

The Fifth Carbon Budget - Call for Evidence

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Question and Response form

When responding please provide answers that are as specific and evidence-based as possible, providing data and references to the extent possible. Please limit your response to a maximum of 400 words per question.

Questions for consideration:

A. Climate Science and International Circumstances

Climate science and international circumstances are important criteria in setting carbon budgets.

- The science indicates the impacts associated with different levels of climate change and the limit on emissions globally if these risks are to be contained.
- International circumstances inform the prospects of future action to reduce emissions globally, potential requirements of the UK to contribute to those actions, and prospects for low-carbon technology development and carbon pricing.
- The EU places obligations on Member States to reduce emissions to contribute to reductions in the bloc as a whole. These imply a minimum level of effort for the UK's carbon budgets.

The Committee intends to draw primarily on the work of the IPCC, as published in the Fifth Assessment Report, in assessing the implications of climate science for the budget advice

The Committee's advice is based on a climate objective to limit central estimates of temperature rise to as close to 2°C as possible, with a very low chance of exceeding 4°C by 2100 (henceforth referred to as "the climate objective"). This is broadly similar to the UNFCCC climate objective, and that of the EU.

In order to achieve this objective, global emissions would have to peak around 2020, before decreasing to roughly half of recent levels by 2050 and falling further thereafter.

The UNFCCC is working toward a global deal consistent with such reductions. Individual parties are submitting pledges for effort beyond 2020, with the details of the agreement to be discussed in Paris late in 2015.

The EU has agreed a package that requires a reduction in emissions of at least 40% on 1990 levels by 2030, on the way to an 80-95% reduction by 2050. The UK Government supported this package, while arguing for an increase to 50% in the context of a global deal.

The US and China have jointly made pledges for the period beyond 2020. The US has pledged a reduction of 26-28% by 2025 versus 2005, requiring a doubling of the rate of carbon reduction compared to 2005-2020 and on a trajectory to economy-wide cuts of the order of 80% by 2050. China has pledged to peak CO₂ emissions around 2030, and to make best efforts to do so earlier.

Question 1 *The IPCC's Fifth Assessment Report will form the basis of the Committee's assessment of climate risks and global emissions pathways consistent with climate objectives. What further evidence should the Committee consider in this area?*

ANSWER:

Several reports and studies have been published in the past 15 months supporting and strengthening the findings and recommendations of the IPCC, such as:

- The New Climate Economy Report – better growth, better climate by the Global Commission on the Economy and Climate
- Pentagon Climate Risk Report
- The World Bank report “Turn down the heat”
- The IEA's Energy, Climate Change and Environment 2014 Insights

We also are part and witness of a growing support of industry sectors and business leaders asking governments to strengthen climate policies and instruments, especially through putting a price on carbon.

Question 2 *To what extent are the UN talks in Paris likely to have implications for the Committee's advice beyond the pledges and positions announced in advance of the talks?*

ANSWER:

The key consideration for the Committee will be the path for the UK towards achieving the 80% reduction in carbon emissions in 2050 compared to 1990 set in the Climate Change Act. Scope for ambitious global action following the UN talks would however strengthen the case for an ambitious fifth carbon budget as strong reduction efforts globally is likely to underpin progress and cost reductions in renewables and other low carbon technologies.

Question 3 *Based on the available evidence, does the EU 2030 package reflect the best path to its stated 2050 ambition? How might this package change, specifically its targeted emissions reduction, either before the end of Paris or after Paris?*

ANSWER:

- The EU-target of 40% is and should be a minimum target. A stronger target should be considered if other countries show strong commitment and if a new international agreement reflects high ambitions. Many questions on the 2030 framework remain open, e.g. the modalities of effort sharing between Member States and sectors.
- The EU should actively engage for an ambitious outcome of the Paris negotiations, and prepare thoroughly and in time for a possible increase of its own ambition of EU reductions.
- The upcoming revision of the EU ETS and other policies should ensure that carbon pricing is an effective driver of investments, independently of the outcome of Paris and any reworking of the EU package.

Question 4 *How does the UK's legislated 2050 target affect its ability to support international efforts to reduce emissions, including its position in negotiations? Does the level of UK carbon budgets have any additional impact (over-and-above the 2050 target) for the UK in international discussions?*

ANSWER:

- The UK has established its climate change ambition early on through the unilateral commitment on decarbonisation in the Climate Change Act 2008 and the setting of the periodic carbon budgets, representing historic leadership in this area. However, while these mechanisms provide solid foundations, there needs to be the right policies in place to ensure the budgets can be met.
- The UK has been an early adopter of a number of new renewable energy technologies, including offshore wind. There is currently 5.1GW of offshore wind in UK waters, making it a world leader in the technology. By being a pioneer in offshore wind, the UK has helped force down the costs of this

technology, opening up opportunities for also other countries to increase their deployment.

- Helping to provide cost-effective renewable energy solutions will increase affordability and help persuade developing countries to make emissions commitments as part of a wider global deal.
- The UK's commitment and leadership should be renewed and manifest through:
 - 1) pressure on the EU to review and address shortcomings in the 2030 package
 - 2) taking affordable steps to address the projected shortfall in the fourth carbon budget
 - 3) setting an appropriately challenging fifth and subsequent budgets.
- This would enhance its standing in international discussions.

B. The cost-effective path to the 2050 target

The carbon budgets need to set a path that is achievable from today without being over-optimistic about what is achievable in later periods to prepare for the 2050 target.

The Committee has previously set out scenarios for 2030 that balance effort before 2030 with potential opportunities from 2030 to 2050. The scenarios aim to include ways of reducing emissions that are likely to be relatively low cost and actions that will develop options that may need to be deployed at scale by 2050.

These scenarios, reviewed in detail in the Committee's report *The Fourth Carbon Budget Review – the cost-effective path to the 2050 target*, include substantial investment in low-carbon power generation, roll-out of low-carbon heat (heat pumps and district heating), development of the markets for ultra-low emissions vehicles and a combination of energy efficiency measures and fuel switching in industrial sectors.

The scenarios also reflect detailed assessments of what is practically deliverable, and the Committee monitors progress towards them as part of its statutory duties. The *2014 Progress Report to Parliament* indicated that current policy would not be enough to meet the fourth carbon budget, but that the 'policy gap' could be closed at affordable cost.

The set of policy options required to close the gap include:

- Strengthening the EU Emissions Trading System.
- Setting a clear objective for Electricity Market Reform (EMR) beyond 2020.
- Focusing on low-cost residential energy efficiency.
- Simplifying policies targeting commercial energy efficiency.
- Tackling financial and non-financial barriers to low-carbon heat.
- Pushing for strong EU targets for new vehicle efficiency in 2030.

The Government has subsequently published various documents, including its formal response, as required under the Climate Change Act, and the National Infrastructure Plan. The Plan includes investments of around £100 billion in low-carbon power generation in the 2020s, in line with the scenarios from the EMR Delivery Plan that reach 100 gCO₂/kWh by 2030. It also has significant investments in offshore oil and gas and in the road network. This includes £15 billion of new spending on roads and around £50 billion on offshore oil and gas.

Question 5 *In the area(s) of your expertise, what are the opportunities and challenges in reducing emissions to 2032, and at what cost? What may be required by 2032 to prepare for the 2050 target, recognising that this may require that emissions in some areas are reduced close to zero?*

ANSWER:

- The UK's power sector is key to decarbonisation; in 2013 over 40% of emissions were from electricity supply. The power sector was highlighted in previous CCC analysis as part of the lowest cost pathway to 2050 given the high proportion of emissions and the discrete number of point sources. Full decarbonisation of the power sector will in turn enable further emissions reduction in other sectors, including heat (replacing gas with power) and transport (electrification of vehicles).
- Recent evidence would suggest renewables technologies are making faster progress in cost reductions than previously expected. According to analysis published by Offshore Renewable Energy Catapult in February 2015, the levelised cost of energy of offshore wind has reduced by 11% during the period 2010-14. It said a target of £100/MWh by 2020 is challenging but

achievable.

- Statkraft believes offshore wind has proven to be the most scalable of the renewables technologies. Recently commissioned stations have also benefitted from higher load factor capabilities than government expectations, with some stations achieving 40%+ on an annual basis.
- A total of 40GW of offshore wind is currently under lease from the Crown Estate and at varying stages of development, construction or operation. However, there has been significant project attrition last years. 20GW is not being actively developed and it seems uncertain that these projects will be taken forward under the current framework of CfD auctions and lack of long-term certainty and transparency. Development can typically take between six and eight years and cost £80mn per project (see Appendix A).
- A further challenge faced by the offshore wind industry is planning consent and grid connection. Offshore wind consents require construction to commence within five years of award. Re-consenting will be timely and costly. Analysis of the UK pipeline indicates that a peak of capacity of around 11GW will be consented in 2014-2015 and that this volume must have started construction by 2019-20. Based on an assumption that the government allocates budget for 1GW/year each year for the next five years (e.g. to commission late this decade or in the first part of the next decade) then ~6GW of projects would automatically lose their consent.(see Appendix B).
- We believe an opportunity will arise in the period to create greater electricity interconnection with mainland Europe. At present the UK has 4GW of installed interconnection, representing around 5% of all electricity generating capacity. The installation of new interconnectors will help manage the increased variability of power electricity generation and demand (electric vehicles and heating demand). Statkraft believes interconnection is more effective and cheaper than most storage and demand side response technologies but also benefits UK security of supply and offers price arbitrage opportunities across jurisdictions.
- Some clarity is needed on carbon and emission reductions policies. We believe coal generation has recently been given life extensions in the UK through the government's decision to freeze carbon price support (2016-20), the technology's eligibility in the Capacity Market and the current low fuel prices aiding the economics. This is likely to result in coal-fired stations remaining on the system for longer than previously expected and higher emissions levels.

Question 6 *What, if any, is the role of consumer, individual or household behaviour in delivering emissions reductions between now and 2032? And, separately, after 2032?*

ANSWER:

Demand side response and smart grids are important measures to increase flexibility and enable the electricity system to handle increasing shares of intermittent renewables. There needs to be a degree of automated appliance DSR as well as tariff schemes that support DSR and flexibility. Electrification of individual transport is also a measure that could contribute significantly to carbon reduction and where policies should be supportive of introduction and use of electric vehicles.

Question 7 *Is there evidence to suggest that actions to further reduce emissions after 2032 are likely to be more or less challenging to achieve than actions in the period up to 2032?*

ANSWER:

- It is difficult to answer this question, as technology change will be a key variable, but in general we assuming that all other things being equal the challenges will increase over time.
- The phasing out of coal-fired stations is likely to be the low hanging fruit in terms of decarbonisation of the power sector. According to the National Grid's Gone Green Future Energy Scenario there is likely to be a significant reliance on gas-fired generation in the 2030s. In order to decarbonise gas carbon capture and storage (CCS) technology will be required, but this is likely to come at relatively high cost.
- By 2030 from a renewables perspective much of the heavy-lifting should have been done: costs are falling, and with the correct policies in place to secure steady deployment this is likely to continue. With steady renewables growth in the 2020s, as anticipated by National Grid's Gone Green Scenario, an increased proportion of the sector will be decarbonised.
- If the power sector is largely decarbonised by 2030, subsequent emissions cuts will have to be made from other sectors, in particular transport, heating, steel, and upstream oil and gas. This does not necessarily mean that emissions cuts will be more challenging as this depends on progress over

the coming decade in finding cheaper ways to decarbonise sectors. Progress made in the power sector will directly benefit transport (electric vehicles) and heat (electricity replacing gas in heating demand).

Question 8 *Are there alternatives for closing the 'policy gap' to the fourth carbon budget that could be more effective? What evidence supports that?*

ANSWER:

- The UK has introduced significant reforms to the energy market. This includes new EMR legislation, securing EU state aids, and setting aside subsidy budget. This has created a strong investment framework in the short term for those who are successful in being awarded contracts.
- However, this is not to say that the regime is without challenges when looking forward for keeping large, capital intensive, projects on track for the 2020s.
- Continued offshore wind power deployment is key to enable continued decarbonisation of the power sector through the 2020s. Three main challenges faced by the industry to keep offshore wind deployment rolling into the 2020s are:
 - 1) uncertainty over the size of the low-carbon market and role of offshore wind in the CfD scheme;
 - 2) predictability and design of the CfD auction approach; and
 - 3) balancing development risk and allocation risk
- Statkraft believes most of the required policy tools are available, but the power industry generally needs clearer, more transparent and stable signalling of the government's intent for the 2020s and beyond. In particular the LCF budget needs to be set for a longer time-span. More clarity on auction budget pots and administrative strike prices is also needed. Without clarity on these issues investment decisions for low-carbon generation projects will be delayed and even cancelled. Development of an offshore wind project can typically take between six and eight years. For a new project today this takes us to 2021-23, where there is currently no clarity beyond 2020-21.
- To be eligible for a CfD a project needs consents and grid connection agreement and even further development as there is only allowed one year

from CfD allocation to the Significant Financial Commitment must be demonstrated. This implies a very high risk for project development spending, and could lead to project development stalling. Short lifetime of granted consents magnifies the problem.

The industry needs the fifth carbon budget to be set in a timely manner, with setting of an appropriate LCF to at least 2025. Some clarity on the inclusion of nuclear and CCS in the LCF is also needed: are they out of same budget pot? How will capacity market payments be treated?

- Clarity is needed on carbon price support post 2020 following the freeze. Does it continue back onto the original planned trajectory?
- In 2013 the government set out scenarios for technology deployment and decarbonisation to 2030 which included decarbonisation targets ranging from 50g/kWh to 200g/kWh. However, in 2015 as part of its election manifesto the Conservative Party said there should be no new specific targets for the electricity sector. Statkraft would strongly argue a 100g/kWh target for 2030 as being cost-effective and providing an appropriate signal to the power market for low-carbon investment and decarbonisation.

Question 9 *Are the investments envisaged in the National Infrastructure Plan consistent with meeting legislated carbon budgets and following the cost-effective path to the 2050 target? Would they have wider implications for global emissions and the UK's position in international climate negotiations?*

ANSWER:

- From Statkraft's point of view it is positive to see the inclusion of both wind generation and electricity interconnection in the Top 40 infrastructure investment priorities of the National Infrastructure Plan. However, there is a lack of prioritisation i.e. everything is treated the same.
- If the National Infrastructure Plan were to underpin the UK taking a leading position in offshore wind, then this action would have considerable impact on the cost of the technology and therefore its global deployment. Already considerable emission reductions could be scaled up. Such leadership would also strengthen the UK's position in global negotiations, as it would be showing that it is willing to invest in the development of a key technology which other nations can benefit from.
- As noted in response to Question 8, the UK requires a stable policy

environment to encourage the required investment in low-carbon generation in order to decarbonise the power sector. In particular clarity and action is needed on the LCF post 2020 and a 2030 decarbonisation target.

- The framework provided by the carbon budgets provide some confidence to investors but on their own are not sufficient to encourage final investment decisions on large energy infrastructure projects such as offshore wind.

C. Budgets and action

The UK's statutory 2050 target requires actions across the economy to reduce emissions. Many of these actions will be driven by (UK and devolved) Government policy and implemented by businesses and consumers. There will be an important role for Local Authorities in successful delivery.

Although the carbon budgets do not require specific actions, they provide an important indication of the overall direction that policy will take in future. Once set, carbon budgets can only be changed if there has been a significant change in the relevant circumstances set out in the Climate Change Act.

Feedback from businesses as part of the Committee's 2013 Call for Evidence for the review of the fourth carbon budget was that stability is an important and valuable characteristic of carbon budgets.

Question 10 *As a business, as a Local Authority, or as a consumer, how do carbon budgets affect your planning and decision-making?*

ANSWER:

- Carbon budgets are an important policy foundation for Statkraft and other investors in low-carbon generation. A strong commitment in the fifth carbon budget will provide a platform for increased strategic commitment from Statkraft
- Of course by itself a carbon budget is not sufficient to make investment decisions on large energy infrastructure projects such as offshore wind. However, with carbon-budgets as basis in combination with other policy elements such as the LCF post 2020, development of EMR and CfD allocation framework and ideally a 2030 decarbonisation target, further successful development of renewables including offshore wind will be sustained.

- A firm carbon budget will act as a strong and important long term signal to the renewables supply chain underpinning investments and growth.

Question 11 *What challenges and opportunities do carbon budgets bring, including in relation to your ability to compete internationally? What evidence do you have for this from your experience of carbon budgets to date?*

ANSWER:

Statkraft is Europe's largest producer of renewable electricity, and has operations in more than 20 countries. Our consideration has been that the UK is a long term attractive market, in particular for our wind power business, and we have experienced significant growth within onshore and offshore wind as well as within electricity market trading and origination. The Climate Change Act and the carbon budgets have been key elements in our assessment of the long term market opportunities in the UK. The growth and experience realised in the UK wind onshore market has strengthened our ability to be successful also in other markets in Europe and globally. At the moment Statkraft's offshore wind activity is focused on the UK, but no doubt our position for entering into other markets for offshore wind has been strengthened by learning and building capabilities in the UK.

Question 12 *What would you consider to be important characteristics of an effective carbon budget? What is the evidence for their importance?*

ANSWER:

- The carbon budget must be ambitious, measurable and clear to provide signals to the market to reduce emissions. There should also be provision to strengthen budgets in light of advances in international emissions efforts, improvements in technology, reduced costs or increased urgency and heightened environment risks.
- A carbon budget based on these principles would provide confidence to investors in renewables and other providers of carbon-reductions. This is crucial in the post 2020 period in particular for sectors where large-scale infrastructure investments are essential, including offshore wind and interconnection.

D. Other issues

The Climate Change Act requires that in designing the fifth carbon budget we consider impacts on competitiveness, fiscal circumstances, fuel poverty and security of energy supply, as well as differences in circumstances between UK nations. High-level conclusions on these from our advice on the fourth carbon budget were:

- **Competitiveness** risks for energy-intensive industries over the period to 2020 can be addressed under policies already announced by the Government. Incremental impacts of the fourth carbon budget are limited and manageable.
- **Fiscal impacts.** The order of magnitude of any fiscal impacts through the 2020s is likely to be small, and with adjusted VED banding and full auctioning of EU ETS allowances could be neutral or broadly positive.
- **Fuel poverty.** Energy policies are likely to have broadly neutral impacts on fuel poverty to 2020, with the impact of increases in electricity prices due to investment in low-carbon generation being offset by energy efficiency improvement delivered under the Energy Company Obligation. Incremental impacts through the 2020s are likely to be limited and manageable through a combination of further energy efficiency improvement, and possible income transfers or social tariffs.
- **Security of supply** risks due to increasing levels of intermittent power generation through the 2020s can be managed through a range of flexibility options including demand-side response, increased interconnection and flexible generation. Decarbonisation of the economy will reduce the reliance on fossil fuels through the 2020s and thus help mitigate any geopolitical risks of fuel supply interruption and price volatility.
- **Devolved administrations.** Significant abatement opportunities exist at the national level across all of the key options (i.e. renewable electricity, energy efficiency, low-carbon heat, more carbon-efficient vehicles, agriculture and land use).

Question 13 *What evidence should the Committee draw on in assessing the (incremental) impacts of the fifth carbon budget on competitiveness, the fiscal balance, fuel poverty and security of supply?*

ANSWER:

There have been a number of relevant reports and studies published in the past year in relation to wind energy, including:

[Offshore Wind Programme Board Annual Report 2014](#)

[Economic Grid Support Services by Wind and Solar PV, EWEA, 2015](#)

[The Impact of Wind Energy on UK Energy Dependence and Resilience, Cambridge Econometrics, 2015](#)

[Onshore Wind: Direct and Wider Economic Benefits, RenewableUK, 2015](#)

[Onshore Wind Cost Reduction Taskforce Report, RenewableUK, 2015](#)

[Cost Reduction Monitoring Framework: Summary Report to the Offshore Wind Programme Board, 2015](#)

[UK offshore wind in the 2020s: Creating the conditions for cost effective decarbonisation, Green Alliance, 2015](#)

[State of the renewable industry: Investment in renewable electricity, heat and transport, Price Waterhouse Coopers, 2015](#)

Question 14 *What new evidence exists on differences in circumstances between England, Wales, Scotland and Northern Ireland that should be reflected in the Committee's advice on the fifth carbon budget?*

ANSWER:

No response

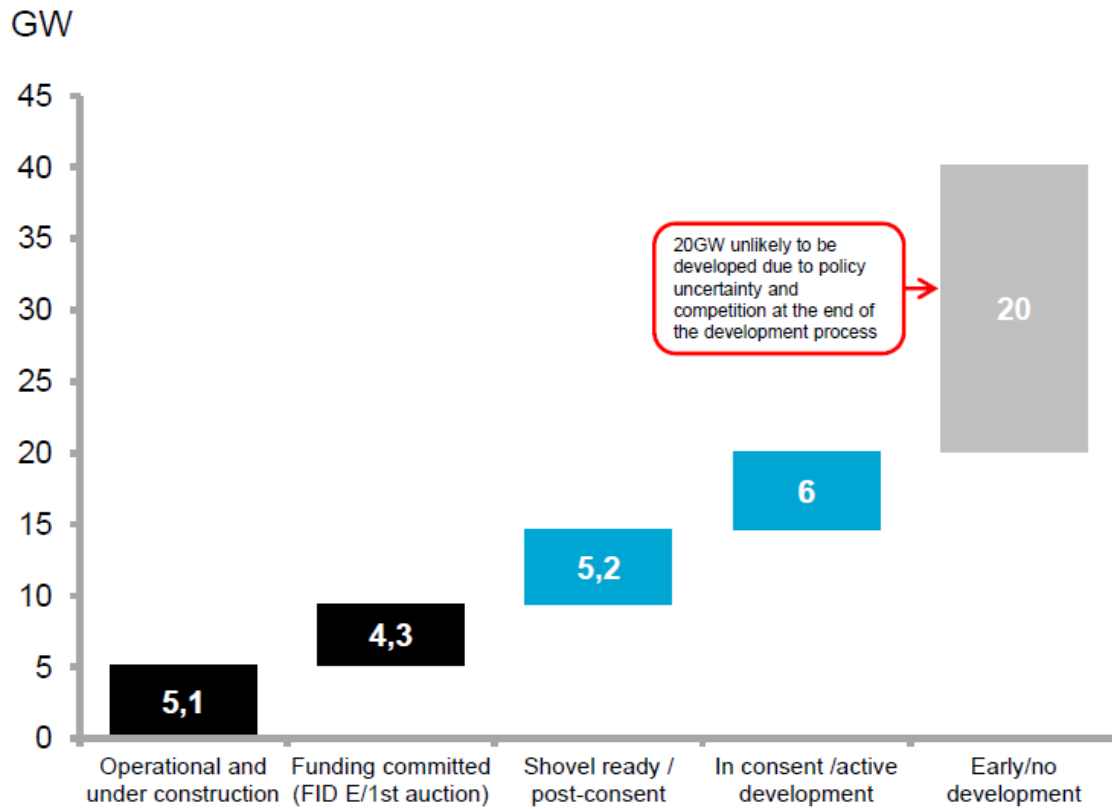
Question 15 *Is there anything else not covered in your answers to previous questions that you would like to add?*

ANSWER:

No response

Appendix A

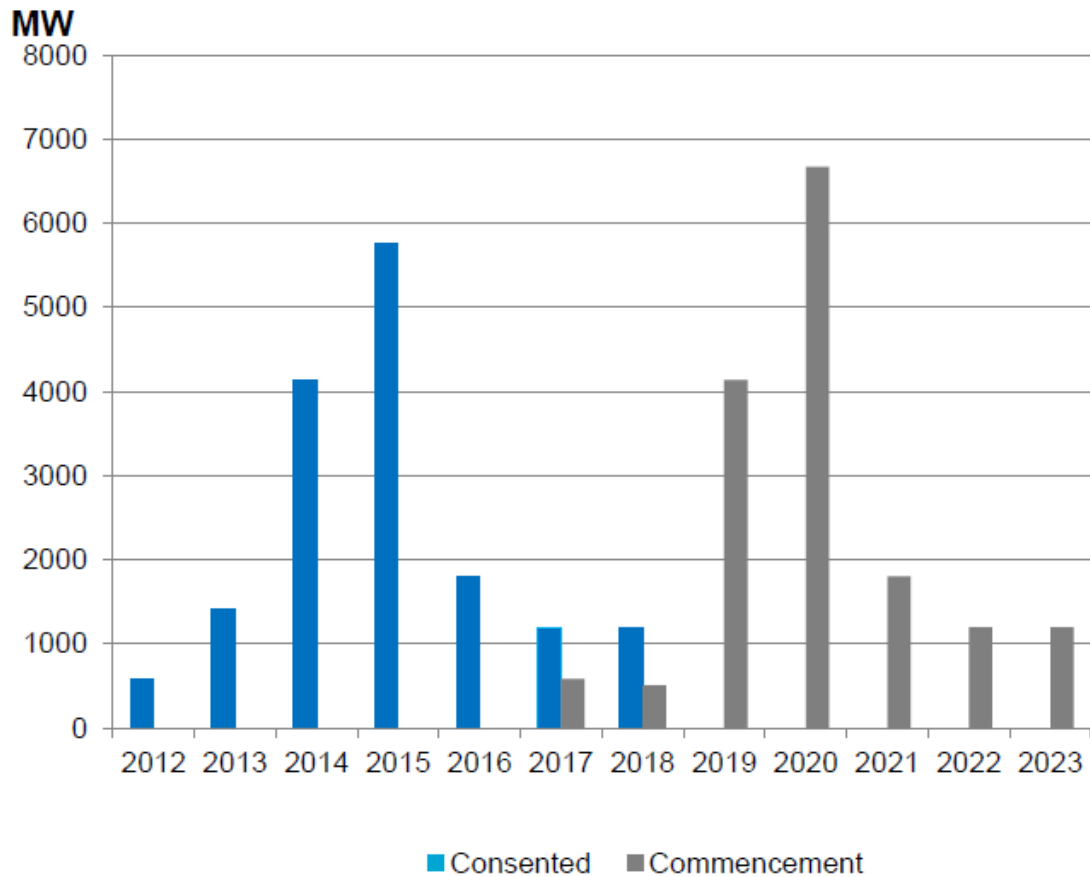
UK offshore wind development pipeline



Source: Statkraft research

Appendix B

Offshore wind planning consents



Source: Statkraft research