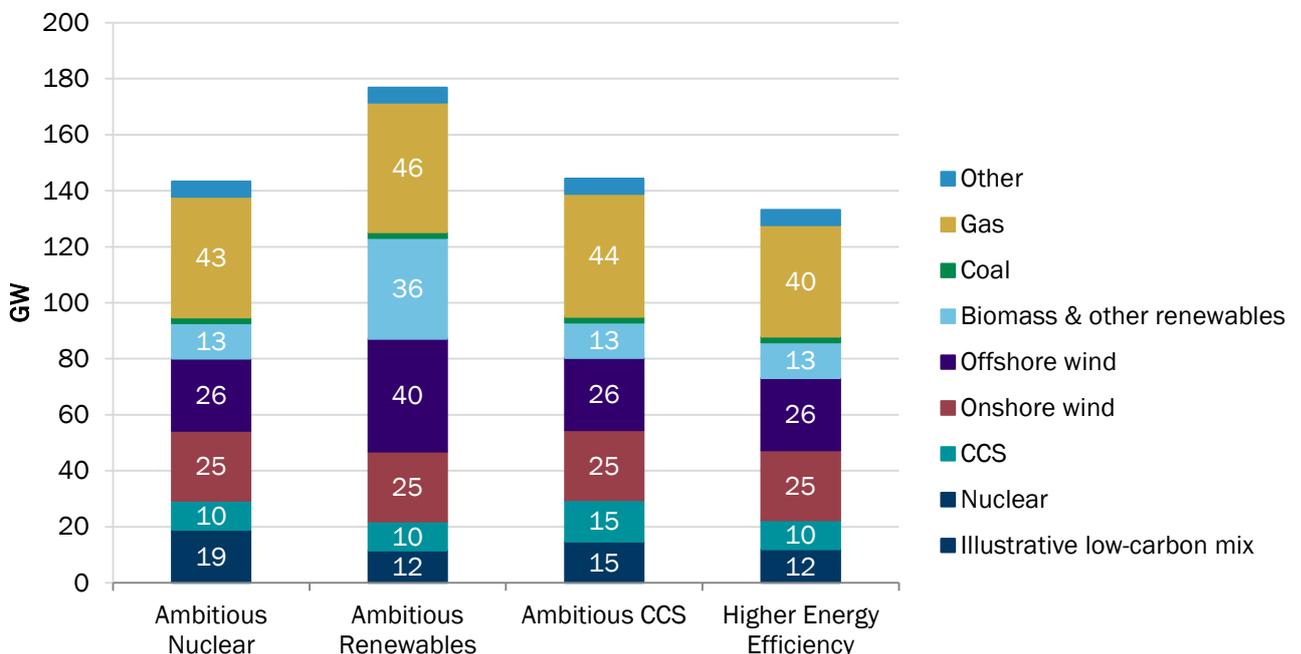
over reaching more than 19 GW (in the “Ambitious Nuclear” scenario), due to planning and cost issues.

There are of course many alternatives to this scenario, which depend on factors as diverse as expected price degeneration through technology development and specific constraints. The Secretary of State rightly points out that society has underestimated in the past the speed with which new technologies can make progress on lowering costs, which makes predicting the future power mix in a market context challenging.

However, FTI Consulting believes that given that the supply chain requires foresight of the development pipeline in order to make necessary investments, and lead times for projects, artificially curtailing the growth of onshore wind generation and replacing the lost capacity with alternative technologies will inevitably increase the cost to the consumer. Instead, FTI believes that the CfD mechanism allows for the move to technology neutral auctions where more established technologies such as onshore wind compete for contracts to facilitate investment.

However, almost regardless of the scenario, onshore wind can, and will need to, continue to make a contribution to meeting the UK’s power needs and de-carbonisation – both through adding new build capacity and through repowering/replanting as early projects come to the end of their operational life. It can do this at a

Power sector scenarios reaching 50gCO₂/kWh by 2030 - capacity (GW)



Scenarios developed for CCC May 2013 EMR Report

Source: CCC (April 2013) Next steps on Electricity Market Reform

lower cost than any other source of low carbon or thermal generation.

FTI Consulting believes that given that the supply chain requires foresight of the development pipeline in order to make the necessary investments, artificially curtailing the growth of onshore wind generation and replacing the lost capacity with alternative technologies, whether low-carbon on CCGT, will inevitably increase the cost to the consumer over the long-term.

Instead, onshore wind should continue to be part of the UK's long-term energy planning, with "subsidy-free" CfDs potentially a way to ensure it can be deployed at no cost to the consumer.

D. CfDs must continue to evolve towards technology neutral scheme

Another issue to take into consideration is the ongoing evolution of the EMR market framework. Many concerns have been raised about the complexity of the current scheme, as the different CfDs by technology create unnecessary complexity. One potential direction for reform would consist in evaluating the feasibility of a gradual evolution toward a technology neutral CfD system in order to create a level playing field and achieve decarbonisation at least cost. FTI-CL Energy has done research on the potential design of such scheme based on international experiences – countries in Latin America for instance have experimented with technology neutral auctions which revealed the competitiveness of wind power compared to other technologies.

In the long term, it would be fruitful for policy makers to consider the design of a single competitive system aimed at ensuring new power supply at the lowest possible cost that is consistent with meeting carbon imperatives. A unified auctioning environment that would place, for example, gas generation and onshore wind in a single competitive "pot" – would be the best way to ensure price transparency and reduce perceptions that one or another technology is being "subsidized".

Policy recommendations

1. Appropriately sited onshore wind should continue to be eligible to participate in competitive CfD allocations, in order to minimise the cost of decarbonisation and impact on the consumer bill.

2. The Government should provide more mid-term clarity on the size and timing of allocations through an extension of the timeframe of the levy control framework to a 10 year lead time with annual rolling extensions (to match project timelines) as suggested by the CCC and endorsed by the Confederation of British Industry (CBI) and other groups. This of course requires the successful conclusion of the planned review of the LCF and legislative support in the forthcoming Fifth carbon budget. These measures should provide the conditions for a build rate of low carbon and other technologies that is consistent with expected 2030 power demand and required carbon intensity.

3. The government should continue to move to technology neutral CfD auctions. It will be necessary to maintain specific allocations for developing technologies and nuclear in the coming period and ensure an appropriate generation mix through the use of minima and maxima, but clear price depression targets should be set, aimed at creating rapid convergence with the technologies in the price competitive allocation.

4. "Subsidy-free" CfDs should be established by the Oct 2016 allocation with delivery of power from 2020. Government and industry need to agree clear criteria as to what constitutes subsidy free. FTI-Consulting believes that the criteria should be based on the forward wholesale prices, but that this needs to be modified by:

- A 15 year carbon-price trajectory that is consistent with meeting the UK's stated carbon emission reduction commitments

- The beneficial impact of further wind deployment on power prices (the so called "merit order effect")

- The impact of additional system costs

This definition should serve as a reference for the setting of ceiling prices for future allocation rounds.

6. In support of this focus on cost reduction, the planning system needs to encourage the development of onshore wind schemes that use standardized technology rather than bespoke configurations that only serve the UK market. The Scottish Government should consider relaxing outdated planning guidance which has the effect of limiting rotor tip heights for onshore wind. This is preventing the deployment of the latest generation wind turbines, which could reduce levelised cost by around 10% through higher load factors and allow greater wind production, from fewer, larger machines.

Industry Actions

1. The onshore wind industry needs to commit to a rapid price degeneration in the transition to “subsidy free” CfDs. This will involve continued focus on the best quality projects with the highest capacity factors and economies of scale.
2. The supply chain for the wind industry needs to ensure production efficiency and competitive prices, through recognizing the ongoing opportunity represented by new onshore wind and future repowering opportunities.
3. Generators should see community engagement as key to its continued development. On a pragmatic level, developer portfolios have already shifted towards areas where public acceptance of onshore wind are highest and there is an approximate correlation between higher capacity sites and relative ease of planning. On a more creative level, the wind industry has begun to introduce highly innovative schemes aimed at offering communities investment opportunities in the low carbon generation assets that will supply their energy. However, there are a number of complexities in respect of community ownership which do not necessarily align with the aim of reducing costs, such as additional legal and financial costs.
4. Generators should continue to seek to maximise local supply chain opportunities which will help create value for the UK economy. Evidence suggests that there are still considerable

efficiencies to be gained from the UK supply chain. While onshore wind is an established technology, the industry is at the forefront of innovation now underpinned by considerable operating experience. This experience, coupled with a new raft of efficiency measures currently being deployed leveraging advances in sensors, big data and material science, should continue to see onshore wind as a key contributor to the UK decarbonisation targets and generation mix.

Conclusions

There is a clear alignment of interests and aims between the current government and the wind industry. The government wants to provide the UK with a stable low carbon generation system at the lowest possible cost to the consumer; while the wind industry’s continued growth and viability depends on driving costs down and being able to operate subsidy free.

Detailed consultations with leading wind generators shows that they are prepared to take up the challenge and compete in the market with other technologies. Research shows that onshore wind continues to be – for the next decade at least – the cheapest way of adding new power capacity in the UK.

What is needed is a grown up discussion and spirit of collaboration between government and industry around solving common problems. Too often there has been a blurring between discussions around energy policy and discussions around planning. There is a legitimate discussion to have around onshore wind’s impact in the two areas, but mixing the two has often led to confusion. On the other hand, it is clear that the wind industry is now a

mature industry sector that is firmly in the mainstream of the UK's energy system.

The wind industry's objectives and messages need to reflect this maturity. Economic actors whose business is based on maximizing revenues from public subsidy will see their businesses wither and die in the coming period. But well-funded, long term participants in the sector are well placed to prosper in a competitive low carbon environment.



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