Pathways for the GB Electricity Sector to 2030

Summary report | February 2016

The voice of the energy industry
About Energy UK

Energy UK is the trade association for the UK energy industry representing over 80 suppliers and generators of electricity and gas for domestic and business consumers.

Our members represent the truly diverse nature of the UK’s energy industry - from the UK’s largest energy firms to new, growing suppliers and generators, now making up over half of our membership.

KPMG’s role in this report

KPMG supported Energy UK with the development of this report by facilitating interviews with member organisations and by co-ordinating the analysis. KPMG LLP is a leading provider of professional services including advisory, audit and tax consulting services across a range of clients and industries. KPMG’s Power & Utilities specialists provide advice to investors, companies and the public sector on financial, transactional, strategic, regulatory and operational issues.
Important notice

The analysis co-ordinated for this report by KPMG LLP has been prepared on behalf of Energy UK on the basis set out in KPMG LLP’s Engagement Letter with Energy UK (“the Client”). Nothing in this report constitutes a valuation, legal advice or represents the views of KPMG LLP.

Any party other than the Client that chooses to rely on this report (or any part of it) does so at its own risk. To the fullest extent permitted by law, KPMG LLP does not assume any responsibility and will not accept any liability, including any liability arising from fault or negligence, for any loss arising from the use of this document or its contents or otherwise in connection with it to any party other than the Client.

In co-ordinating the analysis for this report, the primary sources used were publically available information and are supplemented by information and data provided by the Client and its members. Details of principal sources are set out within the document and we have satisfied ourselves, so far as possible, that the information presented in the report is consistent with other information that was made available to us in the course of our work in accordance with the terms of our services contract. We have not, however, sought to establish the reliability of these sources or of the data and information provided the report partners by reference to other evidence. In addition, references to financial information relate to indicative information that has been prepared solely for illustrative purposes.

Our work was completed in January 2016 and we have not undertaken to update the document for events or circumstances arising after that date.
Contents

About this report ................................................................. 4
Foreword .............................................................................. 7
Pathways for GB electricity sector to 2030 .......................... 8
  The Vision for the 2030 GB Power System ....................... 9
  Delivering the Investment Required ................................. 10
  Working Together To Deliver ............................................ 12
Timeline: Key decisions to restart industry investment ........ 14
Summary of key messages .................................................... 16
BACKGROUND & APPROACH

This report summarises key findings from a series of in-depth interviews carried out in summer and autumn 2015, with senior leaders from the Energy UK membership and other key organisations and stakeholders. The report provides insights from those responsible for ensuring a clean, secure and affordable electricity supply to 2030, and then outlines the key steps required between Government and industry to ensure that delivery.

This report is primarily aimed at those working in policy or regulation in the energy sector. It is also relevant to those working in policy in the heat and transport sectors and wider energy sector stakeholders.
Navigating a complex sector

The organisations interviewed included vertically integrated companies, independent generators, firms with a specific focus on low-carbon technology; as well as those with a supply base to both domestic and non-domestic customers. To provide impartial advice and expertise throughout the process, Energy UK asked KPMG to facilitate the discussions and provide further evidence and supporting analysis. A list of the organisations interviewed is provided as an appendix to this report.

Several prominent policy announcements have arisen since the interviews were carried out, such as the Secretary of State’s ‘Reset’ speech on energy policy (18 November 2015), the publication of the Autumn Statement (25 November 2015), the conclusion of the United Nations Climate Change Conference in Paris (11 December 2015) and the advice from the Committee on Climate Change for the Fifth Carbon Budget (26 November 2015). Where appropriate, the report has been updated in light of these recent developments, but the interviewee responses described should be viewed in light of a rapidly shifting environment in the energy sector.

While there were many areas of common agreement, some priorities and views differed across the interviewees. This is a testament to the complexity and wide-ranging reach of this sector. The report steers through this by providing a summary of the key themes that emerged, but also highlighting where differences existed and the potential arguments on either side.

Energy UK fully recognises industry’s role in delivering a low-carbon, secure and affordable energy mix. To reiterate the commitment made in Energy UK’s February 2015 Manifesto:

“This investment challenge is huge and the industry can – and will – deliver the investment required as long as the right framework is in place from Government.”

Energy UK manifesto, February 2015

Report structure

The first section of this report sets out the ‘Pathways for GB electricity supply to 2030’. This section summarises the key themes from the interviews and sets out a number of policy recommendations and timelines for implementation. This is then followed by a section providing a ‘summary of key messages’, arranged by topic.

A separate Full Report addresses each topic in turn, providing additional detail on interview responses and additional supporting analysis where relevant. The full report is available on Energy UK’s website (http://www.energy-uk.org.uk). Clearly, many key issues in the energy sector are interrelated and can scarcely be considered in isolation. However the report has been structured in this way to enhance clarity on specific issues.

Parameters

A number of parameters have been assumed for the purpose of this report and developing key findings and recommendations.

- **European Union:** It has been assumed the UK will remain as part of the European Union and, as such, will continue to observe relevant legislation and EU-wide energy sector initiatives.
- **Carbon reduction targets:** It has been assumed the UK continues to strive towards meeting the legislated Carbon Budgets and that it will continue to consider the advice given by the Committee on Climate Change as to how to reach long-term targets for 2050.
- **Renewable energy targets:** It is assumed the UK continues to try to meet its legally-binding renewable energy targets for 2020.
- **Market dynamics:** The electricity generation market has faced a number of challenges recently as a result of falling wholesale power prices. Since carrying out interviews, average wholesale power prices have fallen a further 17% (based on prices to deliver in Q1 2016. This report does not discuss recent wholesale market data, but identifies the significant challenges faced by market participants as a result of these developments.
- **Devolved responsibility:** The report recognises many policy decisions are now taken at a devolved level, and this trend is likely to continue. Where appropriate, this report considers the GB electricity market in its entirety.
The country’s energy mix is changing as the government looks to remove all coal from the system by 2025. The absence of coal generation - in the past, a mainstay of British energy - will leave room for lower-carbon fuels, like new gas, biomass and wind, to play a greater role in a flexible energy system. We have the opportunity to see advancing technologies take up more of the mix – including storage, solar, wind and tidal.

There is an urgency for investment as the economics of traditional large-scale generation makes way for a newer model, which will see these plants complemented by decentralised technologies. The message is clear: companies are ready to invest - but they need government to put the right framework in place. Since Energy UK started work on this report in summer 2015 almost 8.5 GW of traditional capacity has closed or will soon be closing, which demonstrate the urgent need to get investment flowing.

As the UK decarbonises the electricity system, there will be costs and challenges along the way. So the industry must take its customers with it. The goal is just too important to be missed.

The cheapest electricity will always be what we don’t use. Energy efficiency remains the most cost-effective way to help cut energy bills and carbon emissions. And much more can still be done. Government needs to put policies in place that: encourage improvement; help people struggling with their bills; and kick-start - by a combination of fiscal and regulatory measures - the able-to-pay market.

There will be renewed focus on customer engagement; on delivering services that meet individual needs. By 2020 every home will have a smart meter allowing us all to take control of the energy we use in ways not previously possible.

The energy world is changing to meet the needs of our busy lives. And, while the future is an unknown land, one thing is certain – Britain’s energy sector is ready to take up the challenge and to work both with customers and other sectors. The members of Energy UK believe together we can tackle the challenges of global warming while delivering, year on year, affordable and reliable energy at the touch of a button. However, no sector can do it alone or without the right support from government. This report sets out a vision and a pathway but Britain needs the policies in place to take it from the page to the practical future we all want.

Lawrence Slade
Chief Executive, Energy UK
Pathways for the Electricity Sector to 2030
The vision for the 2030 GB power system

Across the board, interviewees believed the power system in 2030 will be much more responsive to customer needs than the system we have today. Smart meters, coupled with smart grids and connected homes, will give customers better control over their energy use and further their engagement with the sector. Depending on future policies, there is likely to be more decentralisation, with a greater level of distributed generation, electricity storage and local heat. Many customers, initially from the industrial and commercial communities, could also act as producers of their own energy and / or engaging in the market through demand side response. This means we are likely to have different requirements from the transmission and distribution network than we do today.

There was widespread agreement considerable opportunities exist for further energy efficiency, in both the domestic and non-domestic sector. Respondents agreed Great Britain needs a long term holistic policy framework that encourages consumer demand for energy efficiency measures, whilst providing support for vulnerable and fuel poor customers. There is qualified support for further interconnection in order to bring greater diversification to our energy sources and to contribute to a stable power system, but it must compete on an equal basis with GB generation. The impact of interconnection should be considered alongside the need to attract the investment required to replace domestic generation over the coming years.

All believed there would be greater decarbonisation in 2030 and that, based on current evidence, the power sector would be undertaking most of the “heavy lifting”. The rapid take-up of electric vehicles and electric heat will take place later than forecast and are not likely to materialise without further intervention from Government. Therefore, there are doubts over the current DECC projections that installed capacity will reach over 130GW in 2030. The majority of domestic generation in 2030 will be sourced from a combination of gas, nuclear and renewables.

There is a significant need for investment going forward (e.g. to replace retiring coal, gas and nuclear plants). Based on current evidence, there may be less new large-scale plant needed than previously thought by Government. The investment challenge should not be underestimated, but could be less than previous forecasts suggest as a result of greater energy efficiency, more interconnection, more decentralised energy, more active customers managing their demand and limited expansion of electrification of heat and transport.

Across the board, interviewees believed the power system in 2030 will be much more responsive to customer needs than the system we have today.
Delivering the investment required

It is recognised that there is an urgent need to attract much needed investment into the power generation sector given the recent and forthcoming closures that have been announced (DECC forecasts up to 12GW of closures to 2020). There are a number of immediate steps Government can take to get investment flowing.

It is clear the wholesale market is not providing adequate investment signals; one company has said that “the decade of the wholesale market has gone”. However, the industry broadly agrees the Electricity Market Reform (EMR) has the right framework to attract the required investment. The Contract for Difference (CfD), Capacity Market and Levy Control Framework (LCF) could provide the investment signals for the market, but there is currently no forward view on which to base investment. There are also issues with the transparency of the LCF and Government projections that make it difficult for investment boards to have the informed foresight needed. A technology-neutral market should be the target in the longer term to ensure lowest cost – implying that all mature low-carbon technologies should be allowed to participate in auctions. While there are differing views on this, if the appropriate level of capacity comes forward, then subsidies and Government intervention in the current form would not be needed beyond 2025.

The Government should therefore reconfirm its support for the key instruments of the Electricity Market Reform (EMR) programme which industry believes provide the foundations for the right framework to deliver the required investment. Any future change to market design must be evolutionary and based on open and transparent policy making.

There is an urgent need to attract much needed investment into the power generation sector… There are a number of immediate steps Government can take to get investment flowing.

**Government should:**

- As a matter of urgency, review the LCF so it becomes a reliable budgeting tool to aid investment decisions better.
- The process for defining and forecasting the LCF should be open and transparent. Appropriate provisions should be in place for how fluctuating carbon and wholesale prices are dealt with so industry can anticipate changes. Energy UK sees merit in the approach set out by the Committee on Climate Change that the cost of supporting low-carbon investment should be redefined based on the premium above the alternative investment (e.g. Levelised Cost of Electricity for CCGT plant).
- Set out an LCF budget post-2020 as soon as possible to encourage investment across a range of technologies. We recommend a full breakdown of current and forecast spend under the LCF be published quarterly (potentially by an independent body) to aid investment decisions.
- Set out an indicative timeline for future Contract for Difference (CfD) allocation rounds and budgets for all technologies, and a transparent process by which this will be managed.
- Efficiently deliver low-carbon generation through the CfD by not ruling out any technologies which could impact the competitiveness of the auctions.
- Alongside industry, undertake a review of the longer-term market arrangements, once the costs of low carbon technologies have fallen to the point where they can compete with gas without subsidy. We are clear EMR provides the foundations for the right framework to drive investment but it is necessary to look beyond this. It will be important to consider how to manage a world of increased low marginal cost plants, coupled with a higher amount of distributed generation and the increased need for system flexibility, while ensuring the viability and continued investment in any thermal generation required.
- These issues are discussed further in chapter 3 of the main report.

With the appropriate transition measures in place as detailed above and a credible and reliable carbon price, delivered through a reformed EU ETS, we can move towards a power market without long-term subsidies within a decade. Companies are generally supportive of greater interconnection where it is economic and efficient, but imports should face the same costs as domestic generation, such as the carbon price and network charging. The impact of interconnection on existing generation plants (which gives rise to security of supply concerns) and future investment signals should fully be taken into consideration.
Government should:

- Deliver a credible and reliable carbon price through a reformed EU ETS. In the meantime, Government should set out a clear and stable trajectory for the Carbon Price Floor post-2020 in consultation with industry.
- Ensure a level playing field between GB generation and imports through interconnectors. (Discussed further in chapter 9 of the main report.)

It is clear the wholesale market is not providing adequate investment signals.

As a matter of urgency, Government should review the LCF so it becomes a reliable budgeting tool to aid investment decisions better.

The following sections highlight some of the emerging findings from the report, and some of the longer term recommendations where industry and Government can work together to deliver.

A Whole Systems Approach
Almost all interviewees argued strongly for Government to take a more holistic, ‘whole systems’ approach to energy policy. Respondents stressed the importance of not considering the power sector in isolation from both heat and transport which will each have significant impacts on the power sector and require significant investment in infrastructure.

The sense among industry is that although reforms on the supply side over the last Parliament (i.e. Electricity Market Reform and the introduction of the Capacity Market and Contracts for Difference) were welcomed and should be allowed to bed down, the same was not true on the demand side, where the Green Deal has not been successful. Government should give more consideration to the interaction between demand and supply in seeking to address the ‘energy trilemma’ of energy security and decarbonisation at the least cost to consumers.

Government should adopt a whole systems approach to policy around its chosen pathway to 2030. This should include a robust assessment of the impacts of its policy decisions across electricity, heat and transport.

Government should:

- Set out the role of the electricity sector in decarbonising the whole economy, consistent with decisions made on the Fifth Carbon Budget.
- Establish a taskforce comprising of representatives from the electricity, heat and transport sectors to map out the critical requirements for delivery of a low carbon economy. This could form part of the future work programme of the National Infrastructure Commission, as it considers the National Infrastructure Needs Assessment.
- Provide a clear signal of the intent and the speed of travel to 2030 and beyond for heat and transport to ensure there is sufficient lead time to meet our future power and network development requirements. It is vital Government ensures policies in these three sectors are coordinated across the relevant Government departments, to ensure the scenarios are internally consistent. There should be regular updates and enhanced transparency of the expected trajectory of deployment if investors are to have confidence in the Government’s projections and avoid stranded assets.
- Assess the cost effectiveness of different technology options using the whole system cost of the technologies involved.
- These issues are discussed further in chapter 2 of the main report.

Demand Side action
Industry believes more emphasis on long-term policy for the demand side is necessary. Broadly speaking, this can be split into two areas:

1. Importance of Energy Efficiency
There is significant potential for increased energy efficiency, which can be delivered through a long-term policy framework that is based on competitive market signals. In the short-term, the future of Energy Company Obligation (ECO) post-2017 is paramount for market certainty. More broadly, there is potential for positive change by refocussing on a long-term strategy that is self-sufficient, demand-led, and not dependent on subsidies raised through electricity bills. Specifically, the report highlights an opportunity to deliver efficiency gains through the adoption of long lead time regulation to reduce energy usage in new and existing building stock supported by targeted incentives. It is widely agreed any funding should be directed to customers most in need.

2. Decentralised Energy Could Continue To Play An Increasingly Important Role
Decentralised energy will continue to grow through technologies such as solar PV, battery storage, small-scale gas (e.g. OCGTs), and micro CHP, although some of the recent policy announcements will slow down progress in the short to medium term. Many interview respondents believed solar PV could reach grid parity in the next few years at a residential level and that electricity storage would be an important development for the sector. However some respondents were concerned about the market arrangements for decentralised energy. Rewarding domestic PV at delivered final prices will simply deflect system costs onto other consumers. Greater localised engagement with power and heat could place different stresses on the networks than we have seen to date and this will require another look at how these are paid for. Without significant further demand from electrification of the heat and transport sectors, there is a possibility that less power would be required from the transmission network, however the fixed costs of the transmission network will still need to be recovered from customer bills.

The way energy is consumed and produced is changing and therefore Government needs to undertake the following to ensure an efficient outcome for consumers.
Government should:

- Make energy efficiency a priority, from which the successful delivery of low carbon heat will depend. This requires a long-term policy for delivering energy efficiency through competitive market signals. For instance, through appropriate fiscal incentives (such as stamp duty rebates and council tax incentives) and long lead time regulation (such as building and product standards and regulations). (Discussed further in chapter 4 of the main report.)
- Ensure cost-effective local and community electricity production can continue to succeed:
  - There must be a consultation with industry on an alternative model for delivery if not via the Feed in Tariffs, and ensure that there are no barriers to further development.
  - Government must decide how the impact of increased decentralised energy is properly managed. This will likely require a move to Distributed System Operators.
  - Undertake a review to identify an appropriate charging regime that is reflective of the costs and benefits decentralised energy brings to the system.
  - Issues associated with ‘decentralised energy’ are discussed in chapter 5 of the main report.
- Deliver the critical infrastructure required as soon as possible for smart meter roll-out to enable domestic and SME Demand Side Response (DSR) participation in the next few years and beyond. Government should take action to remove barriers and unlock the benefits of DSR in the Industrial and Commercial sector.
- Focus more on the interaction between demand and supply in the electricity sector to help optimise demand management and DSR to reduce the costs of the overall system on consumers and ultimately the capacity required. Engagement with industry will be critical to effectively delivering the benefits of DSR.
- DSR is discussed further in chapter 6 of the main report.

Governance Framework

The respective roles (and interaction) of DECC, Ofgem and the System Operator need to be redefined, in consultation with industry, to manage an increasingly complex and interactive energy system which also must deliver and integrate the Network Codes being developed by the European Union to support the Third Package. Additionally, there is a need to consider the climate required to support future innovation which can play a key role in delivering cost savings to customers as the current governance framework supporting research and development is complex and layered with multiple institutions.

In association with setting up the National Infrastructure Commission, Government should take the opportunity to consult with industry on the current institutional arrangements in the heat, transport and power sectors and ensure they are suitable for meeting current and future market challenges.

Government should:

- Work with industry and other parties on the right principles for open industry governance and the options for institutional arrangements to ensure they will be fit to deal with new market trends, such as increased interconnection and greater decentralisation of energy.
- Clarify and streamline the multi-agency process for delivering innovation. Government should develop a coordinated energy innovation strategy and align funding to support immature technologies.
- Ensure the policy framework encourages innovation, development and adoption of key new technologies.
- These issues are discussed further in chapter 12 of the main report.

There is significant potential for increased energy efficiency, which can be delivered through a long-term policy framework that is based on competitive market signals.

Decentralised energy will continue to grow ... although some of the recent policy announcements will slow down progress in the short to medium term.
Timeline – Key decisions to restart industry investment

**BY END Q1 2016**

- Confirm details and/or approach to determining future Contract for Difference (CfD) auction rounds across all technologies
- Commit to providing more transparency on the Levy Control Framework (LCF) going forward and redefining the basis on which it is set
- Within the overall LCF spending limits, ensure the profile of Feed-in Tariffs (FITs) enables relevant technologies to get to (retail) grid parity and enable the transition to decentralised energy
- Publish DECC study on whole system impacts and levelised cost of energy.

**BY END Q2 2016**

- Competition and Market Authority (CMA) final recommendations published; Ofgem to provide clarity on how recommendations will be implemented
- Set final parameters for the second CfD auction, including mature technologies
- Ensure that the objectives of the Capacity Market have been suitably met and its interactions with other government policies are considered
- Clarify the future trajectory for Carbon Price Floor
- Establish a taskforce comprising representatives from electricity, heat and transport sectors to map out the critical path for delivery of a low carbon economy
- Launch a review into long-term market arrangement
- New LCF design and LCF limits (in monetary values) set out to 2025 and new design published
- Establish a taskforce to consider future industry governance, working with the National Infrastructure Commission
- Implement the recommendations from the October 2015 capacity mechanism consultation and clarify rules for future auctions
- Clarify end date for balancing reserve measures undertaken by National Grid
- Undertake review to ensure that cost-effective local and community electricity production can continue to succeed
- Set out the future policy framework on energy efficiency including future role for ECO post 2017, regulatory levers and greater role of general taxation in funding future measures
- Identify regulatory barriers to the development of a smarter energy system and develop an action plan to tackle them.
This timeline summarises the key recommendations/expectations of Government from now till the next Parliament. This includes both announcements or publications that are already planned and those that have emerged from our work on Pathways for the GB electricity sector to 2030.

**BY END Q3 2016**
- Set out strategy to deliver the 5th Carbon Budget
- Set out strategy on heat, drawing out implications for the power sector
- Take action on barriers to take up of demand side response in the industrial and commercial sector.

**BY END Q4 2016**
- Run the 2nd CfD auction and third capacity auction

**WITHIN THIS PARLIAMENT**
- No significant policy decision taken without considering whole system impacts
- Complete a review of future market arrangements and set out an implementation plan
- Continued drive for reform of EU ETS to give a more robust carbon price signal consistent with the overall targets for decarbonisation
- Undertake review to ensure a level playing field between domestic and interconnected generation
- Provide greater clarity on long-term forecasts for electrification of heat and transport and align policy to support these forecasts
- Continue roll out of smart meters, keeping under review whether 100% by 2020 is deliverable
- Introduction of time of use tariffs (ToUTs) and half-hourly metering for domestic consumers.
Summary of key messages
The GB power sector is undergoing a period of significant change: the closure of old coal stations; the growth in renewables and decentralised energy; the re-birth of a nuclear programme; more interconnection with Europe. These, and other trends, will probably mean the power sector in 2030 looks very different from today.

The current Government has begun to set out its approach to energy policy and this has included:

- An end to subsidies for new onshore wind farms;
- Cuts in other renewable subsidies, e.g. for solar PV;
- The end of the CCS commercialisation competition;
- A commitment to end the use of unabated coal by 2025;
- Removal of (non-financial) barriers for decentralised energy;
- Renewal of strategies for heat and energy efficiency, e.g. replacement of ECO; and
- A clear intention to get new nuclear and new CCGTs built.

Against this backdrop, Energy UK, as the leading voice in the sector, decided to gather views from senior leaders in the energy industry on what they see as the possible ‘pathways for the GB electricity sector to 2030’ and the related policy priorities for the UK Government going forward.

These views were compiled through a series of interviews facilitated by KPMG during August and September 2015. This report summarises the findings of those interviews and the key policy recommendations for Government. The chief executive of Energy UK, Lawrence Slade, wrote to Amber Rudd in November 2015 highlighting a number of urgent policy recommendations arising from these interviews. Energy UK is pleased that many of these recommendations have been picked up in subsequent announcements.

While effort has been made to refresh the report findings and recommendations in light of recent policy announcements, the comments and interviewee responses described in this report should be viewed in light of a rapidly shifting environment in the energy sector.

The Paris Agreement announced in December 2015, if ratified, will become the first global agreement to limit global warming to “well below” 2 degrees, with the aim of limiting the increase to 1.5 degrees. The EU submitted its EU-wide target of “at least a 40% reduction in Greenhouse Gas Emissions by 2030 on 1990 levels” which is broadly aligned to the Committee on Climate Change’s recommended level for the Fifth Carbon Budget of 1,765 MtCO2e by 2030. These developments provide some certainty that the trajectory of UK action will be at least as ambitious as the existing targets however, many of the details on which sectors will contribute and how, still need to be worked through.

Energy UK decided to gather views from senior leaders in the energy industry on what they see as the possible ‘pathways for the GB electricity sector to 2030’. 
The interviews conducted covered a wide range of Energy UK members and other key players in the power sector, including independent generators, independent suppliers, vertically integrated players, network operators, independent players, supply chain and engineering firms.

Although a wide range of views was expressed by respondents, some key themes emerged. These key themes are summarised by issue below.

**Key messages from interviews**

Better communication with the public is needed on costs and benefits of making the transition to a low-carbon economy

Whatever path the electricity sector takes and the role it plays in decarbonising the economy to 2030, there will be significant costs in terms of new investment. All participants believed there needs to be a more honest communication with the public about these costs going forward. Much of the attention to date has been focused on new infrastructure in other sectors, like transport, however energy remains by far the largest component in the National Infrastructure Plan.

Almost all participants argued strongly for the Government to take a more holistic ‘whole systems’ approach to energy policy.
Many respondents argued the impact of policies on bills needed to be more clearly explained to customers. Whether the impact is due to supply-side measures (e.g. incentives for low-carbon generation or capacity payments) or demand-side measures (e.g. energy efficiency schemes or balancing services), more needed to be done to engage with consumers and explain how these policies translate to energy bills.

There was limited support for the introduction of an independent body to assess the costs of different pathways. Many respondents believed there needed to be more transparency regarding the assumptions and calculations behind DECC’s forecasts and impact assessments for the LCF, as well as how this budget is allocated between different mechanisms. Whatever mechanism is chosen, the clear message from the industry is there needs to be an open and honest debate with the public about the costs of moving to a low-carbon economy.

A ‘whole systems’ approach to energy policy
Almost all participants argued strongly for the Government to take a more holistic ‘whole systems’ approach to energy policy. Respondents stressed the importance of not considering the power sector in isolation and thinking more about the interaction between the power sector and other sectors of the economy, such as heat and power, in seeking to meet the “Trilemma” of energy security and decarbonisation at least cost to the consumer. Respondents also emphasised the importance of the interaction between demand and supply of electricity. Many respondents, in particular smaller suppliers, emphasised the importance of putting consumers at the heart of policymaking. There was strong support for the idea that no policy decision should be taken without consideration of the system-wide impacts.

Many respondents commented that, while reforms on the supply side over the last parliament (i.e. the Electricity Market Reform with the introduction of the Capacity Market and Contracts for Difference) were generally welcomed and should be allowed to bed down, the same was not true on the demand side, where the Green Deal has not been successful, and only limited attention has been paid hitherto by policy makers to the interaction between demand and supply.

Some argued the forthcoming decisions about how to meet the Fourth and Fifth Carbon Budgets provide an opportunity for the Government to rethink the role of the power sector in decarbonising the economy, taking account of the cost effectiveness of different policy options right across the economy. Most believed that, in the period to 2030, the power sector would (and should) continue to do most of the “heavy lifting” on decarbonisation, given the challenges in decarbonising heat, transport and other sectors. On the other hand, several respondents stressed the importance of making progress on the heat and transport sectors in order to meet long-term climate change targets; some respondents believed action was needed within this Parliament in order to avoid significant loss of momentum on heat and transport.

While each of these decisions may have had their own rationale, the cumulative effect of decisions made since the election has, according to many of the investors interviewed, undermined confidence in investment in the GB power generation sector and pushed up the risk premium and ultimately the cost to consumers.

‘Stability and predictability are key for retaining investor confidence’
There was a very strong emphasis on stability and predictability on policy-making being key drivers for investment. A number of players emphasised the importance of keeping the costs of capital down given the scale of new investment required in the sector (even with lower demand forecasts). Several respondents noted the radical change in how capacity needs are determined, arguing DECC now played a much more central role in providing market signals for investment in new plant.

There was significant criticism of the ad hoc and seemingly retrospective action taken to reduce subsidy costs in the early months of the new Government, such as the unforeseen removal of the Levy Exemption Certificates (LECs) for renewable electricity, the removal of the grandfathering principle for solar and biomass subsidies for future investments, or the sudden cancellation of the CCS competition. While each of these decisions may have had their own rationale, the cumulative effect of decisions made since the election has, according to many of the investors interviewed, undermined confidence in investment in the GB power generation sector and pushed up the risk premium and ultimately the cost to consumers.

Energy UK welcomes the steps taken in the ‘Reset’ speech by the Secretary of State and Autumn Statement to provide some greater clarity on future plans, including confirmation there will be further CfD auction rounds for offshore wind. Members are keen to see further detail as soon as possible to aid investment decisions, including on:

- The timings and frequency of future CfD allocation rounds, including for established technologies that require a route to market;
Details of how the different ‘CfD pots’ will work in the future;

The level of the LCF post-2020 (as well as how it will improve transparency);

Some indication of the role of the power sector in decarbonising the economy, given the absence of a specific target for power sector emissions in 2030;

Recommitting to the principle of grandfathering support and not taking perceived retrospective actions once investment decisions have been made.

The UK has been extremely successful in attracting new sources of capital to its electricity sector in recent years, with over £50bn invested since 2010 according to DECC figures. Many respondents flagged this capital is highly mobile and can easily find alternative markets if the Government fails to provide clarity within a reasonable timescale.

‘This is the decade of energy efficiency’

As part of a whole systems approach to minimising costs to consumers, it is important to look at energy efficiency and reducing energy demand. It is essential that cost effective energy efficiency is delivered in order that maximum benefit is reached from low carbon heat.

Electricity storage is widely regarded to be the single most important technological breakthrough likely to happen over the period to 2030 and a complete ‘game changer’ in the way that the power system operates.

Several respondents believed both fiscal and regulatory levers should be used to incentivise uptake of energy efficiency measures. Energy UK has done separate work on energy efficiency, in particular the able-to-pay market, and is supportive of measures such as stamp duty rebates, or possibly council tax incentives, supported by a national Government-led communications campaign. Many respondents believed long lead time regulation should be employed going forward, i.e. implementing building and product efficiency standards and allowing the market to deliver in the most efficient manner.

Respondents compared this to the use of efficiency standards for boilers and vehicles, and believed similar standards should be applied for both domestic (new build and retrofit) and industrial / commercial building stock.

Energy UK welcomes the opportunity to work with Government in developing a new framework for energy efficiency and to ensure it is as cost-effective as possible.

Decentralised energy and storage will continue to grow rapidly

All respondents thought decentralised energy would continue to grow rapidly over this period. Respondents believed technologies such as solar PV, battery storage, small-scale gas (e.g. OCGTs), and micro-CHP could play a significant role in 2030.

Most agreed that solar PV uptake would continue to grow despite the sharp cuts in subsidies, although some argued cuts of this scale (c. 90% of cuts announced at the time of interviews ) risked killing-off the market for solar PV just as costs were rapidly falling. Many believed solar PV would reach ‘grid parity’ in the next few years at the residential level (where the comparator is retail prices), though some had concerns about whether there was a ‘level playing field’ for such comparisons (some questioned whether the consumers with solar PV were adequately covering the costs of grid access and back-up capacity that they continue to require).

Many respondents commented there should be a ‘glide path’ of support for solar PV and other decentralised generation to facilitate these technologies as they approach grid parity and zero subsidy.

Electricity storage is widely regarded to be the single most important technological breakthrough likely to happen over the period to 2030 and a complete ‘game changer’ in the way that the power system operates. Views varied on when storage

---

3 Following the consultation on the future of FiTs in December 2015, the Government has amended the generation tariffs for renewable technologies. Cuts in subsidies for small solar PV have been reduced to c.65%.

4 Existing nuclear is not quite as flexible and would need up to 72 hours to turn down or ramped up.
All respondents argued for greater certainty over the policy framework for energy efficiency going forward … Some argued, if financial resources are constrained going forward, then the remaining budgets should be targeted at the fuel poor.

Current policy signals were adequate to bring this about. Views differed on how best to incentivise DSR and DSM over the period to 2030, and Energy UK encourages Government to engage with industry when considering the policy and regulatory measures to take.

Most see the roll-out of smart meters to every home and every small business by 2020 as an opportunity to build a more interactive demand management system with domestic and business customers. Some argued for relaxing the timetable for delivery to ensure adequate time for an effective smart-metering roll-out, and raised concerns regarding costs passed on to customers.

The ability to vary tariffs to reflect time of use, as recommended by the CMA, is seen as a critical step forward in unlocking the potential of DSR. Some also argued for moving swiftly to half-hourly metering and settlements for residential customers to facilitate this transition. Some questioned whether DSR would be commercially viable at either a consumer or grid level, but many respondents argued it would be commercial at a distributed level within three to five years. One company said that it would ‘always remain 10 years away’.

Many agreed with the sense that the energy sector is about to go through the same sort of technology-led revolution that has been witnessed in telecommunications and banking in recent years. A number of interviewees highlighted that with storage, smart meters, time of use tariffs and half-hourly metering in place, the value of electricity exported back into the grid could change significantly, as well as the need for investment in the transmission and distribution grid to support and manage more complex energy flows at all levels in the system.

Demand-side response (DSR) has a key role to play

All respondents believed demand side response and demand side management (DSM) had key roles to play over this period. Many respondents, however, expressed concerns whether the ability to vary tariffs to reflect time of use, as recommended by the CMA, is seen as a critical step forward in unlocking the potential of DSR. Some also argued for moving swiftly to half-hourly metering and settlements for residential customers to facilitate this transition. Some questioned whether DSR
is adequately reflected in the design of balancing measures run by National Grid. Others believed the Capacity Market should be amended to encourage greater DSR. A number of respondents argued that back-up diesel generation should not be counted as DSR going forwards, or eligible for capacity payments as it was already in receipt of other payments, e.g. for Triad avoidance.

Many respondents flagged the difficulties over the medium-term of balancing the electricity system in the summer troughs as well as the winter peaks. A number highlighted the greater likelihood of periods of negative prices and having to potentially constrain or turn down nuclear and wind if the predictions in National Grid’s Future Energy Scenarios (with lows of 16 GW on a summer’s day) come true. Again, greater interconnection, increased DSR/DSM and the potential of breakthroughs in storage were seen as solutions to these system balancing challenges. Also key to mitigating these ‘curtailment’ risks is the maintenance of a sensibly diverse generation mix.

‘Demand for electricity will not be as high as previously forecast’
Previous DECC projections have shown rising demand for electricity up to 2030 as the electrification of heat and transport accelerates.

Without policy interventions in heat and transport, respondents did not expect electricity demand to increase significantly over the next five to ten years, though beyond 2025 the picture becomes less certain. Most predicted flat or gently falling demand in the short- to medium term in line with recent trends.

There is greater uncertainty the further out one looks. Some respondents thought the market for electric vehicles could potentially take-off in the second half of the 2020s if technology costs continued to fall or if additional Government support became available. Most saw only limited electrification of heat over this period, with gas remaining the predominant fuel for domestic heating in GB.

Significant investment required to 2030, but less new large-scale plant than previously estimated
Many interviewees stressed the magnitude of the investment required to deliver affordable, secure low-carbon power by 2030. DECC estimated in 2012 that c. £110bn of new investment would be required in energy infrastructure by 2020 alone, and many interviewees believed similar levels would need to be maintained up to 2030.

However, respondents also commented DECC’s September 2014 projections overestimated the amount of new large-scale plant required to 2030. DECC’s forecast showed nearly 50 GW of renewables, 16GW of new nuclear and significant levels of CCS being needed by the early 2030s, largely to meet rising demand for low-carbon electricity as a result of the rapid electrification of heat and transport. Most respondents did not think these build-out rates were realistic or affordable, implying as they do very significant increases in the Levy Control Framework (LCF) and capacity payments, all of which will hit consumer bills. The updated projections from November 2015 show lower build-out rates, but still almost 100 GW of new build by the early 2030s, including 27 GW of new CCGTs.
All respondents thought a diverse energy mix would continue to be required, and that overreliance should not be placed on any one particular technology type. All respondents agreed significantly more low-carbon electricity would be needed to meet decarbonisation targets, and most believed some combination of nuclear, gas and renewables (both decentralised and large-scale) could deliver a balanced mix by 2030. Nobody argued for relenting on taking unabated coal off the system, including those with coal assets in their generation portfolio, although some stressed the importance of an ambitious programme of investment in new flexible generation capacity, such as gas and biomass, to replace unabated coal coming off the system.

Some argued there was no longer a case for supporting the development of CCS in the UK at large scale. Although some respondents believed one demonstration project would be beneficial, many believed the ambition set out by DECC and others (e.g. the Committee on Climate Change) was unrealistic, especially in the absence of a specific target for decarbonising the power sector. Government has subsequently announced the end of the CCS Commercialisation Programme and the removal of the £1bn of capital funding but did not clarify its position on the role of CCS going forward.

On nuclear, a number believed DECC’s forecast build-out rates were too ambitious given the track record of delays with new nuclear, and some thought providing CfDs for new nuclear plant could prove to be expensive, given lower wholesale prices and falling costs of other low-carbon technologies. Others believed new nuclear was an important means of meeting GB’s electricity needs affordably and securely, and interventions such as EMR were necessary to bring plants online.

Mary thought the costs of offshore wind could fall significantly and that having made a significant investment the UK should continue to support the sector given the comparative advantage in terms of wind resource and ability to influence the market for supply components. Most Energy UK members welcomed the Government’s continued commitment to offshore wind, on the condition of sustained cost reductions. Cost reduction potential was also a wider theme across interviews, and some also noted the potential for cost reductions in technologies such as nuclear and solar.

No respondents thought wave power would make a significant contribution over this period. Views on tidal were mixed. Some argued it should be backed, but others questioned whether the benefits would outweigh the large investment costs.

There was strong support for DECC to re-evaluate the costs effectiveness of different technologies in bringing down carbon emissions in order to take account of recent cost reductions. However, a number of respondents stressed this must be done in a way that recognises the ‘whole system costs’ of different technologies to ensure such comparisons are done on a level playing field basis. A number of respondents pointed out cost comparisons should take account of the lower long-term costs of wind once re-powering is taken into account (expected to be significant over the period).

Support for interconnectors, but conditional on there being a level playing field

Almost all interviewees thought, in principle at least, greater interconnection with Europe was ‘a good thing’ and would bring benefits in terms of greater diversity of supplies, grid management and ultimately lower bills for consumers. One respondent described interconnection as being equivalent to ‘time zone arbitrage’ (i.e. it allows market participants to take advantage of different time zones and demand patterns in continental Europe when seeking to balance the system).

Some respondents believed the primary role of interconnectors should be to help meet peak demand and address system management challenges, but not to substitute domestic generation. A number of generators raised concerns about whether a level playing field existed between overseas generators and conventional generation given the existence of the Carbon Price Floor in GB, and the scale of the network charges that GB generators pay. One interviewee commented we should not be building interconnectors based on ‘carbon tax arbitrage’ across Europe.

There was widespread support for trying to get the EU Emissions Trading Scheme (EU ETS) to work properly to give consistent carbon price signals across the EU, enabling the UK to move away from unilateral action on carbon taxes and thereby reduce this arbitrage effect. Energy UK welcomes the Government’s renewed commitment to delivering a meaningful carbon price through the EU ETS and encourages Government to engage with industry on how to meet this challenge.
determine how investment is allocated, with technologies competing on a like-for-like basis (taking into account all system costs and benefits). Participants generally agreed reforms such as the Capacity Market and Cash-out Reform were appropriate regulatory interventions, but some argued, in the long-run, there should be a move towards effective carbon-pricing as the basis of investment in low-carbon generation.

Some respondents, however, believed reviving a fully market-led approach would be a significant challenge, and a range of views was expressed on how the market should be structured (in the long-term) in order to effectively provide the correct market signals for new investment. Although many respondents agreed the Capacity Market was an appropriate intervention, a number argued that the mechanism should be carefully reviewed in order to ensure there was a level playing field in capacity auctions for new and existing/refurbished plant. A number of players felt measures such as the Supplemental Balancing Reserve (SBR) were ‘eating away’ at price signals, arguing it increased the cost of existing plant, leading to less plant on the system and aggravating the need to procure more SBR capacity (the “Slippery Slope” problem).

Some respondents also expressed concerns regarding wholesale market liquidity, despite Ofgem’s Secure and Promote reforms, and some raised concerns regarding the potentially increasing volatility in the wholesale market as a result of tightening capacity margins.

**The respective roles of DECC, Ofgem and the System Operator need to be redefined**

In a world with greater decentralised energy and interconnection, many interviewees identified potential benefits of a ‘system architect’ going forward. Many interviewees believed that the future energy market would result in a different set of requirements and challenges for system operations and a number of respondents suggested that the best way to manage the system in the future was to establish a fully independent system operator, though they recognised that the relative merits of this model would need to be analysed further. Others thought there was a role for developing Distributed System Operators (DSOs) given the growth in decentralised energy expected over this period.

The respective roles of DECC and Ofgem were questioned. Some argued DECC should only be involved in high level policy decisions, leaving detailed implementation to either an independent delivery body or Ofgem. Many commented the industry code process has stifled innovation and is too bureaucratic for today’s needs. Nobody believed the current delivery landscape in energy, with the plethora of bodies involved, was desirable or appropriate to facilitate the changes that lie ahead.

Energy UK welcomes the fact both the Government and the National Infrastructure Commission have indicated they are now looking at these issues. Energy UK will continue to contribute to this debate as it progresses.

**Target innovation spend to align with the Government’s technology strategy**

A number of interviewees highlighted the importance of innovation in new technology over this period. Battery storage, systems for grid management, stimulating cost reduction in low-carbon technologies were all areas that received multiple mentions. All agreed the Government needs to align its innovation strategy with its technology strategy. There will be a series of ‘no/low regrets’ options and decisions that can be made now, with ‘course correction’ as new results emerge. However, concerns were also raised about the multiple departments and bodies involved in energy innovation and some argued there should be a more integrated joined-up approach in order to focus attention on key technologies.