Next phase of the European Climate Change Programme: Analysis of Member States actions to implement the Effort Sharing Decision and options for further community-wide measures

A report for DG Climate Action

Appendix 2: Action Plan for Member States preparing for the Effort Sharing Decision

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Table of contents

1 Introduction

1.1 Overview

This report has been prepared by a team led by AEA as part of a project funded by DG Climate Action of the European Commission. It has been developed as a tool for Member States to use as part of their preparation for meeting the requirements of the Effort Sharing Decision (ESD). The aim of the action plan is to summarise key actions that Member States may need to take as part of their preparation, and to share examples of actions already taken by others.

The action plan includes:

1. A summary of the types of activities that Member States might carry out in order to be well prepared for meeting the requirements of the ESD;
2. Information on when and how these activities could be undertaken, and;
3. Useful examples of good practice with respect to each of the activities.

The action plan provides a high level summary of actions already taken in certain Member States in response to the ESD, as well as actions likely to be required in the future. The action plan is not meant to be exhaustive, nor is it expected that all activities should be applied directly in all Member States. Some Member States may choose to focus more on some activities than on others.

The actions were initially identified as part of a project workshop, where representatives from Member States, and other stakeholders, were asked to identify the actions and activities that would need to be performed in order to be well prepared for meeting the requirements of the ESD. Following the workshop the action plan was further developed by the project team, and Member States were then asked to provide examples that could be included within the action plan. More examples were offered by some Member States (e.g. the United Kingdom) than others.

1.2 Summary of key actions

The different elements within the action plan have been grouped under three headings: analytical framework, operational and legal framework, and strategic framework. A summary of the actions is provided below.

Analytical Framework

1. Understand the future evolution of emissions within the scope of the ESD and the extent of any emissions gap
2. Quantify the impacts of the policies and measures on emissions in ESD sectors
3. Understand the abatement potential and the cost of abatement in ESD sectors

Operational and legal framework

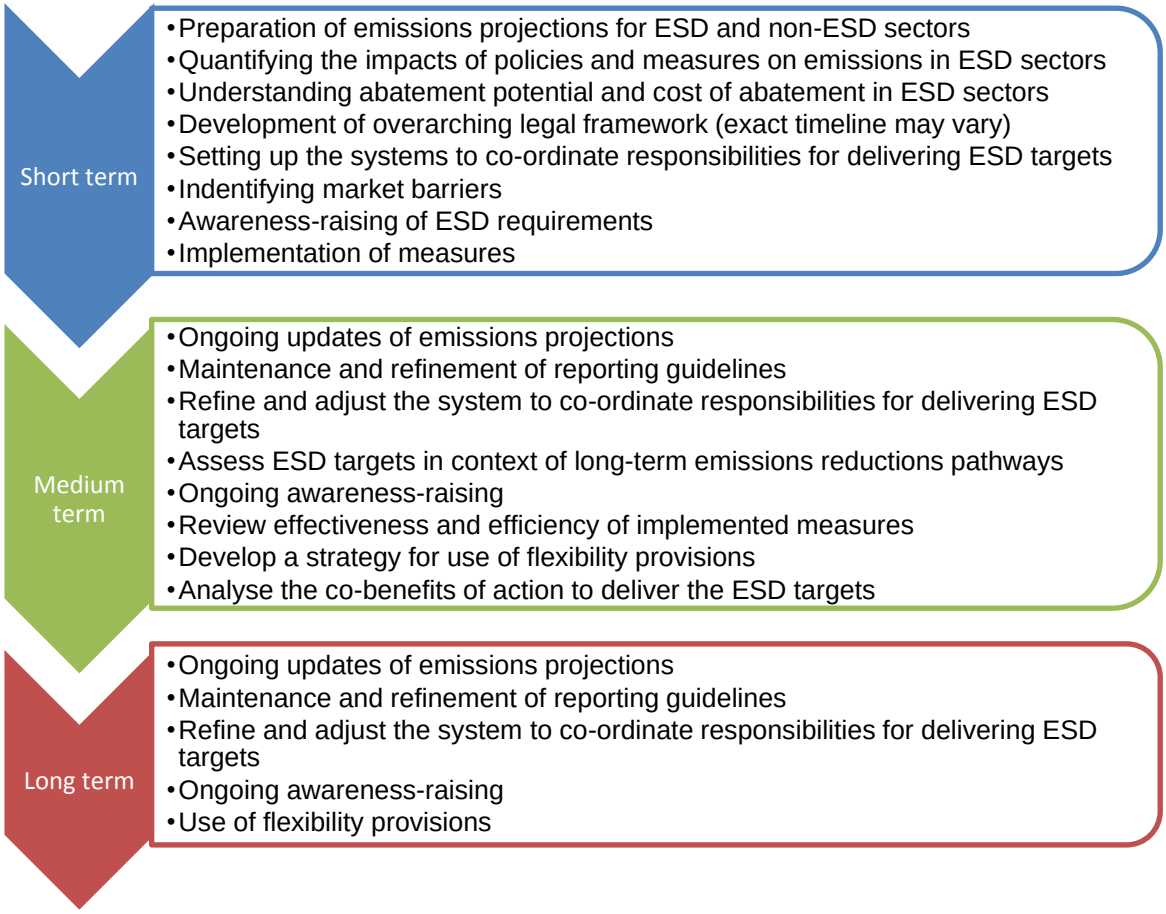
4. Develop an overarching legal framework
5. Co-ordinate responsibilities for ensuring the delivery of the ESD targets
6. Raise awareness of ESD requirements within relevant stakeholder groups

Strategic framework

7. Identify the structural and market barriers at country level that need to be overcome to deliver ESD aspirations
8. Develop a strategy for the use of flexibility provisions
9. Analyse the co-benefits of action to deliver the ESD targets
10. Assess the ESD policies and measures in the context of long-term emissions reduction pathways

The action plan also considers the timeline over which the actions might need to be carried out. Some actions, for example, might be more urgent than others. Also certain actions might only need to be performed once, whereas other might need to be repeated on a regular basis. The figure below provides an overview of actions that might need to be taken in the short, medium and long term.

The activities within the plan, and the examples of good practice, will change over time as new priorities emerge and the implementation of the ESD moves into the next phase. Much of the initial activity is focussed on the development of the evidence base to underpin decision making.



The actions do not explicitly include the *implementation* of policies. However, policy implementation is a key activity, which should be considered alongside all of the actions described above.

On top of these actions, a Member State should also, at some point, define its operational targets which may differ from the ESD targets (because the Member State may be more ambitious or because of the use of flexibilities). These operational targets could be differentiated across sectors or regions.

In the following section each of the elements are described in more detail in order to answer the following questions:

- Why is this important?
- What types of action could be taken?
- When does action need to be taken?
- What effort is required?

2 Analytical framework

Actions within the analytical framework are concerned with being well prepared in terms of the data and evidence base required to make good policy decisions in relation to the Effort Sharing Decision. These actions are therefore concerned with understanding, at a Member State level, the emissions captured by the Decision, the projected evolution of these emissions over time – and how this compares with the overall limits under the ESD. Policy makers also require information on the measures that can be implemented to reduce emissions from the respective sectors, and their cost. These elements are also captured within the framework. Finally, the analytical framework includes policy impact assessment, since good policy making requires an understanding of the impact of existing and planned policies on the overall emission limits.

2.1 Action 1: Understand the future evolution of emissions within the scope of the ESD and the extent of any emissions gap

2.1.1 Why is this important?

It is important that Member States have a good understanding of their likely emissions performance relative to the ESD target, so that actions can be put in place to ensure that the emissions limits are met – either through domestic actions or flexibility provisions. Understanding how the emissions are projected to evolve in each of the sub-sectors within the scope of the ESD is also important to help target effective action across each of the sub-sectors.

2.1.2 What types of action could be taken?

The main activities relate to the preparation of greenhouse gas emissions projections, taking into account issues associated with accounting for emissions within the scope of the ESD as part of emissions inventories, and the different sectoral approaches to projecting emissions.

The preparation of GHG emissions projections is not a new activity. Member States currently have a legal obligation under the EU Monitoring Mechanism Decision to report greenhouse gas emissions projections. However, this requirement does not currently mandate that emissions are disaggregated into ESD and non ESD sources (e.g. sources under the EU Emission Trading Scheme, ETS) which is important for monitoring progress against the ESD targets. However, this information is requested as additional information by the European Commission, and some Member States already prepare projections on this basis.

It is also important that Member States understand how their projected emissions performance compares to the limits that have been set under the ESD. Member States have annual binding emission limits in accordance with a linear trajectory and they must report their emissions to the Commission each year in the period 2013-2020. This may require some further action to prepare projections on an annual basis. Most long-term projections provide emission estimates for specific time intervals (e.g. every 5 years) with emissions in intervening years interpolated. This approach could be supplemented with the use of short-term forecasting tools, or short term indicators.

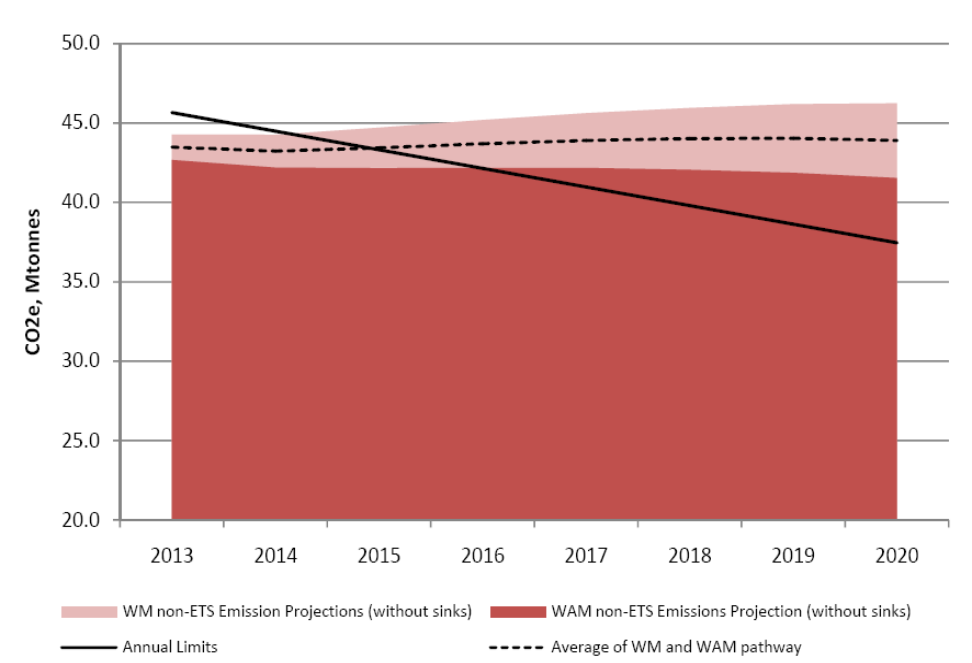
Good preparation by Member States may also involve understanding the potential variability of their future emissions (on the basis of a sensitivity analysis in the projections and/or the assessment of variability seen in past time-series). The ESD provides for flexibilities that can be used in the case of unexpected variations in emissions (e.g. in case of unexpected economic or climatic events). An improved understanding the scale and likelihood of any such variations would therefore be useful for informing strategy development relating to the potential use of flexibilities. Further details on actions relating to flexibility provisions are described later.

Some examples of actions taken within Member States are provided below.

Box 1: Estimating the GHG emissions projections for ESD sectors in Ireland

Ireland's latest greenhouse gas projections include an explicit consideration of the emissions arising in the ESD and non ESD sectors (EPA, 2011). For each of the '*with measures'* and '*with additional measures'* scenarios an estimate is made of the proportion of future emissions that are attributed to the ESD and non ESD sectors. An estimate is also made of the under/over achievement of the ESD target, based on the latest projections, on an annual basis from 2013 to 2020, as well as the cumulative under/over achievement over the whole period.

Comparison of greenhouse gas emissions projections with the linear reduction pathway required between 2013 and 2020

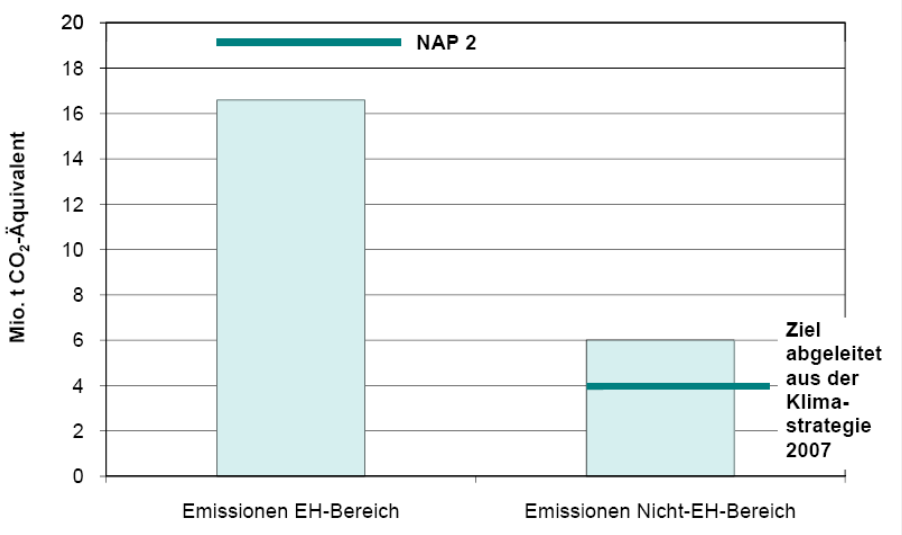


This analysis provides the Irish Government with a good understanding of the projected performance of Ireland relative to its ESD target, along with the impact of proposed additional measures on the emissions gap.

Box 2: Reporting on GHG emissions projections for ESD sectors in Austria

In its annual reporting of GHG emissions Austria reports separately on emissions within the scope of the ESD, at sub-sector level. The example below is taken from the industrial sector, in which emissions are disaggregated in emissions falling within the scope of the ETS (on the left) and emissions within the ESD (on the right). Emissions within the scope of the ESD are compared with the targets derived from the climate strategy Austria 2007.

GHG-Emissions 2009 of the industrial sector in Austria and achievement of the targets



Source: Austrian Environment Agency (2011)

2.1.3 When does action need to be taken?

Short term action is required to develop emission projections that isolate ESD sources, and to review the gap analysis. This should take into account additional policies for 2020 and beyond.

Regular action would be required to update the projections, and assess the policy gap. Under the EU Monitoring Mechanism (MM) Decision, Member States are required to submit updated projections on a bi-annual basis, and (under Art. 6.1.c of the ESD) update projections of emissions captured under the ESD.

2.1.4 What effort is required?

Preparation of emissions projections is an important but time consuming exercise. However, it is also a legal requirement. The additional effort required in order to prepare projections to isolate emissions into ESD and non ESD sources may to some extent relate to the models and modeling tools that are currently used, and the level of accuracy in the approach.

Proposed future revisions to the EU Monitoring Mechanism Decision will make this reporting mandatory.

There is also scope for knowledge-sharing amongst Member States as several have already developed emissions projections and conducted gap analyses to assess their performance. This may be most relevant for some of the more difficult sectors to isolate (e.g. industry)

2.2 Action 2: Quantify the impacts of the policies and measures on emissions in ESD sectors

2.2.1 Why is this important?

Accounting for the ex-ante impacts of policies and measures on emissions from the ESD sectors is important so that progress against ESD emission limits can be monitored, and the overall limits delivered at least cost. It will also ensure that impacts on the ESD target can be taken into account at the policy design stage.

Making a distinction between emissions arising in ESD sectors from those in the Emission Trading System (ETS) is also important because the implied carbon price of the emissions will differ between the two instruments.

In addition, assessing the impacts of individual policies will also provide an improved understanding of the influence of EU level policies and national measures on national emissions. While EU wide policies may make an important contribution to national targets, it is the responsibility of the individual Member States to deliver the ESD targets. More detailed understanding of policy impacts would therefore inform then need for additional national measures.

Finally, accounting for the ESD/ETS split of emissions will also improve the understanding of interactions between emissions from different sectors. For example, certain policies may reduce emissions in the ESD sectors, but increase emissions from ETS sectors (and vice versa). This is a particular issue for policies that act both on direct fuel consumption and also electricity consumption (e.g. certain energy efficiency measures) since emissions from electricity generation are largely captured within the scope of the ETS so these savings will not contribute to the ESD targets.

2.2.2 What types of action could be taken?

Accounting for emissions within the scope of the ESD sector could form part of national policy appraisal systems and procedures. This may be supported by dedicated guidance on accounting for greenhouse gas emissions. This would ensure that all policies account for their impacts on greenhouse gas emissions on a consistent and comparable basis.

Some examples of actions taken within Member States are provided below.

Box 3: Accounting for emissions in ESD sectors within the UK

The UK Government has developed guidance for the Valuation of energy use and greenhouse gas emissions for appraisal and evaluation (DECC, 2011a). This guidance specifically takes into account the requirements of the Climate and Energy package, including the different targets under the ETS and ESD.

Analysts, when preparing their ex-ante policy appraisals, are required to explicitly estimate the proportion of the emissions savings that fall within the scope of the ETS, and the proportion within the non-ETS sectors. Guidance is given on the sectors and sources that fall within the scope of the ETS, and those outside the scope.

The UK guidance also provides standard emissions factors for the different energy sources, and standardised energy and carbon prices for valuing the economic impacts or energy and carbon savings. Use of these default factors ensures that the Government has a good understanding of the relative impact that individual policies will have upon its ESD target.

Alongside the guidance a separate spreadsheet tool has been developed to ensure consistent reporting of emissions savings, and the cost-effectiveness of policies. This is shown below.

Version of GHG guidance used:	e.g. March 2010

Sector		Emission Changes* (MtCO2e) - By Budget Period			Emission Savings (MtCO2e) - Annual Projections														
		CB I; 2008-2012	CB II; 2013-2017	CB III; 2018-2022	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Power sector	Traded	0	0	0															
	Non-traded	0	0	0															
Transport	Traded	0	0	0															
	Non-traded	0	0	0															
Workplaces & Industry	Traded	0	0	0															
	Non-traded	0	0	0															
Homes	Traded	0	0	0															
	Non-traded	0	0	0															
Waste	Traded	0	0	0															
	Non-traded	0	0	0															
Agriculture	Traded	0	0	0															
	Non-traded	0	0	0															
Public	Traded	0	0	0															
	Non-traded	0	0	0															
Total	Traded	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Non-traded	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost effectiveness	% of lifetime emissions below traded cost comparator																		
	% of lifetime emissions below non traded cost comparator																		

Box 4: Accounting for emissions in ESD sectors in Austria

Paragraph 22 of the Ordinance regarding Monitoring and Reporting of Greenhouse Gas Emissions, which pertains to the Austrian Emissions Certificate Trading Act that regulates monitoring and reporting in the context of the EU Emissions Trading scheme (ETS) in Austria, is designed to ensure consistency of emission trading data with the national inventory. It states that the Umweltbundesamt has to incorporate, as far as necessary, the emission reports of the emissions trading scheme into the national greenhouse gas inventory in order to comply with requirements of the EU Monitoring Mechanism Decision (280/2004/EC) and the UNFCCC.

The agency combines data from energy balances with information from the ETS reporting as well as a separate database on larger steam generators (which are relevant for the ETS). With such information, the Umweltbundesamt is able to calculate remaining emissions for the ESD-Sectors.

2.2.3 When does action need to be taken?

Early action is important as policies will have long lifetimes so accounting for the impacts on ESD emissions early on is important. Early activities may include the development and implementation of reporting guidelines.

Ongoing activities may include the maintenance and refinement of any reporting guidelines, as well as the monitoring of the policy impacts. Ideally, the reporting of policy impacts would be coordinated by a central body.

2.2.4 What effort is required?

Effort is required to set up the accounting system, but also to implement the system. The accounting principles will be similar for all Member States, so lessons can be learned from the systems already set up by other countries (see example above).

2.3 Action 3: Understand the abatement potential and the cost of abatement in ESD sectors

2.3.1 Why is this important?

For most Member States, delivery of the national ESD targets will require limits on the future emissions of greenhouse gases. It is therefore important that Member States have a good understanding of the opportunities for abating emissions in the ESD sectors, and the respective cost of these measures. This will ensure the policies and strategies to abate emissions are targeted most effectively and efficiently.

It is also likely that certain abatement opportunities (e.g. associated with energy efficiency) may deliver emissions savings whilst also delivering net financial savings (i.e. the cost of the energy savings exceeds the cost of the abatement measures). In these circumstances the implementation of these measures is justified, from an economic perspective, even before the external cost associated with the climate change impacts of greenhouse gas emissions are taken into account.

Understanding the cost of abatement using domestic measures is also necessary to inform future strategies on the potential use of flexibility provisions.

2.3.2 What types of action could be taken?

Action is required to assess the technical and economic potential of abatement measures in each of the sectors covered by the ESD. This could include both technical measures and also behavioural measures. This would take into account for the cost of applying the measures within the ESD sectors over time, and the potential evolution of these costs. Ideally, the analysis would explicitly take into account the baseline penetration of the technologies (e.g. in response to existing policies) and adjust for hidden costs (e.g. the time cost or hassle factor).

It is, however, important that the assessment of the cost effective potential is not carried out in isolation of work to examine the market failures, and on the private investment landscape. The existence of market failures may result in the lower levels of uptake than expected from techno-economics modelling. Further policy interventions to overcome these barriers may be required to realise this potential.

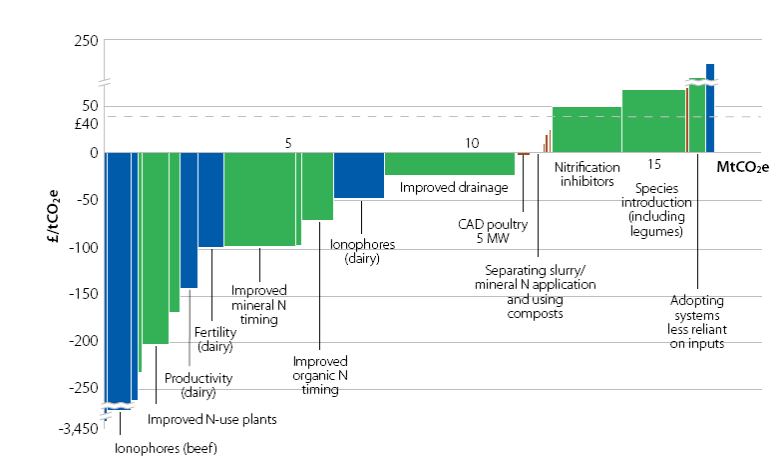
Some examples of actions taken within Member States are provided below.

Box 5: Assessment of the cost-effective abatement potential in ESD sectors within the UK

The UK has implemented an extensive programme of research to assess the abatement potential across all sectors of the economy. Recent work has focused on opportunities with sectors that fall outside the scope of the EU Emissions Trading System i.e. the ESD sectors. The output from such studies is an assessment of the abatement potential that can be delivered by different technical measures, and the associated cost of these measures.

An abatement cost curve for the agriculture sector is shown below to illustrate the output. This was prepared for the UK Committee on Climate Change (CCC), an independent body set up to advise the UK government on its long term climate mitigation targets.

Agriculture MACC maximum technical potential, optimistic case (2020)



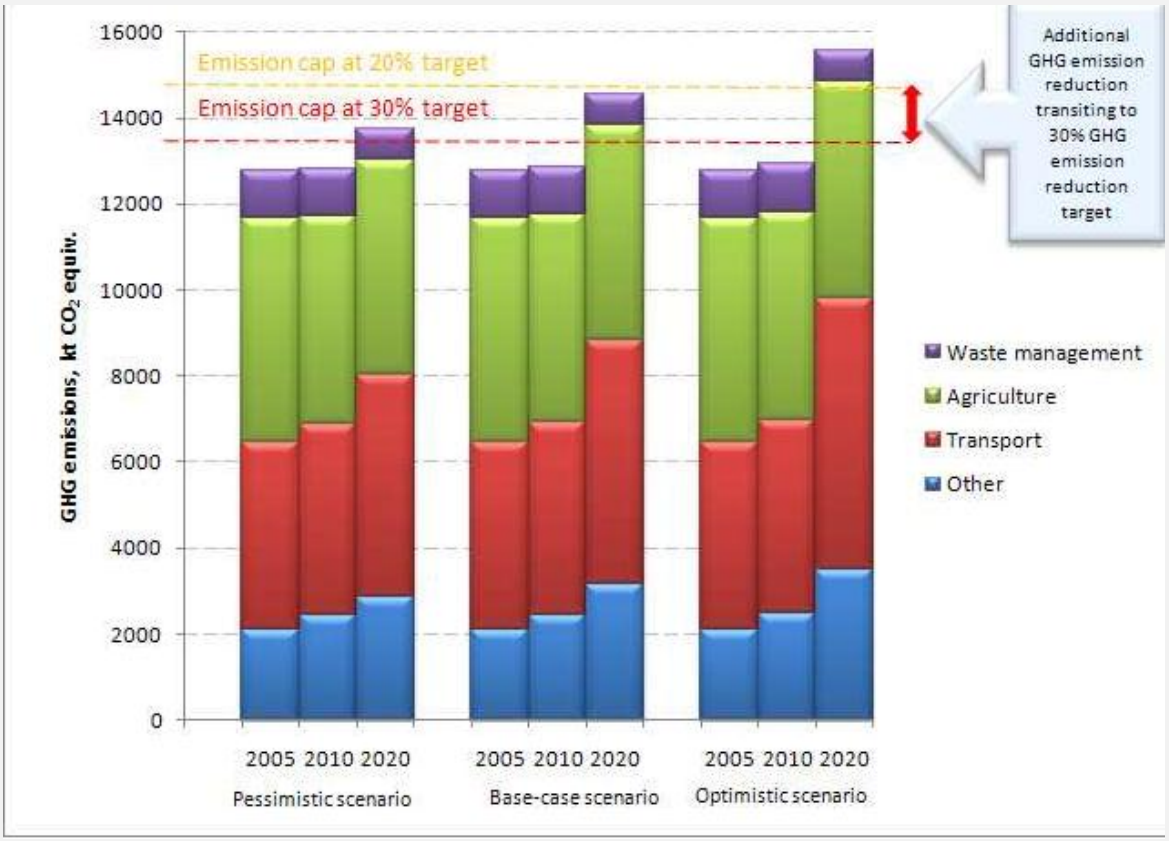
Source: CCC (2010)

Box 6: Assessment of the costs of implementing Lithuanian commitments in case of the EU's move to 30 % reduction of greenhouse gases emissions

Lithuania's foreign affairs ministry recently commissioned an assessment of the costs of implementing a more stringent greenhouse gas emissions reduction target in Lithuania. The analysis by COWI (2011) found that increasing the EU's 2020 carbon reduction target to 30% would cost the Lithuanian economy LTL 2.36bn* (€685m). In sectors covered by the EU's emissions trading scheme, total costs are estimated at LTL 2.13bn (€618m). Additional carbon reduction efforts in sectors captured within the scope of the ESD such as transport and agriculture would cost about LTL 229m (€66m).

The change in emissions associated with the more stringent target is illustrated in the figure below.

Emissions reduction in ESD sectors



Source: Costs of implementing Lithuanian commitments in case of the EU's move to 30% reduction of greenhouse gases emissions (COWI, 2011)

2.3.3 When does action need to be taken?

Action needs to be taken early on, since this information is critical for ensuring that policies are targeting the best measures. However, work is required on an on-going basis. The cost of measures will change over time reflecting both technology innovation but also change to other production costs. Likewise, as the policy landscape evolves certain elements of the abatement potential will be taken up.

2.3.4 What effort is required?

Detailed analysis of the abatement cost potential can be time consuming, particularly where regional and sector specific issues are introduced. However, a certain minimum level of analysis is required in order to ensure that policies are effectively targeting the best measures.

A basic level of understanding can be learned from those Member States that have carried out detailed analysis of measures already, and EU wide studies can provide useful insights. However, this should be supported by work to understand the applicability of the results in the country in question.

Particular effort should be focussed on improving the understanding of those measures that could be delivered at no net cost. These measures, including energy efficiency opportunities, provide the opportunity for financial savings and improved competitiveness so can also make an important contribution to economic growth objectives.

2.3.5 How can barriers to taking up abatement options be overcome?

One issue that is particularly important when assessing abatement options in ESD sectors is the issue of understanding the barriers to taking up certain abatement options. This is particularly important for energy efficiency measures which have the potential to deliver net financial savings, but may not be implemented due to the existence of these barriers.

Previous studies have examined the barriers to energy efficiency measures, but less evidence is generally available on policies to overcome the barriers. One exception is the International Energy Agency publication on financial barriers that is summarised in the box below.

Box 7: Policies and measures to overcome the financial barriers to energy efficiency in existing residential buildings

The study drew the following conclusions:

- **No single policy** category or policy measure can overcome the financial barriers alone. Policy packages that seek to address multiple financial barriers at the same time are likely to be more relevant, have greater impact, and be more sustainable.
- **Public-private partnerships** allow different barriers to be addressed concurrently and increase the impact of a policy on market transformation.
- Increasing the energy efficiency of buildings in a sustainable manner requires the existence (or creation) of a **market for energy efficiency**.
- Significant market transformation however will not take place without increased involvement from the private sector. **Strong political will** is required to trigger such increase in private participation.
- The role of **national contexts** in determining the success and/or failure of any given policy. The specificities of the buildings stock — *i.e.* whether it is largely inhabited by owners or renters — as well as the energy profile or political structure of a country, are all key features to be considered when designing policy packages.

Source: Promoting energy efficiency Investments Case studies in the residential sector (IEA, 2008)

3 Operational and Legal Framework

The operation and legal framework relates to the actions that might be required to ensure that the necessary legal frameworks are in place to deliver the ESD requirements. It also relates to actions taken to put in place the systems to monitor and enforce the requirements relating to the ESD. This may include the setting of departmental carbon budgets, or assigning responsibility relating to ESD delivery requirements.

3.1 Action 4: Development of an overarching legal framework

3.1.1 Why is this important?

It is the responsibility of Member States to define and implement policies and measures to limit emissions of sectors under the Effort Sharing Decision. The ESD does impose penalties for non-compliance and Member States therefore have a strong incentive to ensure compliance.

3.1.2 What types of action could be taken?

A number of Member States have introduced (or proposed) national legislation which provides a regulatory framework for the achievement of the ESD targets. The drivers for introducing such legislation include:

- Setting the targets in the ESD in the context of longer term goals, typically for 2050, thereby providing a long-term framework for low carbon transition;
- Giving businesses and individuals greater regulatory certainty in order to incentivise early investment;
- Ensuring that effective systems are put in place to ensure that departments and delivery bodies across government, or regional authorities, can be held accountable for the policy responsibilities;
- Establishing independent bodies with advisory or oversight functions in respect of meeting ESD or national targets;
- Providing the legal authority required to pass subsidiary legislation necessary to implement specific polices.

Some examples of actions taken within Member States are provided below. Although these examples are not specific to ESD compliance, they demonstrate the scope of climate change legislation that is being developed at the national level.

Box 8: The UK's Climate Change Act

In the United Kingdom, the Climate Change Act 2008 establishes a long-term framework to tackle climate change. The Act requires that emissions are reduced by at least 80% by 2050 compared to 1990 levels. It aims to encourage the transition to a low-carbon economy in the UK through unilateral legally binding emissions reduction targets in the form of 5 year carbon budgets. The first three carbon budgets were set in law in Spring 2009, and run from 2008-12 (equivalent to the first Kyoto Commitment Period), 2013-17 and 2018-22. As the Climate Change Act provides that budgets are set 3 periods in advance, in May the level of the fourth Carbon Budget covering the period 2023-27 was set in law at the end of June 2011.

The Climate Change Act places an obligation to lay before Parliament an "annual statement of emissions" including information on UK emissions and use of carbon credits (see for example, DECC 2011b). It also establishes a system of carbon accounting which is used to determine compliance with the carbon budgets regime (see Carbon Accounting Regulations 2009 SI2009/1257).

The Climate Change Act also provided for the establishment of the Committee on Climate Change which is an independent body with the following priorities.

- Provide independent advice to Government on setting and meeting carbon budgets and targets.
- Monitor progress in reducing emissions and achieving carbon budgets.
- Conduct independent research and analysis into climate change.
- Engage with representatives interested in climate change from across the UK in order to share research and information on climate change and gain input into our analysis.

Box 9: Austria's Climate Change Act

In Austria a Climate Change Act put forward to parliament is awaiting agreement. The proposals include a high level national climate change committee to elaborate and propose future climate strategies. GHG emissions budgets are proposed for 2013-2020 to be allocated to sectors and responsible entities (federation and Länder enter into constitutional agreement). The proposals also include a compliance mechanism (financial compensation in case of non-compliance)

Box 10: Spain's Proposed Climate Change Act

In September 2011 a cross-party commission reporting to both houses of the Spanish parliament backed a report calling on the next government to adopt legally-binding legislation on climate change and UK-style carbon budgets. The parliamentary report makes a number of other recommendations, such as the introduction of a carbon tax on energy use outside sectors covered by the EU's emissions trading sector. Proceeds would be ring-fenced for investment in climate-related projects.

3.1.3 When does action need to be taken?

The lead in time required for the passage of legislation will vary between Member States but given it is likely to involve choices about the scope of legislation and consultation periods, action should be initiated as soon as possible. For example, the UK Climate Change Act was first announced in November 2006 and even with cross-party support was passed into law two years later.

3.1.4 What effort is required?

Legislative processes will vary from Member State to Member State but the adoption of legislation will typically consist of the following stages:

- Policy development to identify the preferred scope and functions to be included in the legislation;
- Consultation with key stakeholders and subsequent finalisation of scope;
- Drafting of legislation and initial introduction into Parliament;
- Parliamentary scrutiny including debate and amendments;
- Passage into law;
- Drafting and passage into law of more detailed secondary legislation.

3.2 Action 5: Co-ordinate responsibilities for ensuring the delivery of the ESD targets

3.2.1 Why is this important?

The ESD covers a range of emission source sectors. A range of different governmental and non-governmental stakeholders may have responsibility for delivering carbon savings in line with the overall national ESD limits. It will be important to ensure effective co-ordination of these responsibilities to ensure targets are met and responsibilities are clear.

Also, there is a strong overlap between the policies required to fulfil the present Directive on Energy Efficiency and Energy Services (as well as the proposed requirements under the recent Energy Efficiency Directive). Therefore, at national level coordination between the bodies responsible for these policies and the ESD relevant policies is required.

3.2.2 What types of action could be taken?

It may be necessary to develop a framework that sets out clear responsibilities for delivering the ESD across all the relevant stakeholder groups. This is most relevant where multiple agencies or ministries have a role in meeting the overall requirements. This will ensure a co-ordinated response, and clear lines of responsibility.

It will also be important to put in place the communications channels to ensure effective communications between stakeholder groups. This may, for example, take the form of working groups, or committees.

Some examples of actions taken within Member States are provided below.

Box 11: Departmental carbon budgets in the UK

In the UK the Carbon Budget Management (CBM) framework holds Government departments to account for their policy responsibilities to reduce emissions.

The approach is composed of the following stages:

- Through collaborative discussion the preferred policies and measures to meet carbon budgets are agreed across Government. The resulting information on emissions savings estimates by policy provide a tool for assisting in tracking progress, risks to delivery and act as a benchmark for what policies are expected to deliver;
- Departments are held accountable for delivery of their carbon reduction policies and / or activities that support or enable carbon reduction through a framework of regular monitoring and reporting against their actions and indicators of progress;

This approach to carbon budget management primarily applies to departments which lead or have an impact on the majority of policies. The wider actions of all departments are constantly kept under review, with particular attention to new government initiatives that may have a knock-on effect on emissions, including those that may lead to an increase in emissions.

This framework ensures that the UK Government has a mechanism in place to deliver, coordinate and monitor the policies required in order to meet its climate change mitigation targets under the ESD.

Box 12: Co-ordination of responsibilities for climate change action in Austria

Austria is a federation made up of nine provinces (Länder), each with its own government and parliament. Government responsibilities are shared between the federation, the federal provinces and the local authorities. The overall responsibility for climate change policymaking lies within the Federal Ministry for Agriculture, Forestry, Environment and Water Management (FMAFEWM), and a number of national institutions are involved in the implementation of this policy.

The federal administrative structure devolves the decision-making to the federal, provincial and local levels. Both the federation and the provinces can enact climate-related legislation, whereas administrative measures, such as permits, are developed at all three levels.

Responsibilities not mentioned in the constitution are automatically allocated to the provinces (*Länder)*, including:

- Building codes (incl. energy certificates)
- Heating installations for buildings
- Spatial planning

To strengthen the coordination of the planning, development and implementation of policies, two inter-institutional groups have been established: the Kyoto Forum, where the provinces and the federal administration meet regularly and, when necessary, create working groups of experts for specific issues; and the Inter-Ministerial Committee to Coordinate Measures to Protect Global Climate, which brings together representatives of the relevant federal ministries, the social partners (representatives of business, industry and agriculture) and the provinces.

These working groups ensure that actions to deliver Austria's ESD targets can be effectively co-ordinated between the different delivery agencies.

3.2.3 When does action need to be taken?

Setting up the systems and processes to ensure effective co-ordination of responsibilities under the ESD should be an early action. However, there will be opportunities to refine and adjust the processes later, so these actions are less urgent.

3.2.4 What effort is required?

Initial effort will be required to set up the systems and responsibility.

On-going effort may be required to monitor progress and ensure effective co-ordination of activities.

3.3 Action 6: Raise awareness of ESD requirements within relevant stakeholder groups

3.3.1 Why is this important?

Raising awareness amongst national stakeholders is an important way to ensure that relevant parties and sectors are aware of the ESD targets and the ways in which those targets can be met.

3.3.2 What types of action could be taken?

Awareness-raising can take several forms – information provided on relevant websites, leaflets distributed at conferences, conference sessions, or online discussion/knowledge-sharing portals. This type of targeted awareness-raising could include articles in relevant trade journals or information on a sector-relevant website.

It may be particularly important to raise awareness of the ESD targets amongst key sector stakeholders. This could be facilitated by existing working groups (see for example Box 12:). Also on-line tools could also be used to help engage with stakeholders on policy actions (see Box 13 below).

Some examples of actions taken within Member States are provided below.

Box 13: Awareness-raising

The Malta Environment and Planning Authority have developed a webpage explaining the Effort Sharing Decision and the implication for Malta. Websites are a useful tool to raise awareness amongst relevant stakeholders.
http://www.mepa.org.mt/climate-effort

3.3.3 When does action need to be taken?

Action needs to be taken by Member States in the short term to ensure that all relevant stakeholders, sectors, and regions are aware of their targets and have the information needed to meet those targets.

3.3.4 What effort is required?

Effort is needed to determine the best way of raising awareness within each Member State, depending on the level of their targets and the sectors involved. This may lead to different approaches and communication channels used for different stakeholders.

After that, effort would be needed to develop the communication material, identify key stakeholders, or distribute information packs as required.

4 Strategic Framework

The strategic framework would capture actions that help ensure effective implementation of the ESD, but may also be concerned with longer term planning, or address the requirements of the ESD in a broader context. This would, for example, take into account the synergies between action taken to deliver the ESD, and other policy objectives (e.g. energy efficiency). It would include the relationship between measures taken in response to the ESD by 2020, and longer term climate policy objectives.

4.1 Action 7: Identify the structural and market barriers at country level that need to be overcome to deliver ESD aspirations

4.1.1 Why is this important?

The existence of market failures and other barriers may make it difficult for Member States to meet their targets under the ESD. Policy interventions can help to overcome these barriers, allowing markets to operate more efficiently, and the limits implied by the ESD targets to be met at a lower cost.

4.1.2 What types of action could be taken?

The concept of market failures is not new, and policy makers are experienced in designing interventions to overcome barriers to the efficient operation of markets. In the context of the ESD, it is necessary to examine the market failures relevant to climate change policies in the main ESD sectors. Some of these barriers could relate to local characteristics (e.g. local regulatory environment) or sector characteristics. It is therefore important to examine the barriers existing within the sector and domain in question.

Analysis of market barriers has become increasingly sophisticated, as policy makers have sought to understand policy impacts at a much higher level of resolution. This includes understanding the barriers faced by different segments of the population, using market research techniques to characterise psychological barriers and drivers and examining technology specific barriers. At the same time, modelling and other policy analysis tools have become more refined, having much more detailed characterisation of technologies and sectors, as well as the associated barriers to take-up.

Box 14: An economic framework for designing policies to reduce carbon emissions

The UK Government (Defra and DECC, 2009) has prepared an economic framework for designing policies to reduce carbon emissions. This document provides a high level review of the main market failures that relate to climate change policy making, and the potential interventions that could be implemented in order to overcome them. Further examination is also provided of the relative importance of the different market failures within different sectors.

An extract from the framework is provided below.

Sector	Major source of emissions	Major market failures and other policy considerations
Residential	Direct emissions from water heating, space heating/cooling of homes Indirect energy consumption from the use of appliances	• Carbon externality • Informational failures • Split incentives, between landlords and tenants • Hidden and transaction costs, especially search costs • Inertia • Low response elasticity: energy cost less than 10% of total household expenditure in 2006, search/transaction costs, limited substitution options • Balancing emissions reduction objectives with equity consideration of higher costs on low income households/individuals
Agriculture, forestry, and land use	Non-carbon emissions (methane, nitrous oxides) from diffuse sources Energy consumption: from petrol/diesel, gas, electricity use and for fertiliser production	• Carbon externality • Under-investment in R&D: into new technologies, agricultural practices, crops • Credit market failures, especially financial constraints on small farmers • Informational failures • High transaction/search costs • Measurement difficulties

4.1.3 When does action need to be taken?

Understanding market failures is required as part of the policy making process. Therefore, early action is required in those sectors where policy interventions to tackle greenhouse gas emissions are being considered. Ideally, this analysis will be carried out in parallel to the assessment of the cost-effective abatement potential.

4.1.4 What effort is required?

Detailed assessment of the market failures may be time consuming, and is likely to require some primary research. A review of the existing literature, and best practice within other Member States is a useful starting point for understanding the main issues, but further analysis is recommended as part of the policy development process, to ensure that policies are most effectively targeted.

4.2 Action 8: Develop a strategy for the use of flexibility provisions

4.2.1 Why is this important?

Flexibility provisions provide a means of helping Member States meet their targets in a cost-effective way. Allowing Member States to transfer a part of their emission allocation to other Member States helps even out differences in abatement costs across the EU. It could also provide an opportunity for Member States to deliver more emissions reductions than required by their targets and earn revenue from their surplus Annual Emission Allocations[1].

4.2.2 What types of action could be taken?

A number of actions could be taken by Member States to prepare for, and then make use of, the flexibility provisions. These actions would aim to maximise the opportunities offered by the flexibility provisions:

1) Transfer of Annual Emission Allocations

The ESD allows Member States to transfer part of their annual emission allocation within the Member State itself. Overachievement during 2013-2019 can be carried over to subsequent years, up to 2020.

In addition, the ESD allows Member States to transfer a part of their annual emission allocation to other Member States. Member States may transfer up to 5% of their annual emission allocation to other Member States, which may use this emission allocation until 2020 (ex-ante).

Also overachievement in 2013-2020 may be transferred to other Member States, which may use this emission allocation until 2020 (ex-post). Some Member States may decide to take advantage of this opportunity to overachieve and then sell their surplus AEA's to other Member States as a source of income.

2) Project Activities

Another opportunity for flexibility is that Member States can utilise project-based credits to help meet their targets. These are basically the Joint Implementation/Clean Development Mechanism projects under the Kyoto Protocol. Member State access to international project credits to meet their targets is limited (annually) to 3% of Member States' 2005 emissions under the ESD.

In developing a strategy to maximise the opportunities associated with the use of the flexibility the following elements might be considered by Member States.

- Purchasing strategy

For those Member States that are likely to need to 'purchase' AEAs or project-based credits in order to meet their annual targets it is important to have in place a purchasing strategy. This strategy may take into account preferences for the different types of flexibility provisions to be purchased (which in turn may reflect the anticipated prices), but also the timing of purchases. This latter point may be important as the level of demand may change over time, both within the Member State, but also the EU as a whole. Thus a purchasing strategy might try to anticipate the availability and price of AEAs and project-based credits.

- Selling strategy

For those Member State that anticipate being net "sellers" of AEAs, then a similar pricing strategy may be required. This would also need to anticipate the level of demand in the market over time, but also

[1] The use of flexibilities by Member States will be monitored and tracked on an annual basis through registries.

the strategy of other 'sellers'. This strategy may evolve over time as the strategy of other sellers is revealed (e.g. if a number of ex-ante transfers are agreed).

- Selection of provisions

In all cases the strategies developed should reflect the fact that certain flexibilities carry more risk than others, both from the perspective of the purchaser and the seller. This should, ultimately, be reflected in the prices. For example, the (ex-ante) transfer of annual emission allocations from one member state to another implies a high level of certainty that one member state can reduce its emissions more cost effectively than another. However, this is still based on future emissions so is potentially more risky. In contrast, an ex-post transfer is associated with reductions that have already been delivered, so are already 'banked'.

- Governance

A final element of the strategy would include issues of governance, such as who should be responsible for trading activities.

No examples of the use of such flexibilities are available yet because trading isn't expected until 2013. However, certain parallels can be drawn with experiences with international emissions trading of assigned amount units (AAUs) under the Kyoto protocol.

4.2.3 When does action need to be taken?

Effort is needed in the near term to develop a trading strategy for using flexible mechanisms and further understanding the different options. Schiellerup et al. (2011) made a strong case for exploring each of the flexible mechanism options further as a matter of some urgency, taking account of current and prospective market conditions as well as the importance of ensuring the safeguarding environmental integrity.

Effort will also be needed in the medium term to maintain the trading system and ensure trading is being carried out at the right time.

4.3 Action 9: Analyse the co-benefits of action to deliver the ESD targets

4.3.1 Why is this important?

Measures taken in response to the ESD may offer a range of co-benefits. These would include environmental impacts (such as air quality improvements), as well as economic and social benefits (such as green job creation). Whilst the assessment of these wider impacts is not necessary for meeting the requirements of the ESD, understanding these impacts may be important for justifying actions under the ESD, as well as for targeting which measures to take.

4.3.2 What types of action could be taken?

A range of co-benefits from climate policies exist, and these have been extensively covered in previous studies. Whilst these are not specific to measures taken in response to the Effort Sharing Decision, the approaches are equally valid.

However, more detailed country or sector level analysis is useful for prioritisation of efforts and decision making. Aspects that have been found to be important in previous studies include:

- Air quality (environmental and human health benefits)
- Energy security
- Green jobs

- Economic growth
- Social and distributional impacts

Action may also be required to co-ordinate activities across the different Ministries that are responsible.

Some examples of actions taken within Member States are provided below.

Box 15: Economic impact of GHG mitigation target

The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety commissioned a study (PIK, 2011) to assess the economic impacts associated with a more stringent GHG mitigation target.

The study used a macroeconomic model to assess the impacts of a more stringent GHG emission target on a number of economic variables. The study concluded that raising the EU's climate target from 20% to 30% can foster the following outcomes by 2020:

- increase the growth rate of the European economy by up to 0.6% per year
- create up to 6 million additional jobs Europe-wide
- boost European investments from 18% to up to 22% of GDP
- increase European GDP by up to $2004842 bn
- increase GDP by up to 6% both in the old (EU15) and new (EU12) member states.

The analysis provided the German government with a better understanding of the wider economics impact of climate mitigation measures, and the implication of a more stringent target.

Box 16: Air pollution co-benefits of climate mitigation measures

The UK government has commissioned research into the air quality co-benefits of GHG abatement measures. Since a number of measures that reduce emissions of greenhouse gas emissions also reduce emissions of air quality pollutants, this can provide further justification for climate mitigation actions. At the same time it is useful for identifying measures where the air quality and climate objective may potentially be in conflict (for example, the use of bioenergy in urban areas).

Policy choices for delivering climate change targets for 2020-2050

	Option	Likely impact on air pollution[17]	Commentary
Transport	Electric cars		Highly beneficial for urban air quality. Benefits for UK emissions (including of greenhouse gases (GHGs)) is dependent on the energy source used to generate the electricity but it is assumed that low carbon sources are used.
	Hydrogen fuel-cell cars		Highly beneficial for urban air quality. The benefit for UK emissions (including GHGs) is dependent on the energy source used for creating the hydrogen fuel but it is assumed that low carbon sources are used.
	Biofuels		Higher blends (>15%) of some conventional biofuels could increase NO_X and VOC emissions, with PM emissions likely to decrease. Certain biofuels such as biomethane can deliver considerable air quality benefits relative to diesel if fuelling and emissions control systems are well engineered.
Heating	Ground- and air source heat pumps		Produces no air pollution emissions and therefore beneficial for urban air quality and, subject to the energy source used to operate the pump, for UK emissions.
	Combined Heat and Power		Large scale uptake would tend to require CHP in urban centres, with a negative impact. In terms of national emissions, CHP uptake will make heat and electricity generation more efficient, with the likely result that total emissions will reduce.

Source: Defra (2010)

The analysis of these co-benefits means that the UK is able to develop mitigation strategies and implement policies in the ESD sectors that maximise the total benefits, and minimise policy conflicts.

4.3.3 When does action need to be taken?

Action is less urgent, but it makes sense to consider these issues as part of the strategic policy making process. The analysis may therefore be carried out to support discussion on a new climate strategy, for example.

4.3.4 What effort is required?

The effort will relate to the scope of the analysis. A high level assessment of the impacts can be informed by existing research in the area. However, it may be necessary to carry out new work to assess the impacts of specific national actions, or specific impacts in the Member State in question.

4.4 Action 10: Assess the ESD policies and measures in the context of long-term emissions reduction pathways

4.4.1 Why is this important?

Whilst the ESD is concerned with actions to 2020, it is also important to consider the long-term pathways to 2050 in order to understand what the options are for delivering longer-term mitigation goals. The decisions made to meet mitigation targets in ESD sectors in 2020 will have implications on the options for meeting long-term mitigation targets as well; issues such as technology lock-in must be considered at an early stage.

Considering long-term pathways early is also necessary to help decision-makers fully understand the implications of policies and different options for meeting emissions targets. It also enables stakeholders to get involved in decision-making from an early stage.

4.4.2 What types of action could be taken?

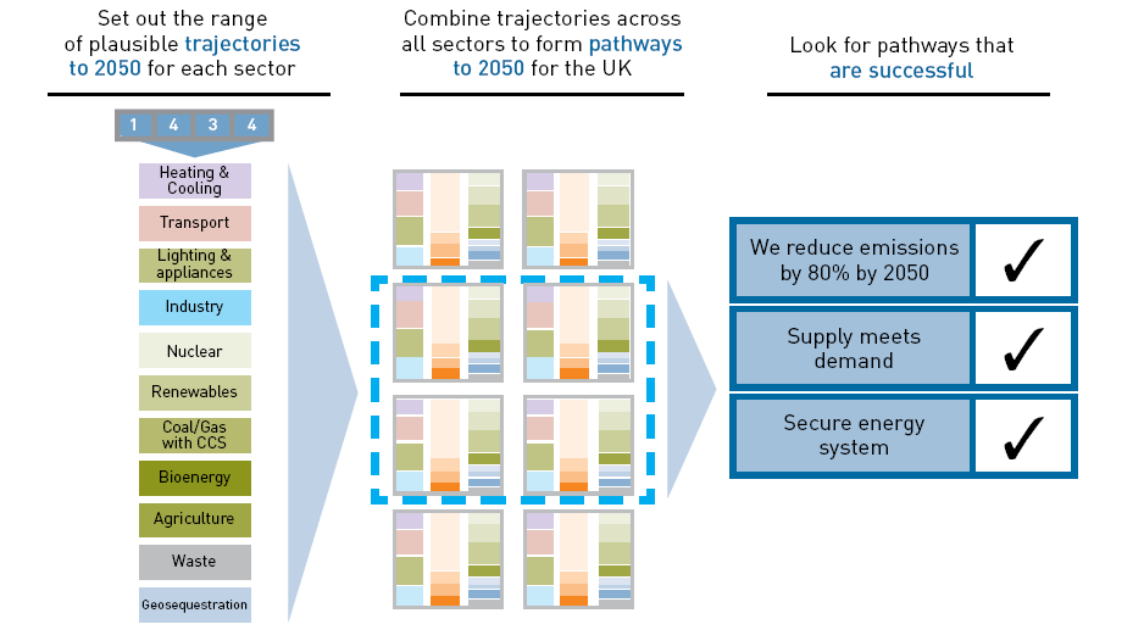
Several Member States have already developed pathways to 2050 to set out possible options for meeting long-term emissions reduction targets in ESD sectors. These roadmaps provide insight on the choices and trade-offs that may be required to meet long-term targets and illustrate the different ways those targets could be met.

Decision-making tools or models are also a useful way to estimate the impacts that different policies may have on the emissions in the long-term.

Some examples of actions taken within Member States are provided below.

Box 17: Development of a 2050 pathways and tool for the UK

The UK Government's 2050 Pathways work (DECC 2011c) presents a framework through which to consider some of the choices and trade-offs that will need to be made to deliver the long-term mitigation goals. It is system-wide, covering all parts of the economy and all greenhouse gas emissions released in the UK. It shows that it is possible to meet the 80% emissions reduction target in a range of ways, and allows people to explore the combinations which meet the emissions target while matching energy supply and demand.



The development of the 2050 pathways tool meant that the UK government was able to engage more effectively with stakeholders on the potential options, and associated pathways, to deliver to UK long term mitigation targets. It also provided an understanding of the importance of certain technologies implemented in the short-term (e.g. to 2020) for the delivery of longer-term objectives.

Box 18: Energy Concept 2050 for Germany

The German government has set up an Energy Concept 2050 in response to the Fukujima nuclear accident which shall insure that Germany will reach its GHG targets of -40% by 2020 and at least -80% by 2050 as compared to 1990.

A large number of targets under this long-term strategy are relevant for the ESD:

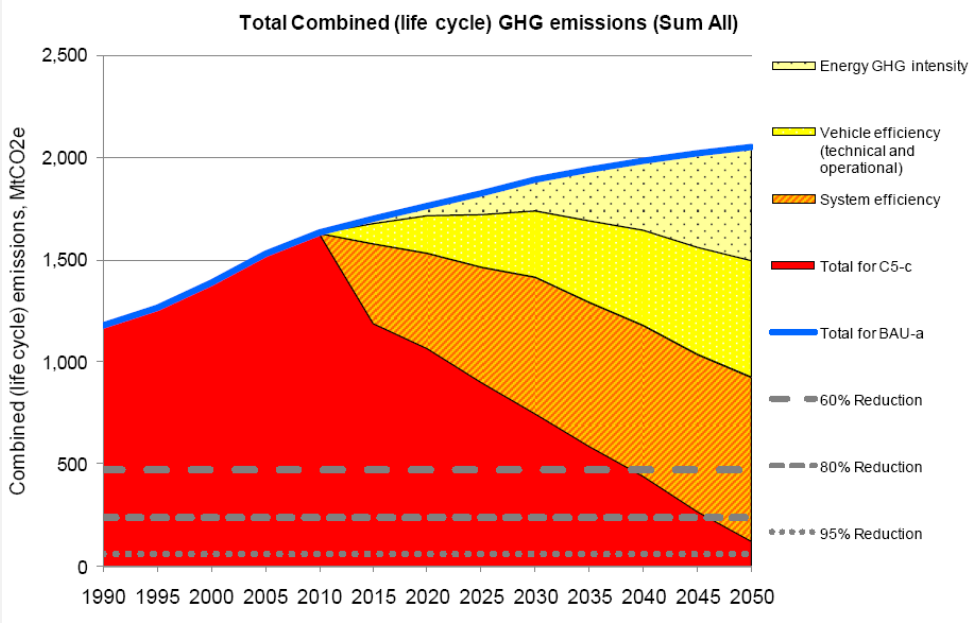
- By 2050 Germany intends to lower the primary energy consumption by 50 % through improved energy efficiency. The corresponding actions are developed in a strategic paper on energy efficiency.
- The demand for energy in existing buildings shall be lowered by 20% in 2020. By 2050 buildings in Germany shall be nearly climate neutral; still required energy shall come from renewables.
- In order to double the thermal refurbishment rate of the building stock, the government adds 1.5 billion Euros to the KfW Building Rehabilitäation Programme. The subsidies are the higher, the earlier rehabilitation is undertaken.
- Accelerated tax depreciation (10% per year) make energetic rehabilitation even more attractive.
- The ministry responsible for the built environment works out a building rehabilitation strategy 2050
- For public procurement products and services in the highest energy efficiency class have to be chosen
- In the transport sector, electric cars are pushed more strongly.

Box 19: Scenario tool for assessing emissions reduction pathways from transport to 2050

The SULTAN Illustrative Scenarios Tool was developed for the European Commission as part of the project *EU Transport GHG: Routes to 2050*.

SULTAN is a Microsoft Excel-based tool that can be used to investigate GHG emissions, and some other quantities, associated with transport from the EU-27 countries in the period 2010-2050. It allows users to create and edit 'Policy Scenarios' – illustrative scenarios for the EU transport system that make assumptions on how policy has impacted on the system – and then view the outcomes of the scenarios in terms of GHG emissions, some other pollutant emissions, and some costs.

A illustrative scenario output is shown below. The tool is available on the project website: www.eutransportghg2050.eu



The development of the tool allowed the European Commission to engage with stakeholders on the challenges associated with reducing emissions from the transport sector, and the potential pathways available to deliver deep cuts in GHG emission from the sector.

Box 20: Polish roadmap to a low-emissions economy (MOS, 2012)

The Polish government issued a policy paper presenting plans to move towards a low carbon economy. The Polish roadmap should be ready in 2013 and will include activities in both ETS and non-ETS sectors. The document outlines areas the National Programme for the Development of a Low Emission Economy will focus on: energy and resource efficiency, waste management, the development of low carbon technologies and new models of consumption. In particular, the need to improve the energy efficiency of buildings was highlighted as an important area of attention.

4.4.3 When does action need to be taken?

Some early action may be important as policies will have long lifetimes so understanding the long-term impacts of policies is necessary. However, as this action is concerned with strategic developments, it is less urgent than certain other activities.

4.4.4 What effort is required?

Effort is required to assess long-term emissions pathways as part of long term economic strategy development. The level of analysis and the resource commitment to such activities should be proportional to the needs and resources of the particular country.

While it is not practical for every Member State to develop a detailed 2050 calculator, it is useful for each to do some assessment of how long term targets could be met and the overall pathways issues around meeting those long term targets. This may focus initially on certain general principles of low carbon development, rather than detailed scenario analysis. For example, policies that result in fuel switching (from oil to gas heating) may reduce short term emissions but run the risk of making the move to zero carbon more expensive.

The principles of developing 2050 pathways and tools will be similar for all Member States, so lessons can be learned from the frameworks already set up by other countries (see examples above). For example, certain abatement options such as electrification of heat and transport are probably a relevant option for most Member States – sharing of the results of such pathways analysis between Member States could be valuable. This will enable the development of common lessons, and also reduce the need for new analysis to be carried out in each country.

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