

## Chapter 4: Energy Efficiency Targets & Issues around Data and Monitoring

### Summary

- This chapter explains how targets for energy efficiency will support and complement the general targets set out in the Climate Change (Scotland) Act.
- The Scottish Government intends, through the process of developing and revising its Energy Efficiency Action Plan, to be able to provide a clear routemap for energy efficiency and a clear picture of the key changes that will be needed.
- Energy efficiency contributes to both our emission reduction and fuel poverty objectives. Energy efficiency and emissions reduction policies need to take account of the complex relationships and trade-offs between the drivers of reducing emissions, reducing energy consumption, and eradicating fuel poverty.
- Given the lower delivery of Britain-wide programmes in Scotland, there is a significant challenge in ensuring that savings equivalent to those in the UK are achieved in Scotland.
- Scottish energy efficiency targets could be based on energy savings to be achieved through specific government policies and programmes. This would not take into account potential growth in consumption in other areas and so total energy use may not decrease by exactly the same amount. An alternative target would be an absolute end-use consumption reduction target.
- The Scottish Government is currently undergoing significant work to be able to improve the monitoring of the annual, interim and 2050 greenhouse gas emission targets. We will aim to ensure that this activity also allows for monitoring of part of our energy efficiency targets.
- As we further assess the options to meet our greenhouse gas emissions reduction targets, we will need to consider the cost-effectiveness of achieving these through energy efficiency and low- and zero-carbon technologies, alongside other positive and negative impacts.
- In the current absence of sufficient data, we set out what sectoral targets would be if based on a share of overall UK energy saving targets as derived from analysis of individual policy measures and their treatment in the 2007 UK Energy Efficiency Action Plan and allocated to the various sectors in Scotland.
- We would welcome views on how to improve these targets.

### Overview

4.1. The Scottish Government's level of ambition on energy efficiency is intrinsically linked to other targets. These are set out below in order to give context to target-setting for energy efficiency, before we move on to discuss what further targets may be required.

### Emissions Targets

4.2. The Climate Change (Scotland) Act, which passed into law on 4 August 2009, requires that Scotland's greenhouse gas emissions, including its share of those from international aviation and shipping, are at least 80% lower in 2050 compared with 1990 levels.<sup>39</sup> The Act's challenging interim target provision requires emissions to be at least 42% lower by 2020, accompanied by a requirement that Scottish Ministers request advice from the Committee on Climate Change on what is the highest achievable target for 2020. An affirmative order passed by the Scottish Parliament may then substitute the figure recommended by the Committee on Climate Change for the 42% figure.

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<sup>39</sup> The baseline is 1990 for carbon dioxide, methane and nitrous oxide and 1995 for hydrofluorocarbons, prefluorocarbons and sulphur hexafluoride.

4.3. The Act also requires the Scottish Government to set annual targets, after seeking advice from the Committee on Climate Change. It requires that emissions reduce each year from 2010, and that the rate of reductions from 2020 onwards is at least 3% per annum.

4.4. The main source of greenhouse gas emissions is the use of fossil fuels to provide electricity and heat and to power transport. As indicated by the definition of energy efficiency set out in Chapter 1, the Energy Efficiency Action Plan will cover the energy efficiency (encompassing all energy including electricity) of domestic and non-domestic energy use, including transport. It will not cover activity to reduce greenhouse gas emissions directly from chemical or biological processes, including those within industrial and agricultural systems, waste decomposition and soil processes.

4.5. The Climate Change (Scotland) Act requires that a Report on Proposals and Policies be published in summer or autumn 2010. This should set out, across all sectors of the economy, the Government’s detailed plans for meeting annual emissions reduction targets. Together with advice from the Committee on Climate Change on the highest achievable target for 2020 and the appropriate level of annual targets between 2010-22, the work carried out on energy efficiency during this consultation will be crucial in informing the statutory Report on Proposals and Policies, as well as fulfilling one of our ten pledges on energy policy (see Chapter 1, paragraph 1.29, for detail on pledges).

4.6. The Climate Change Delivery Plan, published in June 2009, provides a bridge to the statutory report. It sets out measures which would meet an interim target of a 34% reduction in emissions on 1990 levels and a 42% reduction if the EU moved to a 30% target. It also considers the impact of EU and UK policies on Scottish emissions.<sup>40</sup> Parliament subsequently agreed that the interim target should be set to 42%, accompanied by the requirement to take advice from the Committee on Climate Change.

4.7. The Delivery Plan sets out four transformational outcomes that are needed to achieve the 2050 target:

- a largely de-carbonised electricity generation sector by 2030;
- a largely de-carbonised heat sector by 2050, with significant progress by 2030;
- almost complete decarbonisation of road transport by 2050, with significant progress by 2030; and
- a comprehensive approach to ensure that carbon (including the cost of carbon) is fully factored into strategic and local decisions about rural land use.

4.8. Underpinning the four transformational outcomes is the need to give primacy to cost-effective demand reduction and energy efficiency across all sectors.

**Figure 4.1 Extract from Climate Change Delivery Plan (Table 1), showing emissions reductions from sectors most relevant to energy efficiency**

	2006 emissions MtCO <sub>2</sub> e	2020 emissions – 42% Scottish target	
		MtCO <sub>2</sub> e	% change against 2006
Traded <sup>41</sup> sector allocation	22.8	14.2	-38%
Aviation – domestic and international	2.0	1.8	-9%
Heat (includes domestic and non-domestic)	9.3	5.0	-46%
Transport (includes road, rail, off-road, shipping – domestic and international)	14.5	10.0	-32%

<sup>40</sup> Examples of EU and UK policies include the EU Emissions Trading System, Carbon Reduction Commitment, the Carbon Emissions Reduction Target and Energy-Using Products Directive.

<sup>41</sup> The traded sector expanded its coverage in 2007 and in 2008. The size of this extra coverage has been estimated and included in the 2006 total. Changes in coverage due in 2013 have not been considered here.

## Electricity consumption and greenhouse gas emissions

4.9. As outlined in the Climate Change Delivery Plan, the EU Emissions Trading System (EU ETS), which covers major electricity power stations and other heavy industry, accounts for approximately 40% of Scotland's greenhouse gas emissions. These are known as traded sector emissions. The system only counts direct emissions and so is focussed on reducing the carbon emissions associated with electricity generation, rather than reducing electricity use. There may be an indirect effect on electricity demand, due to increases in the cost of electricity caused by the system.

4.10. Reducing electricity consumption will not necessarily lower actual emissions from generation as this is based on the total energy generated in Scotland (i.e. both consumed in, and exported from, Scotland). In addition, a fall in total electricity consumed and exported would not necessarily affect the net Scottish emissions account, which is how progress against the 2020 and 2050 target will be measured. A final decision has still to be taken about the precise methodology that will be adopted in Scotland for the net Scottish emissions account. However, it is important to recognise that organisations in the traded sector do not operate in isolation. The emissions credits, known as allowances, which installations obtain as a result of achieving emissions reductions are bought and sold across Europe. This is why the UK net carbon account assumes that emissions reductions from UK installations will be the same proportion as the emissions reductions for the EU ETS for the whole of Europe, however much UK installations emit directly.

### Box 4.1 Why is electricity consumption included in this consultation?

Although electricity and power generation is traded (and so will make a pre-determined contribution to our climate change targets, however much electricity we consume), the Scottish Government remains committed to reducing the amount of electricity wasted as this is important to our wider resource and efficiency goals. Reducing electricity consumption, for example, means that householders and businesses pay less for their fuel bills and are able to spend the money saved in other sectors across the Scottish economy.

Saving energy from electricity, as well as gas and oil, is also important as the cost of many energy efficiency and renewable energy technologies across Britain feeds through to our fuel bills. Currently, the UK Government estimates that its policies on climate change and energy saving – including the Renewables Obligation, EU Emissions Trading System, and the Carbon Emission Reduction Target – account for around 14% of average domestic electricity bills and 3% of average domestic gas bills. On the industrial side, for an average medium-sized consumer, the Renewables Obligation, EU ETS, and Climate Change Levy together contribute around 21% to industrial electricity bills and about 4% to gas bills.<sup>42</sup> Since these costs are expected to increase, using less energy will help to offset increase in fuel bills for all energy consumers. Reducing electricity consumption also reduces the total amount of renewable electricity generation needed across Scotland, and the costs associated with this, to meet renewable energy targets.

## Energy Efficiency, Emissions Reduction and Fuel Poverty

4.11. Energy efficiency contributes to both our emissions reduction and fuel poverty objectives, though the relationship between these is not always straight-forward. A household is deemed to be in fuel poverty if it has to spend more than 10% of its income (including Housing Benefit or Income Support for Mortgage Interest) on all household fuel used to heat the home to an adequate level.<sup>43</sup> The Scottish Government has set a target to ensure - so far as is reasonably practicable - that by 2016 no-one is living in fuel poverty.

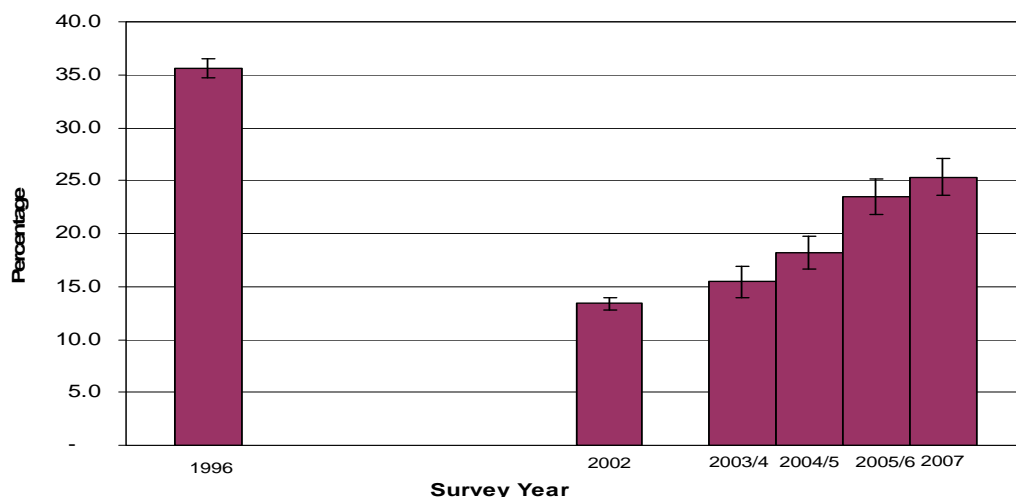
4.12. Fuel poverty is reliant on the interrelationship between the energy efficiency of a property, the income of the household, and fuel prices. These three factors mean that the

<sup>42</sup> Department of Energy and Climate Change, 'The UK Low Carbon Transition Plan', Analytical Annex, July 2009 ([www.decc.gov.uk/en/content/cms/publications/lc\\_trans\\_plan/lc\\_trans\\_plan.aspx](http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx)).

<sup>43</sup> Scottish Executive, Scottish Fuel Poverty Statement 2002 ([www.scotland.gov.uk/Publications/2002/08/15258/9951](http://www.scotland.gov.uk/Publications/2002/08/15258/9951)). 'Extreme Fuel Poverty' is defined as a household that has to spend more than 20% of its income on fuel.

number of fuel poor households fluctuates over time, though the trend in recent years has been upwards, mostly due to increasing fuel prices. Figure 4.2 shows estimates of households living in fuel poverty. Numbers have increased further since 2007 due to significant price rises.

**Figure 4.2 Households in Fuel Poverty 1996-2007<sup>44</sup> (% and Confidence Intervals)**



4.13. The Scottish Government launched its Energy Assistance Package (EAP) in April 2009 to assist fuel poor households. However, it is worth noting that fuel poor households are not necessarily those with the most energy inefficient homes, those consuming the most energy, or those emitting the most carbon. Consequently, it is important that an energy efficiency action plan that has multiple objectives does not focus early action in housing on just one type of household (see Box 4.2).

**Box 4.2 Focusing on one policy driver only would mean focusing early action in different households**

Policies aimed solely at reducing greenhouse gas emissions would involve concentrating on inefficient large detached homes in rural areas fuelled by oil or solid fuel heating systems. Electricity use would be ignored as electricity production is covered by the EU Emissions Trading System.

Policies aimed solely at reducing energy consumption would involve concentrating policy measures on younger households with medium to high income in large private sector properties.

Policies aimed solely at reducing fuel poverty would involve concentrating policy measures on older people and/or lower income households, often in social rented or private rented homes. Action on fuel poverty will usually decrease consumption, but in some cases it may increase energy consumption (particularly where it results in a rise in income or a reduction in the unit-price of fuel) and emissions until a chosen level of thermal comfort is reached (see discussion of rebound effect in Chapter 3)

4.14. Ultimately, energy efficiency and other emissions reduction policies need to take account of these complex relationships and trade-offs between the three drivers of reducing emissions, reducing energy consumption, and eradicating fuel poverty.

**Short- and medium-term ambitions: Energy Efficiency Targets for Scotland**

4.15. The Scottish Government intends, through the process of developing, publishing and revising the Energy Efficiency Action Plan, to be able to provide a clear routemap for energy efficiency and a clear picture of the key changes that will be needed in our buildings, businesses and transport systems. This is particularly important in helping business and industry to understand how government expects to meet its interim and long-term climate change targets, so that they can develop technologies and operating models to capitalise on

<sup>44</sup> Scottish Government, 'Scottish House Condition Survey: Revised Key Findings 2007', p. 26 (<http://www.scotland.gov.uk/Resource/Doc/933/0079066.pdf>).

the opportunities these present. However, it is also important, due to the uncertainty of some assumptions made when developing policy relating to future scenarios, not to be overly prescriptive and to allow flexibility to support innovation.

4.16. The first stage in this routemap is to set overall energy efficiency targets for Scotland. As part of the UK and the European Union, Scotland should consider these in conjunction with the wider EU and UK targets and legislation. The EU Energy End-Use Efficiency and Energy Services Directive requires member states to aim to achieve a reduction in energy consumption of 1% per year between 2008 and 2016 – a total of 9% - and requires every member state to develop an action plan.<sup>45</sup> This excludes energy use by industrial plants within the traded sector. The indicative target of a 9% saving is based on average energy consumed in the previous five years. The European Directive allows energy savings that result from energy efficiency improvement measures initiated in a previous year (not earlier than 1995) and that have a lasting effect to be taken into account in the calculation of the annual energy savings. However, the UK position is to only take into consideration measures since the adoption of the UK Climate Change Programme in 2000.<sup>46</sup>

4.17. For the UK, this target - based on an average for 2001-2005 of 1517 TWh (terawatt-hours) consumed annually in households, the tertiary sector, industry outside the EU ETS, and transport - equates to a energy saving of 136.5 TWh a year by 2016.<sup>47</sup> The UK Energy Efficiency Action Plan, published in 2007, identifies a range of policies that aim to achieve up to 272.7 TWh of annual energy savings by 2016. If the full savings are achieved, this would amount to energy savings equivalent to 18% of the energy consumption baseline, double the level required to meet the EU target. However, the UK Plan does not provide estimates for how much energy consumption may increase outside of the policies identified, for example through business growth, people having warmer homes, or more electrical goods being used.

4.18. The 2007 UK Plan aims to achieve 372.5 TWh of annual energy savings by 2020 - 222.6 TWh above those expected by 2010, or 100 TWh above those expected by 2016 (see Figure 4.3). As outlined in Chapter 2, although overall final energy consumption has been increasing over the last few decades, the UK has observed a 3% reduction in final energy consumption since 2005. This can be interpreted as a positive step towards the energy efficiency targets. EU requirements for a further action plan to be submitted by 2011 will lead to more detailed analysis of the initial energy reductions resulting from improvements outlined in the 2007 UK Action Plan.

**Figure 4.3 UK Energy Efficiency Action Plan – estimated energy and carbon dioxide savings**

Total Energy and Carbon Dioxide Savings from measures in households, private and public sectors and the transport sector <sup>48</sup>	Annual energy savings expected by end of 2010		Annual energy savings expected by end of 2016		Annual energy savings expected by end of 2020	
	TWh	MtCO <sub>2</sub>	TWh	MtCO <sub>2</sub>	TWh	MtCO <sub>2</sub>
	150	39	273	69	373	94

Note: numbers are rounded to the nearest whole

<sup>45</sup> See Articles 4 and 14 of the Energy End-Use Efficiency and Energy Services Directive.

<sup>46</sup> DEFRA, 'UK Energy Efficiency Action Plan', 2007

([http://ec.europa.eu/energy/demand/legislation/doc/neeap/uk\\_en.pdf](http://ec.europa.eu/energy/demand/legislation/doc/neeap/uk_en.pdf) ).

<sup>47</sup> This is measured as final inland energy consumption (the amount of energy distributed or sold to final consumers). It also excludes energy consumption by the Ministry of Defence and EU ETS industrial installations. Therefore electricity consumption by domestic and commercial buildings is included in the figures that are used to estimate the target.

<sup>48</sup> Carbon savings have been converted to carbon dioxide savings.

### What should Scotland's target be based on?

4.19. In setting energy efficiency targets for Scotland, the overall target should be challenging, yet achievable, and in line with other targets such as those in the Climate Change (Scotland) Act and the Renewables Action Plan. It is also important to be able to monitor progress against the targets.

4.20. As required by the Climate Change (Scotland) Act, Ministers have requested advice from the Committee on Climate Change on a number of issues, including the highest achievable emissions reductions target for 2020 and on annual targets from 2010 to 2022. The Act requires that advice on the highest achievable interim target is published by the end of December 2009, or as soon as reasonably practicable after this, and Ministers have requested that all elements of the advice be covered in one single document. The advice will also outline some guidance as to what amount of feasible abatement will come from energy efficiency. However, given data limitations and other demands on the Committee on Climate Change this year, the Committee is not currently in a position to provide specific advice on energy efficiency targets for Scotland.

4.21. As a result, the indicative presentation throughout this chapter of Scotland's potential to reduce energy consumption from energy efficiency measures will be subject to revision as better data becomes available and information on energy saving potential is received from the Committee on Climate Change.

#### *Data availability*

4.22. One of the constraints on Scottish policy decisions in the area of energy, and in particular energy efficiency, is the lack of robust data at a Scottish level on energy consumption trends, energy savings from programmes and policies (both expected and achieved), and how these overlap with other policies. The level of detail available from the existing data varies significantly from sector to sector. For this and further reasons set out below, any targets set out in the first Energy Efficiency Action Plan for Scotland are likely to be broad indicative targets that are subject to change as further data are made available. An important work programme arising from the action plan will be to achieve better energy consumption and energy saving data for Scotland.

4.23. The Scottish Energy Study establishes a set of baseline projections for final end use energy consumption.<sup>49</sup> However, these projections cannot adequately provide accurate analysis of the impact of the rapidly evolving energy efficiency sector. The use of UK regional data for Scotland also provides accuracy problems in setting a baseline and monitoring the effects of energy efficiency on Scottish energy consumption, as this data does not take full account of the particular nature of the Scottish housing stock. As an approximate guide when considering the following scenarios, energy usage in Scotland for 2006 was estimated to be 172.8 TWh, based on UK regional data.<sup>50</sup>

#### *Targets based on energy savings*

4.24. If Scottish energy efficiency targets were based on UK energy savings targets, there could be different levels of ambition for Scotland. Figure 4.4 provides three levels of ambition to provide estimated indicative savings targets for Scotland based on the UK Action Plan. Should this approach be taken for establishing energy efficiency targets for Scotland,

<sup>49</sup> Scottish Executive, 'Scottish Energy Study, Volume 1: Energy in Scotland, Supply', 2006; and Scottish Government, 'Scottish Energy Study, Volume 5: Energy and Carbon Dioxide Projections for Scotland', October 2008.

<sup>50</sup> See Chapter 2, paragraphs 2.7-2.10 for details on different data sources.

further analysis would be needed to assess at what level the target should be set to be in line with climate change and renewables targets.

**Figure 4.4: Possible Scottish energy efficiency targets based on proportions of UK ambition**

Targets	Annual Saving by 2010 (TWh)	Annual Saving by 2016 (TWh)	Annual Saving by 2020 (TWh)	Annual saving by 2016 (TWh)	Annual Saving by 2020 (TWh)
	Based on activity from 2000 onward			Minus activity to 2010	
UK Potential Savings Identified	150	273	373	123	223
Scotland Per capita (8.6%)	12.9	23.5	32	10.6	19.1
Scotland Ambitious share (10%)	15	27.3	37.3	12.3	22.3
Scotland Highly Ambitious Share (15%)	22.5	40.9	55.9	18.4	33.4

4.25. A number of different levels of targets have been provided for consideration. A key issue to consider is that in at least one of the most significant Britain-wide programmes, CERT, Scotland currently sees a lower level of delivery compared to the rest of Britain. So there is a significant challenge in ensuring that savings equivalent to those in the UK are achieved in Scotland, though work on this has already begun (see Chapter 6).

4.26. In addition, further UK-wide and Scottish policies and programmes have been developed since the 2007 UK Energy Efficiency Action Plan. Furthermore, benefits of Scottish policies have rarely been expressed in terms of energy savings, as the focus to date has been on emissions reduction. Work is underway which will allow us to estimate better how much these policies can be expected to add to energy saving in Scotland. For example, we are mapping Scottish emissions reductions and energy savings from UK and EU policies since the 2006 UK Climate Change Programme.

#### *Targets based on absolute consumption*

4.27. An alternative to a target based on energy savings from energy efficiency measures and behaviours is an absolute end-use consumption reduction target. While reducing absolute energy demand is the ultimate aim in terms of contributing to greenhouse gas emissions targets, a target based solely on such a metric could have limitations and lead to unintended consequences. In particular, it would not take account of fluctuations in energy use that generally occur from year to year with up- and downturns in the economy. For the business sector, it could also lead to perverse policy development which focuses on levels of business growth and assumed links to energy use, rather than business energy productivity.

4.28. If such a target were considered appropriate, there is currently limited data on which to base an achievable target for Scotland. This is due to, among other things, the lack of reliable trend data which is required to identify where energy use may grow and to estimate the savings to be achieved.

4.29. For this reason, more work would be required over a number of years before we could set a consumption-based target. We propose to continue to monitor and report on overall energy consumption and to review the targets with the first revision of the Scottish Energy Efficiency Action Plan.

#### *Ability to monitor targets*

4.30. The Scottish Government is working with others to improve the monitoring of the annual, interim and 2050 greenhouse gas emission targets. Improvements are being made within the context of international reporting requirements. Where opportunities for data

improvements occur, the Scottish Government will seek to ensure they provide a platform to better assess energy consumption. As an example, any improvements to the accuracy of the greenhouse gas emissions inventory for Scotland for non-traded emissions from energy consumption should improve the level of data we have on energy use. (This will not be effective for electricity consumption which is covered by the traded sector.)

4.31. Additionally, where Scottish policies and programmes are appraised or evaluated in terms of greenhouse gas emissions impacts, where these emissions impacts derive from the use of energy, the change in energy consumption by fuel type will also need to be reported on. The greenhouse gas emissions reporting framework being developed will include detail on what energy reporting should be included. Applying the reporting framework will mean that the contribution of policies to both energy efficiency and greenhouse gas targets, and the relationship between these two sets of targets, can be understood.

4.32. Nonetheless, other work will be needed in this area. In particular, there are UK-wide programmes, such as the Carbon Reduction Commitment (CRC), that do not currently allow energy savings from these policy instruments to be measured at a Scotland level. We are currently working with the UK Government to improve this situation for the future. It will be necessary to ensure that we can measure both the impact on energy use (either increased energy demand or energy saving benefits) and the greenhouse gas emissions of policies and programmes. Due to the overlapping nature of a number of programmes, it may be necessary to do this in packages.

4.33. In summary, both of the approaches to setting targets – absolute consumption or energy savings from action - currently have monitoring limitations. We will aim to monitor both sets of data. However even with these limitations, we consider it important to set a target, subject to review, and to take action immediately. As highlighted throughout this consultation, significant work is required to achieve a step change in levels of activity and to improve energy efficiency. A lack of perfect data is no reason to delay action we know we must take. As Ian Marchant, CEO of Scottish and Southern Energy, has said,

I've heard it said that the Scottish Government shouldn't set a target for 2020 if it cannot spell out exactly how it is going to reach it. Such an approach is self-limiting and inadequate. The whole point of having a target is to stretch and change behaviour. [...] The challenge of climate change means that we must start now with what we think we can do – and be constantly achieving and committing to additional action.<sup>51</sup>

**Q 1: Should Scotland's energy efficiency target be based, as discussed, on energy savings achieved or total consumption? Or are there alternative ways in which a target should be set and monitored? If so, what would be the benefits of such an approach?**

**Q 2: What should be the basis for the energy efficiency target? For example, should any "energy savings achieved" target take into account UK ambition and programmes? If so, how ambitious should Scotland be in its energy efficiency targets compared to the UK?**

### Sectors

4.34. The availability, level of detail and quality of data on energy saving potential in Scotland from both programmes and energy efficiency technologies, and their associated costs, varies substantially between sectors. This consultation document addresses how the

<sup>51</sup> Ian Marchant, 'Let's lead the push to get 42% cuts by 2020', *The Scotsman*, 18 June, p. 30.

gaps in data and analysis may be filled. However, at this stage we should note that it is currently almost impossible to indicate accurately by sector how overall energy efficiency targets will be met.

4.35. In the absence of available data, we have set out below one method for identifying broad indicative contributions from different sectors. If the overall target were based on a share of overall UK energy saving targets (as set out above in Figure 4.4), this could be allocated to the various sectors, based on the individual policy measures and their treatment in the UK Energy Efficiency Action Plan 2007. More detailed analysis would be necessary before using such an approach, and there are other considerations that would need to be taken into account. These include, for example, cost-effectiveness (discussed below), future potential to achieve savings, and other costs and benefits. When more analysis is available this should provide us with a better indication of sectoral energy savings. In the meantime, the data in Figure 4.5 provides a basis for considering overall targets and any savings potential identified.

**Figure 4.5 Possible energy efficiency targets for Scotland, providing broad indication by sector based on % savings identified in UK Energy Efficiency Action Plan, 2007**

Possible energy efficiency targets (TWh)	Annual saving by 2016	Annual Saving by 2020	Annual saving by 2016	Annual Saving by 2020	Annual saving by 2016	Annual Saving by 2020
	Scotland Per capita Share (8.6%)		Scotland Ambitious Share (10%)		Scotland Very Ambitious Share (15%)	
Total Potential Scottish Savings excluding activity to 2010	10.6	19.1	12.3	22.3	18.4	33.4
Split of possible targets based on proportional sector shares identified in the UK Energy Efficiency Action Plan 2007						
Domestic Sector (53%)	5.6	10.1	6.5	11.8	9.8	17.7
Public & Private Sectors (26%)	2.8	5.0	3.2	5.8	4.8	8.7
Transport Sector (21%)	2.2	4.0	2.6	4.7	3.9	7.0

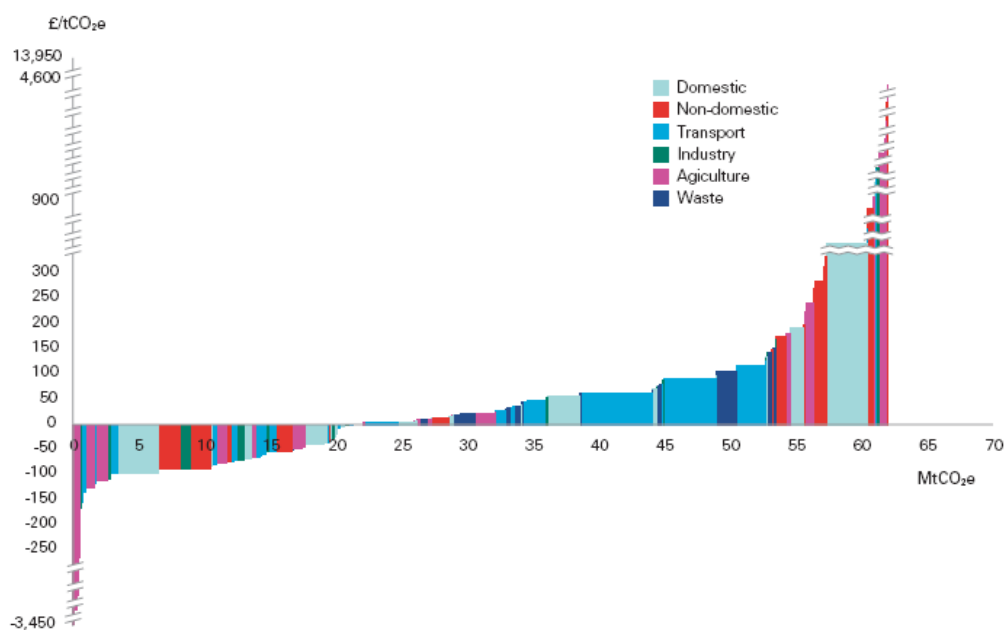
4.36. The broad indicative contributions reported in Figure 4.5 for different sectors are influenced by a range of energy efficiency policies and the resultant sectors they fall under in the UK analysis. This gives rise to two main problems. Firstly, it does not necessarily accurately identify the energy efficiency measures that are unique to Scotland since the analysis does not draw upon Scotland-specific challenges, opportunities and devolved policy levers. As a result, this method does not capture each sector's share of energy demand in Scotland or its ability to make energy efficiency savings. Secondly, this provides indicative contributions based on the range of policies that are currently in operation or planned to be implemented in the near future. It does not capture all of the policy levers identified in the Climate Change (Scotland) Act.

4.37. Figure 4.5 indicates that the energy efficiency policies in the 2007 UK Action Plan operate with various degrees of activity across sectors. For example, domestic policies account for 53% of the reduction potential, the public and private sectors for 26% of the reduction potential, and the transport sector for 21%. This does not correspond to each sector's share of Scottish energy demand, which were reported as 47% industrial and commercial, 29% domestic and 24% transport in Chapter 2, based on DECC regional estimates.<sup>52</sup>

<sup>52</sup> See Chapter 2, paragraphs 2.7-2.10 for details on different data sources.

4.38. Each sector’s contribution to the overall savings required will be partially dependent on where the most cost-effective energy efficiency savings can be made. Chapter 6 provides the levels of cost effectiveness of some of the different measures in housing. There has been some analysis on cost-effective carbon emissions reductions across the UK. As an example, the marginal abatement curve in Figure 4.6 compares the volumes of abatement achievable against the costs per tonne of such abatement, ordering options in terms of these cost – most cost-effective first. There are very cost-effective measures to be found in the domestic and non-domestic sectors, industry and transport. There are also significant volumes of more costly abatement achievable in the domestic, non-domestic and transport sectors. The Analytical Annex to the UK Low Carbon Transition Plan discusses some of the limitations of this work to date.<sup>53</sup>

**Figure 4.6 A Marginal Abatement Cost Curve in the non-traded sector**



Source: Committee on Climate Change (2008)

4.39. As we gather and analyse further evidence on the options for how to meet our significant greenhouse gas emissions reduction targets, we will need to consider the cost-effectiveness of achieving these through energy efficiency and low- and zero-carbon technologies, alongside other positive and negative impacts, including whether energy consumption and hence energy bills are reduced.

**Q 3: What approach do you consider we should take to setting out how different sectors will contribute to our target? What further evidence should be collected and assessed?**

**Q 4: What evidence do you have to suggest that the different levels of saving identified in the broad sectoral indications may or may not be achievable?**

Long-term ambitions

4.40. At a UK level, DECC has considered a number of scenarios that, by means of economic modelling, have projected a range of possible outcomes for achieving the 2050

<sup>53</sup> See DECC, Low Carbon Transition Plan, Analytical Annex, p. 41. ([www.decc.gov.uk/en/content/cms/publications/lc\\_trans\\_plan/lc\\_trans\\_plan.aspx](http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx)).

target of an 80% reduction in net UK greenhouse gas emissions relative to 1990.<sup>54</sup> Each scenario provides different assumptions relating to the price and availability of key technologies and the extent of abatement potential available. The UK analysis indicates that energy efficiency is essential to meeting the 2050 target and is cost-effective. Its modelling suggests that energy demand reduction of between 26% and 43% can be achieved across the different scenarios. The final outcome will be affected by the cost-effectiveness of policies and new technologies, and whether new technologies focus on reducing carbon emissions or reducing energy demand. In addition, the Scottish Government’s long-term ambitions for energy efficiency will be strongly tied to those identified in its 2010 Report on Proposals and Policies.

4.41. Clearly, in order to start impacting on long-term consumption, further work will be needed on:

- achieving a greater understanding of what proportion of the overall aim of largely decarbonising heat supply by 2050 will be met by energy efficiency, smaller-scale low- and zero-carbon technologies (e.g. solar water heating and biomass boilers) and large-scale renewable energy technologies (e.g. biomass CHP with heat networks). The UK Heat and Energy Saving Strategy (HESS) consultation set out an aim for emissions from existing buildings to be approaching zero by 2050.<sup>55</sup> It considered that this will require that all homes receive a ‘whole house’ package, including all cost-effective energy saving measures, plus renewable heat and electricity measures as appropriate, by 2030.
- how approaches to, and technologies for, reducing energy consumption in different sectors may change with a changing climate as Scotland expects warmer, wetter winters and hotter, drier summers.
- the acceptability and need for personal carbon trading and/or energy or carbon rationing.
- additional mechanisms available to Scotland to decouple energy consumption from GDP.

**Data, Monitoring and Reporting**

4.42. Throughout this chapter and the consultation document, there is reference to the need to improve the detail and availability of data that can be used to report the impact of energy efficiency measures and targets in Scotland.

4.43. There are several significant cross-cutting areas where available data is weak. Figure 4.7 below outlines a number of the key data issues and limitations, some of which have already been mentioned, and provides key actions for improving data.

**Figure 4.7 Key data issues**

<b>Final energy consumption in Scotland</b>	DECC is now producing annual data on regional final energy consumption. The Scottish Government must collaborate with DECC to ensure this is as representative as possible of actual consumption in Scotland. We will also seek action, where possible, to ensure that figures are presented in a more detailed manner. This is especially important for the industrial sector, which is currently reported as a combined 'industry and commercial' sector.
<b>Energy consumption by final consuming sector</b>	Scottish Government will work to achieve more detailed analysis on an ongoing basis of final energy consumption by sector. The Scottish Energy Study has provided detailed analysis of this, but as changes occur in business and industry sectors and energy efficiency work is carried out across all sectors, data and estimates will be needed on an ongoing basis to ensure effective policy delivery. Opportunities may

<sup>54</sup> DECC, ‘Low Carbon Transition Plan’, Analytical Annex.

<sup>55</sup> DECC, ‘Heat and Energy Saving Strategy Consultation’, February 2009 (<http://hes.decc.gov.uk/>).

	exist to set up cost-effective systems in the next phase of the CRC or by working more closely with SEPA, the Carbon Trust and/or Scottish Enterprise on this issue.
<b>Projections of energy demand in Scotland</b>	Scottish Government is working alongside Cambridge Economics and the Committee on Climate Change to produce a modelling tool that forecasts CO <sub>2</sub> emissions and energy consumption from the non-traded sector to 2030 under a number of scenarios. This provides a much more tailored forecast of these emissions and energy consumption. However, it is still limited in a number of its assumptions, does not cover electricity consumption, and is reliant on UK energy modelling.
<b>Potential from energy efficiency measures, particularly in terms of electricity consumption</b>	The Scottish Government will work closely with DECC and the Committee on Climate Change in order to improve data and reporting on the potential savings from energy efficiency, and to seek information on setting the Scottish energy efficiency targets. However, key gaps still exist across the reporting of the reductions in electricity consumption as a result of energy efficiency measures.
<b>Impact of Policies and Programmes on Energy Efficiency</b>	There are a number of UK policies that deliver benefits both in Scotland and the UK. A key action for the Scottish Government will be to work closely with DECC to better 'map' the policies that contribute towards Scottish energy efficiency targets. It will be vital to target setting and reporting that the impact on both energy consumption by fuel and greenhouse gas emissions is assessed when developing and appraising policies. It will be important to ensure application of the greenhouse gas emissions reporting framework across government to ensure this. The Climate Change (Scotland) Act (section 35) requires a Report on Proposals and Policies to be produced that will follow the progress towards meeting the annual emission reduction targets. It is envisaged that these reports will also cover energy consumption. In addition, the Scottish Government is looking to put in place before the end of 2009 a carbon impact assessment tool. This pre-expenditure assessment mechanism will appraise, at a high level, the energy and carbon impacts of individual policies and programmes, whilst also taking social and economic considerations into account.

**Conclusion**

4.44. Energy efficiency is increasingly being recognised as having a key role to play in meeting our global challenges. We are clearly at the early stages of some of our work, and will be moving this agenda forward in a flexible way as we respond to new knowledge, research, partnerships and technical developments.

4.45. In addition, it is important for the Scottish Government to be actively involved in any new EU or UK policies that are aimed at improving energy efficiency from the outset and to promote these data issues. For example, consultation and evaluation of the smart meter roll-out across the UK is currently underway. This has the potential to provide reporting based on individual meter point data, which if developed from the outset, could provide useful electricity and gas consumption data for Scotland.

4.46. So far, our key target-related actions include:

- Scottish Government will seek information and aim to develop a collaborative approach from DECC and the Committee on Climate Change in order to improve data and reporting on the potential savings from energy efficiency, and seek information on setting the Scottish energy efficiency targets.
- Scottish Government is compiling greenhouse gas appraisal guidance to be applied during the development and evaluation of individual programmes and policies in Scotland. These appraisals will report on a number of outturns to fulfil requirements under the UK Climate Change Act 2008 and the Climate Change (Scotland) Act 2009 relating to energy and emissions impacts, be these positive or negative.