

**SUMMARY OF KEY CONCLUSIONS:**

- **The first duty of government on energy policy is to guarantee security of supply for domestic consumers and businesses by maintaining a sufficient reserve capacity – yet, the UK government is failing in that regard.**
- **We are facing the highest black-out risk in a generation, with reserve energy margins falling to as low as 2 per cent in the very near future.**
- **The consequences of this are grave with upward pressure on consumer bills, extra costs for business and a deterrent effect on inward investment.**
- **UK Government's own energy White Paper (2011) said low capacity margins could trigger supply shortages costing the UK economy up to £600 million.**
- **Short-term measures to plug the energy gap all entail additional expense for consumers – for example, payments to persuade energy-intensive users to consume less energy or payments to generators to bring back retired plant.**
- **Repeated failures of Westminster governments to take necessary decisions and apply policy consistently have worsened the outlook – Electricity Market Reform has been mishandled leading to a withdrawal of investment in new capacity at a time when it is urgently required to keep the lights on.**
- **Due to high levels of investor uncertainty existing capacity is being mothballed, investment in new capacity delayed or withdrawn completely – so new capacity is coming onto the grid at a rate slower than expected.**
- **The Chancellor's recent Budget decision to slow the deployment of energy efficiency measures will make a difficult situation even worse.**
- **Scotland is a substantial and reliable net exporter of electricity, with over a quarter of all Scottish generation exported in 2012 – effectively, Scotland is now the UK's energy reserve.**
- **The most cost-effective location in these islands for renewable energy generation is Scotland – we are producing clean power in record amounts and consistently supplying over a third of all the UK's clean energy.**
- **Energy investments in Scotland are helping to keep the lights on across these islands and Scotland's renewable generation is necessary to meet the UK Government's legally binding climate change and renewables targets.**

## INTRODUCTION

### Security of supply – a responsibility of government

Ensuring adequate security of supply must be the first priority of energy policy for any responsible government – public services, households and businesses all operate on the basis that a reliable supply of power will be available when needed at affordable cost.

The Scottish Government's policy on electricity generation<sup>1</sup> is clear that Scotland's generation mix must deliver: a secure source of electricity supply; at an affordable cost to consumers; be largely decarbonised by 2030; and achieve the greatest possible economic benefit and competitive advantage for Scotland.

Official projections of **security of electricity supply in the Great Britain market**, however, show the margin between demand and supply at times of peak load **will diminish to historically low levels in the next few years**. Clearly, this is a matter of deep concern to all households, businesses and public services that depend on secure and affordable supplies of power.

### Capacity crunch forecast

The UK Department of Energy and Climate Change (DECC) has a statutory duty, alongside Ofgem, to report annually to the Westminster Parliament on the availability of electricity to meet consumer demand in Great Britain.<sup>2</sup> This duty is met by publication of the *Statutory Security of Supply Report*, the most recent edition of which records that:

“To date GB's electricity system has provided secure supplies. However, the system faces some significant challenges over coming years”

The statutory report produced by DECC builds on a range of credible margin forecasts presented in Ofgem's annual *Electricity Capacity Assessment Report*.<sup>3</sup> This evidence-based outlook shows what levels of spare capacity could be delivered by the electricity market over the coming five winters and quantifies the associated risks to security of supply.

The most recent Ofgem Assessment published in June 2013 makes the following points:

“the risks to electricity security of supply will increase in the next five winters. In particular, we expect that electricity de-rated capacity margins will decrease significantly from the current historically high levels”

“the risk of electricity customer disconnections will appreciably increase from near zero levels. This is primarily because of a significant reduction in electricity supplies from coal and oil plants which are due to close under European environmental legislation”

Ofgem's benchmark scenario has GB's capacity margin falling to 4 per cent by 2015/16, and under their high demand scenario the margin falls to **below 2 per cent by the winter after next. The equivalent margin for Scotland in 2015/16 will be around 20 per cent.**<sup>4</sup>

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1 Electricity Generation Policy Statement, Scottish Government (2013) - <http://www.scotland.gov.uk/Publications/2013/06/5757>

2 This legal duty arises under section 172 of the Energy Act 2004 as amended by section 80 of the Energy Act 2011

3 Electricity Capacity Assessment Report, Ofgem (2013): <https://www.ofgem.gov.uk/publications-and-updates/electricity-capacity-assessment-report-2013>

4 Scottish Government estimate using Ofgem methodology to assess the Scottish part of the network on its own, the estimated de-rated capacity margin in 2015/16 could be approx. 20%

For many years the UK Government has been aware GB capacity margins would narrow substantially in this decade due to planned generation closures. Indeed, the UK Government's 2011 energy White Paper, *Planning our electric future: a White Paper for secure, affordable and low-carbon electricity*, contained the following prediction:

“over the next decade we will lose around a quarter (around 20 GW) of our existing generation capacity as old or more polluting plant close”

**In 2011, DECC expected GB capacity margins to fall below five per cent by around the end of the decade thus increasing the “likelihood of costly blackouts”.**

In reality, the electricity market has tightened much faster than DECC was expecting only a few years ago and this prompts us to consider the potential scale of the economic costs associated with possible supply shortages. On this point, the UK Government's 2011 energy White Paper notes:

“If low capacity margins lead to energy unserved, there are resultant costs to consumers. For example, **if de-rated capacity margins fall to 3 per cent in the early 2020s**, in a year we could expect around 20 GW of energy unserved, with **estimated costs to the economy of £200-600 million**”

## Widening concerns

The clear picture of a tightening electricity market highlighted in the published analysis of DECC and Ofgem has attracted considerable adverse reaction in government, industry and academic circles.

For example, Sir Mark Walport and Professor Dame Nancy Rothwell, Co-chairs of the Council for Science and Technology (the body that advises the Prime Minister on science and technology policy issues), wrote to the Prime Minister on 7 August 2013 to put on record their concern that:

“In the short term, the Academy's work concludes that, without appropriate intervention, the capacity margin could be narrowed to the extent that system security may be threatened by the winter of 2015/2016”

These views have been echoed repeatedly by organisations representing British business. In September last year, the CBI published a survey showing that since 2012 energy has overtaken transport as the biggest worry for businesses:<sup>5</sup>

“95% of firms say they are now concerned about the costs of energy, while 90% report they are concerned about security of supply”

“Data on the security of supply and cost of energy indicate that these concerns are well-founded. Ofgem data indicate that because of the hiatus in investment, the UK will come close to total capacity in the coming years until new energy sources can be brought online. Furthermore, the Department for Energy and Climate Change's own figures indicate costs are due to rise”

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<sup>5</sup> Connect More, CBI/KPMG Infrastructure Survey 2013  
[http://www.cbi.org.uk/media/2360768/cbi\\_kpmg\\_infrastructure\\_survey\\_16\\_sept.pdf](http://www.cbi.org.uk/media/2360768/cbi_kpmg_infrastructure_survey_16_sept.pdf)

## EFFECTS OF LESS SPARE CAPACITY

### Upward pressure on prices

The normal functioning of markets suggests that a narrowing gap between available supply and demand for electricity will tend to exert upward pressure on the price of electricity. Ofgem address this point directly in their June 2013 Assessment:

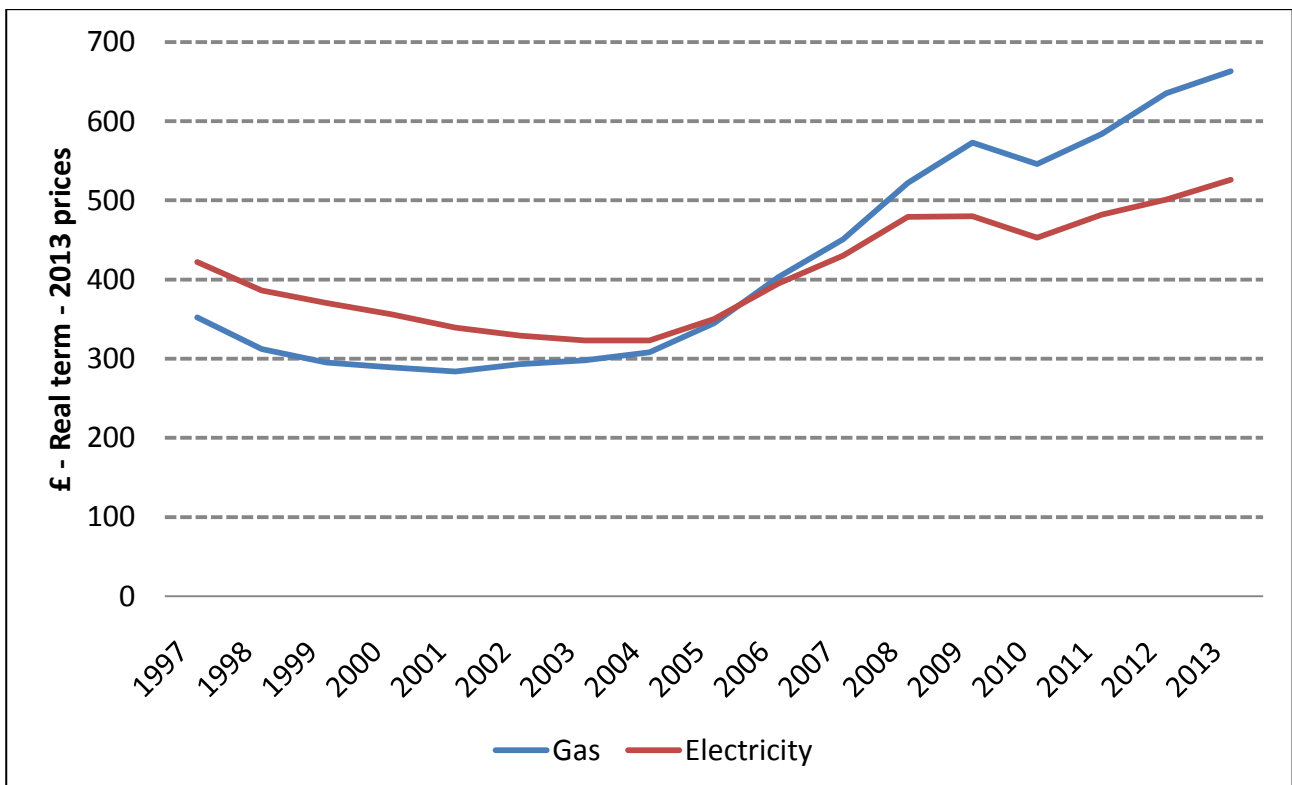
“As installed capacity falls in the next few years, all else being equal, prices can be expected to rise and it is possible that this will lead plant that is currently mothballed to come back online”

Inflationary pressure caused by market tightening and mounting security of supply concerns will tend to raise wholesale electricity prices and, thereby, amplify the existing upward direction of movements in consumer prices. The broad trend of consumer energy bills during the terms of the current and previous Westminster government has been up.

Figure 1 below, using UK Government figures, shows that **between 1997 and 2013:**

- **household energy bills (combined electricity and gas) rose by 54 per cent in real terms**
- **electricity bills rose 25 per cent in real terms**
- **gas bills rose 88 per cent in real terms**

**Figure 1: Trends in household energy bills**



## WHY CAPACITY MARGINS ARE FALLING

Several factors determine security of power supplies in the GB regulated market – including for example global input prices, the design and implementation of national energy policy and regulation, and the evolution of energy technology – and it is this complex interplay of influences which makes capacity margins difficult to predict accurately.

“Although it is clear that the risks to security of supply are increasing, it is very difficult to accurately estimate the level of security of supply that will be provided by the market. In particular, this is because of uncertainties regarding the level of demand, commercial decisions about generating plant and interconnector flows” (Ofgem, *Electricity Capacity Assessment Report 2013*)

The Ofgem quote draws attention to three of the major source of uncertainty – **demand, commercial decisions about generating plant and interconnector flows** – surrounding the true extent of the UK's security of supply problem. A further uncertainty, discussed below, relates to **investor confidence in the direction of UK energy policy**.

**For the reason that capacity margins are difficult to predict – and the consequences of getting them wrong are so great – governments must ensure sufficient reserve energy is available in the system at all times and under all foreseeable circumstances.**

### Demand for electricity

Demand for electrical power within the GB market has historically been more stable than supply but the inherent uncertainties of predicting energy consumption still present significant challenges to those managing security of supply, as both Ofgem and DECC acknowledge:

“demand forecasting is a particularly complex exercise, especially during an economic downturn and with uncertain weather patterns” (Ofgem, *Electricity Capacity Assessment Report 2013*)

Households' usage of electricity and the pace at which they adopt measures to improve energy efficiency play a key part in shaping total electricity demand.

The reference scenario underpinning Ofgem's capacity assessment assumes peak GB demand will fall by 0.8 per cent on average per annum to 2018/19 – or 3 GW cumulatively.

Therefore, anything that hinders demand restraint – such as the UK Government's decision to slow the deployment of energy efficiency measures (e.g. schemes funded through the Energy Company Obligation) – will tend to put further pressure on an already tight capacity margin and thus propagate the risk of supply shortages.

“Involuntary disconnection of some customers (“blackouts”) would be likely to occur in... 1 in 4 years in the Ofgem high demand [scenario]” (DECC: *Statutory Security of Supply Report*, October 2013)

## Commercial decisions about generating plant

To a large extent, the magnitude of the expected erosion of spare GB capacity over the period 2013/14 to 2018/19 will be determined by supply-side developments – principally, the calculations of commercial power producers about whether to operate, build or close power stations, particularly those running on fossil fuels. Such calculations in a regulated market are in turn subject to the influence of policy and regulatory settings, and the signals transmitted by government.

In the six years to 2018/19, the total installed capacity of coal-fired generation is due to fall by 6.6GW while installed capacity of oil-fired facilities will decline by 2.1GW. Ofgem attribute a rise in the rate of mothballing in the last year “to high levels of uncertainty about future market conditions, and low levels of profitability for gas-fired plant”.

Future plant closures will compound the effect of substantial reductions in generation capacity in the period up to 2012-13, when over 7GW of capacity ceased production in response to the Large Combustion Plant Directive that restricts the operation of coal and oil plant:

“During the past year we have seen about 7,500 megawatts of generation shut down, while new build is just 700 megawatts of wind” (National Grid Chief Executive Steve Holliday, *Evening Standard*, 21 November 2013)

**Figure 2: Contribution of generation type to changes in GB capacity**

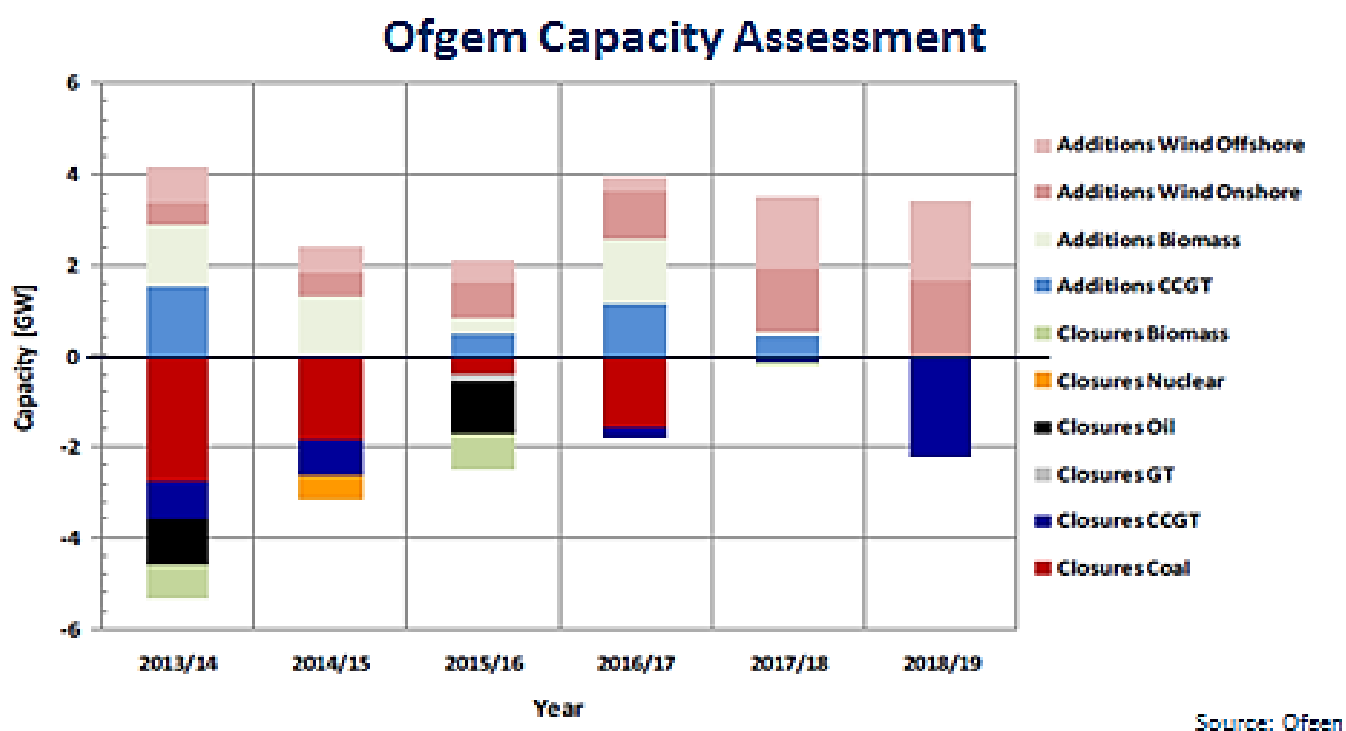


Figure 2 demonstrates clearly how the forecasted decline in generation capacity linked to fossil fuels in the period to 2018/19, can be balanced to a significant degree (but not completely in some years) by greater capacity from renewable sources – much of it from planned developments of new renewable generation capacity in Scotland.

## Limited contribution of interconnectors

International interconnectors are a source of additional supply to meet power demand in the GB market but their capacity and availability is limited. Relative to total generation capacity, interconnectors account for only about 5 per cent of GB capacity (3.8GW compared with circa 80GW of total GB capacity in 2012) – which is well below the European benchmark for interconnection of 10 per cent of generation capacity.

The direction in which power flows across international interconnectors on any given day is determined by energy traders and power will flow into the GB market only when wholesale prices are higher here than elsewhere, such that trade is profitable.

Prices in the GB and Irish wholesale energy markets are more often than not higher in the Irish rather than the GB market, and in such circumstances the contribution UK interconnectors can make to meeting peak GB demand is limited:

“According to National Grid, in the last year GB has been mainly importing electricity from mainland Europe and exporting to Ireland, **resulting in no overall net flows**” (Ofgem, *Electricity Capacity Assessment Report 2013*)

In forecasting GB capacity margins both Ofgem and DECC assume the Irish interconnectors “will be fully exporting at winter peak”<sup>6</sup> and their assumptions reflect accurately recent experience of interconnector availability:

“We have also observed a series of outages due to physical problems with the cables. In particular, the capacity with Northern Ireland (Moyle) has been reduced from 450MW to 250MW. This issue is not expected to be corrected in for some time” (Ofgem, *Electricity Capacity Assessment Report 2013*)

“a number of forced outages on IFA (UK-France) and East-West (UK-Ireland) interconnectors over the past year limited their available capacity to the market” (*Statutory Security of Supply Report 2013*, DECC, October 2013)

Concerns regarding interconnector availability are reinforced by the observation that security of supply constraints are becoming increasingly prevalent in the markets that supply power through the UK's interconnectors:

“We would expect that, in a situation of tight margins, ahead of mitigation actions being implemented, prices would rise resulting in higher interconnector flows into GB. However, GB is not the only European country expecting de-rated margins to fall in the next six winters. France, Ireland, Germany and Belgium are also facing security of supply challenges” (Ofgem, *Electricity Capacity Assessment Report 2013*)

## Investor confidence in UK energy policy

Tighter conditions in the GB electricity market have coincided with a period of heightened uncertainty for the sector as the UK Government and energy regulator have initiated several major overlapping processes of policy and regulatory change. These include Electricity Market Reform (EMR) and Ofgem's review of network charges (Project TransmiT), both of which have been playing out over many years and are yet to conclude.

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<sup>6</sup> *Statutory Security of Supply Report 2013* DECC, October 2013

In addition, Ofgem has recently announced its intention to refer the UK energy market to the Competition and Markets Authority (CMA). Scottish Ministers have welcomed this move but, in the interests of minimizing any potential consequences for security of supply, wish to see a swift conclusion to the review and effective implementation of the CMA's conclusions.

A survey by Pinsent Masons taken at the Scottish Low Carbon Investment conference in October 2012 revealed that 70 per cent of participants agreed that the "speed of progress on UK Government energy policy has caused delay" in investment decisions. The Pinsent Masons report draws the following conclusion:

**"Consistency of government policy** and commitment to renewable energy at a national governmental level is seen by respondents as **the most important factor impacting investment decisions** – a point which brings into sharp focus the impact that UK coalition ambiguity on energy policy will have had during 2012"

National Grid Chief Executive, Steve Holliday, commented on the dampening effect of policy uncertainty on investment, saying that investors in the UK energy sector:

"haven't got clarity around the framework in which they are investing at the moment"  
(*The Telegraph*, 21 November 2013)

Maria McCaffery, Chief Executive of RenewableUK, has called on the UK Government to provide the certainty that investors need to commit to long lead-time energy projects:

"If we could rely on more certainty and less risk, firm commitment to the huge financial investments involved would secure all the economic benefits of energy independence in a shorter timescale" (Business Green, 27 March 2014)

In March 2014, SSE announced that it was scaling back several renewable investment plans, citing limits in the support available under the UK Government's Levy Control Framework.<sup>7</sup> About the same time, major renewables developer RES announced its withdrawal from a £300 million bioenergy project, with the following warning from Chief UK Operating Officer, Gordon MacDougall:

"This is a reminder to government that, without a consistent approach to energy policy, investors and developers will be deterred from delivering the billions of pounds needed to ensure the nation's energy infrastructure is able to keep the lights on and secure cost effective electricity for British homes and businesses"<sup>8</sup>

## Frequent changes of UK energy Minister

In the midst of major policy redesign, uncertainty in the GB electricity sector has been compounded by frequent changes in UK Ministerial responsibilities at DECC. When in 2011 the aims of EMR were first outlined in the energy White Paper, Charles Hendry was the Minister of State for Energy; he was replaced by John Hayes in September 2012; who was himself replaced by Michael Fallon some six months later. In total, there have been fourteen UK energy Ministers since 1997.

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<sup>7</sup> <http://sse.com/newsandviews/allarticles/2014/03/review-of-offshore-wind-farm-development/>

<sup>8</sup> <http://www.res-group.com/media/press-releases/latest-news/latest-news/res-stops-work-on-%C2%A3300m-north-blyth-power-station.aspx>



**Box 1: UK Government's policy of support for new nuclear**

While some renewable and carbon capture and storage (CCS) generators encounter great uncertainty about the levels and availability of support that may be available under EMR, the UK Government has established very clearly its determination to support the development of new nuclear generation.

The UK Government's plans to deliver around 16 GW of new nuclear power by 2030 broadly equates to a commitment to support the construction and operation of at least 12 new nuclear reactors.

The UK Government has outlined a deal with EDF to build and operate two new reactors at Hinkley Point in Somerset – involving a contract length twenty years greater than those which will be available to generators of renewable energy. The Hinkley agreement could, depending on the future wholesale price of power, cost UK consumers an estimated **£35 billion** over the lifetime of the contract.

The scale of proposed subsidies for this single power station is four times greater than the cost of supporting all eligible generating stations across the UK under the first ten years of the Renewables Obligation scheme.

The £92.50 per unit of power agreed for Hinkley – double the current wholesale price of electricity – is index-linked and could on reasonable assumptions rise to around £120-£130 by the time the station begins generating in 2023. The commissioning date of Hinkley Point is also too far distant to have any bearing on the security of supply concerns and capacity crunch facing the GB market in this decade.

The huge scale and long duration of the package of support offered by the UK Government to EDF for Hinkley has created significant uncertainty amongst long-term investors in renewable technologies – such as offshore wind, wave and tidal. Investors have concerns about the levels of support that will be available to support the development of renewables technology after 2020 once payments for Hinkley – and potentially many other nuclear stations – are due to commence.

However, these concerns may not be realised, as a question mark remains concerning whether or not the Hinkley contract will be allowed to proceed. The European Commission is currently investigating the deal on State Aid grounds.

**SCOTLAND'S CONTRIBUTION TO SECURITY OF SUPPLY****Strategic value of Scotland's power**

Scotland makes a significant and reliable contribution to the security of power supplies across these islands – helping to keep the lights on and bills down.

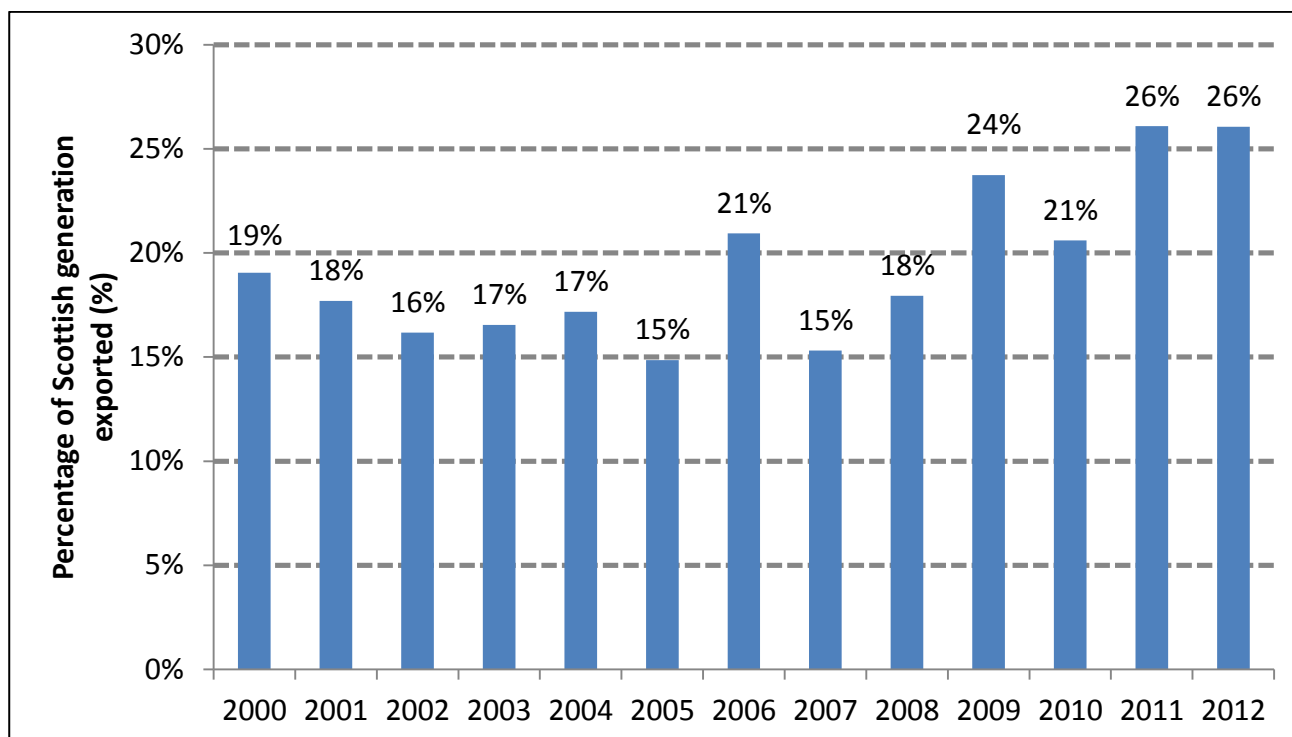
The substantial and varied energy resources of Scotland support the stability of capacity margins on the GB grid, bolster energy security and dampen price spikes:

“Scotland's contribution to the UK's renewable generation provides greater energy diversity to meet the challenges of energy security and makes it more likely that the UK will meet its legal environment targets by 2020” (National Grid's submission to Westminster Energy and Climate Change Committee, March 2012)

Scotland is a consistent net exporter of electricity to the rest of the UK and exported over a quarter of all the electricity generated in Scotland in 2012. Figure 3 below shows the upward trend in Scotland's export contribution to the rest of the UK in recent years.

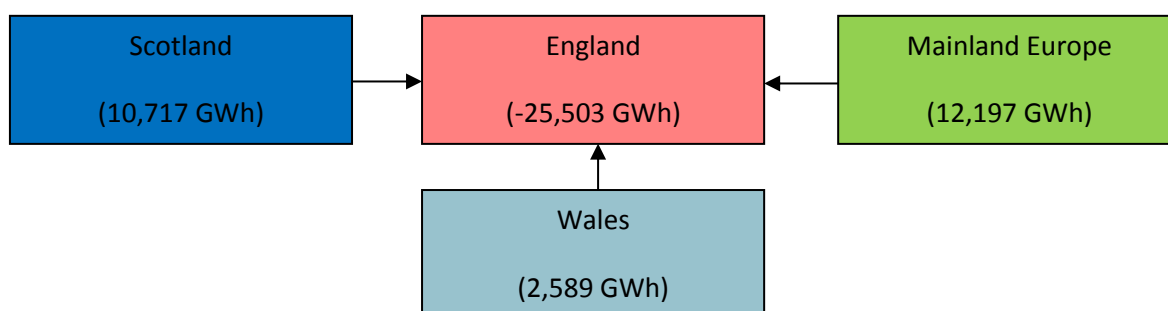
That upward trend is set to strengthen over the next few years, enabled by significant investment to reinforce and develop the GB high-voltage network between Scotland and England. Planned investments will bolster the capacity to export power from Scotland by a further 3 GW – strengthening security of supply and system stability across the GB grid.

**Figure 3: Proportion of Scotland's electricity exported**



Scotland exported approximately 13 TWh of electricity in 2012 to the rest of the UK. The majority of this electricity (11 TWh) was exported to England, with the remainder to Northern Ireland. England also imported 12 TWh from the European mainland via the French and Dutch interconnectors, and a further 2.5 TWh from Wales<sup>9</sup>.

**Figure 4: Direction of power flows in the GB market**



<sup>9</sup> <https://www.gov.uk/government/publications/energy-trends-december-2013-special-feature-article-electricity-generation-and-supply-figures-for-scotland-wales-northern-ireland-and-england-2>

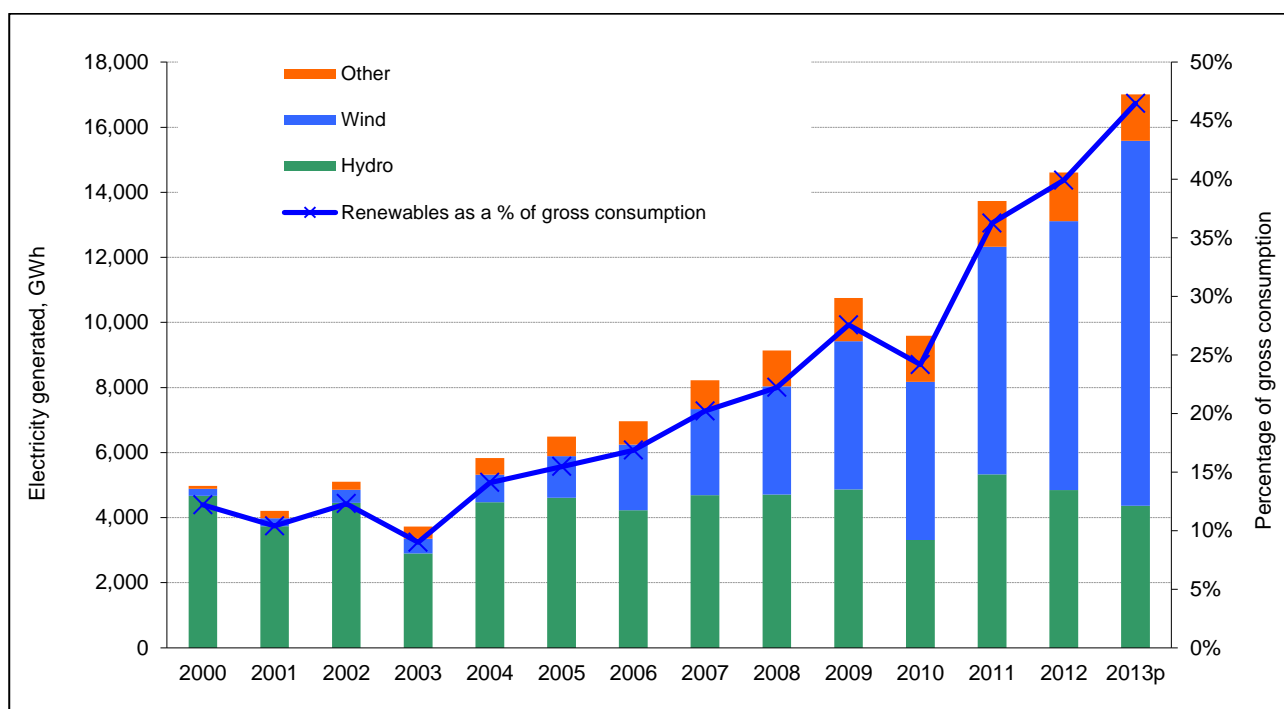
## Scotland's energy policy

The Scottish Government has maintained a clear and consistent approach to energy policy underpinned by world-leading climate change legislation and renewables targets. This consistency of vision and a determination to stick with long-term policy commitments – commitments that industry can trust – is at the heart of Scottish energy policy.

Evidence of the benefits of the Scottish Government's approach to energy and Scotland's contribution to UK security of supply is abundantly clear:

- Renewable electricity generation in Scotland was 17,011 GWh in 2013 – **up 16.4 per cent** on 2012 (the previous record year for renewables)
- Power generated from wind in 2013 was at a **record high level** – 11,216 GWh, **up 35.7 per cent** on 2012 (the previous record year) – five times the level generated in 2006
- Renewable electricity generation in Scotland made up approximately **32 per cent of total UK renewable generation** in 2013
- Scotland has massive renewable energy potential with 25 per cent of Europe's tidal and offshore wind potential and 10 per cent of its wave power.

**Figure 5: Trends in Scotland's renewable energy output**



The energy sector in Scotland continues to grow – between January 2010 and April 2013, the industry announced £13.1 billion of investment and over 9,000 associated jobs. More wave and tidal power devices are being tested in the waters off Scotland than in any other country in the world and Europe's largest tidal array has been consented for development in the Pentland Firth.

## Security of supply is a shared interest

There is common interest in sharing energy resources across these islands. Scotland offers safe and secure supplies of electricity and gas and can assist the rest of the UK in meeting its renewable energy targets.

The White Paper on independence, *Scotland's Future*, makes clear that Scotland's energy aims can be fulfilled by the continuation of a single GB-wide energy market for electricity and gas, **provided security of supply is not jeopardised**. Continued participation in a single GB-wide energy market is also in line with the trend for increasing integration of energy markets across Europe.

However, as a substantial supplier to the rest of the UK, **an independent Scotland will require a far greater degree of oversight of the market arrangements for energy and firmer safeguards over Scottish energy security. The policies of the UK Government have brought us to point where the risk of black-outs is the highest for a generation.**

The Scottish Government plans to establish an Energy Partnership with the Westminster Government, ensuring that we jointly steer the approach to the energy market and that Scotland's long-term interests are better served. Only through this kind of partnership can the Scottish Government ensure that new investment in Scottish generation is not compromised by the Westminster Government's proposals to overhaul the structure of the electricity market and enter into expensive, long-term contracts for new nuclear generation.

**Scottish Government  
April 2014**