Scottish climate change policy: an overview*

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1. Introduction

Despite much of energy policy being a reserved issue for the UK Government, Scotland has pursued its own distinctive energy policy (Allan et al, 2008a), particularly in relation to climate change. The Climate Change Act (Scotland) was passed in 2009 and outlines Scotland's commitment to tackling climate change. It requires Scottish greenhouse gas (GHG) emissions in 2050 to be 80% less than their 1990 levels, with an interim target of a 42% reduction by 2020.

Climate change is an international problem which appears to require a global solution and it is therefore not clear that the appropriate spatial scale for policy action is the regional or even national level. The Scottish Government is aware of this, but claims that such emissions' reduction targets can be used as a means of supporting the UK's international commitments and also showing leadership to encourage other nations to tackle climate change. However, Scottish climate change policy must also be considered in the context of Scottish energy policy as a whole. The Scottish Government has other energy policy goals, notably security of supply, affordability and economic growth through the development of low carbon technologies, notably renewables.

This paper is intended to provide a brief overview of the main issues involved in Scottish climate change policy. We give a brief background, in Section 2, on international, EU and UK climate change policy. In Section 3 we provide an overview of the main features of the Scottish Climate Change Act and highlight particular differences with the UK equivalent framework. In Section 4 we discuss the issues surrounding low carbon technologies and their impact on climate change policy in Scotland. We consider the policy instruments available to the Scottish Government while functioning within EU and UK frameworks in Section 5. In Section 6 we conclude and identify avenues for future research.

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2. Background on International, EU and UK policy

Given the global nature of the climate change issue, most initial policy effort has been on international or multi-national levels, like the EU. There has also been considerable effort at the UK level. Scottish climate change policy is heavily influenced by and conditional upon policies at these other spatial levels. This section therefore gives a short summary of the main agreements, policies, instruments and legislation that affect Scotland.

The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) is an international agreement that imposes reduction targets on GHG emissions for developed nations. It was established in 1997, ratified in 2005 and runs from 2008-2012. No legally binding successor agreement has yet been agreed, although the informal Copenhagen Accord was adopted in 2009 as a step towards this. Kyoto allows countries to use various, specifically created, flexible market mechanisms in meeting their emissions reduction commitments. These are International Emissions Trading, Joint Implementation (JI), and the Clean Development Mechanism (CDM)[1]. In theory all these mechanisms should allow emissions abatement to take place in the most cost effective manner i.e. where it is cheapest, and also allow for the diffusion of low-carbon technologies to developing countries.

Under the Kyoto Protocol, the EU-15 countries have a bubble which allows them to achieve together an overall target of an 8% reduction in emissions by 2012. In order to achieve this reduction the EU created its own instrument in the form of an emissions trading scheme, the EU ETS, in 2005. The EU ETS is a 'cap and trade' system where a limit is put on total emissions based on Kyoto commitments and the scheme allows CO2 allowances, called European Union Allowances (EUAs), to be bought and sold between operators in certain emitting sectors[2]. The sectors currently covered are: energy, ferrous metals, minerals, pulp and paper. Each EUA is equivalent to one tonne of CO2. All installations within these sectors require a permit to operate which covers almost half of EU carbon emissions. However the allocation of the tradable EUAs to permit holders is initiated at national level with individual Member States submitting National Allocation Plans (NAPs) to the EU Commission for approval on the distribution of allowances and details of all installations covered. Phase I of the EU ETS ran from 2005-2007 and Phase II runs in parallel with Kyoto from 2008-2012.

In 2008 the EU introduced its 20-20-20 targets for 2020. This EU goal requires that by the year 2020 there will be a 20% reduction in GHG emissions, to have 20% of final energy consumption met from renewables and a 20% reduction in energy consumption through promoting energy efficiency. The EU stated that it would increase its emissions reduction commitment from 20% to 30% if an international successor to Kyoto was agreed and other

countries adopted strict targets. Although there is an EU renewables target, there is no EU-wide renewables[3] policy instrument and each member state have their own renewables target and can meet it by whatever method they deem appropriate.

The Climate Change Act 2008 outlines the UK's contribution to tackling climate change by setting UK emissions targets for 2020 and 2050. The Climate Change Act also created the Committee on Climate Change, an independent body tasked with advising the UK Government on setting its emissions targets, including 5-year carbon budgets, and monitoring government progress towards the targets. The UK emissions reduction target for 2050 of 80% is the same as that for Scotland[4] but the 2020 target is dependent upon a global climate change agreement being struck. If such an international deal is agreed, then the EU will raise its own emissions reduction targets (from 20% to 30%) and thus the EU Emissions Trading Scheme (EU ETS) cap will be tightened. This will require greater reductions from UK installations covered by the EU ETS i.e. the traded sector, which includes electricity generation. Therefore the UK Government has set a 2020 "interim target" of a 34% reduction but this will rise to 42% "intended target" if international and EU policies dictate so[5]. The overall UK target in 2020 is therefore conditional upon the EU target which is in turn dependent upon a global deal. This framework shows that the UK is willing to demonstrate leadership with its initial effort but that it will also commit to higher targets if others are willing to make more significant reductions.

"This leadership argument is best understood in game theory terms: it is an attempt to induce steps towards a global carbon cartel to reduce the quantity of emissions."[6]

It is also worth stating that the UK has adopted a renewable energy target of 15% by 2020 as its contribution towards the wider EU renewables target.

3. Scottish Climate Change Act

Strict targets

The Climate Change (Scotland) Act sets a 2020 target which is more ambitious than the UK equivalent. Scotland has legislated for a 42% reduction in emissions regardless of what occurs at any other spatial level[7]. Such ambition may be laudable in principle but it must be informed by, and be consistent with, EU and UK policy and account for the likely impact of these other spatial levels. This therefore raises the question of whether it is possible for Scotland to meet the 42% target, especially if there is no global deal. The advice from the Committee on Climate Change (CCC) is that achieving the 42% target is possible but the CCC recommends setting separate targets for the 'traded' and 'non-traded' sectors in Scotland. The traded sector emissions will be counted as Scotland's share of the UK allocation in the EU ETS (CCC, 2010). This is in the spirit of the EU ETS, where the geographic distribution of emission reductions simply reflects the least-cost locations for meeting the overall cap. However, it also implies that, from a purely Scottish perspective, any extra reduction in traded sector emissions, for example, associated with the expansion of renewable electricity generation, will not count towards meeting the reduction targets[8]. This accounting methodology also implies that any non-CO2 GHGs produced within the traded sector, such as methane, will not be counted as Scottish emissions[9].

As for the non-traded sector, the CCC predicts that, with no global deal, there would have to be a 47% reduction in non-traded sector emissions to meet the overall Scottish target of 42%.With a global deal the non-traded sector target falls to 39%[10]. It seems perverse that the non-traded target shrinks if a global deal is agreed. The CCC therefore suggests making Scotland's non-traded target invariant to the achievement of a global deal. This seems logical because if Scotland wishes to make its framework invariant to international agreements, then at least one target, the non-traded sector, must be made invariant to reduce uncertainty. Given that Scotland is part of the EU ETS, there is nothing that can be done to make the overall target invariant.

Annual targets

The Climate Change (Scotland) Act has established the requirement of yearly carbon budgets in Scotland. It will be interesting to see how these are set and met in comparison to the UK budgets, which are set for 5-year periods. The frequency with which budgets are set reflects a trade-off between certainty in the future emissions path and flexibility in meeting targets. Annual year-on-year targets provide certainty for investors, provided that there is confidence that these targets will be met. However, setting 5-year budgets allows for the benefits of flexibility in response to uncontrollable events and a lower reporting burden.

Of course annual targets do not necessarily imply certainty; increased frequency may make it more difficult consistently to achieve targets. For example, if a nuclear station had to shut one year unexpectedly then other types of electricity generation, most likely coal and gas, would need to make up the difference and thus emissions would substantially increase for that single year. This issue is especially important given Scotland's current dependence on a small number of large generators[11]. Less frequent budgets would allow Scotland to cope better with these unexpected fluctuations. The CCC's report to the Scottish government (CCC, 2010) has expressed concern with the lack of flexibility in the Scottish annual targets and suggests measures could be considered to increase flexibility, although it is not within the CCC's remit actually to recommend doing so.

An issue with setting 5-year budgets is defining exactly how the budgets are expressed because the stock of carbon in the atmosphere is more important for global warming than

the flow. For example, meeting the 5 year target by a large reduction in the final year will leave more carbon in the atmosphere, and cause more global warming, than a gradual reduction.

Targets for 2011 and 2012 are relatively small reductions, most likely due to the recession but from 2014 onwards there is a 2-3% decrease in emissions year on year. There is a substantial one-off increase in emissions reductions in 2013 (9.9% relative to the previous year) due to the beginning of the third phase of the EU ETS and therefore the expected tightening of Scotland's allocation in the traded sector. The Act requires reductions from 2020 to be at least 3% each year.

The Scottish annual targets were initially to be passed in secondary legislation in April 2010 but the first set of targets were rejected by a slight majority in the Scottish Parliament for not going far enough, as a pledge of annual 3% reductions each year was made in the SNP manifesto. A short-lived cross-party working group was then established to revisit these annual targets and suggest amendments. The targets shown above have been set out in the most recent Draft Order (not yet legally binding) laid before Parliament in September 2010.

Aviation and shipping

International aviation and shipping both cause considerable GHG emissions and so the Scottish framework explicitly includes international aviation and shipping in its emissions reduction targets. However, these are not yet included at the UK or EU level and there is no agreed method for accounting for these sector's emissions. The main question to ask is whether the Scottish Government can influence emissions in these sectors. If it cannot, then what are the implications of including them amongst the target reductions; and even if the Scottish Government can influence those emissions, would it be desirable to do so unilaterally?

There is likely to be considerable growth of emissions in international aviation and shipping, given previous trends. Therefore action on these sectors is imperative for tackling climate change. However, the ability to make significant reductions in these sectors is mostly outwith Scottish Government control unless it plans to severely limit travel and exports[11]. Due to the international nature, the CCC do not attempt to identify policies that the Scottish Government could use to reduce emissions in these sectors. Instead, given the growth trends in international aviation and shipping, the CCC (2010) believes that GHG emission reductions of 44% will be necessary in the other sectors of the economy (i.e. the total economy less aviation and shipping) in order to meet the 42% Scottish target.

Even if it were possible for the Scottish Government to reduce its emissions from aviation and shipping, it seems inappropriate, given the international nature of these sectors, to include them in national targets before they are included on an international scale. Limiting emissions in these sectors before other countries could lead to serious competitiveness affects. Exactly how these sectors are included is also an issue because the production-orientated-nature of the targets makes it difficult to attribute emissions accurately. These sectors would lend themselves better to a consumption-based accounting methodology. It seems more likely that separate international sectoral agreements will be required in the long-run.

From 2012 domestic aviation will be part of the EU ETS traded sector and will therefore be outwith Scottish control for accounting purposes. A specific issue with the EU ETS is that it only targets CO2 and therefore misses many of the other greenhouse gases (GHGs) attributable to aviation which are included in the emissions reduction targets.

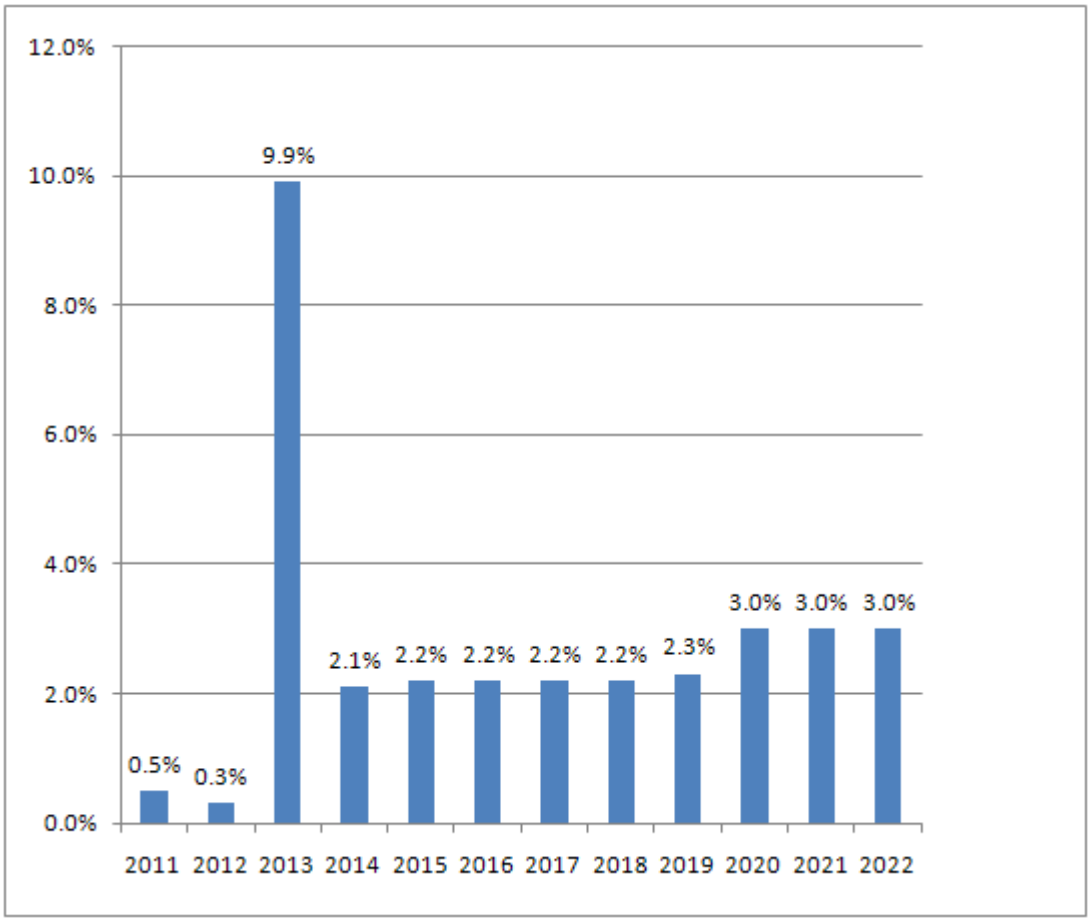
Banking and borrowing

There is no banking or borrowing allowed between each year of the annual Scottish emissions budgets. Each yearly budget must be met, and any over-fulfilment cannot be carried over into future periods. This provides certainty in terms of targets but severely reduces the flexibility of meeting them, especially in years of significant variation in energy use and there is also no incentive to go beyond the necessary in reducing emissions in a given year. If targets are consistently met this may be very beneficial as the credible policy provides certainty to investors. However, if targets are frequently missed, in part because of their inflexibility, then the credibility of the annual targets will ultimately be undermined and perhaps the credibility of the government as a whole. If there are signs of this happening in practice then banking and borrowing should be considered as a means of allowing budgets to be met more flexibly between years. For example, annual targets cannot take into consideration outside events such as colder than anticipated winters, power generation shutting down or a force majeure, such as the limited air travel due to the volcanic ash in April 2010.

Use of credits

Purchase of credits may be used to help Scotland achieve its emissions reduction targets. These may be through the EU ETS or the various Kyoto mechanisms which are discussed in Section 2. As discussed already, there is no limit on the use of European Union Allowances (EUAs), as these can be freely traded within the EU ETS and will count towards Scotland's traded sector target. However, there is a limit on the "offset credits" purchased from the Kyoto flexible mechanisms such as JI or CDM. The Climate Change Scotland Act puts a limit of 20% on emissions reductions

Figure 1: Scottish annual climate change targets - % decrease from previous year



Source: http://www.scotland.gov.uk/News/Releases/2010/09/22133935

being made by purchased Kyoto credits which can be used to meet the non-traded sector target. This cap is set to ensure that the emissions reductions are met mainly through domestic measures. Theoretically these flexible mechanism projects would achieve abatement at lowest cost. However, there are two concerns about their use. Firstly, extensive use of credits would not incentivise the necessary changes in the infrastructure of the economy to put the country on a path to making its 2050 reduction. This would leave us dependent upon reductions in other nations to make the target. Secondly, there are concerns that no significant reductions would be made if the use of Kyoto credits are not limited, as uncertainty exists about their true benefits. This scepticism is due to the difficulty in proving the 'additionality' of such projects against a hypothetical baseline scenario. If these projects are really not credible, then the whole process could be undermined[13]. Therefore domestic emissions reductions, which can be more accurately measured, are the preferred means of meeting the targets.

Given the lack of flexibility of annual targets and the absence of banking or borrowing, then purchasing credits may become important as a method of meeting Scottish targets in years of fluctuation in emissions. This may be expensive. The CCC (2010) suggests credits may have to play a significant part in Scotland meeting its emissions reduction target, especially if there is no global deal. They estimate that a 20% emissions reduction commitment by the EU would require Scotland to purchase credits from the Kyoto mechanisms to cover a range of 9% to 17% of its reductions at an estimated cost of around £30million to £50million in 2020 in order to meet its emissions reduction targets. This is the most likely scenario but would fall within the 20% limit on credits set in the Climate Change Scotland Act and so would allow Scotland to meet its emissions reduction target. The amount of credits needed to contribute would be much less under the stricter 30% EU target, with up to 5% of the 2020 target being met by offset credits costing a maximum of £15 million (CCC, 2010, p. 42). Only time will tell if circumstances arise in which the Scottish Government must buy credits to meet their own self-imposed targets and if so, how they can justify this spending to the public

4. Low carbon technologies

As stated in Section 3, under the accounting principles of the Climate Change (Scotland) Act, low carbon technologies

cannot contribute towards meeting emissions reduction targets at Scottish level. This is because the UK's emissions targets are bound to the EU ETS. Low carbon technologies cannot affect Scotland's performance in meeting its emission reduction targets because emissions from electricity production are covered by the EU ETS. In theory a policy instrument such as the EU ETS, which prices carbon, should achieve the necessary emissions reductions efficiently and thereby induce the desired level of investment in low carbon technolgies. Therefore having a renewables target (and corresponding instrument, such as ROCs, discussed below), for example, only serve to raise costs and so prove inefficient. However, Sorrell and Sijm (2003) argue that, although additional policy instruments bring no efficiency gains, they can achieve other objectives such as stimulating investment in R&D where inducing initial investment is difficult because of moral hazard and imperfect information. In a Scottish context, renewables can be seen as contributing to other Government energy policy goals such as security of supply, and offering potential for economic development through the exploitation of low-carbon technologies.

Independently of the emissions reduction targets set out in the Climate Change Scotland Act, the Scottish Government has other policies and targets for the traded sector, in particular energy generation. The details and possible motivations of these policies are discussed below.

A 'no new nuclear' policy is held by the current Scottish Government with regards to Scotland's energy portfolio[14]. This is especially important given that Scotland's nuclear generating facilities are coming to the end of their life with Hunterston and Torness both scheduled to close (some 30% of Scotland's electricity is currently generated by this source). Furthermore, a substantial proportion of coal-fired power plants are due to retire by 2016. The "no new nuclear" position is not enshrined in any legislation but reflects the stance of the two main political parties. This may partially reflect concerns of safety and disposal and also a perceived link between nuclear energy and nuclear weapons. In terms of climate change policy, a lack of nuclear capacity limits the options available for low-cost, low-carbon technologies available to replace emissions-intensive electricity generation. The UK government is pursuing nuclear within its future energy portfolio, and given the integration of the British electricity market, it will be the case that the costs of the UK government developing nuclear power will be distributed among all British electricity consumers, including those in Scotland (Bellingham, 2008).

It is not clear how Scotland will fill the energy supply gap but most likely this will be through the harnessing of various renewable energy sources[15]. In practice the energy gap will be met by market circumstances and investor decisions, however, the Scottish Government can indirectly attempt to influence the energy supply through its renewables policy. This is reflected in the fact that the Scottish Government has recently set a very demanding renewable electricity target of 80% for 2020 i.e. 80% of Scotland's electricity consumption must come from renewable sources[16]. The Scottish Government sees the potential benefit that renewables can have in terms of achieving energy policy goals, such as stimulating economic growth and promoting security of supply through diversity of generation sources. However, if the Scottish Government believes that renewables are contributing towards achieving Scottish climate change targets, they are misguided. Also, it is highly unlikely that strict climate change targets will do much in practice to help attract substantial investment in low-carbon technologies. Regardless of these facts, the CCC believes there is still a need for low carbon generation, even if it is not part of the emissions targets, because "given that Scotland has an 80% target to reduce emissions, it is important not only that the traded sector cap is achieved, but that the way this is achieved is consistent with the longer-term path to an 80% emissions reduction in 2050 relative to 1990. Specifically, this path requires early decarbonisation of the power sector, and extension of low-carbon power to other sectors, namely through electric forms of transport and heat[17]." This reasoning appears to be based upon long-term R&D considerations. Towards 2050 there will be increased electricity requirements, for instance, through significant predicted increases in electric transport. During the next few decades, as we have already stated, there will also be retirement of many current power generators. It therefore makes no sense to provide this electricity from dirty generating sources if we are serious about reducing emissions. However, there is not a credible carbon price that extends this far into the future. Therefore there is a need to put significant research and development into renewables in order to provide a diverse, low-carbon power sector.

Meeting the 80% renewables target, while providing an adequate energy supply, will require tapping into the extensive renewable energy resources available in Scotland. A significant anticipated benefit is job creation in renewables and other "green" industries. This may also lead to Scotland becoming an exporter of renewable energy (Allan et al, 2007) and possibly also an exporter of renewable technology itself and its operative and management experience (Allan et al, 2010b). These benefits will only be fully realised if renewables projects embody limited imported materials and labour[18]. Onshore wind has been the major technology deployed so far in Scotland but it brings its own problem because of its intermittent nature, and therefore variable output, requiring a back-up to ensure supply meets demand[19]. Offshore wind and marine technologies have the potential to play an important role in Scotland given their abundance, although the peripheral location of the most promising resources provides new challenges to distribution and transmission[20]. It is estimated that Scotland has 25% of Europe's Tidal and Offshore wind power and 10% of its Wave power potential.

Carbon capture and storage (CCS) technology also has the potential in Scotland to stop emissions from coal or gas

combustion being released into the atmosphere. CCS could be fitted to new or old power stations and allow for the use of coal and gas but without their significant CO2 emissions reaching the atmosphere. This is likely to be expensive to fund however as the technology has not yet been tested on a commercial scale, and these costs will likely be passed onto consumers through higher energy prices. The UK government announced a CCS demonstration competition as well as setting up an Office of Carbon Capture and Storage to coordinate the approach to CCS in the UK; this appears to be somewhat behind schedule. The EU has also passed a Directive on CCS and will use EU ETS proceeds to fund up to 12 CCS demonstrations. The development of CCS may take some time but Scotland has substantial capabilities to use its experience with the North Sea oil and gas industry, and the availability of extensive underground storage capacity, to help become a leader in CCS technology and use it to help achieve its environmental goals. The Scottish Government has produced its own roadmap as to how Scotland can become Europe's leader in CCS technology (Scottish Government and Scottish Enterprise, 2010), the funding of which will be through EU and additional Scottish Government support. The export potential of CCS is particularly significant given that it could be adopted worldwide in countries which use coal and gas. In terms of the EU ETS it is not clear what will happen with CCS. Perhaps those installations fitted with CCS will be exempt from the EU ETS or they will otherwise be able to sell all their allowances. Overall, renewables should be preferred over CCS because although CCS helps to decarbonise the economy, in the long run and we would still be reliant upon finite fossil fuels and so it does not help address the energy supply. However, this does not diminish the value of CCS as an incredibly useful but ultimately short-to–medium term solution to reduce carbon emissions across the globe.

5. Policy instruments

Scotland is part of the United Kingdom and the European Union, and as such is subject to many of their climate change policies. At EU level Scotland is already included in the EU 20-20-20 targets for 2020 and policy instruments such as the EU ETS. At the UK level there are instruments such as the Climate Change Levy and the Carbon Reduction Commitment, renewables instruments such as Feed-in Tariffs (FiTs) and ROCs and there are institutions such as the Carbon Trust and the Energy Saving Trust. The Scottish Government must adhere to these given their limited devolved powers but must also use what it has at its disposal to achieve its own goals and the annual targets it sets.

The setting of emissions targets themselves may be seen as an instrument with which to achieve Scottish climate change goals. If targets are believed to be credible (i.e. in practice, if they are met year on year) then the mere setting of them may influence expectations sufficiently to alter behaviour, for example to induce investment in low carbon technologies. However, any such impact is likely to be short-lived if the Scottish Government consistently failed to meet its targets. It seems unlikely, in practice, that targets could be judged as being instruments, especially as there is no clear policy lever to make sure they are met. However, additional credibility of the targets may be brought about by advice on, and monitoring of, targets by an independent agency. The Climate Change (Scotland) Act allows for the possibility of a Scottish Committee on Climate Change to provide advice and progress towards annual targets. So far this possibility has not been utilised. However the Scottish Government commissioned a report from the Committee on Climate Change whose role it is to do this for the UK government (CCC, 2010)[21].

The Scottish government has some other available options in terms of policy instruments. Firstly, the Scottish Government has been able to use its planning powers to help accelerate the achievement of its goals. An example of the use of planning permission is the acceptance of the Beauly to Denny power line, the creation of which will substantially enhance grid capabilities in Scotland. It will allow for easier transmission of electricity, in particular that generated by renewable sources located in peripheral areas to places of high energy consumption. Secondly, the Scottish Government can make funding available for energy efficiency improvements and legislate to ensure efficiency standards in important emitting sectors such as transport, housing and agriculture. This may be through regulating efficiency standards e.g. of insulation, heating and lighting and also undertaking demand-side initiatives for transport, such as encouraging public transport, car sharing and lower speed limits. Thirdly, there is the option of purchasing offset credits from the Kyoto mechanisms in order to meet emissions reduction targets. This may prove to be the cheapest option in the short-run if the price of these credits are low but, given the limit of 20% credit purchase in the Climate Change (Scotland) Act, they cannot rely heavily upon credits. A fourth possible, but ultimately unlikely, action is for the Scottish Government to use its limited fiscal powers to inhibit growth in the economy in order to satisfy their climate change targets. This is highly unlikely given the potential consequences of such action but it should be noted that sustained low growth may make the achievement of targets possible i.e. targets may be met entirely fortuitously, rather than as a consequence of policy action.

In practice, the uptake of renewables will be achieved, not by climate change or renewables targets, but by direct funding and financial support over the time-scale necessary for investments. Extensive exploitation of renewable sources will require substantial funding by the Scottish and UK Governments in conjunction with the regulator Ofgem, given the integrated nature of the electricity market. How renewables are funded is a political decision but one which requires a balance between potentially "picking winners" on the one hand and effectively encouraging only the technology closest to market (a consequence of a "technology blind" approach). In the UK, renewables are substantially supported by the Renewable Obligation

scheme which the Scottish government helps coordinate with other administrations and which Ofgem administers. This is a trading scheme that requires electricity suppliers to provide a certain amount of renewable power or face a penalty. The "banding" of ROCs was introduced by the UK Government to provide greater funding for newer technologies and by making them more cost competitive, to allow them to develop faster. The Scottish Government have gone even further and modified the ROC scheme so that wave and tidal energy receive greater funding in Scotland, than at UK level. At UK level wave and tidal power receive 2 ROCs per MW/hr but in Scotland wave now receives the equivalent of 5 ROCs per MW/hr and tidal receives 3 ROCs per MW/hr. This enhanced banding is particularly important for the marine energy sector, and may make tidal power comparable in costs to that of onshore wind (Allan et al, 2010c). However, it is not yet clear how this differential incentive is to be funded. Also, in April 2010 a UK-wide feed-in Tariff scheme (FiTs) was introduced to provide support for small-scale electricity generators[22]. The downside of this type of funding for renewables is that most of the high support costs are passed on to consumers in the form of higher energy prices. The Scottish Government also provides support through other schemes, funds and prizes to promote renewables, such as the Saltire Prize.

Overall, there are limited powers available to the Scottish Government to achieve its substantial climate change goal of effecting a 42% reduction in emissions by 2020. Why the Scottish Climate Change Act set an emissions reduction target which differs from the UK target, is not entirely obvious. It does not appear to be purely a supply-side decision as 42% is a very ambitious target that will not necessarily be easily met on current trends and maybe therefore require the purchase of offset credits. It may reflect a political stance in Scotland that is more sympathetic towards environmental objectives. One possibility is that, given the limited instruments available to the Scottish Government, in order to achieve their goals they are seeking to influence authorities, such as the UK Government, that do have more powerful instruments available. By setting the demanding 42% reduction target the Scottish Government may be seeking to influence UK policy.

One possible option would be for the Scottish Government to change the nature of the targets, or supplement them with additional targets focussed solely upon emissions generated within Scottish borders. Although this change goes against the principle of the EU ETS, in which the geographic location of emissions reductions is essentially irrelevant, it would provide a direct measure of emissions reductions within Scotland's borders. Clearly, in this case Scotland's new 80% renewables target may influence actual domestic CO2 emissions, while not contributing to the UK's emissions reduction target.

6. Conclusions and further research

The aspiration of Scottish climate change policy, as expressed in their targets, is world leading. Currently the Scottish climate change framework is more ambitious than the UK counterpart. It includes international aviation and shipping, is independent of the EU framework and it sets annual targets. These make the Scottish framework tougher but less flexible than its UK equivalent. The Scottish targets will be more difficult to achieve but, if achieved, then this framework could provide an appropriate contribution to Scotland's effort towards mitigating global climate change. These targets may also indirectly provide a credible incentive for substantial investment in renewable energy in Scotland,though direct funding for renewables is more appropriate in achieving this goal. If targets are missed regularly they will begin to lose credibility. Then measures such as banking, borrowing, using credits and adopting less frequent targets, should be taken to create more flexibility in meeting the targets. However, it is not clear that the Scottish Government actually has sufficient policy instruments to ensure achievement of its emissions reduction targets.

One major issue currently is that the Climate Change (Scotland) Act does not allow for the contribution of renewables towards the emissions reduction targets. Scotland's electricity sector is part of the EU ETS traded sector and as such emissions that "count" here are not Scotland's actual emissions from electricity generation but their share under the EU ETS. The Scottish Government has other energy policy goals of security of supply, price and economic growth. It has specific policies on achieving growth through renewables, with an 80% renewables target by 2020, and also phasing-out nuclear power, a decision at odds with emissions reductions given nuclear may be a cheap low-carbon option. Scotland has the potential to utilise and create new industries for low-carbon technologies. Large-scale deployment of technologies such as onshore and offshore wind, as well as a marine energy, could help promote a diverse and potentially lucrative renewable energy sector. However, given the current costs, these infant industries will require substantial support and funding from the Scottish and UK Governments through mechanisms such as ROCs. These must be set appropriately to induce the levels of investment necessary to meet the renewables targets. It is likely that costs from increasing renewable penetration will be passed onto consumers in the form of higher energy prices. Carbon capture and storage also has a role to play in helping to limit emissions from dirtier sources and there is also a potential for a growing worldwide industry too. CCS will require substantial development support to make it large-scale and regulation to enforce its adoption but ultimately it is not a long-term option.

Many determinants of emissions are beyond Scottish Government control e.g. energy prices, the EU ETS price and tax raising capabilities reserved to the UK Government. Therefore, should Scotland have its own climate change targets at all? The answer is probably no. Given that they do

however, the Scottish Government must use the powers they have, such as planning permission, encouragement for renewables and efficiency benchmarking in the non-traded sectors, to maximum effect if they are to achieve the targets they have set. Perhaps it could set targets that are more obviously linked to the available instruments, specifically on the non-traded sector. Of course, the absence of instruments does not imply that the targets will not be achieved: they may be but as a consequence of forces outside the Scottish Government's control e.g. a prolonged period of low growth or a warm winter. Therefore it is important to know why and how targets are met. While there is a lack of instruments presently the Scottish Government may seek to exert influence on those that do have the necessary instruments or there may be a possible argument for granting more powers to the Scottish Government by extending the devolution agreement. Another option would be to change or supplement the accounting of emissions within the Scottish framework, to make it those emissions produced within Scotland's border than count towards the target and preferably make sure all GHGs are included within these targets.

This paper is intended to provide a brief summary of the main issues that are specific to climate change policy in Scotland. We think it is far from clear that Scotland currently has the range of instruments that it would require to achieve its own targets. If this is the case then there are only a few solutions. One response may be for the Scottish Government to push for more instruments and this could be done by extending the powers afforded to them through devolution. Another response would be to either reduce the targets and thereby making them easier to meet, or to set different targets that the Scottish Government has more control over. What is quite clear is that it would be useful to extend evidence base relating to the feasibility, and likely costs, of any climate change policies. The CCC and DECC are considering some of these in detail. It would be useful, for example, to develop an energy-environment-economy model of the economy to simulate system-wide effects of changes in policy instruments through to the final goal outcomes.

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