



Northern Ireland Greenhouse Gas Emissions Reduction

Action Plan

Cross - Departmental Working Group on Greenhouse Gas Emissions
February 2011

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GLOSSARY

BERR	Department of Business, Enterprise and Regulatory Reform (Now BIS)
BIS	Department of Business, Innovation & Skills
Basket of six	CH ₄ , CO ₂ , N ₂ O, SF ₆ , HFCs, PFCs (see below for acronyms)
BMW	Biodegradable Municipal Waste
bn	(Monetary) Billion
BREEAM	Building Research Establishment Environmental Assessment Method
C	Carbon
Carbon Budgets	<p>A carbon budget is a cap on the total quantity of GHG emissions emitted in the UK over a specified time. Under a system of carbon budgets, every tonne of GHG emitted between now and 2050 will count. Where emissions rise in one sector, corresponding falls in another will have to be achieved. Each carbon budget covers a five-year period, with three budgets set at a time. The first three carbon budgets will run from 2008-12, 2013-17 and 2018-22. The fourth carbon budget, covering the period 2023-2027, must be set by 30 June 2011.</p>
Carbon sink	<p>A carbon sink is a natural or artificial reservoir that accumulates and stores some carbon-containing chemical compound for an indefinite period. The process by which carbon sinks remove carbon dioxide from the atmosphere is known as carbon sequestration. The main natural sinks are absorption of CO₂ by the oceans via physicochemical and biological processes; and photosynthesis by terrestrial plants. Natural sinks are typically much larger than artificial sinks. The main artificial sinks are landfills; and carbon capture and storage proposals.</p>
CCC	Committee on Climate Change
CDWG	
GHG	Cross-Departmental Working Group on Greenhouse Gas Emissions
CEEF	Central Energy Efficiency Fund
CEEQUAL	Civil Engineering Environmental Quality Assessment & Award Scheme
CH₄	Methane
CHP	Combined Heat and Power
CO₂	Carbon dioxide

CO₂e	Equivalent carbon dioxide is the concentration of CO ₂ that would cause the same level of radiative forcing as a given type and concentration of greenhouse gas. Examples of such greenhouse gases are CH ₄ , PFCs and N ₂ O. Carbon dioxide equivalent (CDE) is a quantity that describes, for a given mixture and amount of greenhouse gas, the amount of CO ₂ that would have the same global warming potential (GWP), when measured over a specified timescale (generally, 100 years). Carbon dioxide equivalency thus reflects the time-integrated radiative forcing of a quantity of emissions or rate of greenhouse gas emission - a flow into the atmosphere - rather than the instantaneous value of the radiative forcing of the stock (concentration) of greenhouse gases in the atmosphere described by CO ₂ e.
CPD	Central Procurement Directorate (Part of DFP)
CRC	Carbon Reduction Commitment Energy Efficiency Scheme
DA(s)	Devolved administration(s)
DARD	Department Of Agriculture And Rural Development
DCAL	Department Of Culture, Arts And Leisure
DE	Department Of Education
DECC	Department Of Energy and Climate Change
Defra	Department For the Environment, Food and Rural Affairs
DEL	Department For Employment And Learning
DETI	Department of Enterprise, Trade and Investment
DFP	Department Of Finance And Personnel
DHSSPS	Department Of Health , Social Services And Public Safety
DOE	Department of the Environment
DOJ	Department Of Justice
DRD	Department For Regional Development
DSD	Department For Social Development
ESD	Education for Sustainable Development
EU ETS	EU Emissions Trading Scheme
GDP	Gross Domestic Product
GHG	Greenhouse gas(es)
GHG Inventories (GHGI)	Emissions Inventories account for the amount of a pollutant discharged into the atmosphere. The UK GHG Inventory includes the total emissions of the basket of six emitted during a specific year. It allows government to monitor progress against agreed targets or to consider areas in which new policies/strategies may be needed.
GVA	Gross Value Added
HGV(s)	Heavy Goods Vehicles
HFCs	Hydrofluorocarbons

Interreg	Interreg is a Community initiative that aims to stimulate interregional cooperation in the European Union. It started in 1989, and is financed under the European Regional Development Fund (ERDF). The current programme is Interreg IV, covering the period 2007–2013.
k	(Monetary) Thousand
kt	kilotonnes
LULUCF	Land use, land use change and forestry
m	(Monetary) Million
Mt	Megatonne(s)
MW	Megawatt(s)
N₂O	Nitrous oxide
NICS	Northern Ireland Civil Service
NIEA	Northern Ireland Environment Agency
NIHE	Northern Ireland Housing Executive
NILAS	Northern Ireland Landfill Allowance Scheme
NIPS	Northern Ireland Prison Service
NIRO	Northern Ireland Renewables Obligation
NISRA	Northern Ireland Statistics and Research Agency
NPC	Net Present Cost
NPV	Net Present Value
OFMDFM	Office Of The First Minister And Deputy First Minister
PFCs	Perfluorocarbons
PfG	Programme for Government
ppm	parts per million (if CO ₂ e, often ppmv – ppm by volume)
PPS	Planning Policy Statement
PSA	Public Sector Agreement
PSEC	Public Sector Energy Campaign
RIA(s)	Regulatory Impact Assessment(s)
RDP	Rural Development Programme
ROC(s)	Renewables Obligation Certificate(s)
SAP	Standard Assessment Procedure
SEA	Strategic Environmental Assessment
SEF	Strategic Energy Framework
SF₆	Sulphur hexafluoride
t	Tonne(s)
VAT	Value Added Tax
VFM	Value For Money
WEEE	Waste Electrical and Electronic Equipment

Ministerial Foreword

Climate change is one of Northern Ireland's foremost environmental, social and economic challenges and we all have a key role to play in tackling this issue. Business, industry, government, the public sector and each individual must work together to protect our environment.

In doing so, we should be aware that taking action on the climate change agenda could be of wider benefit to society and business.

For example, businesses and householders can reduce emissions by being more energy efficient and saving on energy bills. Public health can be improved by measures such as walking and cycling and reducing our reliance on the car.

A key objective must be to reduce the greenhouse gas emissions that can have a harmful effect on our atmosphere. The Executive has shown leadership in this area by setting a Programme for Government target to reduce greenhouse gas emissions by 25% below 1990 levels by 2025.

This is why the Executive agreed to my proposal on 13 May 2010, to establish a **Cross-Departmental Working Group on Greenhouse Gas Emissions** made up of senior officials tasked with examining performance to date and to develop an Action Plan giving us a pathway to 2025.

I am pleased to Chair this group, as I personally take the climate change agenda very seriously and believe departments have a significant role to play by ensuring their key policies are aligned to tackle the issue.

Every Northern Ireland department needs to help deliver this target, some will bear more of a burden than others will but all must ensure they play their part.

This **Action Plan** highlights the steps we are currently taking and recommends the areas in which we need to step up our commitment.

More *will be achieved* by acting together, than by departments acting independently of each other. I am confident that this is the first step of many in our combined efforts.



A handwritten signature in black ink, reading "Edwin Poots". The signature is written in a cursive, flowing style.

Edwin Poots, MLA
Minister of the Environment

Section 1 – Executive Summary

Climate change is an issue that continues to dominate the environmental agenda. Although Northern Ireland is unlikely to see the extreme events predicted to devastate parts of Africa and South-East Asia, we still have to make our contribution to mitigate the global challenges presented.

Even in Northern Ireland disruption to business, services and our daily lives will increase if adverse changes occur. An increased risk of flooding and coastal erosion with pressure on drainage, sewage, roads, water and habitat is very real. Increased temperature, increased pollution and poorer air quality may bring discomfort to the vulnerable and threaten species of animals and crops.

The EU, UK Government and Northern Ireland Executive have all recognised this by setting targets to reduce greenhouse gas emissions and establishing strategies to tackle the effects. This document sets out a Cross-Departmental Action Plan to tackle the former, i.e. how Northern Ireland is reducing and will continue to reduce its carbon footprint. Specifically it demonstrates how, the Programme for Government (PfG) target to reduce greenhouse gas emissions by 25% below 1990 levels by 2025 will be delivered.

In 2008 (the latest available figures), overall NI emissions were estimated to be 22,186 kilotonnes of equivalent carbon dioxide (ktCO₂e). Although 11.2% lower than 1990, in this period England and Scotland had achieved reductions of 21.1% and 21.3% respectively (Wales were 9.9% lower).

The 2025 target sets an overall emissions level of 18,746ktCO₂e. The evidence set out in this study shows that this can be reduced to 16,372ktCO₂e (or 33.1% reduction) by 2025 if all proposed policies come to fruition. However, there should be no complacency on the indication that the PfG target will be met. There are a number of reasons for this.

Firstly, there is a greater degree of uncertainty in greenhouse gas estimates at individual country level than at the UK level. This is due to more limited data availability and less precision at devolved administration level. The Northern Ireland emissions estimates therefore have a confidence interval of +/- 33% and are particularly weak in sectors like agriculture and land use. However, the confidence interval will lessen over time as measuring systems improve and more specific data becomes available.

Secondly, if the current target is to be met all departments must deliver the measurable emissions outlined in proposed policies set out in this document. However, it will be important to monitor progress on an ongoing basis since it is possible that policies and measures will not deliver the reductions expected. If so further policies will be required.

Thirdly, it will also be important to follow the current study up with a detailed sensitivity analysis since there is a potential over reliance on a small number of policies to deliver the PfG target. For example delivery of the Strategic Energy Framework is critically important to deliver Northern Ireland's greenhouse gas reduction target. Agriculture, power generation, housing and transport dominate the local emissions landscape. If policy delivery fails there needs to be increased effort or even burden sharing elsewhere.

Fourthly, it is possible that in the future the existing PfG target will need to be revised to reflect more ambitious targets in other parts of the UK and more widely. For example, the UK currently aims to deliver a 34% reduction in emissions by 2020. Scotland's target is for a 42% reduction in the same timeframe. The UK government is also reviewing recommendations from the Committee on Climate Change and is separately in discussion at EU level on increased UK targets.

There are economic and financial implications in reducing emissions. Many measures require increased resources initially but see a greater payback period over time and may even trigger further benefits through behavioural

change. Unfortunately, not all current and planned policy measures relating to greenhouse gas emissions contain financial/economic analysis. The full lifetime costs must be considered when appraising the value of policies. This is not only in terms of value for money but in relation to their wider social and environmental benefit too.

This report identifies that to maximise emission reductions in a cost effective way that all Northern Ireland departments must not only ensure their actions and functions drive emissions reductions but that they work together to realise this goal. Officials in all departments should ensure that all new policies consider greenhouse gas implications fully. This can be supported by more specialist interaction (statisticians, economists for example) to enable more accurate and useful analysis.

This report identifies that this Cross-Departmental Action Plan must be presented to the Executive including recommendations on future governance structures and monitoring arrangements. It is clear that having the Group chaired by the Environment Minister has been helpful in this first step to providing an Action Plan. It is inherent in this that the high level of co-operation achieved through the Working Group in producing the Action Plan needs to continue in a way that ensures accountability and that the Executive remains fully apprised of progress.

It will also be the case that the proposals to the Executive on governance will include consideration of how we engage across government on the need to adapt to the effects of climate change (an issue not covered in this study).

There are four actions identified going forward over and above those within the individual departmental chapters:

1. Inter-departmental working must continue. The Cross-Departmental Working Group on Greenhouse Gas Emissions format is the forum to set the necessary work to support this – in light of 4 below this

2. All policies must be fully appraised for costs and benefits and quantified in terms of greenhouse gas emissions where possible;
3. Data must be improved and refined. Departments must work with statisticians and economists to create robust inventories – this will be established in an analytical sub-group of The Cross-Departmental Working Group on Climate Change;
4. The Cross-Departmental Working Group on Climate Change to agree monitoring arrangements that provide annual reassurance to the Executive that appropriate progress is being made towards the PfG target. This will include consideration of the adaptation agenda.

We have made a big step forward through the development of this Action Plan. None of this is easy and may even seem onerous to begin with. It is easy to repeat the mantra on climate change being one of the most dangerous environmental threats we face without actually tackling the issue or paying anything more than lip service. It is much harder to take action to mitigate against such threats.

This Action Plan commits all departments to tackle that threat together. We should take heart that current predictions indicate that the PfG target will be met. However, as outlined earlier, we also need to say clearly that we need to be cautious at this stage and commit to ongoing interdepartmental governance and monitoring of performance on this very important issue.

Section 2 Action Plan

I. Background

i. The Wider Picture

Although Climate Change is a devolved issue, how we tackle it is influenced by EU and UK policies and legislation. Whitehall represents our interests at EU Member State level and often UK policies will play a major role in shaping our own direction domestically. In some areas, we work with colleagues in forming UK wide initiatives. In others we focus on developing local solutions.

The EU target is a reduction of 20% in greenhouse gas (GHG) emissions by 2020 on 1990 levels, though it is committed to move to a 30% reduction target if the conditions are right internationally in terms of a global deal. There are also Directives aimed at reducing emissions and ensuring energy efficiencies. For example, the EU Emissions Trading Scheme Directive 2003/87/EC, is an EU wide cap and trade scheme that limits emissions from intensive industry.

The Climate Change Act 2008 is UK legislation that extends to Northern Ireland with the consent of the Northern Ireland Executive and Assembly. It sets a long-term framework for the UK to reduce its GHG emissions including:

- A legal framework to reduce emissions by at least 80% below 1990 levels by 2050 and by at least 34% in the period 2018-2022;
- Compliance with a system of five-year carbon budgets, set up to 15 years in advance, to deliver the emission reductions required to achieve the 2018-2022 and 2050 targets; and

- The setting up of a Committee on Climate Change (CCC) to advise government on the level of the carbon budgets and how they might be met and report annually on progress.

The first three UK carbon budgets, covering the period 2008 to 2022, were set in law in May 2009 following approval by Parliament. This included taking account of representations made by the devolved administrations (DAs). The budgets require a 22% reduction in UK emissions below 1990 levels in 2008-12, a 28% reduction in 2013-17 and a 34% reduction in 2018-2022.

While there is no specific target or carbon budget for Northern Ireland in the Climate Change Act 2008, it is implicit that Northern Ireland contributes to the UK effort.

The Climate Change Act 2008 extends to Scotland in the same way described above for Northern Ireland. However, Scotland has passed its own legislation known as the Climate Change (Scotland) Act 2009. This legislation includes targets to reduce emissions by 42% in 2020 relative to 1990 and 80% in 2050 relative to 1990. The Scottish Act also provides for the setting of annual emission targets.

In addition to the provisions of the Climate Change Act 2008, the Welsh Assembly Government has made a commitment from 2011 for Wales to reduce annual GHG emissions by 3% in areas of devolved competence.

In December 2009, the Republic of Ireland published a framework document on a Climate Change Bill, which is modelled on the UK Act. It will set 3% annual reduction targets with an 80% reduction on 1990 levels by 2050. The Bill has not yet been presented.

In Northern Ireland, the Executive has set a target in the Programme for Government (PfG) to reduce GHG emissions by 25% below 1990 levels by 2025. This is set out in Public Sector Agreement (PSA) 22.

Performance against target is summarised in Figure 1 below (the latest year data is available for is 2008):

	Target Reductions (on 1990 levels)	2008 Performance
Northern Ireland	-25% by 2025†	-11%
UK	-34% by 2020* -80% by 2050*	-20%
Scotland	-42% by 2020* -80% by 2050*	-21%
Wales	-3% p.a. in areas of devolved competence†	-10%
Republic of Ireland	Expected to be -3% per annum* -80% by 2050*	+21%
EU-27	-20% by 2020	-11%

Figure 1: GHG Emissions Reduction Targets & Performance

† = Non-statutory; * = Statutory

ii. Need For An Action Plan

The PfG Delivery Report for 2008/2009 identified that there was limited cross-departmental involvement in the accountability framework to monitor delivery of Northern Ireland's target. On 8 December 2009, the Environment Minister met with the First Minister, deputy First Minister and the Finance Minister to review this.

Discussions identified that it was not clear how the Department of the Environment (DOE) as the lead department, and with only the Department of Enterprise, Trade and Investment (DETI) and the Department for Social Development (DSD) contributing to the PSA target, could effectively drive the necessary changes to deliver targeted reductions in emissions. Ministers reflected that although the latest data indicated that the Executive was on target to meet the 25% reduction target, there is no guarantee that progress will continue to be maintained in the absence of a clear action plan.

Consequently, Ministers proposed that it would be useful to establish a Working Group, chaired by the Minister of the Environment, to co-ordinate activity in this area and to ensure full participation across government. The Executive agreed on 13 May 2010 to set up a Cross-Departmental Working Group on Greenhouse Gas Emissions (CDWG GHG) made up of senior officials. Chaired by the Environment Minister, the Terms of Reference are:

- To agree a cross-departmental action plan by end-2010 setting out the strategic approach and actions to be taken to meet the greenhouse gas reduction target set out in the Programme for Government;
- Ensure that Departmental policies are joined-up and reinforce achievement of the Executive's target; and
- Make recommendations on the prioritisation of actions and associated funding.

iii. Current Emissions

Emission calculations are set out in Greenhouse Gas Inventories (GHGI). A National Inventory and associated annual report is prepared at UK level to fulfil international requirements and to monitor the legally binding commitments under the Kyoto Protocol to reduce GHG emissions. This report is usually published in February of the following year.

However, many of the policy levers for delivery of the emission reductions fall to the DAs. Hence, in 1999, the Department for the Environment, Food and Rural Affairs (Defra) and the DAs agreed to undertake a joint research project to provide estimates of GHG emissions from England, Scotland, Wales and Northern Ireland.

The resulting study, 'Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990 and 1995: A Scoping Study' was published in 1999 and formed the framework for the development of the DAs Inventories from 1998 to the present.

Each year the GHGI is extended and updated, and the historical data series is revised to incorporate methodological improvements and new data. Emissions of the six direct GHG (known as the basket of six) are reported, namely:

- Carbon dioxide (CO₂);
- Methane (CH₄);
- Nitrous oxide (N₂O);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Sulphur hexafluoride (SF₆).

The latest DA Inventory is the 'The Greenhouse Gas Inventory for England, Scotland, Wales and Northern Ireland, 1990-2008'. This was published in September 2010. The Inventory contains statistics that cover the period 1990-

2008, and includes sectoral and country breakdowns. Figure 2 shows per capita emissions in the UK in 2008.

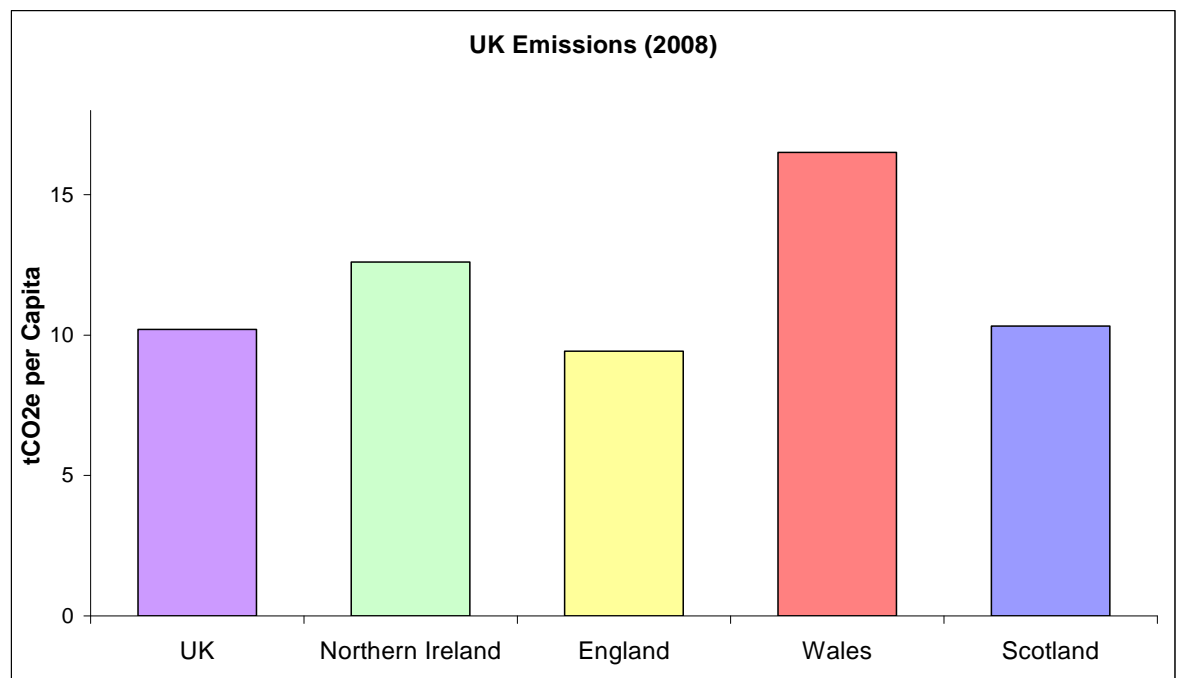


Figure 2: Emissions per Capita 2008

Figure 2 illustrates that Northern Ireland has a relatively high level of emissions per capita compared to the UK figure. Reasons for this include:

- High transport emissions due to greater levels of rural driving;
- Higher dependency on oil for home heating systems, as a larger proportion of homes cannot avail of the mains gas grid; and
- The relatively large contribution of agriculture to the economy.

Emissions are described in terms of both the production/source inventory and the end-user inventory. There is a greater degree of uncertainty at individual country level than the equivalent UK based estimates due to more limited data availability. The Northern Ireland emissions have a confidence interval of +/- 33%.

The most salient points in respect of the 2008 Northern Ireland production/source Inventory are as follows:

- The emissions of the basket of six are estimated to be 22,186 kilotonnes equivalent carbon dioxide (ktCO₂e). This is 11.2% lower than 1990 (24995 ktCO₂e).
- CO₂ is the main GHG, and accounted for 72.9% of all GHG emissions in Northern Ireland in 2008 (16171 ktCO₂e).
- The main sources of GHG were Transport (23%), Agriculture, Forestry and Land Use (22%), Power (22%), and Homes & Communities (18%).
- Transport emissions have increased by 38.8% since the 1990 base year, whereas each of the other sectors has seen a decreasing trend.

The Inventory shows that compared to the 11.2% reduction in Northern Ireland, the estimates for the other administrations is as follows:

- England has reduced emissions by 21.1%.
- Scotland has reduced emissions by 21.3%.
- Wales has reduced emissions by 9.9%.

The latest inventory also allows us to see how the sectoral emissions have changed from 1990 to 2008. Notably, most sectoral emissions have remained static or decreased in proportional terms with an overall reduction in actual emissions. Figure 3 below highlights how the emissions have changed across the sectors from 1990 to 2008.

NI Emissions By Sector 1990-2008

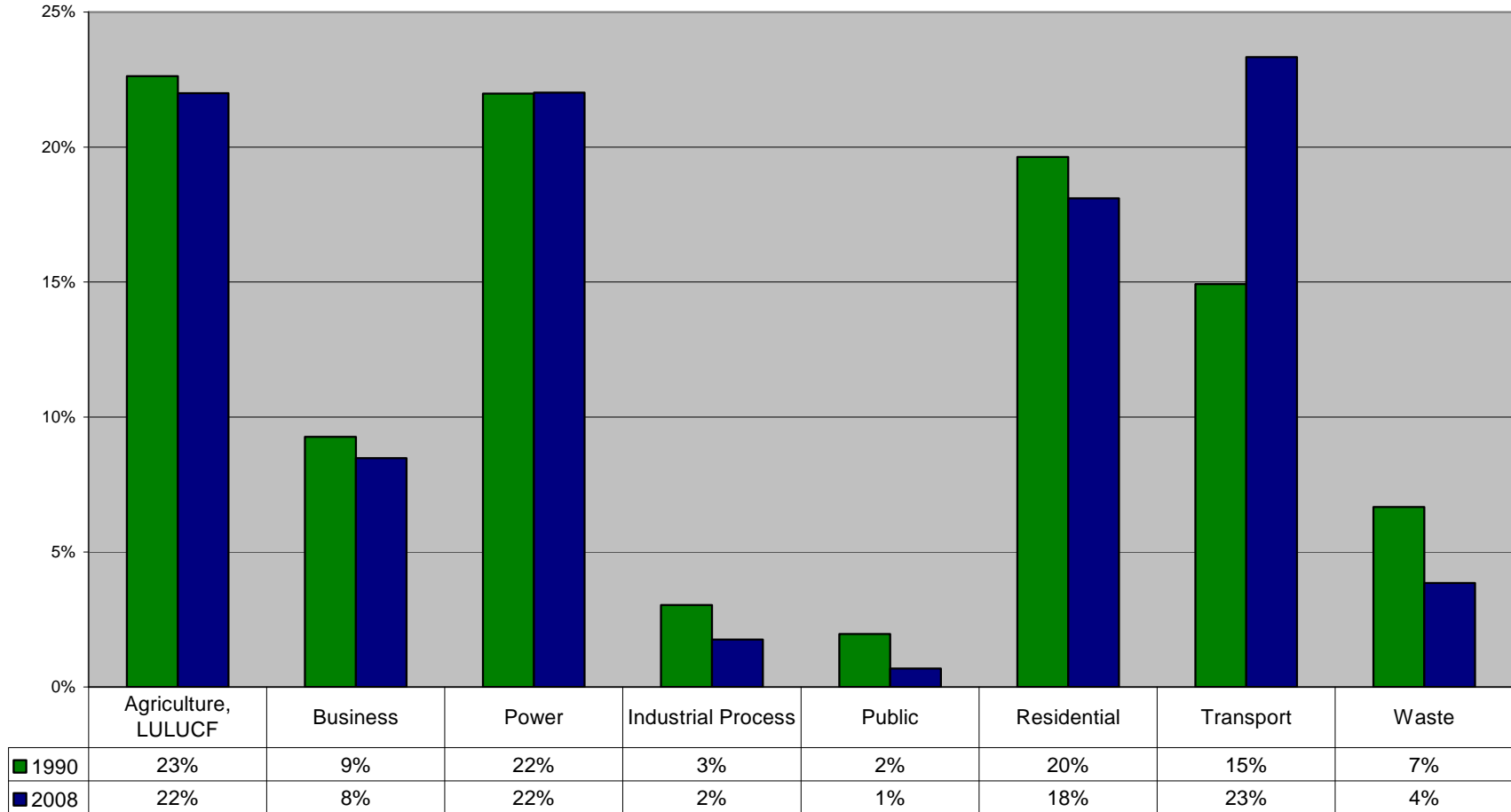


Figure 3: NI Emissions by sector 1990-2008

iv. Economic Overview

Putting in place policies to reduce GHG emissions that cause climate change is likely to entail costs. According to the 'Stern Review on the Economics of Climate Change' (2006):

“an estimate of resource costs suggests that the annual cost of cutting total GHG to about three quarters of current levels by 2050, consistent with a 550 parts per million (ppm) CO₂e stabilisation level, will be in the range -1.0 to +3.5% of GDP, with an average estimate of approximately 1%”.

If there is a global deal in 2011 (which puts the world on an emissions pathway consistent with a 450 ppm CO₂e) the resource costs are likely to be slightly higher than 1% of Gross Domestic Product (GDP). However, if no action is taken to mitigate the effects of climate change, most formal modelling has used as a starting point 2 - 3°C warming. In this temperature range, the cost of climate change could be equivalent to around a 0 - 3% loss in global GDP from what could have been achieved in a world without climate change. It is also worth noting that poorer countries will suffer higher costs. It should be noted that in 2008 Stern reviewed his work and calculated that GDP costs could be 2% per annum.

UK Macroeconomic Impact

The UK has a statutory target of 34% reductions in GHG by 2020 (on 1990 levels), and 80% reductions by 2050. The CCC's first report, 'Building a Low-Carbon Economy – The UK's Contribution to Tackling Climate Change', described both macroeconomic and fiscal impacts of carbon budgets. The report identified four ways that carbon budgets could potentially affect economic growth. These are detailed below.

1. Higher energy costs – reflects a need for a reallocation of resources to energy production from other sectors of the economy, negatively impacting GDP;
2. Energy efficiency improvement – this increases disposable income in the residential/domestic sector. However, it could lead to increased or decreased costs in the non-residential sectors, depending on the cost and format of the energy efficiency measure in question;
3. Lifestyle change – a reduction of energy consumption/production through households consuming less energy intensive goods and services. This is thought to have a minimal impact on GDP; and
4. Competitiveness Impacts – could result for energy-intensive/traded sectors if the UK/EU were to move more quickly in reducing emissions than other countries/regions. Again, the impact will be minimal as the threat is concentrated in sectors that account for a small portion of GDP.

Modelling by the CCC suggests that for the UK to meet the 2020 target, the macroeconomic impact would be less than 1% GDP. The Committee have not attempted to estimate the GDP impact at the level of the national authorities. Nevertheless, both the CCC and the Stern Review agree that the costs of mitigation are substantially lower, and pose less of a threat to economic growth and human welfare, than the damage costs of uncontrolled climate change.

The CCC's report identifies the following fiscal impacts of carbon targets and budgets:

- Increased revenue from the auction of EU Emissions Trading Scheme Allowances;

- Reduced fuel duty revenues due to fuel efficiency improvement;
- Reduced Vehicle Excise Duty revenues due to changed car purchase behaviour;
- Purchase of offset credits by the UK Government, for example to meet non-traded budgets;
- UK Government support for fuel poor households; and
- General fiscal impacts of a reduction in GDP, for example reduced Value Added Tax (VAT) and Corporation Tax.

Given the inherent uncertainties involved, the CCC has not attempted to put a specific value on the net fiscal impact of carbon budgets. However, it is thought that the total scale of any negative impact appears small enough to be manageable.

The recession has had an effect on emissions in the UK. A fall in output, particularly in relation to manufacturing, has resulted in a reduction in emissions and GDP. The CCC's second progress report on meeting the UK's carbon budgets (June 2010) suggests that over the first carbon budget (2008-2012), emissions will be around 4% lower than originally envisaged. Other exogenous factors have contributed to this; however, the majority of this reduction can be attributed to the recession. It is suggested that due to the recession, the DAs will have experienced a reduction in emissions in line with the overall UK level.

Given the current sectoral mix in the UK economy and the reliance on fossil fuels, economic growth and emissions are intrinsically linked. Forecasts from the Office for Budget Responsibility imply that, whilst the economy would return to growth, the recession would lead to a permanent loss of output compared to pre-recession projections. Therefore, a permanent reduction in

output may be taken to imply a permanent reduction in emissions. However, some of the emission reduction in 2009 may be transitory, and emissions may 'bounce back' to higher levels. Reasons for this include:

- As output returns to growth there may be a period of re-stocking;
- Some industrial sectors (e.g. steel) reduced output without permanent closures, and through the mothballing of plants that may reopen in the longer term; and
- Consumers may have implemented temporary changes in behaviour, and could revert to previous behaviours in energy use as economic growth resumes.

The evidence available on how emissions respond after the initial impacts of a major recession is limited. The CCC is continuing to monitor this.

Economic Impact on Northern Ireland

Although the CCC has not attempted to estimate the impact of carbon budgets on economic growth at a DA level, they have completed some analysis as regards employment and output at this level. It is clear that a number of sectors may potentially be at risk, including iron and steel, lime, cement and aluminium.

To assess sectors at risk, the CCC groups the sectors at risk into three categories based on cost increase as a share of Gross Value Added (GVA). This shows the effect on a business's costs in relation to output, as a result of measures to meet carbon budgets. The three categories are as follows:

1. Category 1 comprises sectors with cost increase as a share of GVA of more than 25% (plus aluminium);

2. In Category 2 are sectors with cost increase as a share of GVA of between 15% and 25%; and
3. Category 3 includes sectors that have cost increase as a share of GVA of between 5% and 15%.

Iron and steel, lime, cement and aluminium are considered Category 1 sectors. In Northern Ireland, Category 1 and Category 2 sectors only count for 0.1% of GVA each. Category 3 sectors are slightly higher at 0.7% GVA. Categories 1 and 2 represent less than 0.05% of those in employment in NI.

This suggests that although there is a risk to employment and output in Northern Ireland, it is arguably relatively small.

It should also be recognised that meeting carbon budgets and emission targets will create job opportunities, for instance with the growth of the renewable energy market.

II. Methodology

i. Producing The Action Plan

For the reasons set out above, the Environment Minister set up the CDWG GHG to facilitate inter-departmental working on reducing GHG emissions.

The first meeting was held on 11 August 2010 and consisted of a constructive discussion laying out a busy work plan over the next four months.

DOE and those departments that hold key strategic levers for GHG emissions reduction held bilateral meetings. Written submissions were also sought from all other departments that exert influence.

DOE officials then sought expert input from statisticians and economists to analyse the impacts of policies in place and how these may affect GHG projections going forward to 2025.

This document sets out existing departmental measures in Section IV and the future focus for action in Section V.

The CDWG GHG held a further meeting on 15 December 2010 to discuss the draft Action Plan and agreed that it should be sent to the Executive for approval.

ii. GHG Projection Tool

The Northern Ireland GHG Projection Tool was developed to enable the Northern Ireland Executive to monitor progress towards GHG reduction targets.

It was funded in 2008 by DOE and SNIFFER (Scotland & Northern Ireland Forum for Environmental Research) and produced by AEA Technology. National reporting requirements are fulfilled by the GHGI for Northern Ireland.

The Inventory assists in the monitoring of targets but it does not provide a mechanism for projecting future emissions.

The Projection Tool considers the impacts of both UK and Northern Ireland policy measures on Northern Ireland GHG emissions. It allows the projection of future emissions based on existing or new policies, where emissions data relating to the policy can be measured.

The projections presented are best estimates, based on current knowledge and provide a good indication of the forecasted level of GHG emissions within Northern Ireland. It should be noted that the Projection Tool does have its limitations and is very reliant on UK models and data to underpin the assumptions. A list of policies that have been considered by the CDWG GHG are listed in Annex A. Some of these were included using the Projection Tool.

Going forward the cross-departmental approach to GHG reduction should help to address some of the gaps in data sources and sectoral methodologies so that the overall Northern Ireland Inventory is progressively improved.

In order to ensure that projections are as accurate as possible it is important that the underlying assumptions/data are reviewed and updated regularly.

The latest version of the Projection Tool includes assumptions from the following updates:

- Trends from 1990 to 2008 based on the DA Inventory report;
- 2008 based population projections: Office of National Statistics, Northern Ireland Statistics and Research Agency (NISRA);
- Fuel Trends at 2010: Department of Business, Enterprise and Regulatory Reform (BERR but now Department of Business, Innovation & Skills - BIS) & Department of Energy and Climate Change (DECC);
- 2008 Electricity estimates: Northern Ireland GHG Inventory 2008, end-user estimates; and
- Power station fuel trends at June 2010, includes forecasts out to 2025: DECC.

The GHG Projection Toolkit consists of a number of linked spreadsheets including data relating to the underlying assumptions (population projections, projected fuel trends, Northern Ireland policy impacts etc), which are then used to inform emission calculations for each sector. An overall summary sheet provides GHG emissions and projections, by sector, over the period 1990 to 2025. Most of the main GHG emission source sector calculations follow a broadly similar format, as outlined below:

- Step 1: Forecasted emission data relevant to the sector is used to inform the projections, based on UK trend data. The base UK trend data used for each source sector is outlined below:
 - Power: BERR fuel trends for power plants (2010);

- Industry : BERR fuel trends for UK industry sector (2010);
 - Road Transport: BERR fuel trends for UK road transport sector (2010);
 - Domestic: BERR fuel trends for UK domestic sector (2010);
 - Cattle: Defra research at 2004 provides UK projections of Northern Ireland CH₄ emissions; and
 - Agri Soils: Defra research at 2004 provides UK projections of Northern Ireland N₂O emissions.
- Step 2: The Northern Ireland 2005 GHGI estimates are used as a starting point to project Northern Ireland emissions out to 2025. It is assumed that the Northern Ireland emission forecasts will follow the UK trends. Note that the assumptions underlying the UK trend data are derived from research based at 2005, which is why the 2005, rather than the latest, Inventory figures are used as the starting point to estimate the projections. This ensures a consistency between the base data and the research.
 - Step 3: Estimated emission savings from Northern Ireland policies are calculated, where emission data relating to the policies can be measured.
 - Step 4: The forecasted Northern Ireland emissions are reduced to account for savings from Northern Ireland policies, giving a Northern Ireland projected emission estimate for every year out to 2025.
 - Step 5: The annual percentage change in projected emissions is calculated.

- Step 6: To produce a final projected Northern Ireland GHG emission time series out to 2025 the annual percentage change is applied, taking the latest GHGI estimate (for the relevant sector) as the first point in this time series.

For some of the GHGI source sectors the proportion of Northern Ireland emissions is slightly different when compared against the proportions taken from the GHG Projection Tool source sectors.

For example, the Agriculture Sector (excluding Land Use) in the Inventory in 2008 accounted for 23% of all emissions whereas in the GHG Projection Tool, agriculture accounted for 18% of all emissions.

The reason for this is that not all emission sources used by the Inventory can be robustly forecasted out to 2025 due to insufficient data being available to inform the forecasts. Figure 4 below summarises this.

Projection Tool sector name	GHG Projection Tool emission sources	GHG Inventory additional emission sources
Agricultural	Cattle Agricultural soils (accounted for 79% of GHGI Agriculture Sector emissions)	<u>GHGI Agriculture Sector</u> Other livestock Agricultural engines Agriculture mobile machinery Field Burning
Industry	Cement production combustion Industrial off-road mobile machinery Other industrial combustion	Included in GHGI Business sector
Electricity Generation	Power stations	Included in GHGI Energy Supply sector
Land Use Change	Same sources as GHGI Land Use, Land Use Change & Forestry sector	
Commercial & Public sector	Public Sector combustion Misc commercial/industrial combustion Railways stationary combustion	<u>Public Sector</u> Only Public Sector combustion

Domestic	Domestic Combustion (accounted for 94% of GHGI Homes & Communities Sector emissions 2008)	<u>GHGI Homes & Communities Sector</u> House & garden machinery Non-aerosol products Aerosols
Road Transport	All road transport (accounted for 89% of GHGI Transport Sector emissions in 2008)	<u>GHGI Transport Sector</u> Railways National navigation Other transportation Aircraft – military Aircraft support vehicles Civil aviation
Aviation	Civil aviation - domestic	Civil aviation included in GHGI Transport Sector
Waste	Landfill (accounted for 92% of GHGI Waste Sector emissions in 2008)	<u>Waste Sector</u> Wastewater handling Waste Incineration
Other sources	Such waste water handling, other livestock, cement decarbonising	Included in relevant GHGI sectors

Figure 4: Emissions sources reported in the GHG Projection Tool sectors and details of additional emissions sources reported in the corresponding GHG Inventory sectors

Although within the Projection Tool some sectors do not report on all emission sources that are reported in the Inventory, those emissions that are included in the Projection Tool account for the majority of emissions within that sector.

For example, domestic combustion accounted for 94% of Homes and Communities Sector emissions for Northern Ireland in 2008 and waste to landfill accounted for 92% of Waste Sector emissions.

Despite limitations, the projections presented by the tool are the best estimates, based on current knowledge and do provide a good indication of the forecasted level of GHG emissions within Northern Ireland.

iii. Economic Approach

Ideally, the Action Plan would outline the total monetary costs (and benefits) of the policies being undertaken to achieve the target. This would highlight the total expenditure required to meet the target, broken down by emission sectors.

However, given the lack of available data this was not possible.

Therefore, the Economists supporting this project have collated all of the available data on the costs and benefits of the policies/strategies relevant to the GHG emissions agenda.

This is set out in **Section III** for each department.

Where possible, an attempt has been made to manipulate the data to show costs and benefits from the present time until the target date (2025).

Nevertheless, there are clear limitations due to the data available which have been highlighted in each departmental chapter in Section IV.

III. Projected Emissions

As stated, there is a high degree of uncertainty associated with the GHGI and GHG Projection Tool described in Section II. However, analysis of the available data indicates that Northern Ireland emissions in 2025 are likely to be **33.1%** less compared to the base year. In volume this is 16.4 ktCO₂e compared to 25.0 ktCO₂e in the base year 1990 and 22.2 ktCO₂e in 2008 the latest year for measured emissions.

In the context of the weaknesses of the data outlined, the indications are (see figure 5 below) that, if delivered as intended, existing measures emanating from the EU, UK and indigenous to Northern Ireland could deliver the NI Executive's target. The 25% target reduction in 2025 equates to 18.7ktCO₂e. The chapters that follow in Section IV discuss Departmental policies in detail.

However, if Northern Ireland was to adopt the level of ambition set out in the UK Climate Change Act, i.e. 34% reductions by 2020, the result is not so promising. By 2020, the Projection Tool estimates that there will be a 30.1% reduction equating to 17.3 ktCO₂e.

This would miss the increased target and if even higher ambition is adopted, i.e. 42% reduction, there would need to be an increased programme of mitigation policies to move Northern Ireland in line with these targets.

Figure 5 below shows the recorded emissions from the base year in 1990, 2008, the PfG target reduction of 25% below 1990 levels and the projected total in 2025.

The Projection Tool also allows us to estimate how the sectoral emissions will change from 2008 through to 2025. This is highlighted in Figure 6 below.

NI Overall GHG Emissions

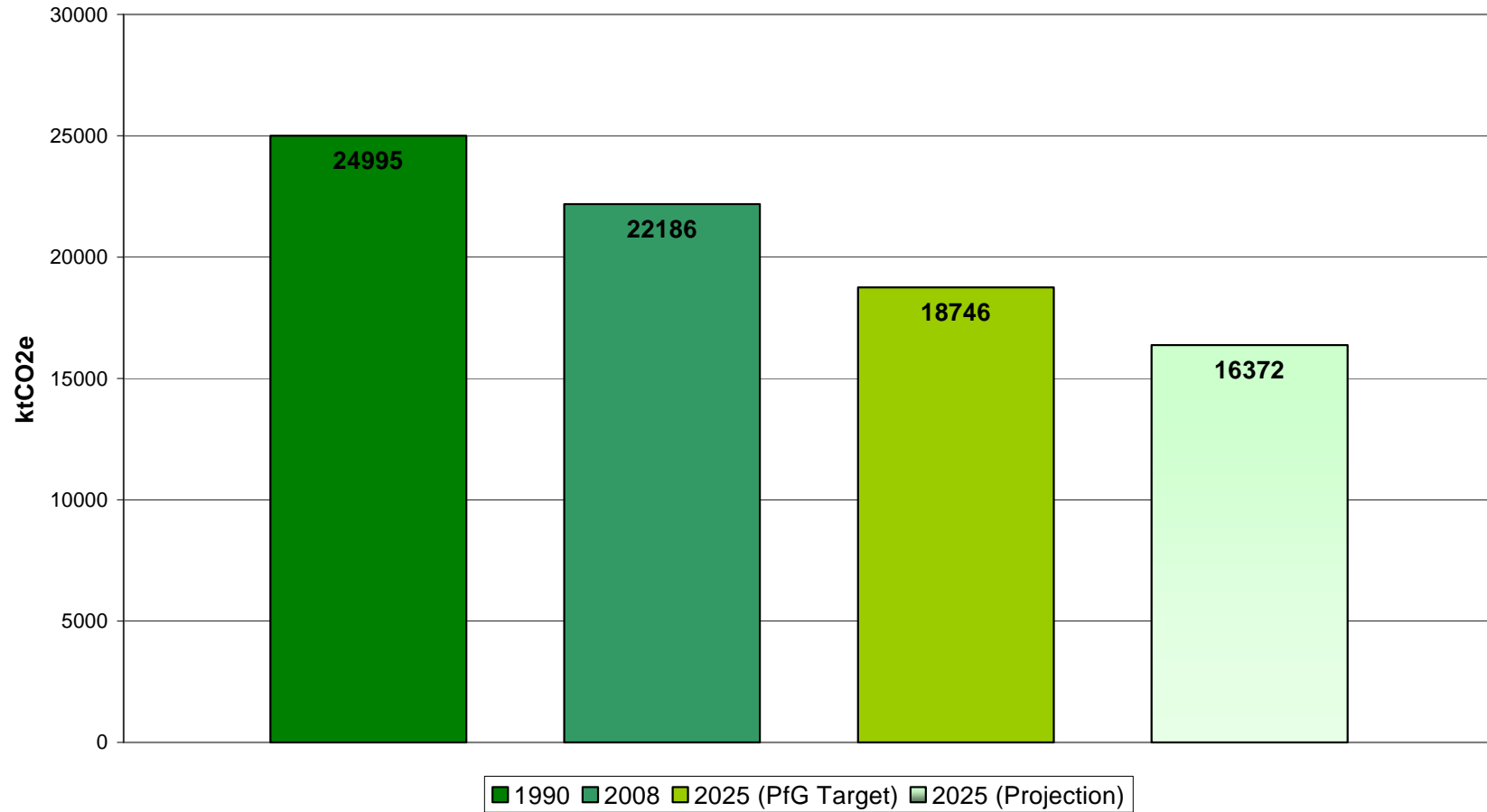


Figure 5: NI Overall Emissions 1990-2025

NI Emissions by Sector 2008-2025

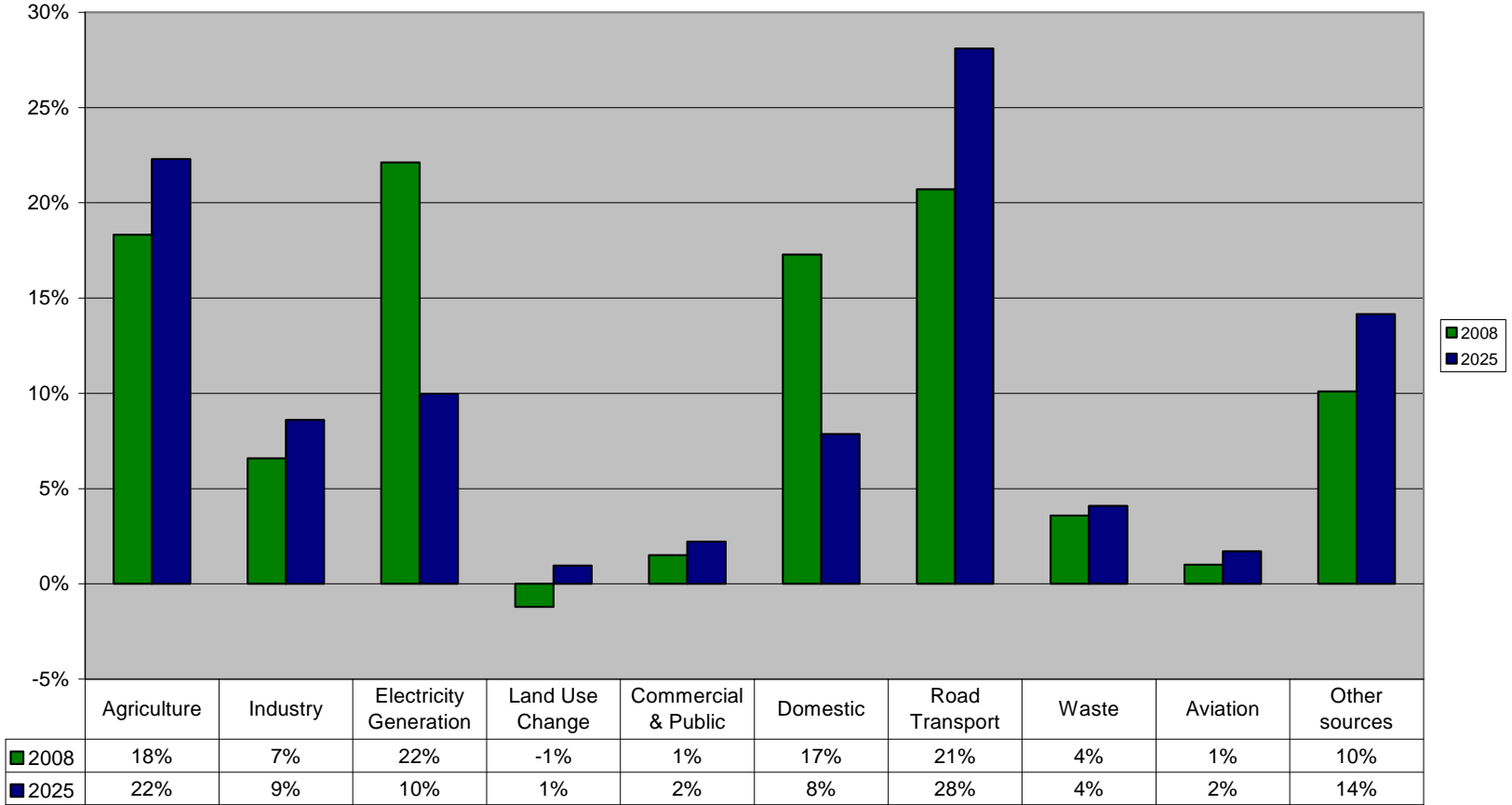


Figure 6: NI Emissions by sector 2008-2025

IV. Departmental Analysis

This section analyses the Northern Ireland Departments and how they contribute to the PfG target.

Each chapter lays out the departments:

- Purpose
- Strategies and Policy Impact on the GHG Agenda;
- Current Emissions and Projections; and
- Economic Impact of Strategies and Policy

i. Department Of Agriculture And Rural Development (DARD)

DARD aims to promote a thriving and sustainable rural community and environment. The Department assists the competitive development of the agri-food, fishing and forestry sectors of the Northern Ireland economy, having regard for the need of the consumers, the welfare of animals and the conservation and enhancement of the environment.

Strategies and Policy Impact on the GHG Agenda

The latest GHG Inventory estimates indicate that agriculture accounted for 23% of Northern Ireland emissions in 2008, with CH₄ and N₂O being the main source of emissions. Land Use Change acts as a 'carbon sink' removing 1% of emissions. When combined with agricultural emissions, the Agriculture, Land Use and Forestry Sector was therefore responsible for 22% of Northern Ireland GHG emissions in 2008. This compares to 7% for the UK as a whole.

DARD can contribute to helping the sector understand and reduce GHG emissions. DARD activities also have the potential to contribute to challenges within the energy and waste sectors in terms of energy efficiency, renewable energy utilisation and generation and energy from waste.

To address concerns raised by the Industry Advisory Panel (IAP) DARD established an internal Steering Group during 2009 and in 2010 established a Greenhouse Gas Stakeholder Group to develop a range of primary production focused mitigation measures based on a review of available scientific evidence. Five key themes designed to reduce emissions intensity have emerged:

- Better livestock management (with mainly moderate costs);
- Better nutrient and fertilizer management (mainly minimal costs);

- Locking in carbon in soils, peatlands and grass (unclear magnitude of potential and costs);
- Locking in carbon in new and existing woodlands (unclear magnitude of costs); and
- Optimising renewable energy generation and encouraging fuel efficiency on farms (high installation costs)

Reductions in CH₄ and N₂O emissions from better livestock management and improved nutrient and fertilizer management are likely to have the most potential and can achieve multiple environmental objectives in addition to emissions reduction such as, for example, improved manure management and better nitrogen efficiency, which have a direct impact on emissions. These themes are currently subject to consultation processes across all segments of the Northern Ireland agri-food industry.

Given the importance of livestock to local agriculture, coupled with the uncertainty associated with livestock emissions, more information is required before the full costs and benefits of these measures become clear. DARD and other UK Agricultural Departments have commissioned research to improve understanding of how agriculture contributes to climate change and to support the development of appropriate mitigation strategies. This research is part of a £12 million Defra led development of the GHG Inventory for agriculture. DARD's funding contribution is £600k and the projects are expected to be completed in 2015, with the first results from this research expected to emerge in 2012.

The DARD Renewable Energy Action Plan 2010 forms an important element of the DARD GHG mitigation strategy. This Action Plan will also contribute to the cross-departmental Bio-Energy plan being developed by DETI.

Business Competitiveness, Energy Security and Carbon Reductions at Farm and Forestry Level are key objectives of the DARD Renewable Energy Action Plan. The fifteen actions within the plan aim to enhance knowledge and deliver industry training and technology transfer programmes to raise awareness and encourage the adoption of renewable technologies within the agri-food sector.

Current emissions and projections

A preliminary analysis of the Agricultural Sector is strongly qualified by the acknowledged uncertainties associated with the agricultural Projection Tool. The GHG Projection Tool methodology for Agriculture only considers CH₄ emissions from cattle and N₂O emissions from agricultural soils; whereas the Northern Ireland GHGI considers additional emission sources, including other livestock, when reporting emissions. Therefore, when referring to the projected emissions, we shall refer to only the 'Agricultural Sector' and the 1990 and 2008 figures will be adjusted in these instances.

Robust and up to date data on specific emission factors for Northern Ireland livestock is currently not available to use in the Projection Tool. Results using 2004 data come with substantial caveats when projecting performance, as data used in the tool do not take into account agricultural policies since 2004 or the impact of a new Rural Development Programme (RDP) from 2014 where climate change mitigation measures are likely to have a central role. DOE and DARD officials will continue to explore how to interpret and improve projections for the sector.

The 4-year Defra project to improve GHG Inventories for agriculture will be key to improving the Northern Ireland estimates for GHG emissions for the Agriculture, Land Use and Forestry Sector and producing more robust emissions projections out to 2025.

For example, the Agriculture, Land Use and Forestry Sector in the Inventory in 2008 accounted for 23% of all Northern Ireland emissions; whereas in the

GHG Projection Tool, the Agricultural Sector accounted for 18% of all Northern Ireland emissions. The reason for this is that the GHG projection tool focuses on the main sources of emissions, due to insufficient data being available to inform the forecasts. As a result, the Inventory source sectors contain additional emissions sources over and above that reported in the GHG Projection Tool.

Using the Projection Tool methodology (1990 baseline has been readjusted here to use the Projection Tool methodology), it is estimated that by 2025 agricultural emissions will decrease by 9.4% from 2008 and 15.2% from 1990 (see Figure 7 below):

	1990 (Actual)		2008 (Actual)		2025 (-25% Target)		2025 (Projected)	
	ktCO ₂ e	%	ktCO ₂ e	%	ktCO ₂ e	%	ktCO ₂ e	%
† Agri Sector	4,315	17.3	4030	18.2	3607.75	19.3	3661	22.3
*NI Total	24995	100	22186	100	18746	100	16372	100
Against 1990	N/A	N/A	-285	-6.6	-707.25	-25	-654	-15.2
Against 2008	N/A	N/A	N/A	N/A	N/A	N/A	-379	-9.4

Figure 7: Impact of scenario activity on projected GHG emissions for Agricultural Sector

†Only relates to emissions from cattle and from agricultural soils

*Assuming all other sectors have no change in current projections out to 2025

However, although this shows that the Agricultural Sector in Northern Ireland will show a decrease, the sector **will need to go further** to ensure business competitiveness particularly given the market pressures to demonstrate the sustainability of food production.

The CCC reported in December 2008 that they believed that there were cost-effective abatements in agriculture by 2020 of 3 MtCO₂e in England, 2 MtCO₂e in Scotland, 1 MtCO₂e in Wales and 1 MtCO₂e in Northern Ireland.

England set 3 MtCO₂e as a minimum target to achieve by 2020 in their Low Carbon Transition Plan published in July 2009. Scotland published its Climate Change Delivery Plan in June 2009 proposing a reduction target of 1.3 MtCO₂e by 2020. Wales has set a reduction target of between 0.6 MtCO₂e (10% below 2008 level) and 1.5 MtCO₂e by 2020 in its Climate Change Strategy announced in October 2010.

If we run the Projection Tool to 2020, the Northern Ireland Agricultural Sector would be projected to be 3754 ktCO₂e in 2020, a reduction on 2008 of 276 ktCO₂e or 6.9%. This falls significantly short of the estimated 1MtCO₂e potential.

New analysis from the CCC in 2010 states that their 2008 predictions were on the conservative side and they believe there is far greater abatement potential in the sector than the targets that have been set.

If England, Scotland and Wales deliver these targets or move beyond them in line with the new CCC predictions, there is a very real risk to the Northern Ireland agri-food sector that it may become uncompetitive in its main markets if it does not further reduce GHG emissions.

The new Climate Change Mitigation Strategy being developed by DARD, with key agriculture and forestry stakeholders, for implementation in 2011 will play a key role in maintaining progress in GHG reduction in agriculture and in helping to ensure the agri-food sector remains competitive in this regard.

Economic Impact of Strategies and Policy

Given the uncertainties and complexities associated with GHG emissions from the Agricultural Sector, economic impacts are especially difficult to assess. While work continues on improving and refining the underlying science and measurement of GHG emissions, there is general agreement that policy should focus on measures that are known to enhance both economic performance and reduce GHG emissions per unit of output. Such a policy sets

a strategic direction for the sector that from an economic perspective minimises future risks arising from current uncertainty while also improving economic competitiveness by reducing cost.

Regional projections on GHGs, which take into account all sectors of the economy, while informative, are not the key focus for buyers of NI agricultural produce. Comparisons and calculations of embedded carbon in products e.g. a litre of milk or a kg of beef, are increasingly used by buyers as a key sustainability criteria. Sustainability in the agriculture sector spans social and economic sustainability in addition to environmental considerations.

The industry has made clear that for NI products to continue to compete for growing markets both nationally and internationally, steps must be taken to ensure that carbon intensity within products is reduced, at least in line with other regions. It is therefore essential that a strategy for delivering sustainable emissions reductions is implemented very soon to ensure a steady reduction trajectory up to 2020 and beyond.

ii. Department Of Culture, Arts And Leisure (DCAL)

The Department is responsible for arts and creativity, museums, libraries, sport, inland waterways and inland fisheries, linguistic diversity, public records, and for advising on National Lottery distribution.

Strategies and Policy Impact on the GHG Agenda

DCAL is ensuring its own estate and operations contribute by active promotion of the use of video conferencing in order to reduce staff travel. DCAL is also a mandatory participant in the Carbon Reduction Commitment Energy Efficiency Scheme (CRC).

It is working with Central Procurement Directorate (CPD) in DFP to reduce the carbon emissions associated with distribution of office supplies through the 2010 Northern Ireland Civil Service (NICS) Stationery/IT Consumables Contract for Service Providers. By March 2011, the Department will bring forward an essential user car parking policy.

Current emissions and projections

The impacts of the CRC within the Department will be factored into the GHGI emission estimates for the Public Sector. There are no specific DCAL policies that produce data that could be factored into the GHG Projection Tool to assist in measuring GHG emissions; therefore the Public Sector emissions, taken from the Northern Ireland GHGI, are projected forward to 2025 using Northern Ireland population trends.

Economic Impact of Strategies and Policy

Economic analysis focuses on the main policies/strategies relevant to the GHG emissions agenda only. At present, as DCAL do not deliver external GHG reductions policies/strategies, no costs or benefits have been analysed.

iii. Department Of Education (DE)

The Department's main areas of responsibility are in pre-school, primary, post-primary and special education; the youth service; the promotion of community relations within and between schools; and teacher education and salaries.

Strategies and Policy Impact on the GHG Agenda

DE supports the promotion of sustainability through the development and management of its estate and through the education of young people by incorporating sustainable development in the school curriculum.

The Department ensures the principles of sustainable development are incorporated into the design of its building projects, targeting the achievement of the Building Research Establishment Environmental Assessment Method (BREEAM) 'excellent' or 'very good' ratings for all new build and refurbished buildings (or the Civil Engineering Environmental Quality Assessment & Award Scheme (CEEQUAL) as appropriate). In addition, all contracts include overarching requirements in respect of energy, water and low carbon design.

All DE major works in schools must, in accordance with the Government Construction Client's Group, include measures to minimise energy in construction and use, eliminate pollution and preserve & enhance biodiversity. DE also works with CPD to reduce the carbon emissions associated with distribution of office supplies across the Government estate through the 2010 NICS Stationery/IT Consumables Contract for Service Providers.

DE and the Education and Library Boards participate in the CRC.

Changing the attitudes of young people through education will be key in developing those sustainable behaviours necessary to contribute to reductions in GHG emissions. Education for Sustainable Development (ESD)

is included in the curriculum across all Key Stages. At Primary level, ESD is built into the statutory area of Learning of the World Around Us. At Key Stage 3 it is included in the statutory areas of Learning for Life and Work.

Through ESD, pupils explore issues such as environmental and climate change, biodiversity and the need to manage human impact on the environment. The aim is to develop pupils as contributors to the environment so that they should come to understand the interdependence of society, the economy and the environment; to develop respect for the needs of both present and future generations; and to act towards promoting an improved environment.

Current emissions and projections

The impacts of the CRC Scheme within the Department are factored into the Northern Ireland GHGI emission estimates for the Public Sector. There are no specific DE policies that produce data that could be factored into the GHG Projection Tool to assist in measuring GHG emissions; therefore, the Public Sector emissions, taken from the Northern Ireland GHGI, are projected forward to 2025 using Northern Ireland population trends.

The Department supports the promotion of sustainability by incorporating sustainable development in the school curriculum which should influence behavioural change and help guide the necessary changes to deliver targeted reductions in emissions.

Economic Impact of Strategies and Policy

Economic analysis focuses only on the main policies/strategies relevant to the GHG emissions agenda. As DE does not have policies/strategies specifically designed to target GHG reductions, no costs or benefits have been analysed at this stage.

iv. Department For Employment And Learning (DEL)

The Department's objectives are to promote economic, social and personal development through high quality learning, research and skills training; and to help people into employment and promote good employment practices.

Strategies and Policy Impact on the GHG Agenda

DEL is seeking to contribute to the mitigation of the effects of climate change through a direction to target 5% of quality-related research (QR) funding towards research in areas that encompass the theme of sustainability, in particular, alternative/renewable energy sources or green technology. QR funding is used to support the research infrastructure necessary for the two Northern Ireland universities to conduct research. It also contributes to the costs of postgraduate research training.

The universities are using the funding, which amounts to a total of some £4m over the 2009/10 and 2010/11 academic years, to support single projects, one entitled "Clean Energies" and the other, "Sustainability Measurement and System Evaluation".

The Department is also supporting relevant research projects through other programmes such as "Strengthening the All-island Research Base", which seeks to contribute to the development of the all-Ireland research infrastructure. Projects are being undertaken in areas of strategic interest to both Governments, including Future Energy Systems.

Funding of £1.54m has been provided to the University of Ulster, between 2008 and 2011, to support an "Energy Storage" project being undertaken in collaboration with University College Dublin, the National University of Ireland (Maynooth) and Dublin Institute of Technology. The project is concerned with demonstrating how energy storage can be incorporated within the built environment to reduce the use of fossil fuels.

Under another research programme, the “US-Ireland R&D Partnership”, the Department is contributing some £350k towards a total investment of approximately £1m in another project concerned with the Development of a Greenhouse Gas Ocean-Atmosphere Flux Sensor with Mems-Based Photoacoustic Technology. The project is being taken forward in conjunction with Woods Hole Oceanographic Institution (Massachusetts) and the National University of Ireland (Galway).

The Department is ensuring its own estate and operations contribute by active promotion of the use of video conferencing in order to reduce staff travel. DEL is also a mandatory participant in the CRC.

The universities have targets to reduce GHG emissions by at least 80% by 2050 and at least 34% by 2020.

As outlined above, supporting research is DEL’s primary contribution outside of its internal management. However, DEL also plays a role in overseeing courses, developing skill sets and supporting tertiary level innovation. This in turn can educate on environmental behaviours, driving behavioural change.

Within the tertiary sector, DEL can support colleges and universities to investigate onsite power generation in; consider better methods of waste/recycling; and to deliver energy efficiency in estate management.

Current emissions and projections

The impacts of the CRC within the Department will be factored into the GHGI emission estimates for the Public Sector. There are no specific DEL polices that produce data that could be factored into the GHG Projection Tool to assist in measuring GHG emissions; therefore the Public Sector emissions, taken from the Northern Ireland GHGI, are projected forward to 2025 using Northern Ireland population trends.

The Department supports research relating to alternative/renewable energy sources or green technology; single projects such as 'Clean Energies', 'Sustainability Measurement & System Evaluation' and 'Energy Storage' which should help guide the necessary changes to deliver targeted reductions in emissions.

Economic Impact of Strategies and Policy

Economic analysis focuses on the main policies/strategies relevant to the GHG emissions agenda only. At present, as DEL do not deliver external GHG reductions policies/strategies, no costs or benefits have been analysed.

However, it should be noted that DEL is investing almost £6m into environmental research that will help deliver the wider reduction target.

v. Department Of Enterprise, Trade And Investment (DETI)

DETI is responsible for formulating and delivering economic development policy in terms of enterprise, innovation, energy, telecoms, tourism, health and safety at work, Insolvency Service, consumer affairs, and labour market and economic statistics services.

Strategies and Policy Impact on the GHG Agenda

A new Strategic Energy Framework (SEF), published in September 2010, and agreed by the NI Executive sets out the direction of travel for Northern Ireland's energy policy over the next 5-10 years and highlights the proposed priorities during that period. The SEF illustrates the key energy goals in terms of business competitiveness, security of energy supply, sustainability and infrastructure investment.

The SEF contains a very challenging target to increase the amount of electricity consumption and heat from renewable sources to 40% and 10% respectively by 2020. In addition to addressing energy diversity and security of supply, higher levels of renewable energy will play a very positive role in climate change mitigation.

Primarily because of current and planned large-scale onshore wind projects, Northern Ireland is expected to meet its current renewable electricity target of 12% electricity consumption from renewable sources by 2012. In order to achieve future ambitious targets however it must also harness the contribution that other renewable energy technologies can make, for example bioenergy and offshore renewables. The Department is therefore currently undertaking a Strategic Environmental Assessment (SEA) of On Shore Renewable Electricity generation to ensure the contribution of other renewable technologies is recognised and included in future renewable energy mixes. The Environmental Report and On Shore Renewable Electricity Strategic

Action Plan, being developed as part of the SEA process, should be consulted on during the spring of 2011. The draft Strategic Action Plan will consider a wide range of renewable energy generation scenarios to 2020 that include all on shore renewable technologies (e.g. large and small scale biomass, microgeneration, geothermal and energy from waste). The plan will also consider the impact of off-shore generation on the on-shore grid.

The SEF also includes proposals to consider, in conjunction with the Utility Regulator, the roll out of smart meters and to investigate a supplier obligation to further stimulate energy efficiency measures.

Progress continues on the development of the first cross-departmental Bioenergy Action Plan, 2010-2015, which is scheduled to be considered by the Executive in the near future. This plan aims to increase awareness of bioenergy, create an enabling environment, facilitate targeted investment in the supply chain and continue focused research & development.

The finalisation in spring 2011 of the Offshore Renewable Energy Strategic Action Plan, 2010-2020 will facilitate the Crown Estate plans to launch a Leasing Round for Northern Ireland waters later in 2010-2011. The draft Plan proposes offshore renewable targets of at least 600MW of offshore wind and 300MW of tidal energy by 2020.

Not only can offshore renewable energy contribute to the region's challenging renewable electricity targets, but it also offers business opportunities for Northern Ireland companies within this growing national and international market.

In conjunction with Scotland and the Republic of Ireland, two major projects continue to progress under the EU Interreg IV Programme; the Biomara research project into the use of local marine seaweeds and algae for bio-fuel production and the Irish-Scottish Links on Energy Study (ISLES) feasibility study for an offshore electricity grid to encourage commercial use of offshore wind, wave and tidal technologies.

The Northern Ireland Renewables Obligation (NIRO) continues to be the main form of incentivising renewable electricity generation. On 1 April 2010, enhanced Renewables Obligation Certificates (ROCs) were introduced for new generating stations using wind, hydro and photovoltaic technologies.

Ensuring that increasing amounts of renewable electricity can be distributed to where they are needed will require significant upgrading of the electrical transmission systems entailing a substantial investment programme in Northern Ireland, estimated at around £1bn and therefore comparable in scale to the £3.6bn investment already announced by EirGrid in the Republic of Ireland. DETI will continue to work closely with the grid owner and operator to ensure effective communication with the wider public in relation to the need for grid development to accommodate increasing amounts of renewable generation.

Importantly, and as a first step in the development of a wider strategy for renewable heat deployment in Northern Ireland, a major piece of work has recently been completed to address the relatively untapped renewable heat market.

This work has collated reliable data on heat and renewable heat usage in Northern Ireland, assessed the future sustainable growth potential for the renewable heat sector in the region and examined the appropriateness of the SEF provisional target of 10% renewable heat by 2020 and how this may impact on the existing Northern Ireland heat markets.

The DETI Minister announced in September, that she considered a Renewable Heat Incentive to be the most appropriate form of support for the industry here, subject to an economic appraisal being completed. The economic appraisal is currently underway and will be completed by March 2011.

The possible extension of the natural gas networks is another strategy identified as being relevant to the GHG emissions agenda. The analysis of this is still in its infancy; therefore, the data available is limited. Nevertheless, a recent study has been completed.

The Gas Study assessed the cost of providing new gas transmission and distribution pipelines and associated equipment to six main urban areas at around £170m. The study also made a high-level assessment of benefits including carbon savings and wider savings to the economy.

However, based on gas load volumes and estimated costs of pipelines etcetera, the study recognised that the gas transmission element of any project is likely to have a funding shortfall. The study conclusions have not yet been published; therefore, it is expected more information will become available at a later date.

Finally, the Department continues to promote energy efficiency in its operations and estate management and participates in the CRC.

Current emissions and projections

The latest GHGI estimates indicate that the Power Sector accounted for 22% of Northern Ireland emissions in 2008.

Power generation is the largest source of CO₂ in Northern Ireland, accounting for 30.1% of emissions in 2008. CO₂ emissions from power generation increased by 4.5% compared with 2007 emissions, mainly due to a 12% increase in coal-fired generation, but have declined from 11% since 1990.

The mix of generation capacity is quite different in Northern Ireland from the rest of the UK and from 1990 to 1995 consisted entirely of coal and oil fired stations. In 1996, the largest power station in Northern Ireland, Ballylumford, was converted from oil to use natural gas.

The lack of nuclear and renewable generation up to 1996, together with the lack of natural gas contributed to the proportionately higher emissions from electricity generation compared to the other DAs. Moreover, the non-availability of natural gas led to a proportionately higher consumption of electricity than in the rest of the UK, also increasing emissions in the early part of the time-series. Natural gas has been supplied to some industrial, commercial and domestic users since 1996 and gas use continues to grow as the supply infrastructure is developed.

The projected GHG emissions for electricity generation in Northern Ireland are based on fuel use projections for UK power stations, developed by DECC. The tool considers emissions from coal and gas power stations and adjusts for savings from Northern Ireland renewable energy policies.

It has been recognised that a given percentage of renewable energy does not displace an equal amount of carbon from fossil fuels and the projection tool methodology has been revised to reflect this.

The All Island Grid Study (2008) examined the reduction in CO₂ emissions associated with renewable energy in power generation. The data within this study has been used as a proxy to estimate the emission savings that can be achieved through renewable electricity, with 40% renewable energy resulting in an estimated 31.7% reduction in emissions.

The Grid Study noted that without additional demand side management measures there would be less of a reduction in emissions associated with the switch to renewables as set out above (i.e. a 25% reduction in emissions in scenario 5 of the Grid Study).

This is the best estimate based on current knowledge; however, this is an area that will require further consideration to get a full understanding of the level of reduction in CO₂ emissions associated with renewable energy.

The projection tool currently estimates that electricity generation will account for 10.0% of NI emissions in 2025 (assuming it follows the UK fuel use trends; and that the 40% target to increase the amount of electricity from renewable sources is achieved by 2020); a decrease from the 2008 level of 22.0%.

Figure 8 below gives an indication of the effect that a change in the level of renewable electricity generation in Northern Ireland would have on the forecasted GHG emissions for electricity generation. Two scenarios have been considered; 30% renewable electricity generation by 2020, equating to 23.9% reduction in emissions and 50% renewable electricity generation by 2020, equating to 39.5% reduction in emissions. The latter projection is for illustration only.

	1990 (Actual)		2008 (Actual)		2025 (-25% Target)		2025 (Projected)		
	ktCO ₂ e	%	ktCO ₂ e	%	ktCO ₂ e	%		ktCO ₂ e	%
Power Sector	5493	21.8	4885	22.0	4119.75	22.0	+40% Renewables	1635	10.0
							+30% Renewables	1830	11.0
							+50% Renewables	1440	8.9
NI Total	24995	100	22186	100	18746	100	+40% Renewables	16372	100
							+30% Renewables	16567	100
							+50% Renewables	16177	100
Against 1990	N/A	N/A	-608	-11.1	-1373.25	-25	+40% Renewables	-3858	-70.2
							+30% Renewables	-3663	-66.7
							+50% Renewables	-4053	-73.8
Against 2008	N/A	N/A	N/A	N/A	-765.25	-15.7	+40% Renewables	-3250	-66.5
							+30% Renewables	-3055	-62.5
							+50% Renewables	-3445	-70.5

Figure 8: Impact of scenario activity on projected GHG emissions for Electricity Generation sector at 2025

If electricity generated from renewable sources only reaches 30% by 2020, it is estimated that electricity generation emissions may rise and by 2025 may account for 11.0% of total Northern Ireland emissions. However, if electricity generated from renewable sources reaches 50% by 2020 it is estimated that electricity generation emissions will fall and by 2025 will account for 8.9% of total Northern Ireland emissions.

There is always going to be a degree of uncertainty associated with the estimates of GHG emissions. The All Island Grid Study did note that there are limitations to the models used within its study. The estimates presented in the scenarios above incorporate not just these limitations but also the additional uncertainties and limitations from the Northern Ireland GHGI as well as from underlying assumptions and forecasts used within the projection tool, in particular the applicability of UK trends in the Northern Ireland context.

Currently DECC do not model growth of fuel use demand in the constituent parts of the UK therefore new research in fuel use projections specific to Northern Ireland would be useful. DECC stressed that it views the fuel use projection model for individual plants as subject to large uncertainty but the overall UK projection as rather more robust.

Further work will also be needed to explore any available data/forecasts for the impacts of the All Island Energy Grid development and data relating to the renewable heat market. This additional data will help to improve the Northern Ireland estimates for GHG emissions for the electricity generation sector and will result in more robust emissions projections out to 2025.

Economic Impact of Strategies and Policy

40% Renewable Electricity Target

A great deal of work has been undertaken by DETI to quantify the costs and benefits of meeting the targets set out in the SEF.

Some uncertainties remain, however, not least because it is difficult to predict what mix of renewable energy sources will be utilised in Northern Ireland in the future. This will ultimately be decided by the market.

To provide the necessary evidence base for the SEF, renewable electricity targets for 2020, DETI commissioned work, which included the development and analysis of various scenarios relating to renewable electricity targets to determine costs, benefits and carbon savings associated with those scenarios. This work has not yet been published.

However, this information should become available in the near future.

10% Renewable Heat Target

As DETI's renewable targets have a target year of 2020, most of the current analysis will only go to this date. This was the case with the information available on the renewable heat target. An indicative figure for the costs and benefits of meeting the 10% target was available i.e. the costs and benefits between 2010 and 2020. To find the costs and benefits between 2010 and 2025, a linear growth in renewable heat was assumed between 2010 and 2020. The level of renewable heat is then kept constant between 2020 and 2025 due to uncertainty; in reality, this is likely to increase.

Some indicative costs emerging from the preliminary work are a cost of £10m/year/% point of the target. Over the 10 years, the cost of achieving the target was estimated at £198.8m up to 2020. This figure was not discounted. Starting with a cost of £3.61m in 2010/11 then adding £3.61m per year (linear growth) gives a total figure of £198.8m in 2020. The cost is then kept constant for 2020 – 2025 and this expenditure profile is used to calculate a present value of costs using a 3.5% discount rate (£281.7m).

This could result in costs to consumers of anywhere up to £95 per bill per year. However, **it must be stressed** that these figures are only indicative at present and are liable to change as DETI refines the assumptions, through the

process of the economic appraisal which, as noted above, is due to be completed in March 2011.

Using this indicative information provided re the benefits shows that the level of CO₂ savings over the period is approximately 2.15MtCO₂ saved between 2010 and 2020. This total figure was broken down between these years assuming linear growth, and the level of emissions saved was kept constant between 2020 and 2025. This gave total CO₂ savings of approximately 4.11MtCO₂. To calculate the benefits a carbon price of £22/tCO₂ is used between 2010 and 2020; this then increases as outlined by DECC guidance¹ as shown in Figure 9 below. Using these prices enabled the benefits for each year to be calculated, subsequently allowing for a present value of benefits to be estimated (£79.9m). Overall, the analysis showed that meeting the 10% target would yield an estimated net present cost of £201.8m. Again, this analysis has severe limitations but help to give an indication of what the cost might be.

Year	Price of CO ₂ /t
2010/11 – 2019/20	£22
2020/21	£25
2021/22	£28.50
2022/23	£32
2023/24	£35.50
2024/25	£39

Figure 9: DECC Price of Carbon Used in Analysis

¹

http://www.decc.gov.uk/assets/decc/what%20we%20do/a%20low%20carbon%20uk/carbon%20valuation/1_20090715105804_e_@@_carbonvaluationinukpolicyappraisal.pdf

vi. Department Of The Environment (DOE)

The Department's main responsibilities are to protect and promote the natural environment and built heritage, to provide land use planning which balances the development of needs of the region with the protection of the environment, to improve and promote road safety and ensure the proper regulation of drivers, vehicles, operators and users and support a system of local government which meets the needs of citizens and ratepayers.

Strategies and Policy Impact on the GHG Agenda

The Department has lead responsibility for climate change policy and is responsible for taking forward policy and legislation in this area. This includes development and implementation of the EU Emissions Trading Scheme (EU ETS) and the CRC; and ensuring Northern Ireland's full participation in these schemes.

The EU ETS is one of the key policies introduced by the European Union to help meet its GHG emissions targets under the Kyoto Protocol. It is a Europe-wide cap and trade scheme. The EU ETS covers electricity generation and the main energy-intensive industries – power stations, refineries and offshore, iron and steel, cement and lime, paper, food and drink, glass, ceramics, engineering and the manufacture of vehicles. Combined, these account for around 42% of UK CO₂ emissions. There are currently 23 Northern Ireland organisations in the scheme.

The CRC is a new UK-wide energy efficiency scheme that was introduced on 1 April 2010. The scheme is designed to incentivise large public and private sector organisations to take up cost-effective energy efficiency opportunities through the application of reputational and financial drivers. All Northern Ireland government departments have been mandated to participate in the scheme by the Northern Ireland Executive.

In May 2010, the Northern Ireland Executive agreed to a proposal by the Minister of the Environment to establish a Cross Departmental Working Group on GHG Emissions. The aim is to produce an agreed mitigation programme by December 2010 which would then be presented to the Northern Ireland Executive for agreement. The plan will help ensure that across the Departments progress on mitigation is maintained and will also provide assurance that the Executive's Programme for Government target to reduce greenhouse gas emissions by 25% on 1990 levels in 2025 will be met. The Department has developed a Greenhouse Gas Projection Tool to assist in this process.

In terms of planning, Planning Policy Statement (PPS) 18 aims to facilitate the siting of renewable energy generating facilities in appropriate locations within the built and natural environments.

PPS 18 is accompanied by a Best Practice Guidance document which provides technical information and guidance on a range of renewable energy technologies as well as information about approaches to Passive Solar Design.

PPS 18 is also accompanied by supplementary planning guidance "Wind Energy Development in Northern Ireland's Landscapes. This document, published by the Northern Ireland Environment Agency (NIEA), provides broad, strategic guidance in relation to the visual and landscape impacts of wind energy development. It includes general guidance on siting and design within Northern Ireland's landscapes and advice on the landscape assessment of proposed developments.

The issue of climate change is to be further considered as part of the forthcoming review of PPS 1 which is being undertaken in order to take account of, and give support to, planning reform implementation. The revised PPS 1 will be submitted for Executive consideration in March 2011 in line with planning reform.

In addition DOE has policy responsibility for waste and there are a number of specific actions in this area. The Department has allocated £5m capital funding through the Rethink Waste Capital Fund and £240k revenue funding through the Rethink Waste Revenue Fund in 2010/11 for initiatives which will boost waste recycling, re-use and prevention. As part of the application process applicants are required to outline the additional tonnages which will be diverted from landfill each year and the CO₂ emissions which will be saved as a result of their proposal.

The EU Landfill Directive requires Member States to reduce the amount of Biodegradable Municipal Waste (BMW) sent to landfill through setting challenging targets. The targets for the reduction of BMW landfilled are:

- To reduce by 2010 the quantity of BMW landfilled to 75% of that produced in 1995;
- To reduce by 2013 the quantity of BMW landfilled to 50% of that produced in 1995; and
- To reduce by 2020 the quantity of BMW landfilled to 35% of that produced in 1995.

The Northern Ireland Landfill Allowance Scheme (NILAS) regulations came into operation in Northern Ireland on 1 April 2005. The regulations place a statutory responsibility on District Councils, in each scheme year, to landfill no more than the quantity of BMW for which they have allowance.

The Department also has responsibility for the implementation of a number of EU producer responsibility Directives e.g. on Waste Electrical and Electronic Equipment (WEEE), Batteries and Packaging Waste. The aim of these Directives is to reduce the amount of certain waste streams going to landfill through setting targets for the re-use and recycling of these streams. Producer compliance schemes have been set up to ensure that

manufacturers and producers of these products and materials fund the collection and treatment of the products. NIEA monitors compliance in relation to Northern Ireland based producers. The increase in recycling rates for these products will significantly reduce the amount of GHGs produced.

In terms of its own estate and operations, DOE participates in the CRC.

NIEA has adopted an Environmental Management System under ISO 14001 which minimises the use of energy and other resources.

Current emissions and projections

The EU ETS and the CRC are incorporated into the GHG Projection Tool through DECC projected fuel and emissions trends for the Power Sector, Industrial Process Sector, Homes & Communities Sector and Transport Sector.

The Northern Ireland Waste Management Strategy 2006-2020 will impact on emissions within the Waste Sector. The latest GHGI estimates indicate that emissions from the Waste Sector represented 3.9% of total GHG emissions in Northern Ireland in 2008.

The projected GHG emissions for the Northern Ireland Waste Sector are based on Defra modelling which estimates the level of methane emissions from landfill waste disposal. The Projection Tool assumes uniform landfill design and waste management across UK and that Northern Ireland emission forecasts will follow the UK trend. The Projection Tool methodology for the Waste Sector only considers emissions from landfill, which accounts for over 92% of emissions in the Waste sector emissions; whereas the GHGI considers additional emission sources, including waste water handling and waste incineration, when reporting emissions for the Sector.

The Projection Tool currently estimates that emissions from landfill will account for 4.1% of projected Northern Ireland emissions in 2025, assuming it

follows the UK trend in landfill design and waste management. This represents a proportional increase from the 2008 level of 3.6% but in terms of actual tonnage of CO₂e it represents a decrease of 14.8% from 2008 and 58.3% from 1990 as illustrated in Figure 10 below.

	1990 (Actual)		2008 (Actual)		2025 (-25% Target)		2025 (Projected)	
	ktCO ₂ e	%	ktCO ₂ e	%	ktCO ₂ e	%	ktCO ₂ e	%
Waste Sector	1610	6.4	788	3.6	1208	6.4	671	4.1
NI Total	24995	100	22186	100	18746	100	16372	100
Against 1990	N/A	N/A	-822	-51	-402	-25	-939	-58
Against 2008	N/A	N/A	N/A	N/A	+420	+53.3	-117	-15

Figure 10: Impact of scenario activity on projected GHG emissions for waste sector

Economic Impact of Strategies and Policy

In terms of economic impact the three main policies/strategies considered for DOE are the two carbon trading schemes and the Northern Ireland Waste Management Strategy 2006-2020. The trading schemes are the EU ETS and the CRC. Information about the trading schemes was taken from the Regulatory Impact Assessments (RIAs) which were completed when introducing or amending the schemes. The main difficulty with using this information is that it is presented at a UK level and is not broken down for each DA and therefore RIAs have not been completed specifically for Northern Ireland.

EU Emissions Trading Scheme

The RIA entitled 'Impact of EU Climate and Energy package, the revised EU Emissions Trading System Directive and meeting the UK non-traded target through UK carbon budgets' (April 2009) was used to calculate costs and benefits of the EU ETS. However, this did not include aviation, which has subsequently been included in the EU ETS. The RIA from December 2009 was used for information on aviation.

The cost of the EU ETS given in the RIA was £2.37bn for the UK between 2013 and 2020 (2008 prices). This is a present value of the costs using a 3.5% discount rate. To calculate a figure for Northern Ireland, information was taken from the Phase II National Allocation Plan. This showed that total annual UK emissions from installations covered by the scheme were estimated at 212MtCO₂e. Northern Ireland's share of this figure was 5.7MtCO₂e or 2.69%.

This figure was used to calculate costs and benefits to Northern Ireland. Using this methodology, the direct cost to Northern Ireland is estimated at £63.8m between 2013 and 2020 in 2008 prices. A GDP deflator was applied to uplift the cost to 2009/10 prices, and the present value of the cost to Northern Ireland between 2010 and 2025 (the target year) was calculated. This is estimated at £109m. Obviously the assumption is made here that the price of carbon is as assumed in the RIA; also that the scheme continues in its current form beyond the third phase (2020).

The cost given does not account for international aviation being included in the EU ETS from 2012. The RIA in relation to aviation shows that the cost to the UK of including aviation in the EU ETS is £2.4bn between 2012 and 2020 (present value discounted at 3.5% in 2009/10 prices). To calculate the cost to Northern Ireland, aviation emissions have been used taken from Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990-2007. Northern Ireland emitted 199ktCO₂e in 2007; this was 0.56% of total UK emissions. Using this figure the present value of costs to Northern Ireland is estimated at £13.5m between 2012 and 2020. Between 2012 and 2025 the present value of costs is £17.1m.

It is estimated that the cost of administering the scheme is zero. This is because full cost recovery is assumed in regards to the charging scheme. Therefore, the total present value of costs of the EU ETS to Northern Ireland between 2010 and 2025 is estimated at £126.1m.

The benefits of the EU ETS are extremely difficult to quantify, particularly as there are many uncertainties involved including the emissions concentration trajectory that the world is on. The RIA does not show benefits specific to the EU ETS over the period in question. Instead, the total benefits of the EU Climate and Energy package are given, and the EU ETS cannot be disaggregated.

However, the UK Government's Energy White Paper (May 2007) estimates 13.7MtC will be abated in the UK as a result of the EU ETS in 2020. This is equal to 50.2Mt CO₂ abated. Using a traded price of carbon of £25 per tonne, as advised by DECC, gives a benefit of £1.26bn. For Northern Ireland using the same methodology as with the costs gives a benefit of £33.8m. Note that this is only for one year (2020) and does not include aviation. Whilst a present value of benefits cannot be calculated at this time, this helps to illustrate that the benefits greatly outweigh the costs.

As regards quantifying the benefits of including international aviation in the EU ETS, the RIA gives two possible scenarios and the benefits for the UK range from £2.2bn to £23.3bn between 2012 and 2020 (present value discounted at 3.5%). For Northern Ireland this range is £59.2m to £627.5m. Between 2010 and 2025 the range for Northern Ireland is £88.8m to £940.5m. Again, this shows that the benefits are estimated to outweigh the costs by a large margin, given that this is only the benefit of including aviation in the EU ETS.

CRC Energy Efficiency Scheme

The RIA for the CRC gives costs and benefits for the UK implementing the scheme. The cost of the scheme is estimated at £534m between 2010 and 2025 (3.5% discount rate); this includes emission control costs and administration costs. The benefit of the scheme is estimated at £4.3bn over the same period; this includes savings on energy bills, carbon saved and air quality benefits which have been quantified. This gives a net present value of £3.8bn. It should be noted that the final level of carbon savings that can be

achieved by the CRC will depend on the cap set on the number of allowances available for participants to purchase. This will be set in 2012.

To calculate the figures for Northern Ireland, the number of participants was used. Unfortunately this has to be estimated, as the (GB) Environment Agency has yet to collate and publish the data on participants; registration for the scheme only closed on 30 September 2010. Nevertheless, DOE estimates that out of a possible 3,500 – 4,000 participants, 60 – 80 will be headquartered in Northern Ireland. There will also be businesses that report through the rest of the UK but will be purchasing allowances to cover their Northern Ireland operations; usually as their head office is based elsewhere in the UK. Therefore, DOE suggest using a figure of 3% when comparing Northern Ireland costs and benefits to those of the UK. Using this methodology gives a cost of £16.0m and a benefit of £130.3m between 2010 and 2025. This is a net present value of £114.3m.

Northern Ireland Waste Management Strategy 2006 - 2020

The key waste areas considered are the forthcoming residual waste infrastructure contracts and grant funding to promote waste prevention, recycling and re-use.

As regards residual waste infrastructure, the three waste management groups in Northern Ireland are currently going through the procurement process to introduce this infrastructure. The aim is to divert municipal waste from landfill in order to achieve targets set in the NILAS (and consequently the EU Landfill Directive). The three Outline Business Cases have been approved and the Approved Business Cases/Final Business Cases are expected to be completed in 2011.

Using information from the 'Waste Management – A Northern Ireland Analysis' (March 2010), the total net present cost (NPC) of the preferred option between 2010 and 2025 is £973.2m. This was calculated using a 3.5%

discount rate and excludes Revenue and NILAS fines. It should be noted that this calculation does not include monetised CO₂ savings; this is due to be estimated for the Approved Business Cases.

In 2010, the Department introduced the Rethink Waste Fund to promote waste prevention, recycling and re-use.

The benefits of the fund have not been quantified given the difficulty this would entail. The Rethink Waste Revenue Fund has a budget of £240k for this financial year. Again, benefits have not been quantified.

Operational expenditure for the Rethink Waste Campaign has been approved for three years (2010/11 – 2012/13) and this is £1.8m in total.

Given budgetary constraints, the current economic climate and the fact that the fund was only introduced this year, it is not possible to project future expenditure on the fund at this time. It is likely that the level of funding for future years will become clear at the start of 2011.

vii. Department Of Finance And Personnel (DFP)

The Department aims to prioritise the use of resources available to Northern Ireland, ensure that these are used efficiently and secure the reform and modernisation of public services; and to deliver efficient and cost effective services to the public in the Department's areas of executive responsibility.

Strategies and Policy Impact on the GHG Agenda

DFP initiatives for reducing GHG Emissions include Building and Construction Carbon Initiatives, the Low Carbon Homes Scheme (LCHS) and the Energy Efficiency Homes Scheme (EEHS) and the Central Energy Efficiency Fund (CEEF).

DFP is responsible for Building Regulations for Northern Ireland. Reduced emissions from new buildings will be achieved through a progressive tightening of thermal standards required under building regulations. This began with an amendment to Part F in 2006, with a further amendment planned for 2011 and 2013.

Government construction clients have agreed, through the Construction Industry Forum for Northern Ireland, to the inclusion of overarching design requirements for energy and carbon use that reflect emerging best practice. In addition, Government construction clients have agreed BREEAM or CEEQUAL targets of 'Excellent' for new build and 'Very Good' for refurbishment projects.

The LCHS is a new rate relief scheme which came into effect on 1 April 2010. It aims to encourage the building of low and zero carbon homes in Northern Ireland by offering full rates relief for first occupiers of low and zero carbon homes for two and five years respectively.

The EEHS is a rate relief, which came into effect on 1 April 2010. It is managed by the Energy Saving Trust and provides a one-off reduction in rates to home owners who install cavity wall insulation and/or loft insulation in their home to the required standards.

The CEEF was established in 1993 to incentivise and support energy efficiency projects within buildings occupied by public sector bodies locally, for example councils, hospitals, schools etc. CEEF investment in such projects has shown a positive rate of return generally over a relatively short period, and the benefits of the investment have accrued directly to the bodies themselves. In recognition of this the Executive's draft budget has not included capital funding for its continuation. It is considered that the relatively short pay-back periods for energy efficiency projects should be sufficient incentive for public bodies to invest in them either via their own funds or through 'invest to save' opportunities.

Additionally other drivers such as the CRC now exist to promote and incentivise energy efficiency. DFP is participating in the CRC and as the government office estate custodian will be providing support and advice to the other departments. It is minimising staff travel through videoconferencing.

Emissions Projection

The emission savings as a result of building regulations are factored into the GHG projection tool and impact on emissions in both the Industry sector and the Domestic sector. An amendment in 2006 to Part F of The Building Regulations (Northern Ireland) 2000 is estimated to produce carbon savings by 2010 of 14.1ktC per annum within the industrial sector and 32.3ktC per annum in the domestic sector. With the further tightening of thermal standards in 2011 and 2013, data modelling will be required to update the Projection Tool to reflect these changes.

Data relating to the benefits of projects assisted by the CEEF need to be considered; however, there may be some difficulty in monitoring the estimated emissions savings of a specific project to the actual savings achieved.

In addition, the impacts of the CRC within the Department are factored into the Northern Ireland GHGI emission estimates for the Public Sector; within the Projection Tool the Public Sector emissions, taken from the Northern Ireland GHGI, are then projected forward to 2025 using Northern Ireland population trends.

Economic Impact of Strategies and Policy

Figure 11 illustrates some of the direct costs and benefits of the projects assisted by the CEEF over the last three years of its operation.

	2008/09	2009/10	2010/11
Project Capital Costs	£2.31m	£1.77m	£1.46m
Project Savings	£1.35m	£0.87m	£0.72
Annual CO₂ Savings (tonnes)	8234	4188	4117
CO₂ Savings (£22/tCO₂)	£0.18m	£0.09m	£0.09m
Total Annual Savings	£1.53m	£0.97m*	£0.81m

Figure 11: CEEF Figures

*Due to rounding

In the table project capital costs shows the cost of the projects excluding VAT. Project Savings are the annual savings made by a reduction in the amount of energy consumed, a change in fuel to a cheaper fuel source, ROCs and, in some instances, from reduced maintenance of the new equipment. It does not account for annual CO₂ savings, which are also shown in the table.

The costs are effectively one-off costs, whereas the savings have the potential to accrue annually over a period of time; albeit this is likely to reduce over time, for instance as equipment becomes older. It would be extremely difficult

to model costs and benefits of the fund between 2010 and 2025; this has not been done.

However, the information provided in Figure 11 helps to illustrate that the fund represented value for money, and that projects funded continue to reduce emissions long after the initial capital outlay. Using the figures above, for every £1m spent, there is an average reduction in CO₂ emissions of approximately 2.9ktCO₂e. It should be highlighted however that the fund is based on capital grant assistance for public sector projects and constraints in the capital budget over the next few years are likely to restrict the ability of DFP to maintain the current scheme in the short term.

The LCHS and the EEHS are rate relief schemes that were introduced in 2010; consequently, no historical data exists. This financial year there have been 12 applications to the LCHS; two applications met the award criteria at an estimated total (over 2 years) of £4,892. As regards the EEHS, there have been 157 applications for 195 measures (both cavity wall and loft insulation), costing a total of £28,125. This shows that to date expenditure on these schemes is relatively small.

Regarding Building and Construction Carbon Initiatives, unfortunately, given the lack of data at this time, it was not possible to analyse the costs and benefits of these initiatives.

viii. Department Of Health , Social Services And Public Safety (DHSSPS)

The Department's main responsibilities are Health and Social Care, which includes policy and legislation for hospitals, family practitioner services and community health and personal social services; Public Health, which covers policy, legislation and administrative action to promote and protect the health and well-being of the population; and Public Safety, which covers policy and legislation for fire and rescue services.

Strategies and Policy Impact on the GHG Agenda

As part of the Northern Ireland Sustainable Development Action Plan, DHSSPS is committed to:

- Monitoring the carbon emission performance of the Health, Social Care and Public Safety (HSC &PS) organisations and setting appropriate targets for performance improvement based on a carbon emission reduction model;
- Continue to support through its Centres of Procurement Excellence (COPEs) the objectives contained in the Northern Ireland Sustainable Procurement Action Plan;
- Continue to work with CPD to reduce the carbon emissions associated with the distribution of office supplies across the government estate through the 2010 NICS Stationery/IT Consumables Contract for Service Providers; and
- Support the HSC & PS Capital Development Programme to achieve BREEAM 'Excellent' for new build and extensions; and 'Very Good' for refurbishment projects.

DHSSPS support and influence large organisations within the health sector. Some participate in the EU ETS and all participate in the CRC, managing large amounts of energy use. Investigating onsite generation, ways to reduce the effect of industrial process and considering how public transport can be better integrated, will all help when achieving the PfG target.

DHSSPS also plays a large role in driving behavioural change, encouraging healthy lifestyles. Some aspects of this, e.g. walking or using public transport rather than driving, will in turn play a role in reducing emissions.

Current emissions and projections

The impacts of the CRC within the Department will be factored into the GHGI emission estimates for the Public Sector. There are no specific DHSSPS policies that produce data that could be factored into the GHG Projection Tool to assist in measuring GHG emissions; therefore, the Public Sector emissions, taken from the Northern Ireland GHGI, are projected forward to 2025 using Northern Ireland population trends.

Economic Impact of Strategies and Policy

Economic analysis focuses on the main policies/strategies relevant to the GHG emissions agenda only. At present, as DHSSPS do not deliver external GHG reductions policies/strategies, no costs or benefits have been analysed.

However, DHSSPS do provide funding to large organisations that participate in EU ETS and CRC, managing large amounts of energy use. Supporting and influencing these organisations plays a key role in ensuring that the value for money is realised when reducing emissions.

ix. Department Of Justice (DOJ)

The Department of Justice (DOJ) is a new Northern Ireland Department which came into existence on 12 April 2010 and was established by the Department of Justice Act (Northern Ireland) 2010. It has a range of devolved policing and justice functions set out in the Northern Ireland Act 1998 (Devolution of Policing and Justice Functions) Order 2010.

The role of the Department is to support the Minister of Justice, David Ford MLA, to help keep the people of Northern Ireland safe.

In addition to its statutory functions, the department provides resources and a legislative framework for its agencies and arms length bodies (which together constitute most of the justice system in Northern Ireland). Together with these organisations the department is responsible for ensuring there is a fair and effective justice system in Northern Ireland and for increasing public confidence in that system.

Strategies and Policy Impact on the GHG Agenda

DOJ participates in both Public Sector Energy Campaign (PSEC) and the CRC. The majority of DOJ total emissions are estate based with 65% of emissions coming from one of its five Agencies – the Northern Ireland Prison Service (NIPS).

DOJ endeavours to use low and zero carbon technologies where appropriate e.g. by installing solar panels in new build prison projects and using local companies for manufacture and installation of equipment where possible. NIPS are also in the process of preparing a business case for the installation of a wind turbine at one of their Prison sites.

The department is committed to ensuring that all new builds and infrastructure investment meets sustainable development objectives. This criterion is achieved by ensuring all designs comply with the Northern Ireland Building

Regulations 2006 approved document F2 – Conservation of Fuel and Power in Non Domestic Buildings.

DOJ endeavours to achieve an “Excellent” rating within the BREEAM assessment on new works projects over 1000m². All statutory regulations in relation to air, water and environmental pollution are covered within the scope of the assessment criteria e.g. water conservation is a key priority in the design of new works and management of the existing NIPS estate. Actions are in hand to improve water management by installing sensor controlled water outlets, low flow water taps, electronic urinal controls, low flush WC cisterns and timed shower controls. Rain water harvesting and grey water recycling schemes have been assessed and are included in future designs at Maghaberry and Magilligan prisons.

Compliance with the current Building Regulations and assessment criteria within the objectives to achieve a high BREEAM rating shall help to reduce emissions.

On major new build projects, DOJ liaise with NIEA to ensure any Waste Water Treatment Works are in full accordance with current legislation. We also assess the need for Sustainable Urban Drainage Systems (SUDS) on all new projects.

DOJ also considers the integration of public transport and improved travel planning in major new build projects, as well as ensuring provision of cyclist facilities.

Waste management is an important theme for DOJ due to combination of strict legislative requirements and the increasing financial burden it places upon the budget holder e.g. within all new NIPS schemes, the Construction teams will develop Site Waste Management Plans to ensure waste is managed correctly and, if required, disposed of in the correct manner.

Waste management systems are in operation on each DOJ site and the principle of “Reduce, Re-use, Re-cycle” is adopted where appropriate.

At present NIPS operates a very effective Waste Management Centre at Magilligan and there are plans to develop strategies for improvement at Maghaberry and Hydebank. Options are being explored to enable inmates to gain relevant qualifications in this line of work.

DOJ also utilises DFP contracts for Recycling of Dry Office Waste and Supply of Electricity where possible. By using the DFP Recycling of Dry Waste contract, the aim is to significantly reduce all office waste going to landfill. Similarly with DOJ sites that use the DFP Electricity contract, DOJ is ensuring that at least 40% of electricity it uses is “green.”

The DOJ Information Systems Division has reduced Desktop PC Power consumption by 25% through implementing “Night-watchman” Power Management Software and has a target to reduce the Server numbers by 10% in 2010/11 by a combination of consolidation and virtualisation. The Department also aims to significantly reduce GHG emissions by adopting energy efficient designs within the development of all new and refurbishment schemes.

The Department has recently replaced twenty five copiers and approximately seventy printers with thirty one Multi Functional Devices. This will have a positive impact on energy emissions and ensure that the Department ties in with the overall NICS Common Printing strategy.

The Department has established an internal Sustainability Forum which enables the Board to be kept up to date and to examine ways of reducing the Department’s carbon emissions.

There have been a number of events held within the Department to raise awareness of sustainability, the most recent of these “DOJ/Business in the Community Environment Day” was held in June.

Current emissions and projections

The impacts of the CRC within the Department will be factored into the GHGI emission estimates for the Public Sector.

There are no specific DOJ policies that produce data that could be factored into the GHG Projection Tool to assist in measuring GHG emissions; therefore the Public Sector emissions, taken from the Northern Ireland GHGI, are projected forward to 2025 using Northern Ireland population trends.

Economic Impact of Strategies and Policy

Economic analysis focuses on the main policies/strategies relevant to the GHG emissions agenda only.

At present, as DOJ do not deliver external GHG reductions policies/strategies, no costs or benefits have been analysed.

x. Department For Regional Development (DRD)

The Department's main responsibilities include regional strategic planning and development policy; transport strategy and sustainable transport policy; public transport policy and performance; certain policy and support work for air and sea ports; policy on water and sewerage services and management of the Department's shareholder interest in Northern Ireland Water and provision and maintenance of all public roads.

Strategies and Policy Impact on the GHG Agenda

The Regional Development Strategy (RDS) is currently being reviewed. The revised Strategy recognises that climate change is one of the most serious problems facing the world and that Northern Ireland will have to play its part by reducing greenhouse gas emissions. To meet this challenge the revised Strategy has a specific Strategic Objective and Strategic Guidance that aim to consider ways to reduce our carbon footprint and facilitate mitigation and adaptation to climate change.

The revised draft RDS document was issued for public consultation on 6 January 2011.

The Regional Transportation Strategy (RTS) is under review. A revised RTS will have sustainability at its core in the travel choices we make. It will allow improved connectivity for people and business to support our economy in an integrated, equitable and environmentally sensitive manner. It will re-orientate and reprioritise our policies to, amongst other things, reducing our impact on the environment particularly on lowering greenhouse gas emissions from transport, influencing travel choices and behaviour and making better use of existing infrastructure and services. It is envisaged that a draft revised RTS document will issue for public consultation in early 2011.

To inform the RTS in this regard the Minister for Regional Development commissioned a programme of work in late 2009 to identify the scale of the challenge and inform the development of more sustainable transport arrangements.

As a first stage in that wider programme of work, in January 2010 the Department published a baseline report setting out trends in greenhouse gas emissions from road transport for the period 1990-2007² and identifying key factors contributing to transport demand and emissions. DRD has undertaken an analysis of the key social, economic and environmental drivers in relation to sustainable transport and the implications of those for future policy.

Following on from that, officials have taken forward work to evaluate a range of sustainable transport policy levers taking full account of best practice, the aims and objectives of the RTS and the constraints and opportunities presented by the local context. The outcome of this work, which aims to build on the programme of investment in the strategic road network and public transport, in particular Belfast Rapid Transit, will inform the RTS and will be made available following publication of that document.

In support of this wider programme of work on sustainable transport, work has also been initiated on a number of more specific reviews and initiatives on key areas with the potential to make a significant contribution to more sustainable transport arrangements and reduced emissions from transport. These have included the Strategic Review of Park and Ride, the All-Island Freight Forum and the Active Travel Strategy.

DRD with DOE have submitted a successful bid to the Office for Low Emissions Vehicles under the Plugged in Places Scheme to provide funding to promote the uptake of electric vehicles through the provision of electric vehicles charging infrastructure.

² Department for Regional Development, *Reducing Greenhouse Gas Emissions from Road Transport: Baseline Report 1990-2007*, Transportation Policy Division, Belfast, January 2010

Since 2005, the DRD Travelwise initiative has continued to engage with businesses, schools and commuters to promote and encourage sustainable modes of travel as alternatives to the private car as part of the drive to help reduce congestion and contribute to reductions in CO₂ emissions. Major elements of this work include:

- Safer Routes to Schools programme which considers infrastructure needs and travel behaviours;
- Walk to School Week which focuses school activities on sustainable modes;
- Bike Week which provides a focus for activities which promote cycling as a sustainable mode;
- The provision and promotion of car share websites to business as well as the general public; and
- Support for organisations to develop Workplace Travel Plans as a means of encouraging sustainable travel.

To build on this work and provide for the development of an integrated strategy to encourage walking and cycling, the Minister for Regional Development established an Active Travel Forum in March 2010. The Forum draws together key stakeholders in the fields of government, the wider public sector, business and voluntary/community sectors.

Since its establishment, the Forum has sought to consider the wider social, economic and health benefits of active travel, the key barriers to active travel, best practice and opportunities for alignment with existing policies and programmes. It is anticipated that the Forum will bring forward recommendations for an Active Travel Strategy, which will be published following publication of the RTS.

Roads Service

Through the Local Transport and Safety Measures programme, Roads Service provides infrastructure to promote sustainable modes of travel, which will in turn impact on GHG emissions including:

- Traffic calming;
- Safer Routes to Schools;
- Bus Priority Measures;
- Making it easier to walk;
- Making it easier to cycle; and
- Provision of Park & Share facilities.

Working with Translink, Roads Service deliver bus priority measures such as bus lanes and expansion of Park and Ride schemes.

Roads Service is committed to applying the CEEQUAL standard to its Major Strategic Road Improvement schemes. CEEQUAL includes environmental aspects such as the use of energy and carbon, land use, ecology, landscape, noise and dust, cultural heritage, waste minimisation and management.

Each of the Strategic Road Improvement schemes undertakes an Environmental Assessment Cost Benefit Analysis where carbon emissions are assessed, reported and used to inform the overall scheme assessment. The output identifies the cost of carbon in pounds per tonne and the fuel consumption calculated by thousands of litres by vehicle type and carbon emitted (tonnes) by year.

The Specification for Road and Bridge Works used by Roads Service includes alternative clauses for use where the contractor opts to provide recycled hardcore or bituminous materials. To encourage recycling or reuse, reclaimed bituminous material permitted shall be 10% in surface course and 50% in all other layers, as detailed in the Specification for Highway Works.

Roads Service has implemented a Construction Sustainability Action Plan. This Action Plan sets out relevant environmental performance standards, to be delivered, whilst undertaking construction works. Sustainable Procurement is a key method for delivering Roads Service's Sustainable Development priorities. It ensures they are considering social and environmental factors alongside financial factors in making procurement decisions.

In a bid to reduce carbon in construction, it is necessary to measure GHG emissions, and provide the incentives to actively manage, and reduce these, wherever possible. Roads Service intend to use the Environment Agency's Project Carbon calculation methodology, so its business and supply chain have a consistent and transparent methodology for collecting and calculating their carbon emissions. They will initially use this data to calculate an annual carbon footprint for major works projects.

A Sustainability Working Group has been established by the Quarry Products Association NI and Roads Service to consider and report on the promotion and development of energy efficiency in all aspects of road construction. It will produce information to raise the awareness of all stakeholders showing the performance of the existing roads network and the opportunities for carbon reduction and improved environmental performance in all aspects of road construction and maintenance. This sector can only achieve significant CO₂ reductions with external assistance or stronger external drivers. Therefore it is up to Roads Service to consider the carbon impact of its choice of material and they support this by committing this year and beyond to energy reduction through support of using new materials in its contracts.

In terms of environmental highway maintenance, due to the advancement in technology, engineers now have a greater opportunity to plan, design and specify a preventive regime that results in reduced need for material and energy intensive repairs. The range of potential options for re-use/ recycling of construction materials and by-products are applied where feasible to all pavement maintenance inclusive of those in the need of strengthening or reconstruction to accommodate increasing traffic volume and loading.

Roads Service has signed up to the 'Halving Waste to Landfill' initiative. This voluntary agreement launched in October 2008 provides a framework through which the construction industry can publicly support and deliver against the headline target of halving waste to landfill by 2012. They currently achieve on average over 50% recycled or re-used content across our works projects.

Roads Service has a substantial ongoing energy requirement for street lighting. A strategy has been developed to ensure improvements are introduced in energy usage across the network including purchasing a minimum of 10% renewable electricity and replacing selected existing lanterns with lower wattage lanterns with improved optical efficiency.

Each of the four Divisions have identified one site for a trial dimming system, which is to be installed and monitored for public reaction, lighting performance, reliability and costs. Investigations are also ongoing for the use of LED lighting systems. LED power consumption yields energy savings of 20% to 50%, as well as reduced fuel consumption by maintenance crews dispatched for bulb replacement. Solar power is used for many traffic sign lighting applications and traffic counting and car parking equipment.

In the vast majority of Major Works Schemes constructed in the last 10 years, Sustainable Drainage Systems were installed to reduce the volume and surface velocity of water run-off, control pollution and reduce the schemes contribution to storm water discharge. Reduction or limiting of flow to the waste water treatment works will reduce energy costs by more efficient treatment.

Northern Ireland Water (NIW)

NIW is the largest single consumer of electricity in Northern Ireland spending £36m in 2009/10. Climate Change mitigation has become a key focus for operational activity. As NIW reductions in GHG emissions often equates to reduced energy and chemicals consumption, a significant benefit will be reduced operating costs.

In October 2010 NIW released a Climate Change Mitigation Strategy. Within this document 32 strategies are scheduled under four sub-headings:

- Organisational Structure and Alignment of Corporate Strategies;
- Use Less Electricity;
- Use Renewable Electricity; and
- Reduction of Other Greenhouse Gas Emissions.

The DRD Social and Environmental Guidance for Water and Sewerage Services 2010-13, provides guidance to NIW on affordability, EU compliance, service improvements, sustainability and GHG emissions reduction. From this, NIW plan to:

- Determine the Sustainable Economic Level of Leakage by including carbon costs by 31st March 2013;
- Secure 13% of its overall energy requirements through green energy sources by 31st March 2010;
- Report on CRC Scheme performance;

- Develop GHG emission targets to cover the 5 year period from either 1st April 2014 or 1st April 2015 (to be determined by the Utility Regulator in consultation with DRD); and
- Appraise Capital Works Programme Projects (where applicable) using carbon by 31 December 2011.

DRD and NIW will both participate (separately) in the CRC Scheme.

Current emissions and projections

The latest GHGI estimates indicate that the Transport sector accounted for 23.3% of Northern Ireland emissions in 2008, with 20.7% relating to road transport emissions.

Emissions from road transport represent 28.2% of the 2008 Northern Ireland CO₂ total, with emissions having risen by 39.5% since 1990, compared with a 7.0% increase for the UK over the same period. Cars continue to represent the most significant source of CO₂ emissions from the road transport sector, contributing approximately 54% of CO₂ from the sector in 2008.

However, the highest levels of increase in emissions have been experienced by the freight sector and in particular Heavy Goods Vehicles (HGV), increasing by 85% on the 1990 baseline and accounting for almost 60% of the total increase in road transport emissions. When Light Goods Vehicles are added this increases to 67%. As a consequence, while cars continue to account for the majority of emissions from transport, this represents a significant change on the 1990 position when cars accounted for 63% of total road transport emissions. HGVs now account for 37% of road transport emissions as compared to 27% in 1990.

As set out in the DRD Baseline Report, these trends reflect and would appear to have been driven by the unprecedented expansion of the local population

and economy in the period since 1990. This has important implications for future transport policy, given the Executive's goal to restructure the local economy with a focus on growth in high value sectors and exports.

UK policies are incorporated into the projection tool through DECC projected fuel trends for the road transport sector. The UK projections are consistent with the Energy White paper 2007, and include savings from policies outlined in the UK Low Carbon Transition Plan (2009) including low carbon buses, Regional Economic Strategy transport bio-fuel (from 5% volume to 10% by energy).

The projected GHG emissions for the NI road transport sector are based on UK projected fuel trends for road transport. The GHG Projection Tool methodology only considers emissions from road transport, which in 2008 accounted for 89% of transport sector emissions; whereas the Northern Ireland GHGI considers additional transport emission sources, including railways and civil aviation. Within the Projection Tool, the emissions are reduced to account for savings from NI Travelwise Scheme. Travelwise savings were estimated at 1.1168ktC in 2005, these savings are then extrapolated forward to 2025, assuming similar level of policy uptake and impact.

The Projection Tool currently estimates that road transport will account for 28.1% of NI emissions in 2025, assuming it follows the UK fuel use trends; an increase from the 2008 level of 20.7%. However, in order to make an allowance for the impact of Northern Ireland road transport trends on the existing projections, consideration was given to the historically faster rate of growth in road transport emissions in NI compared to the UK (which has manifest itself in NI accounting for an increasingly higher share of total UK emissions in this sector).

It should be noted that the Northern Ireland estimates for road transport emissions started at a very low base in 1990, when the level of car ownership was much lower than that in the UK, but latest official figure show that there is

now parity in ownership levels. For this reason, the analysis focused on the short-term trend in Northern Ireland's share of UK emissions over the last five years. Projecting this forward to 2025, and assuming that Northern Ireland's higher growth rate would be similarly reflected in the UK fuel trend data, estimates that by 2025 the Northern Ireland trend in road transport fuel emissions would be 24% higher than that for the UK.

Figure 12 below give an indication of the effect that this analysis, if borne out, would have on the existing road transport emission forecasts. The first shows the current trend – a proportional increase from 13% in 1990 to 20.7% in 2008 to 28.1% in 2025. This would see a rise of 1288ktCO₂e or 38.9% overall on the 1990 baseline.

Two other scenarios have been considered. Scenario 1 assumes that the NI trend in road transport emissions would be 24% higher than that for the UK by 2025, in line with recent historic trends. Scenario 2 assumes that the NI trend in road transport emissions would be 12% higher than that for the UK by 2015, again in line with historic trends, but with additional mitigation measures, this level would then be maintained out to 2025. Note that Scenario 2 is still quite challenging, as simply performing on a par with that suggested by an unmodified projected UK trend (i.e., the base case scenario) will require significant local policy intervention measures.

If road transport emissions follow the short-term historic trends by 2025, the emissions are estimated to be 24% higher than that in the UK and are estimated to account for 31.9% of total NI emissions. This would be an increase 2195ktCO₂e or 66.3% on the 1990 baseline.

If road transport emissions follow the short-term trends out to 2015 (when it is estimated that Northern Ireland emissions would be 12% higher than that in the UK) but maintain this level out to 2025 then road transport emissions are estimated to account for 29.7% of total Northern Ireland emissions. This would be an increase 1662ktCO₂e or 50.2% on the 1990 baseline.

	1990 (Actual)		2008 (Actual)		2025 (-25% Target)		2025 (Projected*)		
	ktCO ₂ e	%	ktCO ₂ e	%	ktCO ₂ e	%		ktCO ₂ e	%
† Road Transport	3311	13.2	4601	20.7	2483.25	-25	Current Trend	4599	28.1
							+24% Scenario	5506	31.9
							+12% Scenario	4973	29.7
*NI Total	24995	100	22186	100	18746	100	Current Trend	16372	100
							+24% Scenario	17278	100
							+12% Scenario	16745	100
Against 1990	N/A	N/A	+1290	+39.0	-827.75	-25	Current Trend	+1288	+38.9
							+24% Scenario	+2195	+66.3
							+12% Scenario	+1662	+50.2
Against 2008	N/A	N/A	N/A	N/A	-2117.75	-46	Current Trend	-2	-0.04
							+24% Scenario	+905	+19.7
							+12% Scenario	+372	+8.1

Figure 12: Impact of scenario activity on projected GHG emissions for road transport sector
*Assuming all other sectors have no change in current projections out to 2025

There is always going to be a degree of uncertainty associated with the estimates of GHG emissions. It should be noted that the modeling behind the estimates presented in the two scenarios has its limitations and in addition incorporates the uncertainties and limitations from the NI GHGI as well as from underlying assumptions and forecasts used within the Projection Tool, in particular the applicability of UK trends in the NI context. In order to develop more robust projections for the Northern Ireland road transport sector, more extensive research and comprehensive modeling would be required.

A revised road transport model for Northern Ireland would be an important development as the road transport sector is a key source of GHG emissions in Northern Ireland. The results of the 2004 DRD road transport model were very different from the DfT forecasts at the time. The 2004 model would need to be reviewed, as the results are now out of date. However, the base model needs to be updated in order to improve the accuracy of the estimates; which is being considered within DRD. If this were approved, the estimated time for delivery of a new or updated transport model could be 1 – 2 years. Any new Northern Ireland specific road transport information will help improve the NI estimates for GHG emissions for this sector and produce more robust emissions projections out to 2025.

NI Water provides a detailed Annual Information Return to the Utility Regulator in July of each year. This includes a carbon footprint assessment using an established UK water industry wide approach. The 2009-10 submission for annual GHG emissions for NIW operations includes:

Gross Operational Emissions	188,673 tCO ₂ e
Net Operational Emissions	186,629 tCO ₂ e
Operational Emissions according to CRC definition	167,213 tCO ₂ e
Operational GHG emissions per million litres of treated water	355 tCO ₂ e per million litres
Operational GHG emissions per million litres of sewage treated	808 tCO ₂ e per million litres

NI Water does not currently provide projections for future GHG emissions. Targets will be developed as part of the PC14/15 Business Plan submission (to cover the 5 year period from either 1st April 2014 or 1st April 2015 – the commencement date is to be determined by the Utility Regulator in consultation with DRD).

There may be an increase in future NI Water emissions due to more stringent treatment and discharge standards imposed due to the application of EU legislation by NIEA. These increases may however be, in part, offset by energy efficiency reduction projects.

Economic Impact of Strategies and Policy

The policies/strategies investigated for DRD include the RDS, RTS, Sustainable Transport and the NIW Climate Change Mitigation Strategy. Both the RDS and RTS are under review. No costs or benefits can be estimated for either the RDS or RTS at this time. However, there are a number of general conclusions which can be made in relation to transport.

Transport

The unprecedented level of mobility we enjoy is a critical attribute that defines and shapes our society and the provision of an efficient, integrated transport network is a fundamental requirement to the realisation of the Executive's wider social and economic goals.

As set out in the PfG, the Executive's top priority is growing the economy. This is critically important, because alongside a focus on addressing significant socio-economic differentials and promoting more balanced growth across all areas of the North this has the potential to require higher levels of mobility for individuals, goods and services and thereby potentially increasing demand for transport.

The Executive's policy recognises that the delivery of economic growth will require a dual focus on supporting local business while attracting increased levels of foreign direct investment. While it is important not to overstate the importance of transport in this regard, the quality of the business environment, including transport infrastructure, has been identified as a significant factor impacting on the ability of locations to attract and sustain competitive businesses. Similarly, empirical research has highlighted access to markets (including export destinations) and labour supply, accommodation and transport links are generally the most important factors driving decisions on business location including for high value sectors. Our future ability therefore to attract investment and promote high value economic growth across the region will in no small part be determined by our ability to deliver a modern, efficient and sustainable transport infrastructure. The challenges in this regard are not unique to the North of Ireland and this is reflected in the direction of transport policy across other administrations on these islands and at EU level where investment in sustainable transport has been identified as a key element of Europe's future competitive advantage.

Alongside investment in the strategic road network and public transport, investment in wider sustainable transport initiatives is critical if we are to

improve the efficiency of our transport network, enhancing regional competitiveness and mobility and connectivity between businesses, labour supply and markets while reducing the costs congestion which at current levels is estimated to cost the local economy approximately £250m per year. In addition to reducing the relative costs of transport to local business and employees, investment in sustainable transport measures also have the potential to enhance the attractiveness of the region as a tourist destination and business investment location, particularly for high value sectors. Thus reducing the negative impacts of transport on quality of life indicators should assist in ensuring that at regional and local level the North is seen as an attractive place to visit, live, work and invest.

It is also widely recognised that improving economic and employment opportunities are central to addressing poverty and exclusion. Accessibility and mobility are critical in this regard and particularly when we move into high value sectors, which require specialisation and are often clustered regionally rather than providing employment within localities. Where our transport infrastructure is orientated towards the private car, it has been demonstrated by a wide body of local and international evidence that the potential to access services and employment is more limited for those who do not have access to a vehicle. More sustainable modes therefore offer the potential for a complimentary and positive impact on delivery of the Executive's social and economic objectives.

NI Water Climate Change Mitigation Strategy

NIW are in the process of setting relevant targets as regards leakage, water efficiency, energy consumption and an overall GHG Emissions Target. From April 2011, all relevant project appraisals will consider the cost of carbon. In addition, funding will be sought for investment in new technologies that can lead to reduced GHG emissions. Due to lack of data, the costs and benefits of the strategy cannot be quantified at this time.

xi. Department For Social Development (DSD)

The Department has strategic responsibility for urban regeneration, community and voluntary sector development, social legislation, housing, social security benefits, pensions and child support.

Strategies and Policy Impact on the GHG Agenda

The policies/schemes analysed for DSD are not necessarily driven by the reduction of GHG emissions, but by the eradication of fuel poverty in Northern Ireland. One of the key methods of combating fuel poverty is reducing household energy consumption. Obviously, in turn this reduces harmful GHG emissions.

For the new housing agenda all new build Social Housing must comply with a minimum rating of Level 3 in the Code for Sustainable Homes. In effect this means new social houses built today are 25% more energy efficient than before.

Housing Associations have been incentivised to go further than Level 3 by increasing the level of subsidy to those Housing Associations who can build to Level 4 standards. Work has commenced on a pilot in South Belfast, which will see up to 70 mixed tenure built to Level 5 standard. When initiated it was the largest and most ambitious Level 5 development across the UK and the use of renewable technologies in this scheme will be essential to meet the strict level 5 ratings.

There are also a number of schemes, such as the Warm Homes Scheme, Cosy Homes Programme and the Northern Ireland Housing Executive (NIHE) Heating Replacement Scheme for social housing to assist householders with energy efficiency improvements. These energy efficiency improvements are aimed at both social and private housing help reduce carbon emissions

contributing to carbon reduction targets as well as contributing to efforts to reduce fuel poverty.

The Department works with CPD to reduce the carbon emissions associated with distribution of office supplies across the department's estate through the 2010 NICS Stationery/IT Consumables Contract for Service Providers.

Current emissions and projections

As noted, earlier policies/schemes analysed for DSD are not necessarily driven by the reduction of GHG emissions, but by the eradication of fuel poverty in Northern Ireland. One of the key methods of combating fuel poverty is reducing household energy consumption. The GHGI reports on domestic combustion emissions within the Homes and Communities Sector.

The latest GHGI estimates indicate that the Homes and Communities Sector (known as the Residential Sector³ in the Projection Tool) accounted for 18% of Northern Ireland emissions in 2008. Carbon dioxide emissions from domestic combustion sources are estimated to account for 23.4% of the Northern Ireland CO₂ total in 2008.

As a proportion of the UK residential emissions, they are estimated to represent 4.8%, which is much higher than would be expected from Northern Ireland's population (2.9% of UK population in 2008). The reason for this is the very limited availability of natural gas resulting in high consumption of coal, burning oil and gas oil in the Homes and Communities Sector; although natural gas is becoming more widely available and Sector CO₂ emissions have shown a decrease of 15.4% since 1990.

UK policies are incorporated into the Projection Tool through DECC projected fuel trends for the Homes and Communities Sector. The UK projections are

³ This is due to the GHGI including other sources (discussed later in chapter) whereas the GHG Projection Tool only considers domestic combustion. When referring to NI projections, 'Residential Sector' will be used to differentiate.

consistent with the Energy White paper 2007, UK Warm Front and fuel poverty schemes and policies outlined in the Low Carbon Transition Plan (July 2009), including the Household Energy Management Strategy and Residential Renewable Heat Incentive. However, the Projection Tool does not currently use any DSD policy specific data.

The projected GHG emissions for the Northern Ireland Residential Sector are based on fuel trend data for the UK Homes and Communities sector, compiled by DECC.

The GHG Projection Tool methodology for the Residential Sector only considers domestic combustion, which accounts for over 94% of residential emissions; whereas the Northern Ireland GHGI considers additional emission sources, including house and garden machinery, when reporting emissions for the Homes and Communities Sector.

The Projection Tool currently estimates that domestic combustion will account for 8.0% of Northern Ireland emissions in 2025, assuming it follows the UK projected fuel trends; a decrease from the 2008 level of 17.5%.

Energy efficiency improvement through schemes, such as the Warm Homes Scheme, the NIHE Heating Replacement Scheme and Codes for Sustainable Homes will contribute to carbon reduction targets.

The latest Housing Condition Survey (2009) can provide data on Standard Assessment Procedure (SAP) ratings change over time from 2001 to 2009, and in addition, DSD are collecting data relating to the Northern Ireland Warm Home policy from July 2009, looking at pre and post SAP ratings for households.

Further consideration of this data and possible collation of additional data may be required to establish what information could be used to improve the Northern Ireland estimates for GHG emissions for domestic combustion and produce more robust emissions projections out to 2025.

Economic Impact of Strategies and Policy

The Cosy Homes Programme

The Cosy Homes Programme provides support and assistance to Housing Associations to improve the energy efficiency of their properties. This involves the changing of electric Economy 7 heating systems to more efficient gas or oil systems, and other energy efficiency measures. Figure 13 illustrates the historical figures that were available for the Cosy Homes Programme.

Year	Conversions	Cost	Insulation Upgrades	Cost	Total Cost
2003/04	854	£2.74m	492	£0.13m	£2.87m
2004/05	500	£1.61m	400	£0.12m	£1.73m
2005/06	400	£1.30m	250	£0.07m	£1.37m
2006/07	346	£1.27m	253	£0.08m	£1.35m
2007/08	600	£1.90m	480	£0.12m	£2.02m
TOTAL	2700	£8.82m	1875	£0.52m	£9.34m

Figure 13: Cosy Homes Programme

Ultimately the cost of the scheme in future will be determined by available funding. The average annual cost of the scheme over the five years in Figure 13 is approximately £1.9m. Due to a lack of data, the benefits of the scheme cannot be estimated at this time.

Warm Homes Scheme

The Warm Homes Scheme is a grant scheme which provides funding to private homeowners and tenants in the private rented sector for insulation measures.

Homeowners/tenants must qualify for specified benefits or tax credits; measures include:

- Cavity Wall Insulation;
- Loft Insulation;
- Hot water tank jackets;
- Benefit Entitlement Checks; or
- Energy Advice.

Figure 14 illustrates historical figures for the Warm Homes Scheme, provided by NIHE.

Year	Insulation Measures	Heating Measures	Expenditure
2002/03	6,445	1,922	£7.6m
2003/04	5,331	2,062	£7.8m
2004/05	6,955	2,670	£13.4m
2005/06	8,233	3,087	£14.4m
2006/07	9,001	3,814	£19.2m
2007/08	8,632	3,909	£19.9m
2008/09	8,189	3,592	£18.8m
2009/10	6,847	576	£5.9m

Figure 14: Warm Homes Scheme Figures

As can be seen in Figure 14, expenditure levels tend to fluctuate and this is likely to be dictated by available funding. Therefore, particularly given the austerity measures likely to be in place in the next few years, it is very difficult to predict future expenditure.

High level benefits for the scheme were identified in an economic appraisal undertaken by DSD when the scheme was being amended. As regards CO₂ emissions, it is thought the scheme saves 12,205tCO₂e per annum.

Using a value of £22/tCO₂e gives a monetary benefit of £269k. Other benefits include a 22% reduction in household energy bills per annum and an increase

in benefits as a direct result of the benefit entitlement check provided under the scheme (estimated at £22.82 per week for each applicant).

NIHE Heating Replacement Scheme

This scheme is one where NIHE as social landlords update the heating systems of tenants, to replace older, less efficient boilers with more energy efficient ones.

As can be seen in Figure 15, expenditure levels tend to fluctuate and this is likely to be dictated by available funding. Therefore, particularly given the austerity measures likely to be in place in the next few years, it is very difficult to predict future expenditure.

Year	Spent (£m)	Systems Replaced
2001/02	11.6	3390
2002/03	15.7	3898
2003/04	16.6	3845
2004/05	16.5	4331
2005/06	15.7	4272
2006/07	13.8	3032
2007/08	11.5	2315
2008/09	9.4	1726
2009/10	14.5	2707
2010/11 (Budget)	7.5	N/A

Figure 15: NIHE Heating Replacement Scheme

New Housing Agenda

The new housing agenda will ensure that all new build Social Housing must comply with a minimum rating of level 3 in the Code for Sustainable Homes. Figure 16 illustrates extra costs of reaching each level of the Code from a baseline of building a 2006 Building Regulation compliant dwelling.

Code Level	2-bed flat		2-bed terrace		3-bed semi		4-bed detached	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
1	£230	£320	£160	£350	£250	£430	£260	£320
2	£1,550	£1,770	£1,490	£1,840	£890	£1,260	£810	£1,090
3	£2,090	£2,760	£2,000	£2,420	£2,640	£3,020	£2,310	£2,680
4	£4,290	£6,360	£6,200	£7,410	£6,580	£8,150	£5,860	£7,190
5	£14,690	£17,740	£23,210	£27,250	£25,580	£29,550	£28,790	£32,560
6	£17,650	£28,510	£26,550	£37,690	£28,390	£41,090	£31,230	£45,510

Figure 16: Upper and lower bound on overall Code extra-over cost

In order to estimate the cost of all new social housing complying with level 3 we would have need information on the number of new-builds and also the type of dwellings proposed. However, this information is not yet known. In addition, to calculate costs and benefits baseline information would be required regarding the ratings of houses build before the New Housing Agenda was introduced. Again this is not available. Figure 17 shows the total number of onsite starts since 2001/02. The information was provided by NIHE.

Year	Total Starts
2001/02	1,005
2002/03	900
2003/04	1,523
2004/05	1,317
2005/06	1,519
2006/07	1,032
2007/08	1,595
2008/09	1,136
2009/10	1,886

Figure 17: Total Onsite Starts for Housing Associations

The average number of houses built annually over the nine years shown in Figure 17 is 1,323. If we assumed these are all 2-bed terrace houses and houses prior to the New Housing Agenda were only built to Building Regulations standard, the extra cost would be approximately between £2.6m and £3.2m per annum. Obviously these are very loose assumptions and more

work would need to be done to calculate the true costs (and benefits) of the New Housing Agenda.

The main environmental benefits of the code include a reduction in CO₂, energy and better adaption to climate change. A level 3 house should represent 25% less CO₂ (and energy) than a house adhering only to 2006 Building Regulations. Unfortunately, there was not enough data to estimate benefits at this time.

xii. Office Of The First Minister And Deputy First Minister (OFMDFM)

The Department's objectives include supporting Ministers and the institutions of Government; building a Programme for Government; promoting better community relations, a culture of equality and equal rights, targeting social need and promoting social inclusion.

Strategies and Policy Impact on the GHG Agenda

The key role in relation to GHG emissions relates to the development of a Northern Ireland Sustainable Development Strategy and associated Implementation Plan. Development of the Plan is well underway and involves all Departments of Government and stakeholders from the private and voluntary and community sectors, This work is being overseen by the Implementation Plan Steering Group, which is chaired by OFMDFM Junior Ministers and has a membership which provides representation from in, and beyond, government.

The draft Implementation Plan sets out the actions to be taken by Departments in support of the achievement of the Strategic Objectives in each Priority Area for Action. Reducing GHG is a strategic objective within Priority Area for Action 5: *“Ensuring reliable, affordable and sustainable energy provision and reducing our carbon footprint”*. The Implementation Plan is scheduled for publication early in 2011 following Executive approval.

The Department will, by participating in the CRC, establish baselines for attributable greenhouse gas emissions and immediately work towards emissions reductions. It will work with DFP and suppliers to reduce the carbon emissions associated with distribution of procured goods, through the management of contracts for supply of goods.

The cross-government Sustainable Development Champions' Group will consider GHG emissions reductions on the wider Public Sector estate and bring forward recommendations on GHG emissions management.

Current emissions and projections

The draft Implementation Plan identifies actions to be taken by Departments to assist in reducing GHG. These actions are reviewed in the individual departmental chapters.

The draft Communication Strategy for sustainable development recognises the importance of behavioural change. It can be very difficult to clearly measure/identify the direct impact of a specific policy relating to behavioural change, although it can be assumed that any effects will be measured when considering impact within a particular policy, e.g. the Travelwise scheme.

Economic Impact of Strategies and Policy

The Sustainable Development Strategy does not seek to measure the economic impact of its priorities and objectives rather, it seeks to create and encourage policy changes, which encourage sustainable behaviours and practices. The economic impact of positive changes to behaviour and practices could lead to significant cost savings through, for example, reduced energy consumption etc. The extent to which this and, other strategies, may be measured in economic terms has not been fully quantified although the use of economic data within a suite of Sustainable Development Indicators has the potential to provide useful information.

The objectives within the Implementation Plan include measurable and quantifiable targets although these do not necessarily seek to measure economic impact; rather, the policies and strategies produced by Departments, which contribute to the strategic objectives of the Plan, are subject to economic appraisal in the course of their development.

V. Sectoral Approach – How Departments Can Work Together

The main elements of the cross-departmental Action Plan are set out in Section VI. However, this focus on single departments tends to oversimplify accountability and masks the degree of influence Departments have on each others greenhouse gas emissions.

For example, housing in Northern Ireland will see DOE play a role in planning, DFP can set building regulations and DSD can support and influence energy efficiency.

In addition, there are also areas that UK Government exerts a major role, e.g. aviation, nuclear power and taxation. This is often outside of local control but can impact upon departmental approaches.

These direct operations are more easily quantified against departmental performance but indirect actions also need considered, e.g. increased tourism activities (DETI through NI Tourism Board) may generate increased emissions in the transport sector (DRD).

As this is difficult to disaggregate (although trend factors used in the Projection Tool consider this in broad terms), departments only assessing their policies against their own remit may mean we are increasing the risk of missing targets and missing synergies.

The Executive and Assembly have recognised that climate change and GHG emission reduction is a combined effort and that all departments need to work together.

To this end, responsibility must be shared so that departmental strategies and policies complement each other. Increasing attention to this cross-cutting

feature will improve efforts to calculate progress more accurately towards the target and to meet the target.

To improve understanding of the intertwined nature of policy outcomes in relation to GHG emissions the following paragraphs set out a possible model that identifies the roles of departments in influencing emissions for a number of defined sectors. The sectors are:

- Power
- Workplaces & Jobs: Industrial Process
- Workplaces & Jobs: Heating Workplaces
- Agriculture, Land And Forestry Management
- Homes And Communities
- Transport
- Waste
- Public Sector

Figure 18 below highlights how each department can play a role in each sector.

DEPT	SECTOR		
	AGRICULTURE, LAND& FORESTRY MANAGEMENT	HOMES & COMMUNITIES	POWER
DARD	Holder of main levers and sectoral influence. Can set strategy to shape sector.	Support rural communities and advise on technology and initiatives. Explore micogeneration opportunities.	Work on bio-energy / rural renewables. Consider micogeneration and power from agricultural by-product.
DCAL		Can encourage behavioural changes within remit.	
DE		Educating better environmental behaviours through the curriculum.	Can investigate onsite power generation in schools.
DEL	Can create courses, skill sets and support innovation.	Can educate on environmental behaviours, skills and innovation.	Can investigate onsite power generation in colleges and universities.
DETI	Impact of renewables and bio-energy policies; consider biofuels use.	Influence residential emissions, tourism, consumption, green standards/consumer protection, advantages from improved telecoms, better regulation and residential technologies.	Lead on energy supply, renewable technology and development of the networks.
DFP	Support innovation and research.	Influence through regulatory reform in construction, rating and valuation of properties.	Can consider micogeneration on government estate.
DHSSPS		Can promote healthy lifestyles.	Can investigate onsite power generation in health estates.
DOE	Use planning mechanisms to support objectives. Advise on biodiversity / carbon sequestration in soil/trees.	Can influence behavioural change, promote agenda to public, manage biodiversity & built environment/heritage, planning applications. Can support local government efforts.	Support infrastructure and network through planning regulations.
DOJ	Can aid enforcement of environmental penalties.	Could prioritise and aid to enforce environmental penalties.	Can investigate onsite power generation for prisons.
DRD	Can consider impact of biofuels in transport; impact of infrastructure.	Sustainable transport behavioural change can create synergies with other behavioural drivers. Water management plays a large role in household emissions	Assist developing infrastructure to support network and transport of generating fuel.

DEPT	SECTOR		
	AGRICULTURE, LAND & FORESTRY MANAGEMENT	HOMES & COMMUNITIES	POWER
DSD		Can support and influence residential schemes, carbon zero homes, energy efficiency, community Combined Heat and Power (CHP), insulation and lead through provision of high standard social housing.	Can investigate onsite power generation in communities including residential CHP.
OFMDFM	Use sustainable development levers to complement other department's initiatives.	Can examine how to target those in marginalised social groups; ensure equality of opportunities. Ensure sustainable principles applied.	Can assist with ROI and EU linkages and bodies on energy issues.

DEPT	SECTOR			
	TRANSPORT	WASTE	WORKPLACES & JOBS: HEATING WORKPLACES	WORKPLACES & JOBS: INDUSTRIAL PROCESS
DARD	Advise on emissions reductions from agriculture related travel / operations. Support sustainable public transport initiatives for rural communities.	Influence on rural waste/bio-energy sectors.	Influence heating processes and energy efficiency take up in rural workplaces.	Can influence methane emissions. Can encourage sustainable consumption and production.
DCAL	Can examine potential for inland waterways. Can consider better public transport integration with delivery bodies.	Can influence level of waste/recycling in sector. Can support behavioural changes in remit.		
DE	Can influence emissions from school-run and education related travel. Can support sustainable modes of transport to and from schools.	Can influence level of waste/recycling in schools.	Can encourage Principals/Boards to better manage estate and install efficient heating systems.	Can consider energy efficient processes in school canteens.
DEL	Can participate in sustainable transport schemes to and from campuses.	Can examine and influence levels of waste/recycling in colleges and universities.	Can advise and influence colleges and universities on estate management.	
DETI	Can work with other departments to consider growth of tourism and its impacts. Influence on emissions associated with energy related freight transport.	Examine power from waste / bio-energy and microgeneration.	Can advise on how to balance economic growth, business needs, energy demand and reduced emissions. Funder of delivery bodies.	Can influence business emissions, energy efficiency, hydrocarbon emissions and de-sulphurisation.

DEPT	SECTOR			
	TRANSPORT	WASTE	WORKPLACES& JOBS: HEATING WORKPLACES	WORKPLACES & JOBS: INDUSTRIAL PROCESS
DFP	Can influence procurement strategy and use of innovative technologies.	Can advise on procurement of technologies.	Manages government office estate and procurement of power and energy.	
DHSSPS	Responsible for health and rescue services related travel/operational journeys. Can influence sustainable transport initiatives for access to healthcare.	Can examine and influence levels of waste/recycling in health sector/possibilities for energy from waste.	Can consider implications upon health estate, power management and onsite CHP.	Can examine incinerations processes.
DOE	Can set vehicle standards, incentivise new technology. Planning levers on infrastructure.	Can influence emissions from waste; support sponsored bodies to change behaviours; set municipal standards.	Public face of reducing consumption - can influence emissions reduction campaigns.	Responsible for carbon policies including sector agreements and trading schemes; f-gas regulations and pollution control and inspection.
DOJ	Can support department's enforcing vehicle standards' action on infrastructure development. Responsible for PSNI and Prison Service travel emissions.	Can aid enforcement of environmental penalties on polluters.	Can consider emissions in prisons, police service buildings.	Can aid enforcement of environmental penalties on polluters.
DRD	Holder of main policy levers and influence including infrastructure, sustainable transport, freight, surface transport policy, aviation and road use tariffs.	Can consider how energy from waste can be used in transport sector.	Can consider emissions in section offices, treatment works.	Can examine energy efficiencies in water related functions.
DSD	Can utilise sustainable transport hubs in social housing development/urban regeneration projects.	Can examine and influence levels of waste/recycling in social housing/possibilities for energy from waste.	Can consider emissions in social security offices/ job centres.	
OFMDFM	Ensure that development is sustainable but in line with economic regeneration targets.	Encourage waste and recycling in line with Sustainability agenda.	Support sustainable consumption and procurement.	Can consider links of NI Office in Brussels with DG Environment to better understand international implications.

Figure 18: NI Departments Sectoral Roles

Following on from this, we have attempted to show notional influencing potential in each sector in the charts (Figs 19 – 27 below). It is not an exact measurement and does not attempt to split up the sector's overall emissions into a 'share' that the department is responsible for. This highlights how departments will need to work together when planning their approach to emissions reduction.

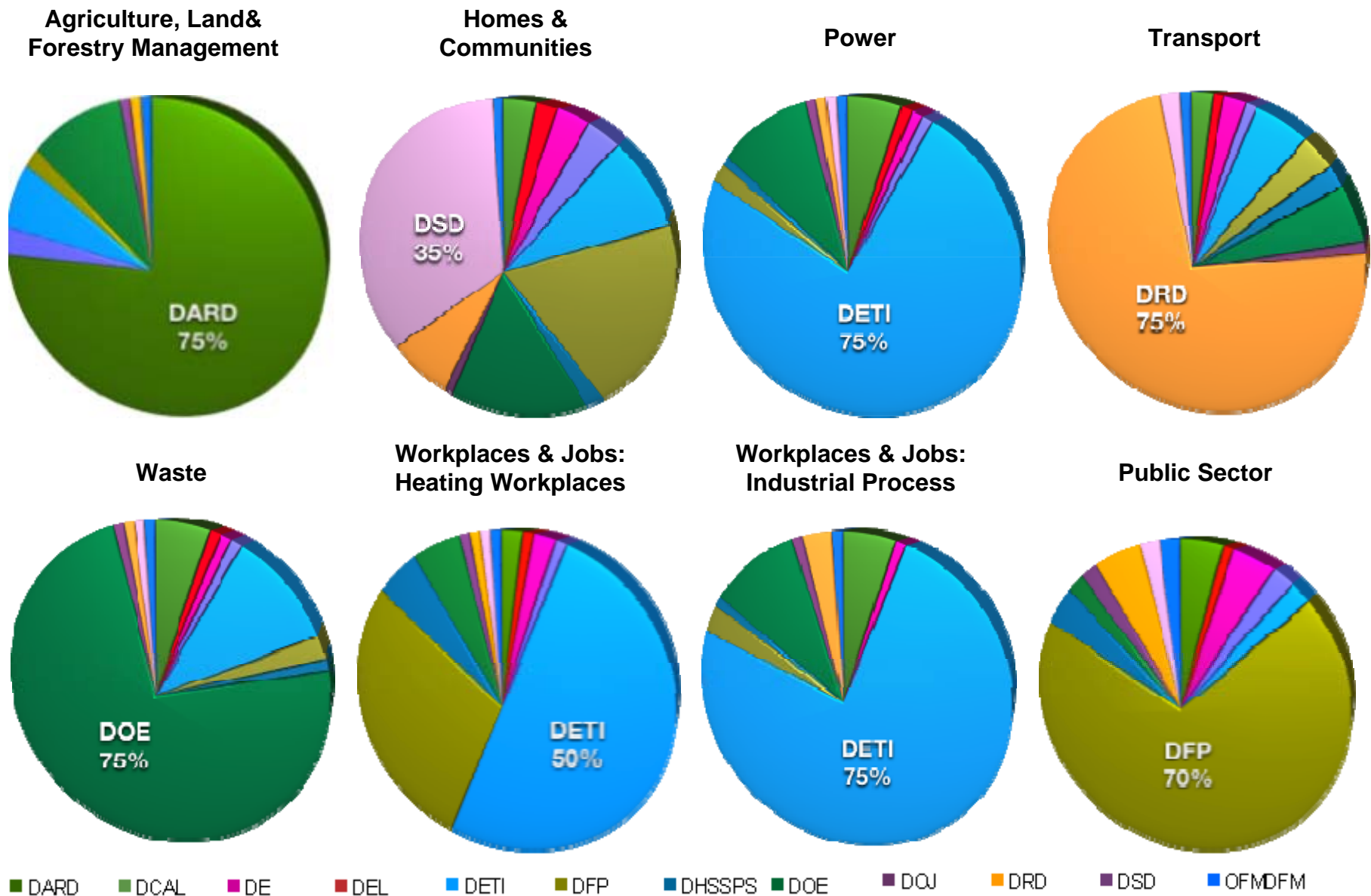
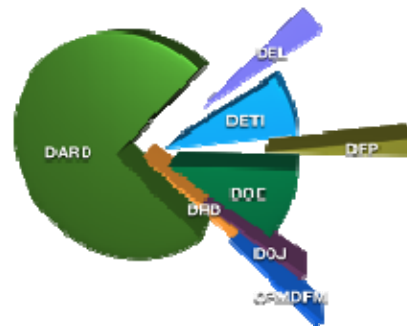


Figure 19: NI Departments Sectoral Roles Overview

Agriculture, Land & Forestry Management

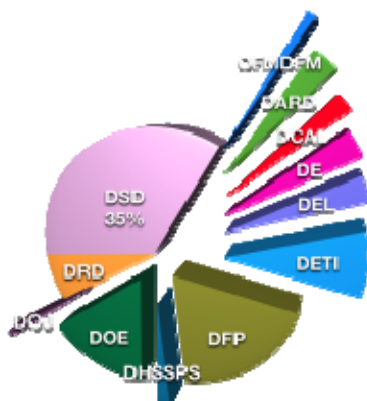
Livestock, fertilisers, farming fuel use and the way land is used are the main causes of emissions in this sector. DARD would take the lead role in the sector, although DOE have influence through planning policy, biodiversity strategy, pollution control and environmental protection legislation.



DETI play a role in supporting rural renewables, bioenergy, and use of biofuels. Other departments have minor supporting roles.

Homes & Communities

The diversity of the Homes & Communities sector can be seen in the split of responsibility across departments.



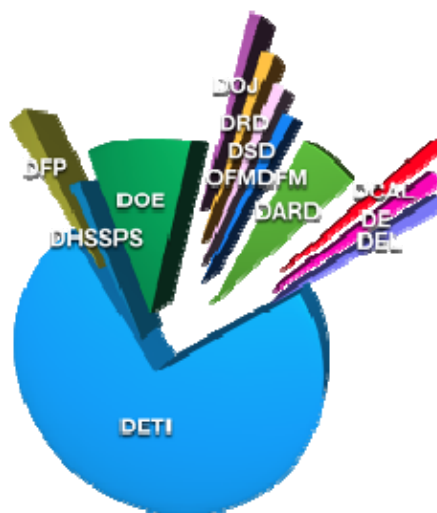
Although DSD has the greatest impact through housing stock and delivery bodies, DFP, DOE, DETI

and DRD contribute large roles. DFP control regulatory reform in construction and can create rates incentives. DOE brings bearing through planning policy and supporting local government. DETI shapes tourism and consumer standards, can bring advantages from improved telecoms, better regulation and energy efficient technology. DRD's main lever in this area is water – after heating it is one of the largest emission sources. All other departments can play behavioural change and influencing roles within their remits.

Power

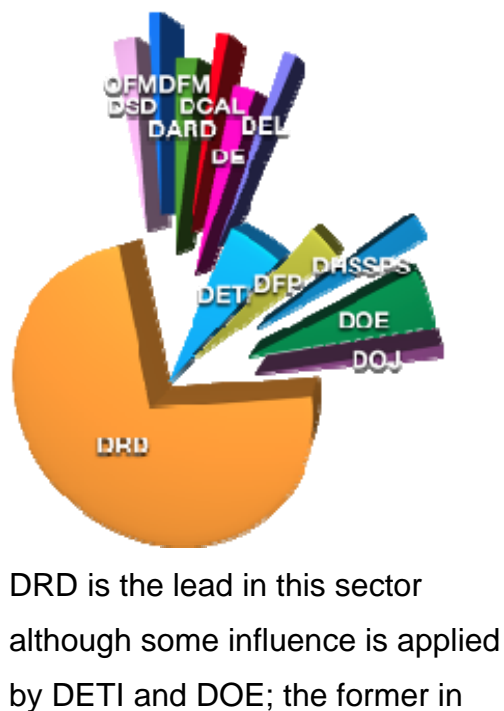
The majority of emissions in this sector come from large power generation with the rest coming from renewable and microgeneration sources. DETI take a strong lead and has shown a large commitment to expanding renewables through the recent publication of the Strategic Energy Framework. DOE has a supporting function through planning policy and DARD has commenced work

on bioenergy and rural renewables.



Other departments can influence onsite microgeneration.

Transport

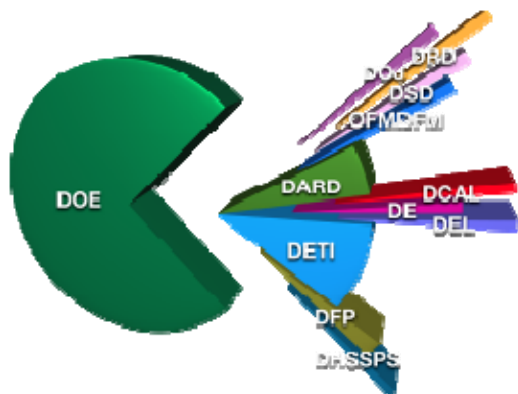


DRD is the lead in this sector although some influence is applied by DETI and DOE; the former in

terms of increased tourism and the latter through vehicle standards and planning effects on infrastructure. Other departments can consider the effects of increased integration within their remits with sustainable transport options. This sector will also have influence from outside Northern Ireland in terms of Whitehall policies on tax, emissions levels (to meet EU Directives) and vehicle standards.

Waste

Although DARD and DETI both exert some bearing on the Waste Sector, DOE controls most efforts in this area.

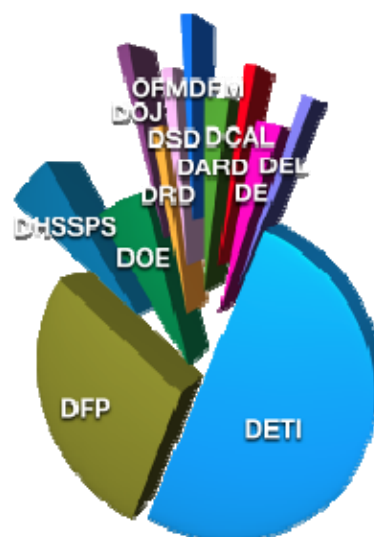


Others can influence how waste is recycled and reduced within their remits – some can also drive behavioural change – but DOE manages the strategic overview transposing EU Directives into central policy and therefore through to local government initiatives.

Workplaces & Jobs: Heating Workplaces

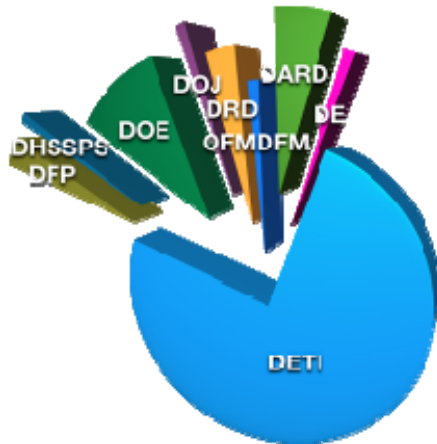
DETI have the most influence on this sector, centrally through its strategic function but also through its delivery bodies and partner organisations. The need to ensure that efficiencies do not deter economic advance would also remain part of the departmental purview. DFP can provide a strong leadership role through setting policy on procurement and through promoting best practice in managing the government office

estate and in providing analyses of energy consumption data.



Workplaces & Jobs: Industrial Process

Again, DETI is the sector lead although DOE and DARD play significant roles.

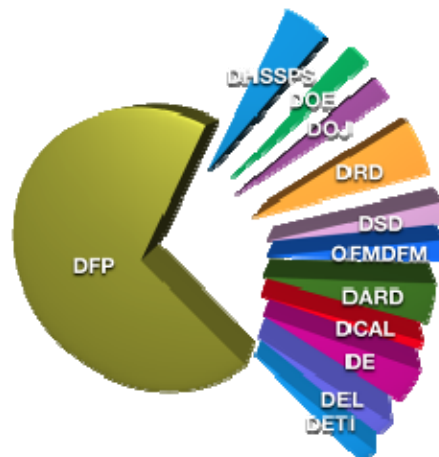


Reducing Industrial Process emissions works alongside influencing Heating Workplaces. DOE are the policy leads on sectoral issues that concern emissions including pollution control and inspection. DARD can influence emissions in agricultural industries.

Public Sector

The public sector plays a large role here. Influences aside, the government and associated public bodies (e.g. hospitals and schools), have significant estate emissions. Each department is responsible for its own emissions as demonstrated in the Executive's decision ensuring each department will account for its own emissions in the CRC. It is not only the direct emissions from the estate that count – the purchasing power in procurement can support the local introduction of new technologies and drive behavioural change. The chart below illustrates DFP's

overarching influence in terms of procurement policy as it relates to other public sector organisations.



Section 3 – Action Plan

The departmental analysis set out in this document indicates that the policies and measures already adopted **will enable the NI Executive to meet its target of a 25% reduction in GHG emissions below 1990 levels.**

However, there is a high degree of uncertainty in the GHG inventory at DA level.

Therefore, it would be important that in future attention is paid to improving emission calculations so that a sounder basis can be provided to appraise the NI Executive on its emission target and to inform policy development. The continuation of co-ordinated cross-departmental working on the GHG emissions agenda, i.e. the CDWG GHG, would provide a productive basis for this.

When quantifying the costs and benefits relevant to the GHG Emissions Agenda, in most cases there was a general lack of information available.

Had the information been available, it may have been possible to calculate the NPV of undertaking these policies/strategies between the present day and the target year (2025). This information would be useful as it may be possible to show which policies/strategies are the most cost effective or provide the best Value For Money (VFM). This, in turn, helps to shape future policy decisions in relation to climate change. Therefore, the onus is on Departments to ensure that any policy/strategy introduced has been fully appraised for costs and benefits, and that these have been quantified where possible, in terms of GHG emissions.

It would also be useful if other departmental economists became more involved in the climate change agenda, particularly for exercises such as this.

They will have a greater knowledge of their own Department's policies and may have a better grasp of the costs and benefits involved. This should help to save time and effort in regards to gathering and analysing data. In addition, the extra resources will help to enhance any future work in this field. It is recommended that an analytical sub-group (of the CDWG GHG) be created to meet as and when required, with a representative from each Department.

Finally, there is a need to provide annual reassurance to the Executive that appropriate progress is being made towards the PfG target. The scope of such monitoring arrangements should be up to the CDWG GHG to set and should include consideration of the adaptation agenda.

The tables that follow provide an outline of specific Departmental actions (and commentary) that are ongoing or are required to deliver the target and improve the analysis, in terms of both economics and GHG emissions. **These should be read in conjunction with the relevant departmental chapter in Section IV.**

Department of Agriculture and Rural Development

1. Strategies and Policy Impact on the GHG Agenda

i.	Nutrient Management	<ul style="list-style-type: none"> Application Method of Slurry, timing of Slurry Application, nitrogen fixation, Nutrient Management Plans
ii.	Livestock Management	<ul style="list-style-type: none"> Genetic Improvement in sheep and cattle, analysis of feed, reducing losses from animal diseases
iii.	Renewable Energy	<ul style="list-style-type: none"> Use of anaerobic digestion, use of biomass boilers, energy crops, energy use on farms; contribute to cross-departmental plans.
iv.	Locking In Carbon	<ul style="list-style-type: none"> Grass, peatland and soil sequestration, use of new woodland, managing existing woodland.
v.	GHG Inventory Development	<ul style="list-style-type: none"> Support GHG Inventory development.
vi.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other NI Departments to deliver benefits in CRC; manage estate and operations efficiently; support behavioural change within remit.

2. Emissions Projection

i.	UK policy impacts currently impacting on GHG Projection Tool	<ul style="list-style-type: none"> Calculations of current emissions assume UK-average cattle weights and breeds, UK-average manure management practices. Needs robust NI focus by closer engagement of DOE statisticians with DARD.
ii.	Ongoing development work to improve GHGI estimates	<ul style="list-style-type: none"> Currently £12m research project underway funded by Defra, Scotland, Wales & NI, to be completed by 2015. This will ensure that policy work will get recognised in GHGI.
iii.	Assumptions based on UK trends and how these are used to produce NI emission projections	<ul style="list-style-type: none"> Defra research report SFF0601 at 2004, based on UK calculations split out to DAs, provides simplistic projections of NI CH₄ emission & N₂O emission out to 2025. There is a need to update these projections taking account of current issues (e.g. Common Agricultural Policy Reform and increasing global concerns about food security) as inventory progresses. The NI 2005 GHGI CH₄ & N₂O emission estimates are then used as a starting point to project NI emissions out to 2025, based on the percentage changes from the Defra research.
iv.	DARD policy impacts as they currently stand in the NI greenhouse gas projection tool	<ul style="list-style-type: none"> No policy specific data used. Note that if NI Government implements specific local policies to improve herd / waste management to reduce CH₄ emissions or to improve fertiliser management to reduce N₂O emissions, these efforts will NOT be reflected in the NI GHGI or the projection tool as the system currently stands.

v.	Straightforward adjustments that can be made - data updates or newly sourced data. (Annex B outlines the impact these adjustments have on projected GHG emissions by sector)	<ul style="list-style-type: none"> Update GHGI estimates time series, 1990 to 2008, for cattle enteric fermentation, cattle manure management and agricultural soils. Also need to include data for intensive livestock sector if feasible.
vi.	Additional data that may be incorporated into the NI GHG Projection Tool, but would require technical consultation with AEA (AEA produce the GHGI)	<ul style="list-style-type: none"> Defra research on measuring changes in CH₄ emissions is ongoing and includes NI elements. The Agri-Food and Biosciences Institute has been involved in the project. The first results are due in 2011/12.
vii.	Next Steps	<ul style="list-style-type: none"> 2011/12: Liaise with AEA when additional methane emissions data is available to establish if this data will be factored into GHGI estimates through the existing GHGI work programme and/or the GHGI improvement scheme. 2014: Liaise with AEA when the results of Defra research project is available to establish if this data will be factored into GHGI estimates through the existing GHGI work programme and/or the GHGI improvement scheme. Otherwise consider commissioning AEA to undertake bespoke research/modelling and update GHGI and NI GHG projection tool accordingly.
3. Economic Impact of Strategies and Policy		
i.	GHG Inventory	<ul style="list-style-type: none"> Use GHGI to assist economic analysis.
ii.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs in new strategies & policies.
iii.	Reaction of Agri-Food Sector	<ul style="list-style-type: none"> Agri-food sector must assess need to build in GHG reduction to ensure business competitiveness.

Figure 28: DARD Action Plan

Department of Culture, Arts and Leisure

1. Strategies and Policy Impact on the GHG Agenda

i.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other Northern Ireland Departments to deliver benefits in the CRC; manage estate and operations efficiently; support behavioural change within remit.
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2. Emissions Projection

i.	Projection Tool	<ul style="list-style-type: none"> There are no specific DCAL policies that produce data that could be factored into the GHG Projection Tool, to assist in measuring GHG emissions. The impacts of CRC within the DCAL estate will be factored into the GHGI emission estimates for Public Sector combustion.
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3. Economic Impact of Strategies and Policy

i.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs in new strategies & policies.
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Figure 29: DCAL Action Plan

Department of Education		
1. Strategies and Policy Impact on the GHG Agenda		
i.	Low Carbon & Building	<ul style="list-style-type: none"> Continue to use best practice in procurement and design.
ii.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other Northern Ireland Departments to deliver benefits in CRC; manage estate and operations efficiently; support behavioural change within remit.
2. Emissions Projection		
i.	Projection Tool	<ul style="list-style-type: none"> There are no specific DE policies that produce data that could be factored into the GHG Projection Tool, to assist in measuring GHG emissions. The impacts of the CRC within the DE estate will be factored into the GHGI emission estimates for Public Sector combustion.
3. Economic Impact of Strategies and Policy		
i.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs in new strategies & policies.

Figure 30: DE Action Plan

Department For Employment and Learning		
1. Strategies and Policy Impact on the GHG Agenda		
i.	Quality-related research	<ul style="list-style-type: none"> Continue to support QR.
ii.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other Northern Ireland Departments to deliver benefits in the CRC; manage estate and operations efficiently; support behavioural change within remit.
2. Emissions Projection		
i.	Projection Tool	<ul style="list-style-type: none"> There are no specific DEL policies that produce data that could be factored into the GHG Projection Tool, to assist in measuring GHG emissions. The impacts of the CRC within DEL will be factored into the GHGI emission estimates for Public Sector combustion.
3. Economic Impact of Strategies and Policy		
i.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs in new strategies & policies.

Figure 31: DEL Action Plan

Department of Enterprise, Trade and Investment

1. Strategies and Policy Impact on the GHG Agenda

i.	Strategic Energy Framework	<ul style="list-style-type: none"> To begin delivery of SEF.
ii.	Northern Ireland Renewables Obligation	<ul style="list-style-type: none"> Continue to apply revised NIRO.
iii.	The Gas Study	<ul style="list-style-type: none"> Analyse conclusions when available and consider impact.
iv.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other Northern Ireland departments to deliver benefits in the CRC; manage estate and operations efficiently; support behavioural change within remit.

2. Emissions Projection

i.	UK policy impacts currently impacting on GHG Projection Tool	<ul style="list-style-type: none"> DECC produce fuel use projections for UK power stations.
ii.	Ongoing development work to improve GHGI estimates	<ul style="list-style-type: none"> Consultations have taken place with policy contacts in DETI and preliminary documents relating to SEF have been obtained and reviewed. Documents do not contain any new data but do indicate that further studies of relevance are expected to become available in future.
iii.	Assumptions based on UK trends and how these are used to produce NI emission projections	<ul style="list-style-type: none"> UK assumption: DECC fuel use projections for UK power stations. Electricity demand in NI is projected as being a proportion of overall UK demand (approximately 2%). DECC produce NI power plant specific fuel use (coal and natural gas) forecasts to 2020, which are flat lined out to 2025 in the Projection Tool. A GHG emission factor for coal and gas is applied to the forecasted fuel use figures to estimate NI electricity generation emissions out to 2020 and flat lined out to 2025. Fuel oil is forecasted based on the scale of change for coal, as primarily support fuel.
iv.	Electricity generation policy impacts as they currently stand in the NI GHG Projection Tool	<ul style="list-style-type: none"> The savings from NI Renewable Energy policies are factored into the Projection Tool, but estimated emission savings assume a like-for-like displacement of generation capacity: <ul style="list-style-type: none"> Renewable obligation target of 6.3% renewable energy by 2012 (NI Renewables Obligations). 12% renewable energy by 2012 (DETI) All Island Energy Grid – 42% renewable energy generation by 2020.

		<ul style="list-style-type: none"> The savings from these policies are incorporated incrementally into the GHG Projection Tool.
v.	Straightforward adjustments that can be made - data updates or newly sourced data (Annex B outlines the impact these adjustments have on projected GHG emissions by sector)	<ul style="list-style-type: none"> Update DECC fuel use projections for UK power stations consistent with energy and emission projections at June 2010, which includes forecasts out to 2025: Complete. Strategic Energy Framework 2010: Adjust for target of 40% of electricity consumption from renewable sources by 2020: Complete. Update GHGI estimates timeseries, 1990 to 2008, for power stations: Complete.
vi.	Additional data that may be incorporated into the NI GHG Projection Tool, but would require technical consultation with AEA	<ul style="list-style-type: none"> Any new research in fuel use projections specific to NI would be very useful. Currently DECC do not model growth of demand in the constituent parts of the UK. DECC stressed that it views the fuel use projection model for individual plants as subject to large uncertainty but the overall UK projection as rather more robust. Electricity Regulator is to undertake modelling work to estimate the emission savings for renewable energy. Further work is needed to explore the available data/forecasts for the impacts of the All Island Energy Grid development.
vii.	Next Steps	<ul style="list-style-type: none"> Electricity Regulator modelling work to be considered and factored into the GHG Projection Tool. This will reduce emission savings from renewable electricity, as the current emission savings assume a like-for-like displacement of generation capacity. Liaise with AEA to establish if modelling of additional data may already be included in the existing GHGI work programmes and/or the GHGI improvement scheme. Otherwise consider commissioning AEA to undertake bespoke research/modelling and update GHGI and NI GHG Projection Tool accordingly.
3. Economic Impact of Strategies and Policy		
i.	Strategic Energy Framework	<ul style="list-style-type: none"> Continue to pursue objectives and deliver VFM.
ii.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs to allow full analysis.

Figure 32: DETI Action Plan

Department of the Environment

1. Strategies and Policy Impact on the GHG Agenda

i.	Trading Schemes	<ul style="list-style-type: none"> Continue to develop policy and implementation of EU ETS & CRC.
ii.	NI lead on climate change agenda	<ul style="list-style-type: none"> Co-ordinate and support actions to mitigate GHG emissions.
iii.	Waste Strategy	<ul style="list-style-type: none"> Deliver and develop waste strategies and policies.
iv.	Planning Policy	<ul style="list-style-type: none"> Ensure GHG agenda is supported through planning policy.
v.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other NI Departments to deliver benefits in the CRC; manage estate and operations efficiently; support behavioural change within remit.

2. Emissions Projection

i.	GHG Projection Tool	<ul style="list-style-type: none"> Ensure it is fit for purpose.
ii.	UK policy impacts currently impacting on GHG Projection Tool	<ul style="list-style-type: none"> Waste Management Emissions: The projection tool assumes uniform landfill design and waste management across UK, so NI emission forecasts follow the UK trend.
iii.	Ongoing development work to improve GHGI estimates	<ul style="list-style-type: none"> Defra have commissioned a study at UK level to review the GHG emission estimates from the model used for CH₄ emissions from landfill waste disposal. The UK model is known to have limitations as regards the detail and scope of input from all across the UK for different waste types, hence consultation and research was focused on identifying and accessing new data that could be useful to improve the current UK model.
iv.	Assumptions based on UK trends and how these are used to produce NI emission projections	<ul style="list-style-type: none"> Defra research at 2005 provides UK projections of CH₄ emissions from landfill, out to 2025. NI emission forecasts follow the UK trend. Waste data flow reports are then used to estimate Northern Ireland's share of the total UK waste to landfill, based on 2005 report. This share of UK total emissions is assumed to be emitted from NI landfills throughout the projections.

v.	Straightforward adjustments that can be made - data updates or newly sourced data. (Annex B outlines the impact these adjustments have on projected GHG emissions by sector)	<ul style="list-style-type: none"> Update GHGI estimates timeseries, 1990 to 2008, for waste to landfill: Complete
vi.	Additional data that may be incorporated into the NI GHG Projection Tool but would require technical consultation with AEA.	<ul style="list-style-type: none"> NI Waste Compositional Study and Commercial & Industrial waste sector report. AEA are aware of this data source but the full details of the studies have not been reviewed at this stage, as research at UK level has now begun through Defra (as noted in point 2). NI Landfill Allowance Scheme. The staged reduction in biodegradable municipal waste to landfill could be used to provide an indicative trend to the likely methane emissions from landfill waste in NI to 2020, if a local model was developed to assess the emissions from historic and ongoing waste trends.
vii	Next Steps	<ul style="list-style-type: none"> Liaise with AEA to establish if modelling of additional data may already be included in the existing work programmes for the GHGI and/or the GHGI improvement scheme. Otherwise consider commissioning AEA to undertake bespoke research/modelling and update NI GHG Projection Tool accordingly.
3. Economic Impact of Strategies and Policy		
i.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs to allow full analysis.
ii.	NI lead on climate change agenda	<ul style="list-style-type: none"> Work with economists across departments to develop economic analysis for impact of climate change on NI.

Figure 33: DOE Action Plan

Department of Finance & Personnel

1. Strategies and Policy Impact on the GHG Agenda

i.	Building Regulations	<ul style="list-style-type: none"> Continue to update in line with agenda.
ii.	Low Carbon	<ul style="list-style-type: none"> Continue to use best practice in procurement and design.
iii.	Rate Relief	<ul style="list-style-type: none"> Consider rate relief as a method to drive GHG reduction.
iv.	CRC	<ul style="list-style-type: none"> Participate fully and work with other NI Departments to deliver benefits.
v.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other NI Departments to deliver benefits in the CRC; manage estate and operations efficiently; support behavioural change within remit.

2. Emissions Projection

i.	UK policy impacts currently impacting on greenhouse gas Projection Tool	<ul style="list-style-type: none"> <u>Public sector emissions</u>: No UK policy impacts factored into public sector emissions <u>Industry sector emissions & Domestic sector emissions</u>: UK policies are incorporated into the Projection Tool through DECC projected fuel trends for the industry sector. The UK projections are consistent with the Energy White Paper.
ii.	Ongoing development work to improve GHG Inventory estimates	<ul style="list-style-type: none"> New data from public sector energy reports have been provided by DFP. Further information has been sought to obtain a more detailed breakdown of the fuel use data by source, as the scope for the DFP reporting includes sources that are accounted for elsewhere within the inventory and hence the data cannot be used directly due to the risk of double counting.
iii.	Assumptions based on UK trends and how these are used to produce NI emission projections.	<ul style="list-style-type: none"> <u>Public Sector Emissions</u>: No UK assumptions. The NI emission forecasts are based on the NI GHGI public sector emission estimates, projected forward using NI population trends, based on 2006 population projections. <u>Industry sector Emissions</u>: UK assumption: DECC fuel trends for Industry sector. The 2005 NI GHGI direct fuel emission estimates (excluding electricity) for the industry sector are then taken as a starting point to project NI emissions to 2025, projections based on DECC fuel trends. These emissions are then adjusted to account for the impact of NI policies.

		<ul style="list-style-type: none"> • <u>Domestic sector Emissions</u>: UK assumption: DECC fuel trends for Domestic sector. The 2005 NI GHGI direct fuel emission estimates (excluding electricity) for the domestic sector are then taken as a starting point to project NI emissions to 2025, projections based on DECC fuel trends. The impact of UK policies in the domestic sector in NI are assumed to reduce emissions in proportion with the NI share of UK population. The emissions are then adjusted to account for the impact of NI policies.
iv.	DFP policy impacts as they currently stand in the NI greenhouse gas Projection Tool	<ul style="list-style-type: none"> • <u>Public sector emissions</u>: No policy specific data used. • <u>Industry sector emissions</u>: Building regulations NI 2000; savings of 14.10 ktC by 2010. • <u>Domestic sector emissions</u>: Building regulations NI 2000; savings of 32.3ktC by 2010.
v.	Straightforward adjustments that can be made - data updates or newly sourced data. (Annex B outlines the impact these adjustments have on projected GHG emissions by sector)	<ul style="list-style-type: none"> • Update population projections, based on 2008 data :Complete • Update GHGI estimates timeseries, 1990 to 2008, for public sector, industry & domestic sector: Complete • Update fuel trends for UK industry & domestic sector emissions forecasts using projections at June 2010, which includes forecasts out to 2025. The most recent DECC projections include measures outlined in the UK Low Carbon Transition Plan (July 2009) and include savings from Energy Performance of Buildings Directive, Smart Meters (SME), Carbon Reduction Commitment and Renewable Heat Incentive: Complete
vi.	Additional data that may be incorporated into the NI greenhouse Projection Tool, but would require technical consultation with AEA	<ul style="list-style-type: none"> • Update impact of building regulations. NI implements the same standard to broadly the same timeframe as England & Wales. Therefore may be able to tailor modelling techniques for England & Wales building regulations, if already developed by AEA.
vii	Next Steps	<ul style="list-style-type: none"> • Liaise with AEA to establish if modelling of additional data may already be included in the existing work programmes for the GHGI and/or the GHGI improvement scheme. Otherwise consider commissioning AEA to undertake bespoke research/modelling and update NI GHG Projection Tool accordingly.
3. Economic Impact of Strategies and Policy		
i.	Strategies & Policies	<ul style="list-style-type: none"> • Establish whole costs to allow full analysis

Department Of Health , Social Services And Public Safety		
1. Strategies and Policy Impact on the GHG Agenda		
i.	Health Sector Footprint	<ul style="list-style-type: none"> Support delivery bodies and sectoral organisations to manage estate and operations; support behavioural change within remit.
ii.	Low Carbon & Building	<ul style="list-style-type: none"> Continue to use best practice in procurement and design.
iii.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other NI Departments to deliver benefits in the CRC; manage estate and operations efficiently; support behavioural change within remit.
2. Emissions Projection		
i.	Projection Tool	<ul style="list-style-type: none"> There are no specific DHSSPS policies that produce data that could be factored into the GHG Projection Tool, to assist in measuring GHG emissions. The impacts of the CRC within the DHSSPS estate will be factored into the GHGI emission estimates for Public Sector combustion.
3. Economic Impact of Strategies and Policy		
i.	External Funding	<ul style="list-style-type: none"> Establish whole costs when supporting projects in sector.
ii.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs in new strategies & policies.

Figure 35: DHSSPSS Action Plan

Department Of Justice		
1. Strategies and Policy Impact on the GHG Agenda		
i.	Justice Sector Footprint	<ul style="list-style-type: none"> Support delivery bodies and sectoral organisations to manage estate and operations; support behavioural change within remit.
ii.	Low Carbon & Building	<ul style="list-style-type: none"> Continue to use best practice in procurement and design.
iii.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other Northern Ireland Departments to deliver benefits in the CRC; manage estate and operations efficiently; support behavioural change within remit.
2. Emissions Projection		
i.	Projection Tool	<ul style="list-style-type: none"> There are no specific Department of Justice policies that produce data that could be factored into the GHG Projection Tool, to assist in measuring GHG emissions. The impacts of the CRC within the Department of Justice estate will be factored into the GHGI emission estimates for Public Sector combustion.
3. Economic Impact of Strategies and Policy		
i.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs in new strategies & policies.

Figure 36: DOJ Action Plan

Department for Regional Development

1. Strategies and Policy Impact on the GHG Agenda

i.	RDS & RTS Reviews	<ul style="list-style-type: none"> Consider ways to reduce carbon footprint and facilitate mitigation; re-orientate and reprioritise policies to, amongst other things, reduce impact on the environment, lowering GHG emissions from transport, influencing travel choices and behaviour and making better use of existing infrastructure and services.
ii.	Sustainable transport & travel	<ul style="list-style-type: none"> Continue to investigate options and to develop programmes, including Travelwise, Low Emissions Vehicles, Rapid Transit and the Active Travel Strategy, including proposals for demonstration projects to include both infrastructure and 'smarter choices' initiatives to promote behavioural change.
iii.	NIW Climate Change Mitigation Strategy	<ul style="list-style-type: none"> Support NIW in developing and delivering measures.
iv.	Procurement and Design	<ul style="list-style-type: none"> By 31 December 2011, the NIW Capital Works Programme Projects will start to be appraised (where applicable) using carbon. By 31st March 2010 NIW to secure 13% of its overall energy requirements through green energy sources. Roads service to continue to use best practice in procurement and design.
v.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other NI Departments to deliver benefits in CRC; manage estate and operations efficiently; support behavioural change within remit.

2. Emissions Projection

i.	UK policy impacts currently impacting on greenhouse gas projection tool	<ul style="list-style-type: none"> UK policies are incorporated into the projection tool through DECC projected fuel trends for the road transport sector. The UK projections are consistent with the Energy White Paper 2007, and include savings from Renewable Transport Fuel Obligation (5% by volume) and EU Voluntary Agreements on new car CO₂ to 2009, including supporting fiscal measures.
ii.	Ongoing development work to improve GHG Inventory estimates	<ul style="list-style-type: none"> Nothing currently.
iii.	Assumptions based on UK trends and how these are used to produce NI emission projections.	<ul style="list-style-type: none"> UK assumption: DECC fuel trends are used to inform UK transport sector emission projections out to 2020, with extrapolation out to 2025 (based on 2007 projections). The 2005 NI GHGI fuel emission estimates, from the road traffic data, are then taken as a starting point to project NI emissions to 2025, based on above UK trends. The projections are adjusted to take account of the impact from NI policy.

iv.	DRD policy impacts as they currently stand in the NI greenhouse gas projection tool	<ul style="list-style-type: none"> Travelwise savings at 2005 level, 1.1168 ktC in 2005. These savings are then extrapolated forward to 2025; assume similar level of policy uptake and impact.
v.	Straightforward adjustments that can be made - data updates or newly sourced data. (Annex B outlines the impact these adjustments have on projected GHG emissions by sector)	<ul style="list-style-type: none"> Update UK transport sector emission forecasts using projections at June 2010, which includes forecasts out to 2025. The most recent projections include savings from policies outlined in the UK Low Carbon Transition Plan (July 2009), including low carbon buses, Regional Economic Strategy transport bio-fuel (from 5% volume to 10% by energy) and Interim Voluntary Agreement target to 130g/km CO₂: Complete Update GHGI estimates timeseries, 1990 to 2008, for road transport: Complete
vi.	Additional data that may be incorporated into the NI greenhouse projection tool, but would require technical consultation with AEA	<ul style="list-style-type: none"> Data coming out of Frameworks and strategies outlined in the Regional Transportation Strategy (including sustainable transport) which is due out for consultation in Jan 2011. If available update analysis of the impacts of the Travelwise policy, including savings estimate if full implementation is on track for 2010, (currently estimated at 2.838 ktC)
vii	Next Steps	<ul style="list-style-type: none"> Review Regional Transportation Strategy to assess what information may be used to inform the GHG projection tool and consider commissioning AEA to undertake bespoke research/modelling. DRD to consider the opportunities to develop a revised road transport model including the potential of any such model to inform future GHG projections. NIW to develop GHG reduction targets as part of the Price Control 2014 / 2015 Business Plan submission. NIW to consider how to balance GHG emissions rising due to more stringent treatment and discharge standards imposed due to the application of EU legislation by NIEA. These increases may however be, in part, offset by energy efficiency reduction projects.
3. Economic Impact of Strategies and Policy		
i.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs to allow full analysis NI Water Capital Costs: The Price Control 2014/15 Business Plan submission will include projects that have been appraised using the standard Net Present Cost (NPC) methodology, and also, where applicable, the preferred solution using a modified NPC methodology incorporating the cost of carbon. The impact of the policy decision to assess capital projects by incorporating the cost of carbon into the NPC calculation will be the cumulative difference (the total for all PC14/15 projects) between the initial capital cost between the standard and carbon NPC options. This increased capital cost can then be assessed against the benefit of reduced carbon emissions over the 40 year NPC assessment period. Continue to utilise cost benefit analysis to identify economic benefits of investment in transport infrastructure projects including carbon costs.

Figure 37: DRD Action Plan

Department for Social Development

1. Strategies and Policy Impact on the GHG Agenda

i.	Fuel Poverty	<ul style="list-style-type: none"> Reduce energy consumption.
ii.	Social Housing Stock	<ul style="list-style-type: none"> Improve energy efficiency through Code for Sustainable Homes.
iii.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other Northern Ireland Departments to deliver benefits in the CRC; manage estate and operations efficiently.

2. Emissions Projection

i.	UK policy impacts currently impacting on GHG Projection Tool	<ul style="list-style-type: none"> UK policies are incorporated into the Projection Tool through DECC projected fuel trends for the domestic sector. The UK projections are consistent with the Energy White Paper 2007 and include savings as a result of building regulations and UK Warm Front and fuel poverty programmes.
ii.	Ongoing development work to improve GHGI estimates	<ul style="list-style-type: none"> Development of National Housing Model by DECC to build on existing resources of information.
iii.	Assumptions based on UK trends and how these are used to produce NI emission projections	<ul style="list-style-type: none"> UK assumption: DECC fuel trends are used to inform the UK domestic sector emission projections to 2020, with extrapolation out to 2025 (based on 2007 projections). The 2005 NI GHGI fuel emission estimates (excluding electricity) are then taken as a starting point to project NI emissions out to 2025, based on above UK trends. The impact of UK policies in the domestic sector in NI are assumed to reduce emissions in proportion with the NI share of UK population, which changes over time according to Office for National Statistics projections. The projections are adjusted to take account of the impact from NI policies.
iv.	DSD policy impacts as they currently stand in the GHG Projection Tool	<ul style="list-style-type: none"> No DSD policy specific data used. Note that if NI implements specific local policies to improve Warm Homes & Fuel Poverty schemes these efforts will not be reflected in the NI GHGI or the Projection Tool as the system currently stands.
v.	Straightforward adjustments that can be made - data updates or newly sourced data. (Annex B outlines the	<ul style="list-style-type: none"> Update UK domestic sector emission forecasts using projections at June 2010, which includes forecasts out to 2025. The most recent projections include savings from policies outlined in the UK Low Carbon Transition

	impact these adjustments have on projected GHG emissions by sector)	<ul style="list-style-type: none"> • 2005 Electricity estimates for NI domestic sector, originally taken from 2007-08 DETI/OFMDFM study, to be superseded with NI electricity use for domestic sector from GHGI End-user data, 2003-2008: Complete. • Update population projections, based on 2008 Office for National Statistics data: Complete. • Update GHGI estimates timeseries, 1990 to 2008, for domestic combustion: Complete.
vi.	Additional data that may be incorporated into the NI GHG Projection Tool, but would require technical consultation with AEA	<ul style="list-style-type: none"> • Data on NI Warm Home Policy available from July 2009, pre and post SAP rating, number of houses. • Housing Condition Survey – data on SAP ratings change over time from 2001 to 2009.
vii	Next Steps	<ul style="list-style-type: none"> • Liaise with AEA to establish if modelling of additional data may already be included in the existing GHGI work programmes and/or the GHGI improvement scheme. Otherwise consider commissioning AEA to undertake bespoke research/modelling and update GHGI and NI GHG Projection Tool accordingly.
3. Economic Impact of Strategies and Policy		
i.	Fuel Poverty	<ul style="list-style-type: none"> • Assess contribution of energy efficiency measures.
ii.	Strategies & Policies	<ul style="list-style-type: none"> • Establish whole costs to allow full analysis.

Figure 38: DSD Action Plan

Office Of The First Minister And Deputy First Minister

1. Strategies and Policy Impact on the GHG Agenda

i.	Sustainable Development Strategy	<ul style="list-style-type: none"> Support NICS implementation of policies in their remit; support behavioural change within remit.
ii.	Departmental Footprint	<ul style="list-style-type: none"> Participate fully and work with other Northern Ireland Departments to deliver benefits in the CRC; manage estate and operations efficiently; support behavioural change within remit.

2. Emissions Projection

i.	Projection Tool	<ul style="list-style-type: none"> The draft Implementation Plan for the Sustainable Development Strategy sets out the actions to be taken by Departments in support of the achievement of the Strategic Objectives in each Priority Area for Action. Reducing GHG is a strategic objective within Priority Area for Action 5: ensuring reliable, affordable and sustainable energy provision and reducing our carbon footprint. The draft implementation plan provides an overview of actions to be taken by departments to assist in reducing GHGs. However, actions relating to reduction of GHGs across the NICS have already been considered when reviewing the individual departments, following the bilateral meetings.
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3. Economic Impact of Strategies and Policy

i.	Strategies & Policies	<ul style="list-style-type: none"> Establish whole costs in new strategies & policies.
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Figure 39: OFMDFM Action Plan

Section 4 – The Way Ahead

There are considerable weaknesses in the quality of information available for analysis in this study. For the future there will be an onus on Departments to continue to improve the data available through the Northern Ireland Greenhouse Gas Inventory and at policy level so that the current high level of uncertainty is reduced particularly in relation to the over-reliance on UK inventory sources and methodologies.

That said the overall picture as presented in the Action Plan and as demonstrated in the Projection Tool is that the Northern Ireland Executive is on course to meet/exceed the PfG target to reduce emissions by 25% by 2025 on 1990 levels.

This takes account of the impact of the economic recession and uses Treasury economic projections out to 2025 in making its predictions.

The production of this cross-departmental action plan is the first step in demonstrating that the policies and measures necessary to achieve the target are in place.

There will need to be continuing long term co-operation and co-ordination of action across Departments to ensure progress continues towards the 2025 target and that the policies/measures initiated are monitored to ensure they deliver on their carbon reduction goals.

DOE will commit to updating its GHG Projection Tool to refine and improve its outputs.

Future governance arrangements, including any non-government stakeholder involvement, will be directed by the Northern Ireland Executive as this report/action plan will be considered by the Executive.

We need to continue to keep an eye on wider developments and particularly to consider the implications of global negotiations on climate change.

There are a number of important developments in the offing. In the Spring, the EU is to consider its position on its commitment to increase the EU target from 20% reductions to 30% by 2020 on 1990 levels if international conditions are right. If this were to happen, the UK government is committed to increase its 2022 target from 34% reductions to 42%.

There will also be new Assembly elections in May 2011 and there is the possibility that the existing PfG target of 25% reductions in 2025 on 1990 levels will be reviewed.

The analysis contained in this report would have the potential to inform such discussions if this is required.

ANNEX A: List of Departmental Policies Considered (August 2010)

DEPT	POLICY/STRATEGY	Aims
DARD	Development of Climate Change Mitigation Measures in the Primary Production Sector	DARD established an internal Steering Group during 2009 to develop a range of primary production focused mitigation measures based on a review of available scientific evidence. Five key themes have emerged; better livestock management, better nutrient and fertilizer management, locking in carbon in soils, peatlands and grass, locking in carbon in new and existing woodlands and optimising renewable energy and fuel efficiency on farms. These themes are currently subject to consultation processes across all segments of the NI agri-food industry and practical steps to implement each theme have been drafted to aid the consultation process. Greater efficiency and cost effectiveness are key to the approach and DARD plan to commence implementation on climate change mitigation by the issue of a Renewable Energy Action Plan in June 2010. A DARD led Stakeholder Group is being established to help further develop mitigation themes/measures. Adaptation to climate change is being taken forward encompassing the agriculture, rivers, forestry and fisheries sectors via the Climate Change Risk Assessment (CCRA) processes. Additionally, DARD is a contributor to the DEFRA led development of GHG Inventories for agriculture and land use, land use change and forestry (LULUCF).
DETI	Strategic Energy Framework	Increase the amount of electricity and heat from renewable sources to 40% and 10% respectively by 2020. Renewable electricity target of 12% by 2012 (on target). The SEF also includes proposals to roll out SMART meters and to provide for a Supplier Obligation to stimulate energy efficiency measures. This is due for approval at the Executive in early summer 2010.
DETI	Potential extension of the Natural Gas Networks	The Strategic Energy Framework includes reference to the potential for further extension of natural gas in Northern Ireland, particularly to the West, and areas of the North West that do not currently have access to natural gas.
DETI	Bioenergy Action Plan (2010-2015)	This soon to be finalised plan (Autumn 2010) aims to increase awareness of bioenergy, create an enabling environment, facilitate targeted investment in the supply chain and continue focused R&D.
DETI	Strategic Renewable Energy Research Initiatives	Includes: Biomara research project into the use of local marine seaweeds and algae for bio-fuel production; and ISLES feasibility study for an off-shore electricity grid
DETI	Offshore Renewable Energy Strategic Action Plan 2009-2020	This Strategic Action Plan aims to develop up to a potential 900MW – 1200MW of offshore renewable electricity by 2020.
DETI	Onshore Renewable Electricity Strategic Action Plan & Strategic Environmental Assessment 2010-2020	This Strategic Action Plan and Environmental Assessment aims to identify environmental issues associated with grid strengthening required to accommodate increasing levels of renewable generation.

DEPT	POLICY/STRATEGY	Aims
DETI	Northern Ireland Renewables Obligation (NIRO)	Prior to 1 April 2009 all renewable electricity generation technologies received 1 Renewables Obligation Certificate (ROC) for every megawatt hour (MWh) generated. On 1 April 2009, banding levels were introduced to the NIRO providing different levels of support for renewable generation depending on the cost of the technologies involved. All microgeneration (up to 50kW) was increased to 2 ROCs regardless of technology. On 1 April 2010 additional ROCs were introduced for wind, hydro and photovoltaic technologies.
DFP	The Central Energy Efficiency Fund	Makes available £1 million annually to public sector projects that aim to deliver energy efficiencies and reduce carbon emissions. The fund offers grants covering a maximum of 50% of the projects' capital costs with an average payback of less than three years.
DFP	Building and Construction Carbon Initiatives	Central Procurement Directorate has adopted a Low Carbon Design policy for construction procurement. This will include adoption of best practice in new builds through BREEAM & CEEQUAL; improved building regulations through planned amendments to thermal standards. The first amendment will be in 2011.; and procurement of electricity for the government estate incorporating an element from renewable sources. Contracts have been awarded for up to 25% green electricity on large sites (e.g. Stormont Estate) with 100% green supply available for smaller buildings. This encourages electricity generators to invest in Renewable Energy Technologies.
DFP	Low Carbon Homes Scheme	The Low Carbon Homes Scheme is a new rate relief scheme, which came into effect on 1 April 2010. It aims to encourage the building of low and zero carbon homes in Northern Ireland by offering full rates relief for first occupiers of low and zero carbon homes for 2 and 5 years respectively.
DFP	Energy Efficiency Homes Scheme	The Energy Efficiency Homes Scheme is a rate relief, which came into effect on 1 April 2010. It is managed by the Energy Saving Trust and provides a one-off reduction in rates to homeowners who install cavity wall insulation and/or loft installation in their home to the required standards.
DOE	Trading Schemes	Northern Ireland fully participates in the EU Emissions Trading Scheme and the CRC Energy Efficiency Scheme. All Northern Ireland central government departments participate in the CRC Scheme on a mandatory basis.
DOE	Cross Departmental Working Group on Greenhouse Gas Emissions	On 13th May 2010, the Northern Ireland Executive agreed to a proposal by the Minister of the Environment to establish a Cross Departmental Working Group on GHG Emissions. This group aims to produce an agreed mitigation programme by December 2010.
DOE	PPS - Planning Policy Statements	The issue of climate change is to be considered as part of the forthcoming review of Planning Policy Statement 1 which is being undertaken in order to take account of, and give support to, planning reform implementation. The revised PPS 1 will be submitted for Executive consideration in March 2011 in line with planning reform. PPS 18, published in August 2009, aims to facilitate the siting of renewable energy generating facilities in appropriate locations within the built and natural environments.
DOE	Northern Ireland Waste Strategy 2006-2020	This long-term strategy aims to tackle waste, which in turn will lead to long-term greenhouse gas emission emissions reductions.

DEPT	POLICY/STRATEGY	Aims
DRD	Regional Development Strategy	The Regional Development Strategy is currently being reviewed. The revised Strategy recognises that climate change is one of the most serious problems facing the world and that we will have to play our part by reducing our greenhouse gas emissions. To meet this challenge the revised Strategy has a specific Strategic Objective and Strategic Guidance that aim to consider ways to help reduce energy consumption towards more sustainable methods of production, reduce impact on greenhouse gas emissions and mitigate the effects of climate change. It also provides Strategic Guidance on ways to change our travel culture thus reducing reliance on the car. It is envisaged the revised draft RDS document will issue for public consultation in the Autumn.
DRD	Regional Transportation Strategy	The Regional Transportation Strategy (RTS) is under review with the DRD Minister acknowledging that transport emissions are continuing to rise and have to be tackled through changing driver behaviour, modal shift and better journey planning. It is envisaged that a draft revised RTS document will issue for public consultation towards the end of this year.
DRD	Social and Environmental Guidance for Water and Sewerage Services	S&E Guidance sets environmental and social priorities for the water and sewerage industry. The Executive's priorities include affordability, EU compliance, service improvements and sustainability. Current sustainability priorities include achieving an economic level of water leakage and lowering the energy consumption of Northern Ireland's largest electricity consumer, NI Water.
DRD	Sustainable Transport	Transportation Policy Division has been established to assist in the development of sustainable transport arrangements. To inform the debate on the way forward and clarify the scale of the challenge, it has taken forward work to establish the greenhouse gas emissions of road transport arrangements. The new division will also aim to contribute to the identification of options to reduce emissions from transport and promote more sustainable and active travel. The outcome of that work will inform the review of the Regional Transportation Strategy. Currently sustainable transport options are supported through the Rural Transport Fund.
DRD	Electric Vehicles	Preparing bids for Budget 2010 for investment in electric vehicle infrastructure to enable a step change in transport by 2025. DRD, together with DOE, are submitting a bid to the Office for Low Emissions Vehicles under the Plugged in Places Scheme to provide funding to promote the uptake of Electric Vehicles (EV) through the provision of EV charging infrastructure.
DSD	New Housing Agenda	All new build Social Housing must comply with a minimum rating of level 3 in the Code for Sustainable Homes. In effect this means new social houses built today are 25% more energy efficient than before.
DSD	Housing Associations Incentivisation	To go further than level 3 by increasing the level of subsidy to those Housing Associations who can build to level 4 standards.
DSD	Pilot site in South Belfast that will see up to 70 mixed tenure homes built to level 5 standard.	When initiated it was the largest and most ambitious level 5 development across the UK and the use of renewable technologies in this scheme will be essential to meet the strict level 5 ratings.
DSD	The Heating Replacement	To assist householders with energy efficiency improvements. These energy efficiency improvements also help reduce carbon

DEPT	POLICY/STRATEGY	Aims
	Scheme; Warm Homes Scheme; and Fuel Poverty Strategy	emissions contributing to carbon reduction targets.
OFMDFM	Sustainable Development Strategy and Implementation Plan.	Was approved for publication by the Executive on 28 May 2010. Development work on the Implementation Plan for the Strategy is underway across Government, and this work is being overseen by the Implementation Plan Steering Group, which is chaired by OFMDFM Junior Ministers and has a membership that represents significant stakeholder sectors beyond Government. The Implementation Plan is scheduled for publication later in the year.

Figure 40: Annex A (List of Policies)

Annex B: The impact of straightforward adjustments on projected GHG emissions, by sector

Adjustment	Sector	How data is used within the GHG Projection Tool	Level of Impact
2008 GHGI figures	All sectors	Used as the baseline to forecast all sectors out to 2025	Minimal impact
2008 based Population Projections (Office for National Statistics)	Commercial and Public Sector & Domestic Sector	Commercial & Public Sector emissions are projected forward using NI population trends. Domestic Sector emissions are assumed to reduce in proportion with the NI share of UK population.	Minimal impact
Electricity Estimates (2003 - 2008 GHGI End User estimates)	Industry Sector & Domestic Sector	Used to estimate what proportion direct fuels (i.e. excluding electricity) are of all fuels. However, the final emission estimates for these sectors are based on direct fuels only.	Minimal Impact
DECC forecasted Fuel Trends (produced at 2010)	Industry sector, Domestic sector & Road Transport sector	Used in forecasting fuel use emissions out to 2025	Considerable Impact
Power Station forecasted Fuel Trends out to 2025 (produced at 2010)	Power Generation sector	Used in forecasting electricity generation emissions out to 2025. The latest forecasts indicate a large drop in electricity generation from coal, with minimal use of coal at 2025	Considerable Impact

Figure 41: Annex B (Projection Adjustments)

Annex C: Cross-Departmental Working Group on Greenhouse Gas Emissions – Membership

Chair: Minister For The Environment, Edwin Poots MLA

Leo O'Reilly	DOE
John McMillen	DOE
Denis McMahon	DOE
Tim Irwin	DOE
Brendan Forde	DOE
Garey Vance	DRD Economics Branch
Claire Craig	DRD Economics Branch
Frances Curran	DRD Statistics Branch
Michael Bennett	DRD Statistics Branch
Dr Mark Browne	DARD
Deborah Brown	DCAL
Diarmuid McLean	DE
Stephen Jackson	DEL
Fiona Hepper	DETI
Philip Irwin	DFP
Brian Godfrey	DHSSPS
Karen Pearson	DOJ
Doreen Brown	DRD
Heather Cousins	DSD
Jim Sutherland	OFMDFM

Figure 42: Annex C (CDWG GHG Membership List)

Numerous helpful officials in **all** departments also made supporting contributions.