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ECONOMY, ENERGY AND TOURISM COMMITTEE INQUIRY INTO THE SCOTTISH GOVERNMENT'S RENEWABLE ENERGY TARGETS

Feb 2012

WWF Scotland is part of the international WWF network with offices in over 90 countries worldwide. Working with Governments, industry and the public to secure the transformation of our global energy system is a shared priority across this network. This work is guided by our influential global publication ***The Energy Report- 100% renewable energy by 2050***. This report sets out how the world could get all the energy it needs from renewable sources in ways that are both affordable and sustainable.

WWF Scotland welcomes the opportunity to contribute to the EET Committee's inquiry onto the achievability of the Scottish Government's 2020 renewable energy targets. Over the last decade WWF Scotland has campaigned to reduce Scotland's reliance on nuclear and fossil fuels and instead to ensure we secure the huge opportunity we have for renewable energy.

Over the last six years WWF Scotland, alongside colleagues from RSPB and Friends of the Earth Scotland have published a series of reports under the title Power of Scotland. The most recent of these is entitled **Power of Scotland Secured**[1] and alongside the original analysis from consultants Garrad Hassan forms the basis of much of this evidence. WWF Scotland has also commissioned work on renewable heat from independent energy experts Element Energy and the Energy Savings Trust in Scotland. Although this work will not be published until the autumn the analysis informs much of the evidence on renewable heat.

The evidence is organised according to the questions set out by the Committee. The following points summarise our key priorities:

1. Both the renewable electricity and renewable heat target are achievable
2. Achieving the 100% renewable electricity target is a critical step on the path to decarbonising our power sector and hitting the 2050 climate change targets as required by the Climate Change (Scotland) Act 2009.
3. Continued leadership from the Scottish Government and cross party support for renewables is important in building investor confidence, providing long-term policy clarity and maintaining public acceptance of renewables.
4. The growth in renewable generation across Scotland and the UK is happening with just a fraction of the public finance support enjoyed by coal and gas.

[1] See http://assets.wwf.org.uk/downloads/power_of_scotland_secured.pdf for the full report

Targets

1. Are the 2020 renewables targets (for electricity and heat) achievable? If not, why not?

Both the renewable electricity target and the renewable heat target are achievable, and certainly in the case of the heat target need to be increased if it is to be effective in driving the growth of renewable heat.

Renewable electricity: Renewables have grown very rapidly and exisiting or committed schemes will account for over 50% Scotland's electricity consumption. Today there are 7 gigawatts (GW) of renewable electricity projects operational, under construction or consented. In addition to this there is a pipeline of proposed projects to deliver 17GW of generating capacity. The current target to generate the equivalent of 100% of Scotland's own electricity demand from renewables by 2020 roughly equates to 16GW of installed capacity. So we already know where almost all of the generating capacity will come from to meet the 2020 target. It is quite clear that there is more than sufficient industry interest in developing Scotland's renewable capacity to ensure the target is achieved. This is not to suggest there are no challenges to be faced but to recognise that that there is confidence in Scotland's renewables sector and, if the current strong political support is maintained, the targets can be met.

Analysis for us by Garrad Hassan clearly describes how Scotland could meet 130% of our electricity consumption needs by 2020. Importantly this assumes a significantly more conservative level of demand reduction (just 7.7% by 2020) compared to that expected by the UK Committee on Climate Change (CCC) (20% by the same date[2]) or indeed the Scottish Government (12 -22%). Obviously if demand is reduced in line with the CCC's figure the 2020 target will become easier to meet. Growth rates for different renewables were referenced against historical rates and build rates from around the world. For instance, onshore wind is assumed to grow at 360MW per year over the period 2015- 2019, this is equivalent to a 26% consenting success rate (this historic success rate is closer to 60%). Offshore wind is assumed to reach 5GW by 2020 and then to expand more slowly. This allows for some attrition from the 11GW of sites identified by the Crown Estate. Against this renewable capacity growth rate Garrad Hassan applied capacity factors for the range of technology types, including declining figures for onshore wind to reflect the likely development into less windy sites. In summary the report clearly demonstrates that the 2020 target is economically and technically credible, even with conservative assumptions. The net costs will be comparable with the previous 80% target supported by four out of five political parties and reliability of electricity supply will maintained.

By 2030 with the installation of the planned west and east coast subsea interconnectors (each 1800MW) and a further interconnector of the same size Scotland's electricity supply will be secured without any thermal power generation. Indeed, even with just the two proposed interconnectors and modest investment in storage and deferrable demand Scotland could meet its projected peak demand. The analysis by Garrad Hassan suggests that the transmission capacity which is economically justified for export is at least 15,000MW; this is well in excess of what is required for system security.

Renewable Heat: Heating in Scotland currently represents around 50% of total energy demand and produces 47% of our CO_2 emissions[3]. Against the obvious imperative to tackle this source of emissions the current renewable heat target to meet 11% of demand by 2020 is achievable and should be increased. Separate pieces of work by both Energy Saving Trust and Scottish Renewables (SR) suggest[4] that progress has been faster than expected with SR concluding that "the 11% target will be achieved early and that a more stretching target could be set in order to stimulate greater development and uptake of renewable heating systems". Initial analysis for WWF Scotland by Element Energy and the EST suggests that if Scotland is to achieve the transformational outcome related to heat required by the RPP then at least 14% of the heating requirement of Scotland's housing sector must come from renewables by 2020. This compares to around just 5.5% under the current level of ambition for 2020.

2 Committee on Climate Change, Scotland's path to a low-carbon economy, Advice to Scottish Ministers, February 2010, www.theccc.org.uk (including also the Technical Annex)
3 See DECC (2010) Renewable Heat Incentive Consultation www.decc.gov.uk/en/content/cms/consultations/rhi/rhi.aspx
4 See http://www.scottishrenewables.com/static/uploads/publications/110320_sr_-_renewable_heat_report_final.pdf and http://www.scotland.gov.uk/Resource/Doc/917/0115248.pdf

2. 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?

Achieving the 100% renewable electricity target is a critical step on the path to decarbonising our power sector and hitting the 2050 climate change targets. The UK CCC has repeatedly advised that in order to meet our climate targets we have to decarbonise our power sector and achieve a carbon intensity of some 50gCO_2/kWh by 2030. This is essential if we are to be able to provide renewable electricity for new heating technologies like air source heat pumps and transport solutions such as electric vehicles (EVs).

Although the accounting rules of the EU ETS trading scheme mean savings in Scotland's power sector are translated into emission allowances elsewhere in Europe it is possible to calculate the actual CO_2 savings resulting from replacing the current carbon intensity of our electricity with 100% renewables. Using the demand reduction scenario in Power of Scotland Secured of a 7.7% reduction by 2020 the total electricity consumption in 2020 should be approximately 32.7 TWh. Even after factoring in the impact of integrating renewable generation with thermal power[5] and applying the UK average grid intensity the emissions savings are significant. The total CO_2 saving from achieving the 2020 target would be approximately equivalent to 13 million tonnes of CO_2 per year. Due to the way that emissions from the power sector are counted the real world carbon savings from moving to renewable electricity will only appear in our carbon accounting when we move to electric heating and transport.

Space and water heating currently accounts for approximately 47% of Scotland's CO_2 emissions. Alongside a step change in the roll out of energy efficiency measures it is vitally important that we remove the carbon from our heat supply. The Scottish Government's Report on Proposals and Polices includes the commitment to a largely decarbonised heat sector by 2050 with significant progress by 2030. The current target of just 11% renewable heat of 2020 demand is clearly not sufficient to significantly reduce emissions in line with this 2030 milestone. Analysis for WWF Scotland by Element Energy and EST concludes that:

- based on current policy commitments (i.e. Renewable Heat Incentive funding to 2015 only), uptake of renewable heat in Scottish homes will fall well short of the levels needed to meet ambitions for decarbonising heat supply in this sector.
- Meeting a stretch ambition of renewable heat contributing 50% of domestic heat demand by 2030 will require a significant reliance on renewable heat from district heating combined with very rapid ramp up in dwelling-scale renewable heat technology sales.
- The conclusions are based on a very aggressive insulation rollout programme to upgrade the energy efficiency of Scotland's dwelling stock. Failure to adequately insulate homes could lead to heat pump efficiency values not being achieved and undermine medium to long term renewable heat targets.[6]
- High ambitions for renewable heat are unlikely to be met without a substantial contribution from district heating. However, there are significant barriers to delivering schemes under current market conditions.

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

Increases in demand from electric heating and transport will be marginal until 2020 and will be partly offset by reduction in electricity demand elsewhere. Analysis carried out for us by leading independent energy experts Element Energy suggest that the electricity demand resulting from the growth of EVs to approximately 11% of the Scottish fleet is less than 1% of total demand. How this growth in electricity demand is integrated into the grid will be instrumental in determining the extent to which it requires additional generation capacity. For instance, incentivising charging to fill the current night-time troughs in demand would provide a market for wind-generated electricity and shift demand away from peak times reducing the overall generation capacity required

5 The UK Energy Research Council suggests that the greatest efficiency loss resulting from the ramping up and down of gas power plants is likely to be just 7%. See http://www.ukerc.ac.uk/Downloads/PDF/06/0604Intermittency/0604IntermittencyReport.pdf for the full report.
6 The Homes Energy Efficiency Database suggest that the current rate of cavity wall and loft insulation is around 40 000 – 50 000 per yr (excluding DIY loft insulation). Modelling by Element Energy is based on energy efficiency upgrades to around 200 000 dwellings per year over the next decade.

Initial analysis by the same consultancy concludes that the increase in electricity demand from the growth in renewable heating using heat pumps will range from 6 - 9% of predicted demand in 2030. Beyond 2030 the increased electricity demand from both heating and transport sectors will increase. This emphasises the importance of demand reduction and energy efficiency, which must be central to our future energy strategy.

Outside of the efficiency gains inherent in moving towards an increased electrification of the heating and transport sectors, there is an important body of evidence at both UK and EU level showing that the potential for reducing energy demand and reducing the costs of decarbonising our power sector is substantial[7].

Challenges

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

Yes the technology is available and with the appropriate level of initial support and long-term policy clarity (e.g. setting 2030 renewable targets) it is affordable. This is especially true when seen alongside both the high costs of thermal power and the massive societal costs resulting from failing to tackle climate change. Most renewable technologies are relatively new and have not yet been widely deployed or benefitted from the same level of R&D improvements and economies of scale as more mature technologies. As renewable energy technologies mature cost can be expected to fall. This is a phenomenon which was clearly highlighted by the CCC in its recent Renewable Energy Review[8] and which we are now observing with the increased cost competitiveness of onshore wind, a technology that was initially seen as risky and expensive to invest in. A UKERC report stated that "the costs of onshore wind energy fell fourfold in the 1980s and halved again in the 1990s through a combination of innovation and economies of scale[9]". The most recent evidence of the decreasing cost of onshore wind is provided in a report by Bloomberg New Energy Finance[10]. The analysis shows that the cost of electricity from onshore wind turbines will drop 12% in the next five years thanks to a mix of lower-cost equipment and gains in output efficiency. Bloomberg conclude that the best wind farms already produce power as economically as coal, gas and nuclear generators and the average wind farm will be fully competitive by 2016.

Costs of offshore wind are expected to fall in coming years with future levelised cost projections ranging from £70-80/MWh by 2020-2030 in the Offshore Valuation Report to £85-£135/MWh by 2030 in the Mott MacDonald analysis[11]. A recent report from Renewable UK also concluded that the costs of offshore wind were likely to reduce by at least 15% between 2011 and 2022 and that "with strong competition and innovation, combined with favourable movements in steel and exchange rates, costs could fall by 30% to approximately £100/MWh" by 2022[12]. Reducing the cost of offshore wind to £100/MWh by the early 2020s has become a key objective for DECC and is currently being investigated by the Crown Estate's Offshore Wind Cost Reduction Pathways project.

Evidence of the growth in renewables can be seen around the world. For instance, a record 71% of all new power generating capacity installed in the European Union last year came from renewable energy sources[13]. Looking further afield, 2011 was the first year in history when renewable power supply overtook nuclear in the US[14] and China grew its wind power capacity to an impressive 65 GW, adding 20 GW in 2011. Not only is renewable generation growing at pace it is also delivering the greatest economic returns, A mid-term review of the European Energy Programme for Recovery has found that

7 See Making the transition to a secure and low-carbon energy system, UK Energy Research Centre, UKERC Energy 2050 Project, April 2009 and Roadmap 2050: A Practical Guide to a Prosperous, Low-Carbon Europe, European Climate Foundation, April 2010, http://www.roadmap2050.eu/downloads

8 http://www.theccc.org.uk/reports/renewable-energy-review

9 http://www.ukerc.ac.uk/support/tiki-index.php?page=Great+Expectations%3A+The+cost+of+offshore+wind+in+UK+waters

10 See http://bnef.com/PressReleases/view/172

11 See http://hmccc.s3.amazonaws.com/Renewables%20Review/MML%20final%20report%20for%20CCC%209%20may%202011.pdf

12 Offshore Wind: Forecasts of future costs and benefits, Renewable UK, June 2011: http://www.bwea.com/pdf/publications/Offshore_report.pdf..

13 See http://www.ewea.org/fileadmin/ewea_documents/documents/publications/statistics/Stats_2011.pdf

14 http://cleanedge.com/resources/news/Renewables-Now-Provide-12-Percent-of-Domestic-Energy-Up-14-Percent

offshore wind energy is the strongest performer of the three areas selected for funding[15] in terms of investment, creating jobs and putting investment in place quickly.

The growth in renewable generation across Scotland and the UK is happening with just a fraction of the public finance support enjoyed by coal, gas and oil. A recent report in the Guardian[16] highlighted data from the Organisation for Economic Cooperation and Development (OECD) that gas, oil and coal were subsidised by £3.63bn in 2010 while offshore and onshore wind received just £0.7bn in the year from April 2010.

2. Are electricity generating or heat producing technologies compatible with the need for security of energy supplies?

Yes, the generation of renewable energy insulates customers from volatile global commodity markets and reduces the flow of money out of Scotland. The UK currently depends on imports for 48% of its gas. Scotland is faced with the enviable opportunity to be energy independent and renewable at the same time.

Work by WWF-UK[17] on the role of EVs in a future sustainable transport system described a reduction in UK fuel demand of nearly 80% by 2030. EVs could account for nearly a third of this, representing over £5 billion a year in avoided oil imports by 2030. Equivalent savings will be available to Scotland if we commit seriously to a sustainable transport system. However, the balance of funding in support of new road building measures in the 2012/13 budget and the Scottish Government's commitment to increasing traffic growth by at least 14% by 2020 as set out in the Infrastructure Plan offer little indication that this huge saving has been identified.

4. 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?

With improved interconnection and moderate investments in storage and deferrable demand, it would be possible to phase out all conventional thermal generation capacity in Scotland by 2030 and still deliver a secure and reliable electricity supply. The interconnection capacity required for a secure electricity system is two to three times smaller than the interconnection capacity which would be economically justified by the value of electricity exports**.**

The UK and indeed EU ambition on climate change means that it is likely that whatever the outcome of the independence referendum that there will remain a growing market for renewable power generated in Scotland. This market should ensure that there is a strong investment case for infrastructure provision.

Over the next ten to twenty years we will need to see a massive role out of district heating infrastructure. In one scenario developed by Element Energy 350,000 Scottish dwellings are to be connected to renewables fed district heating by 2030. This is roughly equivalent to half the households in Dundee, Aberdeen, Edinburgh and Glasgow.

7. 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?

The most important role that the Scottish Government can play is to provide policy certainty and strong leadership for the renewables sector. This should mean providing a 2030 target so that companies can see the required growth beyond the current investment cycle up until 2020. By 2030 renewables could be providing 185% of Scotland's electricity needs. By combining this with moderate efficiency measures Scotland could decarbonise at least 50% of our energy needs by the same date.

15 The three areas were gas and electricity infrastructure, offshore wind and CCS. See http://ec.europa.eu/energy/evaluations/doc/2011_eepr_mid_term_evaluation.pdf

16 See http://www.guardian.co.uk/environment/2012/feb/27/wind-power-subsidy-fossil-fuels?newsfeed=true

17 See http://www.wwf.org.uk/wwf_articles.cfm?unewsid=4784

8. What will the impacts be on consumers and their bills?

The rise in the wholesale price of gas has been the main driver behind recent energy bill increases. According to the CCC's recent report, Household Energy Bills – the impact of meeting carbon budgets[18], the average UK dual-fuel consumer bill (i.e. gas and electricity) rose from £605 in 2004 to £1,060 in 2010. Of this £455 increase:

- £290 was linked to the rise of the wholesale price of gas, by far the largest contributor to bill increases (around 63%);
- £70 was linked to transmission and distribution costs (these do not include the costs of linking up onshore and offshore wind farms to the grid);
- £20 was linked to VAT; and just £75 was linked to low-carbon support measures. This breaks down into £45 linked to funding energy efficiency measures (which will have contributed to reducing domestic energy bills) and only £30 linked to supporting low-carbon generation, including renewable energy.

There is a similar story for the gas heating prices and bills where according to the UK CCC a typical domestic bill rose by 90% between 2004 -2009, from £335 to £630. The cost of low carbon measures on gas prices accounted for just 7% of the increase in gas bill.

Looking to 2020 the CCC's analysis suggests that further significant energy savings out to 2020 are feasible and desirable, including a 19% reduction in electricity from more efficient appliances, and an 8% reduction in gas consumption through loft and cavity wall insulations, other insulation measures and user-driven energy savings. If stronger policies are put in place to deliver these savings, this would have the effect of bringing energy bills in 2020 down to £1,085, i.e. maintaining them to a similar level to the average 2010 energy bill of £1,060.

9. Are the reforms of the energy markets and subsidy regimes at both UK and EU sufficient?

Although WWF Scotland is broadly supportive of the Electricity Market Reform we have a number of key concerns. Firstly, it is currently unclear whether the EMR package will have a clear decarbonisation target (as recommended by the CCC) and a level of renewable energy ambition for 2030. Having a clear generation target for 2030 is important for policy clarity and creating the right investment environment.

WWF Scotland believes that the EMR presents an important opportunity to incentivise further energy demand reduction. We remain concerned by the lack of clarity surrounding this process and in particular the extent to which energy efficiency will play an important role within the EMR.

The proposed level of emissions performance standard will have very little impact in preventing the construction of unabated gas plants and largely unabated coal and is not in line with the Scottish Government's commitment to a virtually decarbonised power sector by 2030.

The proposed support for new nuclear power (and the windfall existing nuclear power will enjoy from the carbon tax) risks distorting the investment environment and threaten the future growth in renewables. Nuclear power is a mature technology and cannot justify further public subsidy.

18 Households Energy Bills – impacts of meeting carbon budgets, the CCC, December 2011: http://downloads.theccc.org.uk.s3.amazonaws.com/Household%20Energy%20Bills/CCC_Energy%20Note%20Bill_bookmarked_1.pdf