Business Energy and Industrial Strategy Committee - Financing Energy Infrastructure Inquiry

Written evidence from Regen and the Electricity Storage Network

Introduction

Strong public policy support and financial incentives have transformed the UK power sector in recent years attracting billions of pounds of investment in clean energy. One third of our power now comes from renewables and we are close to ending the use of coal for power generation. These shifts have driven rapid reductions in our carbon emissions from power[1]. At the same time energy costs from renewables have fallen rapidly to the point where wind and solar PV have become the lowest cost source of low carbon energy. This record is a demonstration of what can be achieved by clear public policy backed by an industrial strategy coupled with private sector innovation and investment.

It would be a mistake however to assume that, because of past success, the job of decarbonising the energy sector has been completed. In fact, we will need an additional 40-50 GW[2] of renewable electricity capacity by the early 2030s to maintain progress towards the UK's decarbonisation targets and critically to enable the decarbonisation of transport and heat. We also need to transform our energy system, adding far greater flexibility and responsiveness enabled by new 'smart' technologies such as energy storage.

This level of renewable and smart technology deployment is achievable. The industry has shown that it can rapidly deliver new projects at both large and small scale, while creating thousands of UK jobs. The ESO has confirmed that the grid will be able to manage with zero carbon energy by 2025[3] provided we make the right investments in smart technology. The major challenge therefore is to attract and secure the level of investment that is needed.

The growth of renewable electricity over the last decade was primed by the use of subsidies. Although costs have fallen dramatically, the rapid and almost complete removal of financial support and lack of a coherent energy strategy has led to the deployment of renewable generation stalling. While a handful of 'post subsidy' wind and solar projects will continue to progress, the outlook for future investment on the scale needed to maintain decarbonisation is in jeopardy. The exception, which demonstrates the importance of long term support, is offshore wind which continues to benefit from access to subsidies via Contracts for Difference and the recently agreed sector deal[4] and continues therefore to achieve cost reductions and the creation of UK jobs.

The cost of renewables has fallen dramatically, enabling different approaches to investment. The industry is not therefore calling for a return to high levels of subsidy, but is asking for a long term policy framework that supports clean growth and innovation, sustains public and political support, and attracts investment. We also

[1] Carbon intensity of power has fallen to circa 260 g CO_2e/kWh

[2] Annex K - BEIS emissions projections https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/666266/Annex-k-total-cumulative-new-capacity.xls

[3] https://www.nationalgrideso.com/document/141031/download

[4] Offshore wind sector deal - https://www.gov.uk/government/publications/offshore-wind-sector-deal

need to think creatively and be prepared to turn to new ideas to transform our economy and so this inquiry is well-timed to investigate such mechanisms.

As well as attracting financial support to deliver decarbonisation, the new policy framework must also:

- Maintain competition and continue the drive to reduce energy costs, including system and infrastructure costs
- Reduce the cost of capital by reducing investment risk - creating a clear and consistent environment for long term growth
- Attract a good mix of investment sources, specifically from UK investors with a focus on local and community ownership to ensure value retention in the UK economy
- Enable and support the development, commercialisation and public adoption of new smart technologies such as energy storage, energy efficiency, electric vehicles and the digitalisation necessary to complete the job of achieving a net zero carbon economy
- Create UK and regional jobs especially through investment in the supply chain as well as directly in equipment manufacture, infrastructure and creation of new export markets
- Provide a long term roadmap and energy strategy, with interim targets, that is consistent with the decarbonisation goals that have been set

Clear central government support alongside increased investment at the regional, city and local level will be needed. Investing locally creates jobs and opportunities directly in the local economy, providing long term societal support and increased engagement.

The clean energy sector is a creative one and has plenty of innovative proposals for increasing investment and strengthening the sector - for example providing a floor mechanism for Contracts for Difference, reforming the REGO market and setting a meaningful carbon price.

Failure to act now will make it more difficult, and much more costly, for future consumers to achieve decarbonisation. The latest report from the Committee on Climate Change warns that the UK is not on track to meet the fourth or fifth carbon budgets[5] and the rate of our carbon emissions reduction has been steadily declining since 2016 with most of those gains made as a result of reduction in the use of coal power[6]. The recent declaration of climate emergencies by many local and regional bodies, as well as the climate change protests led by our school children, shows the overwhelming continued support for actions to achieve a low carbon future.

[5] https://www.theccc.org.uk/2018/06/28/apply-the-lessons-of-the-past-decade-or-risk-a-poor-deal-for-the-public-in-the-next/
[6] https://www.carbonbrief.org/analysis-uks-co2-emissions-fell-for-record-sixth-consecutive-year-in-2018

In summary, we recommend that the government follows through on its commitment to clean growth and creates a new policy framework for low carbon investment that:

1. Removes the distortion of preventing solar and onshore wind competing in the Contracts for Difference scheme thereby giving investors the confidence to proceed with the pipeline of current projects as recommended by the Committee on Climate Change.[7]

2. Considers reforming the CfD scheme in the longer term to include a cost-neutral floor price[8] or zero net subsidy, to provide a base level revenue guarantee which would be cost neutral for the consumer.

3. Considers a new scheme to support small scale renewable energy which recognises the social and economic value of locally-owned energy assets. Also to bring forward plans to implement The Smart Export Guarantee with a meaningful floor price that reflects the real value of energy generation.

4. Considers measures to ensure that the growing demand for green energy products, and the movement towards net-zero carbon by cities, regions and companies, increases the material value of low carbon investment. This could achieved by;
    a. a new investment stimulus via the power purchase agreement (PPA) market; or
    b. through significant reforms to the green energy trading scheme based on REGO[9] certificates of origin, including providing greater visibility of fuel mix reporting and setting a minimum (residual) low carbon energy obligation for all tariffs.

5. Provides a long-term plan for decarbonisation of the energy sector, alongside a coherent investment plan, implementing the recommendations off the Green Finance Taskforce - e.g. supporting investment at a local level through pension funds, local authorities and favourable tax conditions for renewable investment.

6. Creates a similar 'sector deal' for renewable and low carbon technologies to that enjoyed by offshore wind recognising the value of jobs, innovation and investment to regional and local economies.

7. Accelerates the devolution of energy strategy and investment to the UK's devolved governments, cities and regions, recognising their desire to achieve net zero carbon by enabling greater local governance and oversight of energy infrastructure investment - for example giving regional stakeholders greater oversight of the RIIO2 investment process[10].

8. Mandates Ofgem, and other regulatory agencies, to put decarbonisation and clean growth as a major policy objective and to consider the carbon impacts of regulatory policies, such as future network charging arrangements.

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[7] CCC 2018 Progress Report to Parliament https://www.theccc.org.uk/wp-content/uploads/2018/06/CCC-2018-Progress-Report-to-Parliament.pdf

[8] See for example Cornwall Energy proposed CFD Floor Price

[9] Renewable Energy Guarantee of Origin

[10] RIIO2 is Ofgem's regulation to set price controls for network companies running the gas and electricity networks

9. Maintains a clear and consistent carbon price for all fossil fuel use (including gas used for heat and small scale fossil generation) that properly reflects the externality cost of carbon emissions and underpins the long term transition to a low carbon economy as identified by the Committee on Climate Change in their latest progress report[11].

10. Explores the options for financial support for the decarbonisation of heat and for energy efficiency, including the extension of the Renewable Heat Incentive.

Regen is an independent, not-for-profit centre of expertise on sustainable energy with 15 years frontline experience of working in the renewable energy sector. Regen manages the ESN - the UK industry group formed in 2008 dedicated to electricity storage.

Regen and the Electricity Storage Network (ESN) have 180 members from business, local authority, community energy, consultants, academic institutions, and research organisations across the energy sector.

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[11] CCC 2018 Progress Report to Parliament https://www.theccc.org.uk/wp-content/uploads/2018/06/CCC-2018-Progress-Report-to-Parliament.pdf

Questions

1. *How do recent investment decisions on nuclear and trends in low carbon investment affect the UK investment outlook for energy infrastructure? Is there a case for changing the Government's current approach to delivering a low cost, low carbon energy system? How could the 'nuclear gap' be filled?*

1.1. The UK has had excellent growth in renewable energy and storage over the last decade due to positive decisions and investment from government creating a favourable environment for local, private and community investment. Investment hasn't just been at the large scale either - much of this growth has been financed by households, small businesses and local communities who have supported one million installations and 6 GW of capacity.

1.2. To meet our carbon targets we need to build on this success by decarbonising the power sector, transport and heat - the latter two presenting major challenges. Investors remain keen to back clean energy projects and innovation is driving down costs. The challenge now is the lack of clear public policy support with recent developments stalling the UK's progress - for example solar PV deployment has effectively halved each year since 2015.[12] Closing the Feed-in Tariff, creating a very difficult planning environment for onshore wind and removing investment in Contracts for Difference for technologies other than offshore wind, have all decreased deployment. These decisions, amongst others, have slowed progress and created a difficult environment for actors right across the renewable industry from investors to developers to operators, and supports the case for change in the UK government's approach.

1.3. Clearly deployment needs to increase to fill a gap in the energy system, but this gap can be characterised in different ways; as a carbon gap, or an energy security gap. Increased renewable deployment will be required to replace carbon-intensive generation and meet our carbon targets, however, due to their variable nature, other technologies will be needed to deliver the energy security that baseload generation such as fossil fuels or nuclear provide. Storage, interconnectors and demand-side response will give the flexibility needed to provide this security, particularly as we see increased demand from electrification, such as electric vehicles and heat pumps.

1.4. The stop-start nature of UK energy policy has had a detrimental impact on the supply chain and has cost the UK jobs. Historically, the UK has not attracted large amounts of original equipment manufacturers and as a result, the supply chain is not robust enough to deal with peaks and troughs in deployment, as evidenced by the 32% reduction in jobs in the solar sector in 2015-16 following the reduction of Feed-in Tariff rates[13]. Strengthening this supply chain through investment will enable it to weather such periods, for example by increasing the export market.

2. *How attractive is the UK energy sector for investment compared to other countries? Are there particular technologies which are more – or less – attractive to investors under current arrangements?*

[12] https://www.gov.uk/government/statistics/energy-trends-section-6-renewables

[13] https://www.pwc.co.uk/power-utilities/assets/solar-report-2016.pdf 9 MCS installer

2.1. The UK has largely been an attractive and stable investment prospect, with a few blips over the last few years; according to the annual EY renewable energy country attractiveness index, the UK has climbed back to 7th after falling to 14th in 2016 due to uncertainty around Brexit, the closure of the Department for Energy and Climate Change and the approval of Hinkley Point C[14,15].

2.2. The attractiveness of the UK for investment is evidenced in the increase in capacity over the last decade. Although the UK is often a global leader in investing in innovation, the stumbling block comes at the point of commercialising that innovation. Storage is a prime example of this - the UK has experienced significant growth in storage since 2016 (355 MW connected with 5.3 GW in pipeline), but now that the sector and the markets are attempting to adapt to provide appropriate routes to market for storage, margins are being squeezed to a point where storage is an increasingly difficult business case for investors. The markets that were originally ideal for storage - e.g. frequency response and STOR - are becoming increasingly saturated, Capacity Market value is decreasing, behind-the-meter storage is being penalised by a u-turn in policy which has cut revenues from network charges, and domestic storage is struggling to achieve viable returns. Feedback from our members is that this lack of stability is deterring investors.

2.3. This trend of policy developments doesn't prioritise decarbonisation and flexibility and thus is creating a hostile environment for renewables, storage and other low carbon technologies. The government's rhetoric in support of renewables is contradictory to their and the regulator's actions which consistently prioritise cheap energy and competition over decarbonisation. This disparity between ambition and action makes it very difficult to predict how regulation will change - which at present it does frequently. This volatility and unpredictability is deterring investment, decreasing deployment and impacting the workforce and skills we have built up in the UK.

3. *How has Government policy improved the UK energy investment environment over the last three years?*

See responses to other questions

4. *What types of investor can we expect to finance future UK energy infrastructure? What are their criteria for investment, including on risks and returns? Does it matter if investors for specific technologies are largely from overseas?*

4.1. Thus far, investment in UK energy infrastructure has originated from a wide range of scales, from overseas investment and state owned operators, to small businesses, local energy groups and individuals.

Diversity of supply and investment

4.2. 73% of total new renewable energy capacity in 2018 came from just two technology types, offshore wind and plant biomass. A diverse investment mix is important, as is a mix of generation technology types. This decentralises financial risk, builds more resilient supply chains and business models, as well as stabilising energy supply fluctuations. While future investment in some technologies seems secure in the short term,

[14] https://www.ey.com/Publication/vwLUAssets/ey-recai-issue-51-may-2018/$File/ey-recai-51-may-2018.pdf
[15] https://www.ey.com/Publication/vwLUAssets/EY-RECAI-48-October-2016/$FILE/EY-RECAI-48-October-2016.pdf

relatively limited solar PV development is expected in the next few years. Since 2015, new solar PV deployment has effectively halved each year.[16]

4.3. The interest and development of particular generation technologies indicates an interest from particular investors. Offshore wind has so far been attractive to large scale utilities and financial investors while solar PV has had comparatively more local investment and decentralised financing. Overseas investment in a particular technology may not matter to such an extent if there were a greater balance between development of new technology types.

4.4. Offshore wind, one of the most active renewable energy sectors, has seen a shifting investment make-up as the industry develops. Financial investors (including pension funds) in operational/under construction offshore wind farms have increased their market share, currently at 27%, up from 17% two years ago.[17]

4.5. Around 50% of UK offshore wind farms are publicly owned (wholly or majority stake), however only 0.07% are UK publicly owned. The remaining mix of UK offshore wind ownership is from overseas investment (over 90%) and private UK investment[18]. This predominance of overseas investment in the dominant technology is problematic; the concentration of singular types of investors in a single technology limits the value captured across the sector whereas a diverse investment mix reduces risk.

Local investment is vital

4.6. Whilst investment in green infrastructure from all scales is beneficial, UK investment needs a strong local base. This increases the value retained locally from jobs and operating profits. Furthermore, local investment can create positive engagement and sense of ownership, providing long-term societal support. Since 2010 energy development at the local scale was supported by straight-forward, valuable subsidy schemes. These de-risked the upfront capital expenditure necessary for renewable projects, which is otherwise beyond the reach of smaller investors. These subsidy schemes have ended, and with them almost all of the community-scale renewable energy development.

4.7. Though the technological risks of renewable energy reduced as the industry matured, the financial nature of development (high upfront, low marginal cost) has remained the same. Current and near-term measures to reduce these risks (Contracts for Difference, the Carbon Price Floor, UK sector deals) favour larger scale investment, including overseas investment. There is practically no financial incentive scheme for renewable energy deployment at a local scale in which the benefits are retained locally. Furthermore, there is a lack of sustainable investment in the supply chain as a whole, and the UK needs to attract original equipment manufacturers alongside policies to attract further capacity deployment.

Investment in heat and energy efficiency

4.8. Domestic heating demand will also be decarbonised in line with UK targets, and the investors in retrofitting energy efficiency and changing heat technologies are likely to be very decentralised, down to the housing association, cooperative and individual-home level. It has been suggested around 26 million homes need to

[16] https://www.gov.uk/government/statistics/energy-trends-section-6-renewables
[17] https://www.thecrownestate.co.uk/media/2082/offshore-wind-operational-report-2017.pdf
[18] https://labourenergy.org/wp-content/uploads/2017/08/Who-owns-the-wind_2017_Labour-Energy-Forum.pdf

be substantially upgraded over the next 30 years to meet our carbon targets[19]. Awareness of this sector is especially important in terms of tackling carbon emissions. Large investment will be required nationally, whether it is for whole-house retrofit or for conversion to heat pumps or hydrogen for example, though it will come from a range of scales. Examples of home-level financing for these include an 'energy efficiency mortgage'. This would allow householders to borrow at better rates to reduce their energy bills or purchase an already energy efficient property by way of preferential financing conditions linked to the mortgage, linked to increased loss mitigation capacity and lower probability of default. There are other methods such as 'Energiesprong' from the Netherlands, who have a similar housing stock to the UK. Whichever financing mechanism is available to homeowners, renters, and housing associations, etc. a significant amount of expenditure is anticipated.

5. *What role should the Government play in providing financial support and sharing risks for new energy infrastructure? Are existing financing mechanisms, notably the Contracts for Difference, fit for purpose? Are there any practical issues, or potential unintended consequences, that could affect the feasibility of implementing alternative support models (such as a Regulated Asset Base)?*

5.1. As laid out in previous questions, the government's role in providing financial support to the renewable sector has been instrumental in growth of deployment over the last decade. Equally, the reduction of this support has had the opposite effect, with unplanned and hasty withdrawal deterring private investment. To be clear, we are not proposing a return of the subsidies that were available under schemes like the Feed-in Tariff. What is now required to enable the speed and scale of investment required is a level of revenue certainty to de-risk investment.

Existing support and finance mechanisms

5.2. There are several ways in which the existing support mechanisms could be reformed at low cost to encourage investment and deployment.

Contracts for Difference

5.3. CfDs have been successful in de-risking investment in offshore wind and substantially increasing its deployment. However, for 'mature' technologies in Pot 1, auctions have been limited to one auction in 2015. This has resulted in solar PV and onshore wind being unable to compete for contracts and missing the opportunity to decrease the risk of investment caused by wholesale price volatility. The argument that solar PV and wind can compete without any form of support is hotly debated in the industry with many of the opinion that risk is still too high. The Committee on Climate Change, numerous high profile industry bodies and the National Infrastructure Commission have all called for CfD contracts to be opened up to all renewable technologies and not limited to offshore wind alone.

[19] https://www.theiet.org/impact-society/factfiles/built-environment/retrofit-2050/?utm_source=redirect&utm_medium=legacyredirects&utm_campaign=2019relaunch

5.4. There are options to reform the CfD contracts to make them cost-neutral; energy consultants Cornwall Insight have proposed a 'CfD floor' which would give a guaranteed floor price and therefore protection against volatile energy prices which are likely to increase in line with renewable penetration[20]. Requiring generators to repay any payments received under the floor before positive prices can be realised would make such a scheme deliverable at zero subsidy.

Feed-in Tariff and Smart Export Guarantee

5.5. The Feed-in Tariff has supported 6 GW of small-scale renewable generation and nearly 1m generators to date. Its removal is a blow to the industry, not least because of a lack of replacement or alternative scheme, even for energy exported to the grid for which all generators should be paid a fair rate. The government's proposed replacement scheme (which has no fixed date for coming into effect) will mandate suppliers to provide an export rate and encourage them to do so with dynamic, variable tariffs. Industry has welcomed this scheme which matches the smart trajectory of the energy system, but a floor price of zero is unlikely to de-risk a project to encourage investment. We recommend that a meaningful floor price be implemented to give small-scale generators an opportunity to secure investment.

Regulated Asset Base

5.6. The RAB model may be suitable for nuclear because of the high risk associated with such a large investment, but is likely to be unnecessary for renewable generation and storage. Using the RAB model of funding shifts the bulk of the cost and the risk onto the consumer and is unlikely to provide value for money in the long term for nuclear projects. Even backed by a RAB model it seems unlikely that new nuclear projects will be developed without very significant public subsidy and risk. Long term costs of decommissioning, clean up and radioactive waste management continue to make nuclear an expensive low carbon option. The lack of flexibility provided by nuclear generation compares poorly with energy storage, interconnection and other forms of flexibility.

5.7. There are many alternative models laid out in this response that reduce both the cost and the risk of renewable investment for the investor and the consumer.

New finance initiatives

5.8. The existing funding models in place are unlikely to stimulate investment at the required scale. New initiatives must also be explored to reach the level of deployment needed to reach our carbon targets.

Green finance

5.9. The government's green finance scheme, the Green Investment Bank (GIB), stimulated investment in the green economy, particularly offshore wind. According to a report from the National Audit Office, GIB attracted £8.6bn of private capital to March 2017, but the impact in other areas is less certain[21].

[20] https://www.cornwall-insight.com/newsroom/all-news/cfd-floor-price-letter-to-beis
[21] https://www.nao.org.uk/wp-content/uploads/2017/12/The-Green-Investment-Bank.pdf

5.10. After the sale of the GIB, the government commissioned a review into green investment - the Green Finance Taskforce[22]. The recommendations in this review echo many of the proposals in this response, in particular a 'National Capital Raising Plan' - a structured, investment plan that aligns with government objectives on carbon reduction and the environment. The report also recommends that more local, public finance initiatives are developed and supported by government, including a recommendation to align local authority pension funds with environmental aims. Of particular note is the proposal for a 'Sovereign Green Bond' in the region of £9-10bn; as well as directly funding new infrastructure, the leadership provided by such a clear investment in the green economy would stimulate local and private investment.

Price variability and volatility

5.11. A key risk for future renewable energy projects is the effect that deployment will have on energy price predictability and returns. At times of high variable generation, prices are driven down and create significant fluctuations in market prices, including negative pricing. An example of such an event happened in March when an unexpectedly sunny and windy conditions pushed the imbalance price below zero for over six hours, falling as low as -£70.24/MWh. This is likely to be a more frequent occurrence in future as variable generation increases and as a result, business models will become less predictable. In order to incentivise investment, the government may need to provide a cap and floor price to reduce the risk of a project.

6. *What further steps should the Government take to increase investor confidence in the UK energy sector?*

Price volatility must be addressed

6.1. Changes to investment support has been covered in detail above, namely restructuring CfDs to allow development of other technology types such as onshore wind and solar PV, and furthermore introducing a 'CfD floor'. The CfD floor addresses concerns about price volatility through a mechanism which could be deliverable at net zero subsidy.

6.2. Price volatility is something which affects investors at all scales. A restructured CfD process can increase investor confidence in the UK energy sector as a whole, especially at the large scale. There is significant investor confidence lacking in the small and more local scales of the energy sector too, often from organisations which are more sensitive to risk, but that can deliver local benefits which are retained in the community. The very difficult policy and planning environment for onshore wind increases the costs of any projects which do manage to go ahead, and stifle the deployment of a manufacturing, development, and operating chain. In this context the comments on the SEG above are submitted.

6.3. The sole reliance on kWh price in the current electricity market is not designed for a prevalence of near zero marginal cost operators, i.e. wind and solar PV generators. Since the kWh price needs to cover both the operating and capital costs, as more renewable energy is brought online, 'peaking' generators need to cover their costs in fewer, shorter periods, leading to increased price volatility. This volatility hinders

[22] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/703816/green-finance-taskforce-accelerating-green-finance-report.pdf

investor confidence in all energy generation types. This is the context in which a 'price floor' can be highly effective, reducing volatility for existing generators, and uncertainty for developers, delivered at low financial support levels. It is a system set up for lower volatility and therefore lower government intervention, which can increase investor confidence.

Clear policy targets will create confidence

6.4. Further to the financial question, clear policy targets in the energy sector are needed to increase investor confidence, and guide sector decarbonisation to ensure it is done efficiently. For the electricity sector, long term targets of either generating capacity or total gCO_2/kWh can be highly effective. An example may be observed in the Welsh Government TAN 8 SSAs where indicative targets have been published as part of the onshore wind strategy there[23]. Though a UK approach may encompass a wider variety of technology types, indicative electricity targets would increase investor confidence and support the re-emergence of a supportive supply chain.

The cost of gas for heat should reflect the cost of carbon to incentivise decarbonisation

6.5. In terms of heat, the scale of the problem has been laid out in Question 4. Energy efficiency measures are generally financially profitable though on a longer timescale than many households want to contemplate. Government intervention is necessary to decrease the capital risk and shorten the payback period, or to support alternative financing measures, such as the energy efficiency mortgage. One way of reducing the upfront capital expenditure is to support the supply chain and to ensure the construction industry is up-skilled to deliver the scale of the solutions needed. This is also supported through the enforcement of building standards and ensuring compliance.

6.6. Large energy firms have argued to maintain the Carbon Floor Price out to 2025, as it provides investor certainty and contributes to security of supply. The long-term plan for the Carbon Floor Price is uncertain, and long term trajectories for this are needed, including how the cost of gas used for heat and small-scale fossil generation will transition to accurately reflect the cost of carbon.

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[23] https://gov.wales/sites/default/files/publications/2018-09/tan8-renewable-energy_0.pdf