1. Scotland-specific issues in relation to the roll-out of CCS by 2020

The development of CCS technology has proven a greater challenge than was anticipated 5 years ago. The challenges are interrelated ones around technical risk, cost and regulation. These are international challenges, and while CCS projects are being actively progressed in some countries (e.g. Norway, Canada and Australia) there has been much less progress than was envisaged, and the UK has had particular difficulties. The funding and policy development mechanisms for CCS projects in Scotland has mainly come from UK and European Union sources. Scottish influence on overcoming the challenges facing CCS is therefore limited, but still significant, largely around planning, regulation and co-ordination. Scottish Government has some powers related to CCS regulation and licensing, but I am not aware of any major barriers to CCS development associated with these powers.

The suggestion from WWF Scotland / Stop Climate Chaos Scotland for a Scottish-specific Emissions Performance Standard (EPS) merits further analysis and consultation; I personally haven’t seen any supporting evidence. While there is a case for a more aggressive EPS to be implemented in Scotland and the GB in the 2020s, one concern is that in the absence of a consistent EPS across the GB grid, the effect of a more aggressive Scottish-only EPS would be to locate new thermal generation south of the border, with no net effect on the carbon intensity of the GB grid. The RPP2 scenario on p75 of the Draft report involves 1.6GW of CCS fitted-Gas and 1.6 of unabated gas to be built in Scotland by 2027.

A good contact on Scottish CCS matters is Ray Waters, Project Manager at the Scottish Carbon Capture and Storage (SCCS) centre, ray.waters@sccs.org.uk

2. Solutions for housing stock with regards to district and community heating

In my oral evidence I indicated that policymaking for low carbon heating is at a less mature stage than had been envisaged 3-4 years ago. Heat is often seen as a difficult and neglected aspect of overall energy policy in the UK – although in practice UK heat policy has been dominated by North Sea natural gas and the UK gas grid. Heat policy is currently being remade, with the UK heat policy white paper to be published by DECC in March 2013.

In Scotland, recent policy outputs include the Expert Commission on District Heating recommendations to the Scottish Government (November 2012) and the Outline for a Draft Heat Vision (January 2012). These two short reports make a number of recommendations and guidance notes. The Heat Vision outline introduces a ‘heat hierarchy’, with priority (rightly) given to improving energy conservation in the existing and new building stock.

Heat is a complex area, with alternative versions of the future being articulated, often based on different perspectives and analytical tools. In taking forwards heat policymaking in Scotland, and in attempting to resolve the uncertainties regarding the policy framework for heat, it is important to base policy in best available research evidence. Policy recommendations should therefore be tied to referenced sources of evidence and evidence of ‘what works’ wherever possible. This evidence needs to
go beyond current boundaries of heat provision, to span also demand reduction, electricity generation and storage – i.e. a whole system perspective. UK Energy research Centre has made a number of contributions to UK heat policy, including Green Deal and Demand Reduction consultations. These are available from: [http://www.ukerc.ac.uk/support/Inputs+to+Policy](http://www.ukerc.ac.uk/support/Inputs+to+Policy)

A good contact on the development of district heating in Scotland is Dave Hawkey, Research Fellow at Edinburgh University: dave.hawkey@ed.ac.uk

3. The overall impact relative to policy timelines for the increased use of geothermal energy

Geothermal energy is now attracting increasing interest in Scotland and more widely, both in terms of shallow (ex-mine) and deep resources. The Scottish Government has recently commissioned research projects to identify the commercial potential of deep geothermal heat, involving AECOM (Edinburgh) and British Geological Society (BGS) (Edinburgh). BGS has also been undertaking 3D mapping of mine workings in and around Glasgow with a view to assisting the development of geothermal (mine water) projects. Glasgow Caledonian University have also recently started a research project on shallow geothermal in Glasgow [http://www.gcu.ac.uk/newsevents/news/article.php?id=53804](http://www.gcu.ac.uk/newsevents/news/article.php?id=53804).

As yet, these developments appear to be rather fragmented and site-specific, and there is as yet no published evidence on the possible role of geothermal energy in Scotland from a wider whole energy system perspective.

Jim Hart at Napier University and the Edinburgh Centre for Carbon Innovation (ECCI) has a working knowledge of these developments, [J.Hart@napier.ac.uk](mailto:J.Hart@napier.ac.uk)

4. The impact of wind energy on the level of carbon emissions

In my evidence I referred to a recent paper by researchers from Imperial College which challenges some of the claims in other publications (specifically from the Global Warming Policy Foundation, GWPF) on the economics and carbon emissions associated with increased levels of wind penetration in the UK electricity system. This paper is available in pdf format from: [http://tinyurl.com/d3ktylu](http://tinyurl.com/d3ktylu) An article summarising the contested debate is available at: [http://www.carbonbrief.org/blog/2012/10/responses-to-the-gwpfs-wind-report](http://www.carbonbrief.org/blog/2012/10/responses-to-the-gwpfs-wind-report)

The main source of contention of these claims and counter-claims is the way the physical infrastructure of the UK electricity system will respond to increased wind deployment. GWPF claims that the cost of installing wind to meet 2020 targets will be £124 billion. In essence, the Imperial College researchers challenge GWPF’s claim that there is an impending threshold on how much wind the UK power system can viably absorb. The Imperial team’s analysis finds that the amount of wind energy needed to be ‘wasted’ in the UK system is likely to be very small, so that windpower’s cost and carbon implications as identified by the GWPF are likely to be misleading.
As in other areas of uncertainty which I referenced in my oral evidence and in this note, the role of research inputs in the policy formation is to report on the best available evidence, using independent, peer reviewed, published and transparent research. This won’t resolve all the uncertainties and confusion in policy, and as I stated in Parliament, RPP2 should give more explicit recognition of the uncertainties involved in meeting energy and climate policy, such as demand reduction, the availability of CCS and gas prices. The aim here is not to paralyse policy in the face of uncertainty, but to help make policy delivery more resilient.

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