Friends of the Earth Scotland Consultation Response

The Economy, Energy and Tourism Committee's Inquiry into Renewables Targets

29 February 2012

Introduction

Friends of the Earth Scotland is an independent Scottish charity with a network of thousands of supporters, and active local groups across Scotland. We are part of Friends of the Earth International, the largest grassroots environmental network in the world, uniting over 2 million supporters, 77 national member groups, and some 5,000 local activist groups - covering every continent.

We welcome the opportunity to contribute to the Economy, Energy and Tourism Committee's inquiry into the achievability of Scotland's renewables targets. Scotland's reliance on fossil fuels to meet our energy needs is not only unsustainable in the long term but also has significant environmental implications in the short term, not least through climate changing emissions. For a number of years Friends of the Earth Scotland has been campaigning for increased investment in renewables, alongside significantly increased energy efficiency measures. With support from RSPB and WWF, we have sponsored 'Power of Scotland' research trilogy, including 2010's 'Power of Scotland Secured' publication based on analysis from world leading renewable energy consultants Garrad Hassan, from which much of this evidence is drawn.[1]

Our response rebuts the Institution of Mechanical Engineers (IMECH) criticisms of our analysis before answering the Committee's formal questions.

Our key points are:

- The 2020 renewable electricity targets are achievable. Based on credible scenarios Scotland could produce 130% of demand by 2020 and 185% by 2030 from renewables
- High penetration of renewables coupled with demand reduction measures could allow Scotland to phase out fossil fuel and nuclear generation by 2030 ensuring substantial GHG emissions savings
- Increased interconnection, deferrable demand, and energy storage offer a number of security of supply benefits over conventional back up capacity
- Recent increased energy bills are due to wholesale gas prices, and gas represents a far greater threat to fuel poverty and security of supply than renewables
- The Scottish Government should pressurise the UK Government to ensure Energy Market Reform (EMR) and Project Transmit don't undermine investment in renewables.

Rebutting IMECH's criticisms

Before answering the formal questions we would like to rebut the criticisms of the 'Power of Scotland Renewed' (2009), the second in our Power of Scotland trilogy, by IMECH in its report 'Scottish Energy 2020?' The IMECH report criticises this report on the basis that it

1 http://www.foe-scotland.org.uk/power-secured

contains 'inherent contradiction', 'idealistic solutions' and 'inaccurate trends'.[2] Below we outline both IMECH's criticisms (in red) and our rebuttals:

> IMECH statement 1: "Inherent contradiction. The report claims on page 1: "Given that the power generation sector is the largest single source of carbon dioxide…"; it further claims on page 10: "Electricity generation is responsible for only a small proportion of energy related greenhouse gas emissions. Transport, and to a greater extent heat, make up the majority of Scotland's greenhouse gas emissions." Clearly, these are diametrically-opposed views."

The following NAEI graph of GHG emissions in 2009 clearly shows these are not diametrically opposed views, with power stations being both the largest single source (27.8%) while still being a small proportion overall.

Table 3.1 GHG Emissions Summary for Scotland in 2009

Summary of Main GHG Emission Sources, Scotland 2009 (kt CO_2e)				
Rank	Sector Name	IPCC code	Emission	Percentage of total GWP Weighted Emissions
1	Power stations	1A1a	13,384	27.8%
2	Road transport	1A3b	9,515	19.8%
3	Residential Combustion	1A4b	6,977	14.5%
4	Land Converted to Cropland	5B2	5,582	11.6%
5	Other Industrial Combustion	1A2f	4,844	10.1%
6	Agricultural Soils	4D	3,798	7.9%
7	Refineries	1A1b	2,059	4.3%
9	Enteric fermentation - Cattle	4A1	1,918	4.0%
8	Landfill	6A1	1,917	4.0%
10	Other Energy Industries	1A1c	1,628	3.4%

Note that in the National Communication format sector discussion text below, the percentages quoted are derived from the inventory and emissions data stored at full precision. These data can be found on the NAEI web site and on the CD-ROM that accompanies this report. The percentages in the text of this chapter do not in all cases match directly with percentages in the above table (which are quoted as % of the total of all six GHG emissions).

> IMECH statement 2 "Idealistic solutions. None of the technical issues raised in this Institution report have been addressed in the five scenarios presented in the paper, which does not provide a practical workable approach for providing a more sustainable energy future for the country. In particular, the need for large amounts of back-up generation capacity to support the deployment of intermittent renewables on the scale proposed appears to have been largely ignored."

This is factually incorrect. The Power of Scotland Renewed specifically notes that interconnection capacity to England is due to rise to a level greater than Scottish maximum electricity demand. Therefore there is no technical need for there to be any conventional thermal generation in Scotland, just as there is no need for there to be a conventional thermal power station in, say Glasgow. The critical issue is the security of the electricity system of which Scotland is a part, i.e. the GB system, taking into account interconnections to France, the Netherlands, Ireland and possibly in future Norway.

Moreover, it is also clear the IMECH haven't read our follow up report in late 2010, the 'Power of Scotland Secured' (POSS). This report is almost entirely focused on achieving a secure supply with high penetration of renewables and concludes that thermal back-up is not required due to diversity of generation, energy efficiency, improved interconnections and deferrable demand (see more in detailed answers below).

2 p.14 of report, available online at: http://www.imeche.org/scottish-energy-2020

IMECH Statement 3: "Inaccurate trends. The paper states on page 5: "The overwhelming bulk of the reduction in large-scale generation was in the nuclear sector – its share of electricity generation fell from over 33% in 2000 to 25% in 2007." Data presented in the Compendium shows that in 2009, 33% of electricity in Scotland was generated from nuclear, so there was virtually no change over the decade.

2007 was used for the reason we state in the report - it was the last year for which there was reliable data. While acknowledging that nuclear generation did increase between 2007 and 2009 it decreased, again, by 3% in 2010[3] and while figures for 2011 are not yet available, events such as jellyfish swimming into the water coolant intake system of Torness, resulted in outages. While windpower is much maligned for its intermittency, nuclear shutdowns, due to heavy reliance on a centralized plant, pose a much greater threat to security of supply than individual wind-turbines not generating.

Committee Questions

Are the 2020 renewables targets (for electricity and heat) achievable?
Our analysis suggests the 100% renewable electricity demand target for 2020 is achievable.

Garrad Hassan's background analysis for the Power of Scotland Secured (POSS) looks at plausible scenarios for renewables growth based on known volumes of projects under development, estimates of available resource and constraints, stated targets, and achievable construction rates. It then compared these scenarios with projected energy demand. The conclusion is that Scotland could surpass 130% renewables by 2020, on our way to generating 185% of our electricity demand by 2030. It is worth noting that such a target assumes declining consenting rates going forward (for example onshore wind is assumed to only achieve a 26% consenting rate going forward compared to a historical rate of 60%). It also assumes moderate levels of demand reduction (a 7.7% decrease), compared to the Scottish Government target of a 12% reduction in total energy consumption and the UK Committee on Climate Change's assumptions for a 20% decrease.[4]

In addition to the POSS analysis it is worth looking back at the progress that Scotland has made in this area over recent years. The proportion of electricity generated by renewables doubled between 2000 and 2010. While output fell in 2010 this was due to exceptionally low rainfall leading to a drop in hydro output. All the other renewable technologies increased their output in 2010 as they have done previously. It also seems likely that 2011 will be a record year for renewable generation with the first three quarters of 2011 already delivering 94% of the 2010 total.[5]

While it is difficult to estimate what level of installed capacity will be required to meet the 2020 target (partly because greater effort on the demand-side will lead to less need for generation) the Renewables Routemap estimates it to be in the region of 16GW, while during a roundtable discussion on 7 December 2011 Scottish Renewables stated around

3 http://www.scotland.gov.uk/Resource/Doc/933/0124593.pdf

4 'Conserve and Save', Scottish Government Energy Efficiency Action Plan (2010): http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Action/energy-efficiency-policy/ActionPlan and UK Committee on Climate Change advice to Scottish Ministers (2010) http://www.theccc.org.uk/reports/scottish-report

5 Scottish Government Energy Statistics: http://www.scotland.gov.uk/Topics/Statistics/Browse/Business/TrenRenEnergy and www.scotland.gov.uk/Resource/Doc/933/0124593.pdf

12-15GW will be required.[6] There is currently 7GW of renewable electricity projects operational, under construction or consented, which is expected to provide around 50% of our electricity demand. A further15GW is in scoping stages.[7]

With regards to the heat target, WWF and Scottish Renewables have suggested 11% renewable heat is likely to be surpassed and should therefore be increased. The renewables routemap also shows that Scotland has overachieved with regard to its 2010 target.[8] There are challenges however, such as ensuring any biomass is supplied from secure,sustainable sources, and FoES would support an inquiry into whether the renewable heat target should be raised.

What contribution will achievement of the 2020 renewables targets make to meeting Scotland's CO_2 emissions targets (a reduction of at least 42% by 2020 and an 80% reduction target for 2050) under the Climate Change (Scotland) Act 2009?
It's clear that our current system of generating energy, including electricity, is a significant source of greenhouse gas emissions contributing to climate change.

With regards to the 42% reductions contained in the Climate Change (Scotland) Act it should be noted that due to the complex accounting system and interaction with the European Emissions Trading Scheme (ETS) - Scotland's emissions are effectively split into two – the 'traded sector' which includes power generation and manufacturing and is covered by the ETS, and the 'non-traded' or 'domestic' sector which includes homes and transport and is not covered by the ETS. Emissions reductions associated with the traded sector can be traded on a European wide basis – for example a Scottish power company can sell/purchase permits from an installation in Eastern Europe. The intention is that emissions are brought down where it is most cost-effective to do so, in order to meet a European-wide cap/budget. This has the effect that emissions savings in Scotland's power sector can be translated into emissions savings elsewhere in Europe. For this reason the Scottish Government (and for that matter the UK Government) when accounting for emissions in the Climate Change Act count emissions savings in the traded sector in relation to the EU cap rather than actual reductions made in Scotland.

Having said this it is clear that emissions savings in the power sector are still genuine emissions savings that will benefit the climate whether or not they count towards Scotland's climate targets. Moreover, the UK Committee on Climate Change is clear that achieving a decarbonised power sector by 2030 is a pre-requisite to meeting long-term carbon reduction targets.[9] As we electrify heating and transport, emissions reductions previously associated with the ETS sector will move-over to the non-traded sector and become crucial in decarbonising homes and transport.

Putting aside the intricacies of EU regulation, the crucial point is that to benefit the climate renewables need to displace fossil fuel generation. While strong electricity demand targets are likely to ensure renewables are given priority access to the grid, we are concerned that the Scottish Government's policy is for 100% renewables in addition to 100% thermal generation. As PoSS makes clear Scotland could phase out all conventional thermal power by 2030, maintain a secure electricity supply and generate revenue from renewable exports. Scotland should concentrate on its unique renewables potential rather than seeking to build or extend the lifetimes of unnecessary thermal plant.

6 http://www.scottish.parliament.uk/parliamentarybusiness/28862.aspx?r=6829&mode=pdf

7 p.3 2020 renewables routemap: http://www.scotland.gov.uk/Publications/2011/08/04110353/0

8 p.7 Ibid

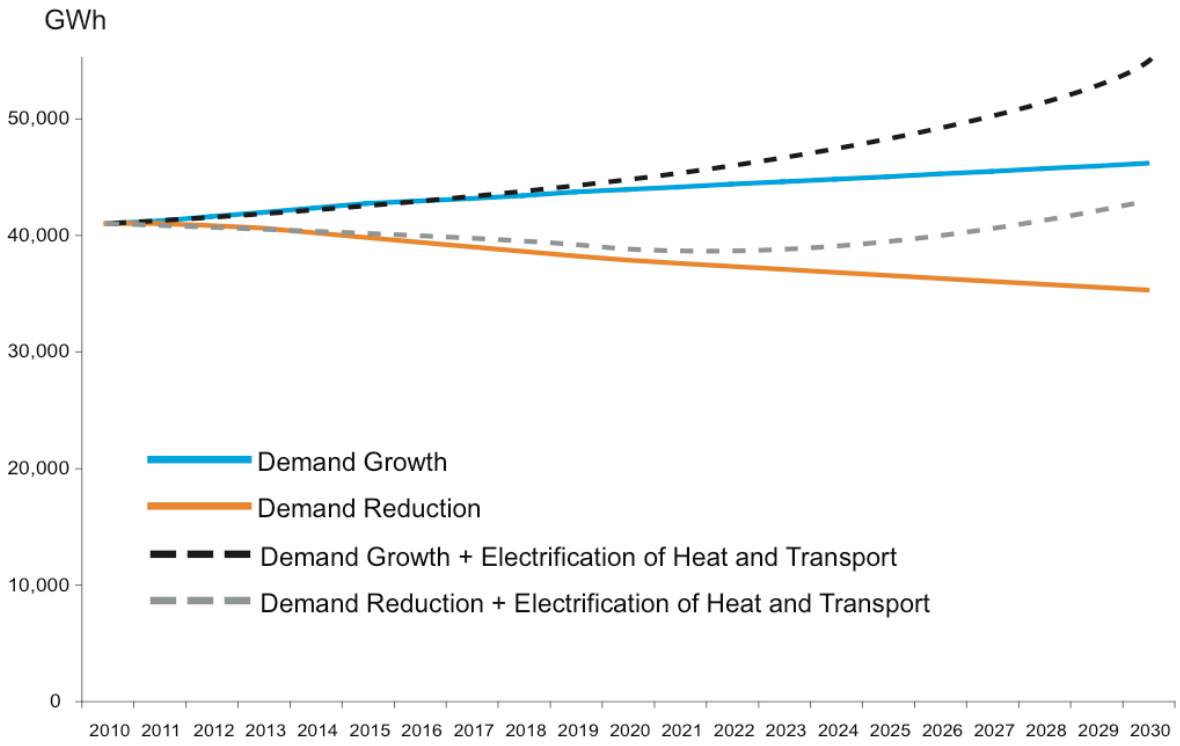
9 http://www.theccc.org.uk/sectors/power

Will increase in demand from electric heat and transport be offset by efficiencies elsewhere?

The European Climate Foundation (ECF) '2050 Roadmap', a detailed technical and economic study looking at ways to achieve 80% emissions reductions across Europe, found that the electrification of heat and transport would be almost completely balanced out by demand reduction from energy efficiency measures.

POSS comes to similar conclusions as the following graph shows[10].

Figure 2: The effects of electrification of heat and transport on total energy demand



Detailed explanations behind these figures, and why reducing the total distance traveled by car rather would be more cost-effective than electrification, is contained in pp.5-6 of POSS and pp.34-38 of Garrad Hassan's analysis.

Is the technology to meet these targets available and affordable? If not, what needs to be done?

POSS looks at projected scenarios for onshore wind, offshore wind, hydro, wave and tidal, biomass and energy from waste.[11] While all these technologies are currently available, some are more mature than others. In the high renewables projections wave and tidal only comes online from 2016 (achieving 2520MW by 2024) while 5000MW of offshore wind is installed between 2015-2020. This compared to 7500MW of onshore wind.

10 p.17, 'Power of Scotland explained', community briefing: http://dl.dropbox.com/u/2846460/Community_Briefing_web.pdf

11 FoES only consider certain forms of energy from waste (such as anaerobic digestion) as renewable while biomass must be sourced from local and well managed forests and used efficiently if it is to be considered sustainable.

We would expect, as has been the case for onshore wind, costs for these technologies are likely to fall as technologies mature.[12] Having said this, another factor is exchange rates and commodity prices. For this and other reasons, renewable manufacturing should also be prioritized.

It is worth noting that the growth in renewables, and subsequent lowering of costs, has occurred with far less support than that given to the fossil fuel industry. While renewables gained £1.4 billion worth of support in 2010, an OECD report picked up by the Guardian recently highlighted tax breaks for gas, oil and coal to the tune £3.63bn in 2010.[13]

Are electricity generating or heat producing technologies compatible with the need for security of energy supplies?
Yes. POSS highlights three key ways to provide security of supply with high penetration of renewables:

1) Deferrable demand
Power system operators already make extensive use of interruptible demand, usually through industrial customers who are contracted to be able to reduce their demand substantially at short notice, and for short periods only. There is growing potential to increase the amount of electricity demand including through use of smart meters and electric heat pumps.

2) Energy storage
In Scotland, the main opportunities to store energy are in pumped storage, and electric vehicles. Scottish and Southern Energy are already developing schemes for new pumped storage plant.

3) Interconnection
Interconnection between systems can help increase security of supply in three ways:

- Sharing reserve: failures of major generators on interconnected systems are unlikely to occur simultaneously, so interconnection provides backup for both systems.
- Smoothing demand: demand peaks in northern Europe in winter occur in late afternoons, for example, so the peak in Germany occurs before those in the Netherlands and France.
- Smoothing supply: with variable renewables, interconnection also allows the variability to be 'smoothed' over a larger geographical area and wider mix of renewable sources.

Yet Energy security is not only about diversity of supply. It is also about independence from reliance on speculative international commodity markets, from highly centralised energy infrastructure, and from energy sources that commit future generations to ongoing risk.

Security of supply measures based on renewables (such as the three listed above) therefore offer a number of benefits over conventional back up capacity. For example, the partial electrification of heat and transport sectors would not only increase deferrable demand and heat storage, but also cut emissions and make overall 'triple fuel bills' cheaper for consumers.

12 Mott McDonald (May, 2011), analysis for UK Committee on Climate Change renewable energy review: http://www.theccc.org.uk/reports/renewable-energy-review

13 See: http://www.oecd.org/document/41/0,3746,en_2649_37431_48813609_1_1_1_37431,00.html and http://www.guardian.co.uk/environment/2012/feb/27/wind-power-subsidy-fossil-fuels?newsfeed=true

What further improvements are needed to the grid infrastructure or heat supply networks both at a national and a local level? Additionally, are we confident that the necessary infrastructure can be developed and financed so that Scotland can export any excess electricity generated to the rest of the UK and/or the EU? What is the role for the Scottish Government here?
As ECF state: "Upgrading the grid infrastructure is, however, the most cost–effective way to keep a power system in transition secure and reliable. Less transmission build-out will lead to less optimal use of RES (renewables) and additional need for back-up capacity".[14]

This mirrors the POSS analysis which finds that the interconnection capacity required for a secure electricity system by 2030 is 2-3 times less than that economically justified by the value of electricity exports.[15] In practice this means a further 8-10,000MW of interconnection (or linkages) with England and Wales or elsewhere in Europe, on top of the 4,000MW existing, will be required.

In terms of the role of the Scottish Government it should support the further development and completion of Beauly-Denny and sub-sea connections on both the east and west coasts as well as undertaking research into the economics of transmission connections between Scotland and Norway, the Netherlands and Germany.

It is likely that whatever the outcome of an independence referendum, there will be a growing market for renewable power generated in Scotland. While it is probable, because of Scotland's strong resource, that this would be required for UK and EU targets in the medium term (2020), beyond this, and because of uncertainty around fossil fuel prices, one would expect renewables to be even more sought after.

How can national priorities be reconciled with local interests?
Denmark has very high levels of community renewables and we would recommend looking at their example (and others) to see what we can learn. In particular we should explore the possibility of allowing communities the right to buy-in to a significant percentage of a commercial development. This would go beyond the traditional 'community benefit' to actual community ownership, allowing communities to take a degree of control over an important asset and revenue source, and as well as diffusing possible tensions due to a lack of perceived benefit.

Will sufficient funds be available to allow investment in both the installation and the development of relevant technologies? What can the Scottish Government do to influence this?
Government could increase investment in the development of relevant technologies by providing further policy certainty with regard to targets beyond 2020 as well as leveraging whatever pressure it can to ensure increased investment in renewables from the financial sector.

1. Provide long-term certainty
   While the 2020 renewable targets are welcome, the Government should go further and provide longer term clarity by setting targets for 2030. Specifically Government should follow the advice of the UK CCC and set a target for 100% renewable electricity generation mix by 2030 (as opposed to the current 100% electricity demand target for

14 European Climate Foundation, 'Power Perspectives' (2011) pp 9-11, available online at: http://www.roadmap2050.eu/pp2030

15 We consider the electricity supply secure if Scottish peak demand can still be met assuming concurrent failure of the two largest elements of interconnection capacity, combined with zero output from onshore wind, offshore wind, eave generation, run-off river hydro, and tidal over a multi day period.

2020). In addition it should set a target to decarbonise 50% of our total energy needs (ie including heat and transport). POSS shows this is achievable with high penetration of renewables, moderate demand reduction, and recommended levels of electrification of heat and transport.

2. Continue to make the case for the GIB to be in Edinburgh
The Green Investment Bank could provide £3 billion worth of investment in the green economy while leveraging in further private investment.

3. Put pressure on the bailed out banks
Despite being bailed out by the UK Government, the state-owned banks, like RBS, invest incredibly small proportions of funding in renewables (both project and company). This is at the same time as continuing to invest huge amounts in the fossil fuel industry. A report published in late 2011 showed that RBS is the seventh largest global investor in coal mining and coal power plants.[16] If the UK Government can intervene with regard to bonuses it should also be prepared to intervene to ensure RBS lending practices match Government ambitions for the low carbon economy. The Scottish Government should pressure the UK Government, UKFI and RBS itself to ensure it increases low carbon investment while disinvesting in irresponsible, high carbon activities.

What will the impacts be on consumers and their bills?
There has been a lot of misinformation over the past 6 months with regard to the impact of renewables on household fuel bills. This includes a BBC Panaroma episode and various newspaper articles claiming renewable policies would add £34 billion to fuel bills. It is now clear that these claims were based on a flawed KPMG report that the authors have since decided not to publish.[17]

In actual fact household energy bill increases are being driven by the rising cost of wholesale gas as well as the enormous profits made by the 'Big Six' energy companies who dominate the market. The UK Committee on Climate Change estimate that since 2004, less than 16% of price rises are due to environmental policies, with more than 50% due to the rising cost of wholesale gas.[18]

As a subsequent Panaroma clarification stated:

> "While the film focussed on government energy policy going forward – and the associated costs – we feel it worth repeating that the rise in current energy bills is predominantly linked to the increase in winter gas prices…We accept that it would have been helpful to our audience had this point been made more clear in the film and the website materials that accompanied it."[19]

Rather than rely on investment in gas to deliver our energy needs, investment in renewables, and energy efficiency measures, is the only sustainable means through which to insulate consumers from volatile fossil fuel prices.

This is not to say that there won't be a cost, clearly there will (and energy efficiency

16 Bankrolling Climate Change' (November, 2011), Banktrack:
http://www.banktrack.org/download/bankrolling_climate_change/climatekillerbanks_final_0.pdf

17 http://www.businessgreen.com/bg/news/2144519/exclusive-kpmg-scraps-controversial-green-energy-report

18 CCC report (December 2011) 'Household energy bills - impacts of meeting carbon budgets':
www.theccc.org.uk/reports/household-energy-bills

19 http://news.bbc.co.uk/panorama/hi/front_page/newsid_9691000/9691095.stm

measures are the cheapest means through which to mitigate that cost). But we need to recognize that there is a cost with any energy system going forward. POSS suggests that because the transmission infrastructure required for a secure system is easily justified by the value of exports, costs to consumers in a high renewables scenario are unlikely to exceed those in other scenarios. In fact, with achievable demand management, and if home heating and transport are electrified in line with recommendations, 100% renewable generation in Scotland could make overall household 'triple fuel' bills lower than in conventional scenarios.

Are the reforms of the energy markets and subsidy regimes at both UK and EU level sufficient to meet the challenge of the Scottish Government's renewable targets?
EMR and the UK transmission charging regime, are two of the biggest challenges to achieving Scotland's targets. As things stand (the Energy Bill is due before Parliament this summer) the proposals risk investment in nuclear and gas power stations at the expense of renewable energy. As well as continuing to input to OFGEM's review of transmission charging the Scottish Government should continue to push the UK Government to ensure EMR delivers:

1. A technology specific feed in tariff
As Westminster's Energy and Climate Change Committee pointed out in their report: "The long term contracts designed to encourage low carbon energy sources—known as Feed-in-Tariffs with Contracts for Difference—will work for nuclear, but different types of contract are needed for renewables and other clean technologies".[20] Levels of support should be technology-specific and reflect both the environmental performance and the maturity of the technology. Nuclear and unsustainable large-scale biomass should not benefit from price support.

2. A tougher emissions performance standard
The proposed level of the emissions performance standard (EPS) is likely to lead to a new 'dash for gas'. This poses a threat to the development of renewables in Scotland, which are already in direct competition with fossil fuel plant for export capacity. In order to avoid this 'lock-in' to a fossil-fuel dependent system, there should be a plant-based EPS set at a level of 300gCO2/kWh for all new generating plant from now on, tightening to less than 100gCO2/kWh by 2025 (from which point it should also apply to existing plant). This would ensure that any new gas plant has to have some degree of combined heat and power (CHP) or carbon capture and storage (CCS).

3. Clear targets for the decarbonisation and renewables
The lack of a UK renewable energy target for 2030 and concerns that the EMR package favours nuclear could seriously undermine the growth of the UK renewables industry. As well as an ambitious renewable energy target there must also be clarity on the definition of a 'low-carbon' electricity system. The EMR consultation currently makes no commitment to a 2030 deadline for decarbonisation (referring to decarbonisation during the 2030s) and the policies in the consultation are supported by modelling on the basis of a carbon intensity of 100gCO2/kWh. This is despite the Committee on Climate Change's recommended carbon intensity of no more than 50gCO2/kWh by 2030.

4. A windfall tax for nuclear
As Westminster's Energy and Climate Change Committee point out in their report, "The Carbon Price Support…could provide windfall profits to existing nuclear generators." If nuclear gains at the expense of renewables, as is likely under the proposed package,

20 Available at: http://www.publications.parliament.uk/pa/cm201012/cmselect/cmenergy/742/74202.htm

the electricity system is likely to decarbonise less quickly (since nuclear plants take much longer to construct than, e.g. windfarms); we risk lock-in to a highly centralized electricity system, with concomitant inefficiencies in transmission and distribution; we will fail to support emerging technologies in which the UK could be world leader, e.g. wave, tidal, and the jobs that would accompany such leadership.

5. Greater focus on demand reduction

The EMR package will fail in its objective of affordability unless it gives much greater attention to the task of reducing and 'smoothing' energy demand. Improving energy efficiency, and enabling greater short and medium-term 'load-shifting' to smooth demand peaks is the cheapest way to cut emissions and would reduce the need for new generation plant. Without such measures, the cost of maintaining security of supply (at any carbon intensity) will be unnecessarily high.

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