

Energy Security:

# A strategy for the next 50 years

Briefing paper



*Drafted for BCC by Aberdeen and Grampian Chamber of Commerce*

## Introduction

In October 2014 the British Chambers of Commerce (BCC) set out a requirement for the next UK Government to 'develop and implement a 50-year UK energy security strategy'.

To make a clear case for this, BCC has consulted with industry, met civil servants, surveyed members and reviewed available public data.

It is clear to us that information exists within government and industry which shows that thoughts on energy security can be made more readily available.

It is time for the UK Government to provide direction on energy security in a clear and meaningful way which is accessible to business.

In return for publishing a strategy the BCC is committed to helping the Government communicate these plans to the 70,000 businesses we represent once published.

## Executive summary

When formulating energy policy, policymakers must balance the requirements of cost, security of supply and the carbon emissions of the available sources of energy. This is often illustrated as an 'energy triangle', which should be equilateral in theory, but in practice leans more towards one factor depending on who your perspective.

Our research shows that, when faced with the energy triangle, the main priority of the UK business community lies in a competitive cost envelope of energy solutions which will provide security of supply. This will allow businesses to continue funding low carbon technologies until they overcome issues of viability, pricing and storage.

The UK energy market presents long-standing problems in its pricing practices and structural maintenance. As a result, the risks of power failures are increasing as capacity of supply margins become smaller. The National grid has attempted to counter the problem by applying short-term and reactive solutions, such as limiting the energy usage of major industrial consumers and paying utility companies to switch off their plants in times of low demand. These methods are little more than patches which fail to address the underlying issues in the system, which requires a commitment towards greater investment and technological development.

However, it is difficult to identify the best opportunities for solving these long-standing issues if there is no long-term strategy which reaches beyond immediate goals of "keeping the lights on" and begins to envision a post-oil and gas future.

This briefing paper suggests ways in which government policy can address some of these challenges, mainly by recommending the development of a 50-year energy security strategy. In the medium term, attention should be paid to delivering an energy mix which makes use of both national capacities and international opportunities, broadening the UK's relationship with other energy markets in an effort to diminish geopolitical risk. In the longer term, the strategy should lead towards the fulfilment of carbon targets, which we suggest can be achieved through a balanced use of hydrocarbons and renewables.

The business community wants to be engaged in these efforts, but it cannot participate effectively if it cannot easily access comprehensive and reliable information. Government should unify data on sources' emissions, costs, the energy mix, geopolitical challenges and technological upgrades, make it readily available in a simple format and update it every five years.

We consider these suggestions to be a good beginning towards formulating a strategy which will lead the way towards an energy secure future in the UK for the next 50 years.

## Background

The British Chambers of Commerce (BCC) is the national body for a powerful and influential Network of Accredited Chambers of Commerce across the UK. Representing thousands of businesses of all sizes and within all sectors, the BCC is the voice of the 'real economy'. Every Chamber sits at the very heart of its local community working with businesses to grow and develop by sharing opportunities, knowledge and know-how.

This is one part of a series of papers we are producing to support members. The papers are designed to encourage political parties to focus on 'keeping the lights on' and managing our long-term energy needs in a financially sustainable manner whilst optimising environmental outcomes. This paper complements other sector publications and documents focused on the delivery of our 'Business Plan for Britain'.

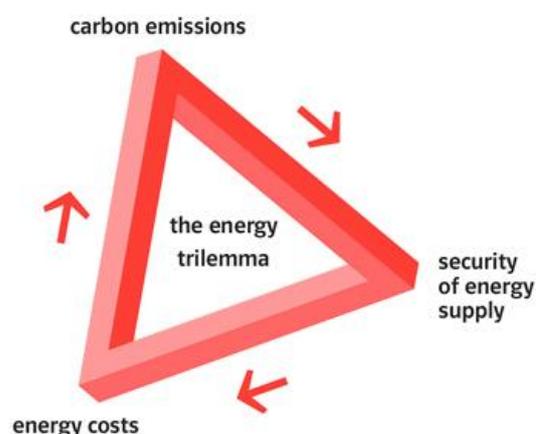
## Context in sector

### The energy triangle

Politicians and policy makers talk frequently about the 'energy triangle'. This energy triangle discusses our energy mix as attempting to gain an optimal mix of security of supply, low emissions, and competitive costs / prices.

Generally this is drawn as an equilateral triangle, which gives the impression that all parts of the 'trilemma' have equal weight. However, in a developed country with ambitious growth targets that is not a realistic illustration.

To better demonstrate the actual position of each component BCC undertook research to assess the views of the Chamber network. The energy triangle is redrawn twice below with a business lens applied. The first chart shows the results when businesses are asked about their main priority (i.e. very important), the second chart shows the result when businesses were asked to choose a wider option (very important or important).



### *The energy triangle, A business viewpoint*

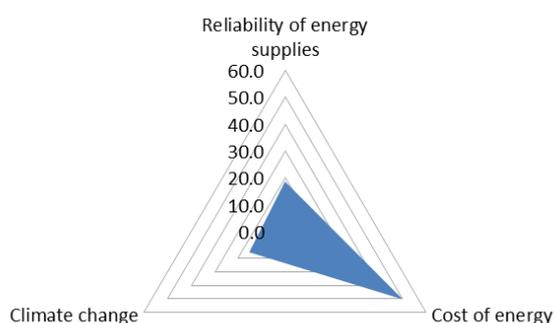


Figure 1: Rating very important

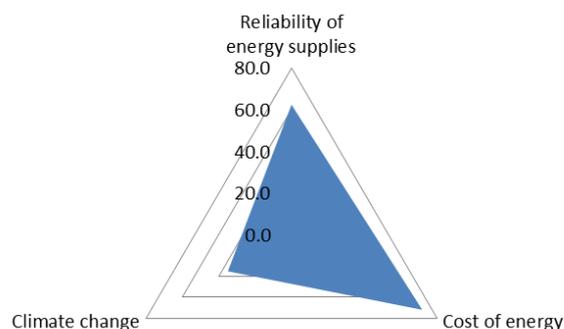


Figure 2: Rating important / very important

This revised view of the triangle has to be taken into cognisance when we consider how we approach energy security planning in future. At the BCC we are of course aware that businesses are not the only stakeholder in this discussion and that other parties have strong views on what their triangle may look like. However, our members are a primary customer group who fund expensive low carbon sources of energy so have to be listened to. **Our members believe cost is a priority, but security of supply must be provided with a competitive cost envelope.** Unsurprisingly, our members also feel their priorities should be reflected in the work of Government, as shown in the following tables.

*The energy triangle, What Government should be doing*

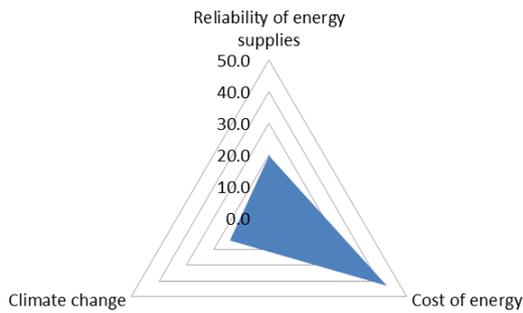


Figure 3: Rating very important

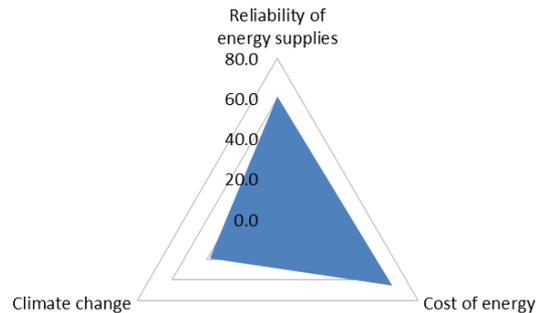


Figure 4: Rating important / very important

**Current energy mix – sources of energy**

Our members, leading business people in the UK, have a limited knowledge of the current energy mix. More work is need to help businesses understand the energy mix, its impact on pricing and security of supply.

Looking at the big picture of the UK energy mix, it is divided relatively equally between heat, transport and electricity. The largest source of transport are oil products, for heat it is gas, and electricity is a mix of coal, gas, nuclear and renewable, plus some inter connection from Europe.

The chart to the right illustrates the electricity mix in summer 2014.

Simple communications which highlight the role each source of energy plays are important.

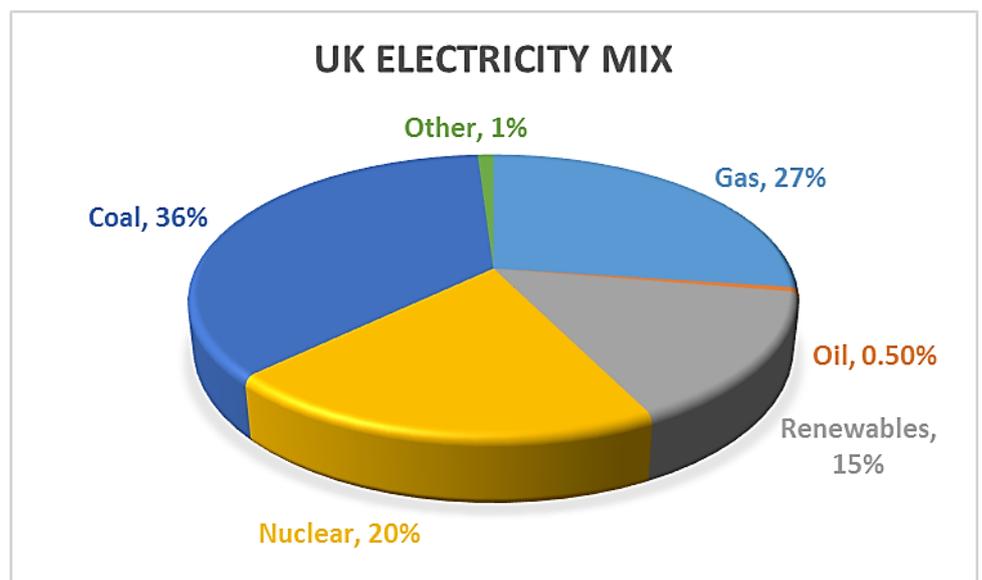


Figure 5: UK Energy Mix - Department for Energy and Climate Change (July 2014)

This should include messaging such as that outlined in the table below. This information is publicly available but is hard to find. The Chamber network could be better utilised to localise and share data on a more regular basis. This would build confidence in Government and energy network planning.

Energy source	Description	Cost per MWh (DEFRA)	Emissions CO2 kg / KWH
Coal	This is the cheapest energy source, but creates harmful emissions.	£55.05	0.323
Natural Gas	This is a key source of energy and is sourced in the North Sea as well as being important as feedstock for various industries. It is cleaner than coal.	£76.6	0.185
Nuclear	Nuclear energy creates no carbon emissions. Existing infrastructure is aging and being decommissioned although new projects are being planned.	£92.50	
Renewables – onshore wind	Onshore wind is now a proven technology and a source of no-carbon energy. However, there are times when the wind doesn't blow and other energy sources are required for 'base load'.	£90.2	0.008 - 0.020
Renewables – offshore wind	Offshore wind is seen as less intrusive than onshore wind. It is more costly to deliver but is more reliable.	£150	
Other	Tidal, Wave, Biomass, Solar	£305, £305, £105, £125	

Table 1: Energy sources by cost per MWh and emissions. DEFRA, 2015.

## Current energy mix – markets

The UK benefits from the use of international energy markets to meet its supply needs, to manage costs and increase energy security.

The chart to the right provides an illustration for electricity only and demonstrates that the UK is a net importer of electricity.

However, since 2002 we have seen exports slowly grow as markets become more active across Europe.

Currently the main sources of our energy imports are France and the Netherlands. We also trade coal, oil, gas and other energy sources.

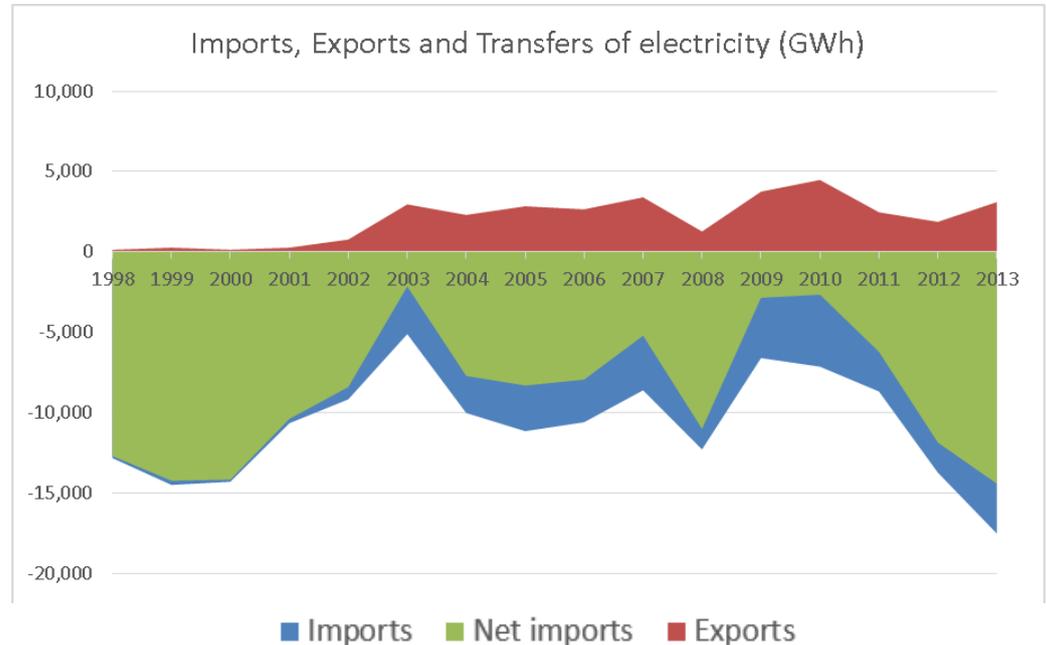


Figure 6: Imports, exports and transfers of electricity. DECC, 2014

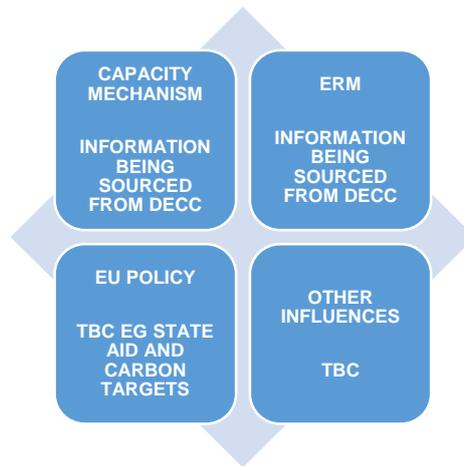
Moving forward, gaining more access to a diversity of international markets should be a key aim to manage energy demand, create competition across the generation sector and help to ensure energy security while diminishing the political risk of these investments.

Using markets works, the UK Government has to ensure interconnectors to Europe are delivered and should again make its intentions public in the 50-year strategy we request.

## Policy context

The raft of regulatory and policy changes which are implemented by Government are confusing, not well explained, trailed or always justified.

Some policy and regulatory changes are of course necessary and effective. However, it is important that more effort is made to communicate the rationale behind the decisions, the nature of change and the benefits which accrue to businesses on a consistent basis. We give some examples below.



## CAPACITY MARKET

In an effort to ensure the UK has a secure electricity supply into the next decade the Government is introducing a Capacity Market. The aim of this initiative is to drive new investment in gas and demand side capacity to help keep the lights on as well as utilising capacity which is available across the network which is not being used.

The Capacity Market uses an auction and applications 'bid' to provide call-off energy resources. This approach is therefore using competition to create pressure on providers to deliver capacity for as low a price as possible.

The agreements are only available to investors in existing and new capacity four years ahead of the year capacity must be delivered. This gives an investor certainty over part of the future revenues they will receive although of course it doesn't provide the longer-term certainty for larger investment programmes.

## What our members say

Our most recent survey of members highlighted 38% of businesses considered their growth had been impacted by energy costs in previous years. While our energy costs are not significantly higher than other competitors there is a strong perception they are.

Rising energy costs had adversely impacted 50% of businesses in Northern Ireland

We at BCC are concerned that our energy intensive industries will become uncompetitive in the near term as energy prices stabilise in some overseas locations. We are also concerned some companies are holding off investing in energy efficiency efforts as they will have a negative impact on their business rates, again impacting on our cost competitiveness.

Our members recognise and want a diverse energy mix. While DECC and politicians are 'comfortable' that energy security is in hand, our members are concerned about the long-term implications of the current market and structural weaknesses. Among the Chamber membership we see interest from diverse sources which offer significant opportunities to support the efforts to ensure energy security.

## The future

Looking to the future, the source of our energy is changing. This section provides a brief analysis on that changing environment.

### The near future

By 2016 a third of the output from coal fired power stations is expected to close to meet EU air quality rules. The table below provides some illustration of the capacity we will lose from coal and other sources as well as new capacity coming online.

Energy generation planned for closure / decommissioning			Energy generation planned to come online		
Site / Power station	Capacity in MW	Expected closure	Site / Power station	Capacity in MW	Expected closure
Ferrybridge	1,995	2015	Hinkley Point C-1	1,670	2023
Ironbridge	970	2015	Hinkley Point C-2	1,670	2024
Kingsnorth	1,940	2015	Sizewell C-1	1,670	Not known
Tilbury	1,131	2015	Sizewell C-2	1,670	Not known
Wylfa 1	490	2015	Wylfa Newydd 1	1,380	2025
Dungeness B	1,090	2028	Wylfa Newydd 2	1,380	2025
Hartlepool 1&2	1,190	2024	Oldbury B-1	1,380	2029
Heysham	1,160	2019	Oldbury B-2	1,380	2029
Heysham II	1,230	2023	Moorside 1	1,135	2024
Hinkley Point B 1&2	860	2023	Moorside 2	1,135	Not known
Hunterston	840	2023	Moorside 3	1,135	Not known
Torness 1&2	1,250	2023	Various renewable	70,000	2030
Sizewell B	1,188	2035			
<b>Total</b>	<b>15,334</b>			<b>85,605</b>	

Table 2: Coal (Energy UK, 2015), Nuclear (World Nuclear Association, 2015), Renewable (mid scenario, potential not confirmed or planned output, DECC, 2011)

The table shows that in many respects after 2023 meeting capacity challenges is deliverable, at a cost. There is significant opportunity to develop increased renewable energy output but this is currently more costly than the energy generation we are about to lose.

The data demonstrates shorter-term challenges which DECC and other civil servants are well aware of. Generally experts agree a 'blackout' is unlikely but that does not tell the full story. Setting measures to only 'see us through' is not good enough.

## Keeping the lights on

In winter 2015/16 we could face a situation where margins of capacity of demand over supply is expected to reduce to just 1.2%, after having been as high as 15% in 2011/12. The media has published stories outlining that contingency methods include paying power stations to increase output and paying large energy users to use less energy.

This approach is not optimal because:

1. it is necessarily reactive and short-term, it comes from last-minute planning
2. it creates risks for business and their planning
3. it involves increased regulation and policy making which is not desirable in an already complicated environment

It is a lack of long-term planning which has left us in this position. Removing political interference from the sector, it is encouraging that National Grid, as an independent party, is able to determine our forecast energy needs. However, it is equally important to inform business what is being done to keep the lights on and ensure this is done regularly. It is also vital that politicians listen to independent forecasts and remove the obstacles to delivering new infrastructure.

## The medium and longer term

The mix of energy we use is already changing and will continue to change. Climate change is an issue we need to meet and our members recognise that. Moving forward our energy mix is likely to be increasingly diverse to meet the challenges of climate change, cost, security of supply, and changing use of energy:

- Low carbon energy need not only be renewables, carbon capture may change our future
- Renewables may demonstrate that their long-term costs are not the highest
- In 50 years gas supply will change from being mainly offshore to onshore, and possibly imported LNG
- Electricity may see increased demand if electric vehicle use grows. Equally, other technologies like hydrogen may prosper
- Nuclear generation looks increasingly likely to be 'plugged in' in the near future
- The use of markets via interconnectors will also be vital to managing demand and increasing the role of competition
- In addition to straightforward generation and supply considerations, there are external influences which will determine what generation capacity is required in the UK or via international markets.

Examples of additional influences	
<b>Carbon Capture and Storage (CCS)</b>	Most people assume a low carbon future does not involve the use of gas or coal fired power stations. However, the advent of a commercially viable CCS industry could significantly change that outlook. Of course CCS like other emerging low carbon technologies has yet to prove it can compete on price.
<b>Electric car use / Hydrogen</b>	We have seen increasing use of hybrid and electric cars, we have also seen large roll outs of hydrogen buses. Depending on the incentives in place, policy drivers and technology advances we could see 5 million electric cars on UK roads, we currently have around 15,000. This could of course significantly shift our energy supply and generation needs.
<b>Changes in demand</b>	The UK has seen falling demand as our industrial structure has changed. Inevitably we need to plan for changes in demand caused by business and consumer changes in addition to moves in technology.

Table 3: Examples of additional influences

The UK should not operate in isolation of the rest of our global competitors and ensuring our energy is competitively priced is vital.

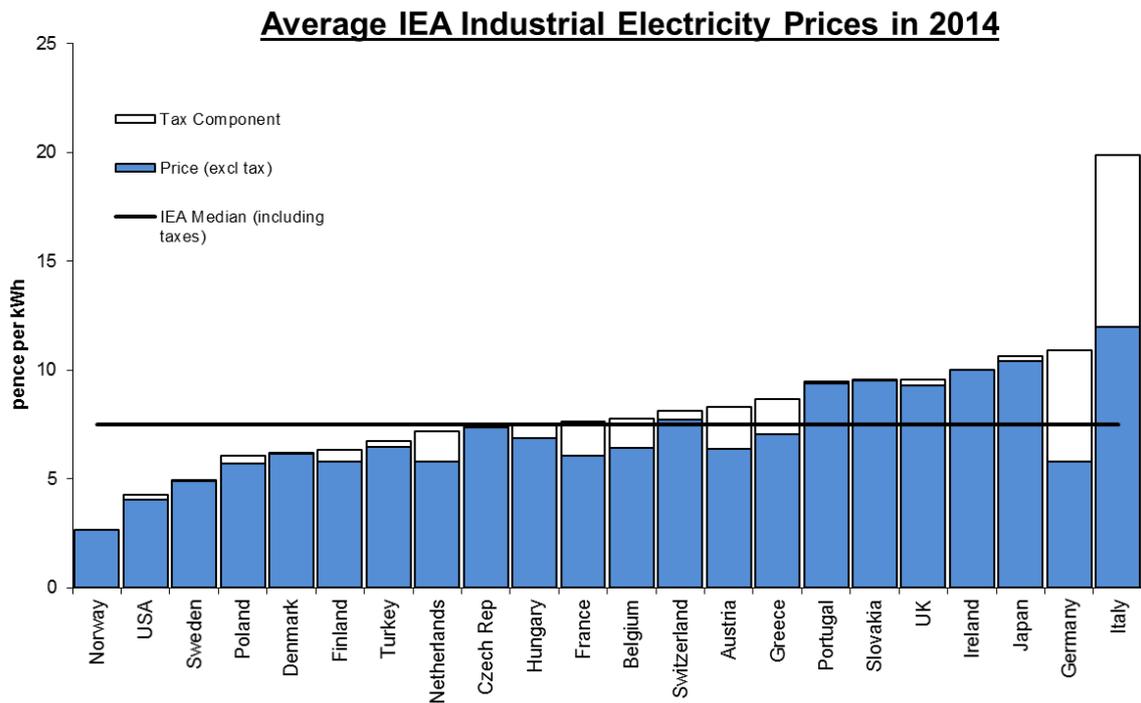


Figure 7: Industrial electricity prices in the IEA. DECC, 2015.

The chart above shows that our relative performance is on par with some of our wider economic and business performance in a global context. However, there is clear room for improvement in prices with the UK sitting above the IEA median level, although taxation is below many countries.

This analysis should provide important context for decisions made in any long-term strategy.

The UK Government will not start with a blank sheet of paper in the preparation of a 50-year energy security strategy. National grid forecasts show a variety of possible futures, some of which are explored below.

## Key statistics in 2030

	Gone Green	Slow Progression	No Progression	Consumer Power
<b>Power</b>				
Annual demand, TWh	362	332	333	342
Peak demand, GW	66.1	59.4	60.8	62.6
Total installed capacity, GW	136	117	101	125
Low carbon capacity, GW	98	74	48	76
Interconnector capacity, GW	17.7	14.2	9.8	10.8
<b>Gas</b>				
Residential gas demand, TWh	200	274	308	292
Annual gas demand, TWh	602	702	819	851
Gas imports, %	68	88	61	34
Shale gas production, bcm	0	0	1	32
<b>Decarbonisation</b>				
Renewable energy, %	30	22	11	19
Reduction of GHG emissions, %	64	60	52	57

Figure 8: Future Energy Scenarios. National Grid, 2015.

For anyone interested in data, forecasts and future energy scenarios the work of National Grid is worth reviewing.

Whichever scenario is followed, Government must not procrastinate and we must be sure we learn the lessons of the tight capacity margins we will reach in winter 2015/16.

At BCC we recognise that there are multiple 'moving parts' in trying to forecast energy demand and supply. However, this is exactly why we are calling for a 50-year energy security strategy. Our members have a right to know what options are being considered as we look beyond the next few years.

## What do we expect

Our briefing paper is not exhaustive but aims to illustrate that data is available, forecasts exist and that government departments and industry are thinking about energy security. However, this analysis is often inaccessible, indigestible and unsuited to a business audience. We are therefore calling for the UK Government to:

1. write and implement a 50-year energy security strategy
2. recognise the changing landscape and update the key drivers in this strategy every 5 years as insight becomes available
3. communicate better with industry using BCC and other trade organisations
4. remove the politics from energy security by using the 50-year strategy to drive decision making

### **In this document we would expect to see:**

1. a statement noting that energy security is our main priority within the strategy
2. an aspiration to being carbon neutral in 50 years but not necessarily rule out the use of fossil fuels alongside carbon capture and storage
3. milestones setting out how the carbon targets will be met
4. annual pricing targets referencing acceptable changes for consumers (including business) e.g. 2% per annum. This will avoid unexpected surprises for consumers and will mitigate the development of new technologies at any costs
5. an assumption towards a diverse energy mix which will continue to include fossil fuels and perhaps use CCS in the longer-term
6. simple fact sheets on current generation costs and emissions each year
7. fact sheets on current energy mix and forecasts for the next 5, 10, 15, 25 and 50 years
8. a discussion on the changing landscape, updated every five years, exploring in simple terms:
  - a. technology advances
  - b. geopolitical influences
  - c. the appropriate mix of imports to ensure energy security
  - d. identification of critical milestones including key infrastructure
9. Details on how we can secure more supply chain jobs and added value from the energy sector. The Oil & Gas sector provides a case study of where the UK has excelled on a global basis, but other sectors have been less successful in securing local economic benefits

We recognise that much of this data is already available. However, the key point is that it has to be searched for via a wide variety of sources rather than being readily available in one place.

On behalf of our members we look forward to a positive response from the UK Government.