The appropriateness of a **Northern Ireland** Climate Change Act

Committee on Climate Change | November 2011

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Contents

Committee on Climate Change

The Committee on Climate Change (the Committee) is an independent body established under the Climate Change Act (2008) to advise UK and devolved administration government on setting and meeting carbon budgets, and preparing for climate change.

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Appropriateness of a Northern Ireland Climate Change Act

This report sets out the analysis underpinning the Committee's recommendations in relation to the appropriateness of climate change legislation in Northern Ireland. We begin by setting out the current emissions profile in Northern Ireland and recent trends. We then summarise the existing legislative and policy framework. Next we consider the key emitting sectors, where we focus on current emissions, opportunities for emissions reductions, and high level approaches to addressing these opportunities. Finally we draw together these blocks of analysis and consider whether legislation would be useful to underpin these approaches.

The report is structured in four sections:

1. Emission profile and recent trends
2. Current policy and legislation
3. Analysis by sector
4. Summary and recommendations

1. Emission profile and recent trends

Emission profile – sector shares and per capita emissions

In 2009, Northern Ireland's emissions represented 3.5% of the UK's total greenhouse gas emissions (GHGs, excluding emissions from international aviation and shipping), slightly above its share of UK population (3%) and GDP (2%).

Northern Ireland has relatively high shares of agriculture and residential emissions, and relatively high per capita emissions in agriculture, transport and the residential sector (Figures 1, 2):

- **Agriculture:** Accounts for 27% of emissions in Northern Ireland compared to 9% in the UK as a whole, with per capita emissions in Northern Ireland of 2.9 tCO_2e/per person against 0.8 in the UK.
- **Transport**: The share of transport in the overall emissions profile is the same in Northern Ireland and the UK (22%). However, emissions per capita are slightly higher in Northern Ireland than in the UK as a whole (2.4 and 2.0 tCO_2e/per person respectively), reflecting a relatively dispersed population and reliance on private rather than public transport.
- **Residential**: The share of residential emissions is slightly higher in Northern Ireland than in the UK as a whole (17% and 14% respectively), as are emissions per capita (1.9 and 1.3 tCO_2e). This reflects widespread reliance on oil and coal for heating in the domestic sector, with limited availability of natural gas.

Figure 1: Total and sectoral emissions (tCO_2e) per capita – Northern Ireland and UK, 2009

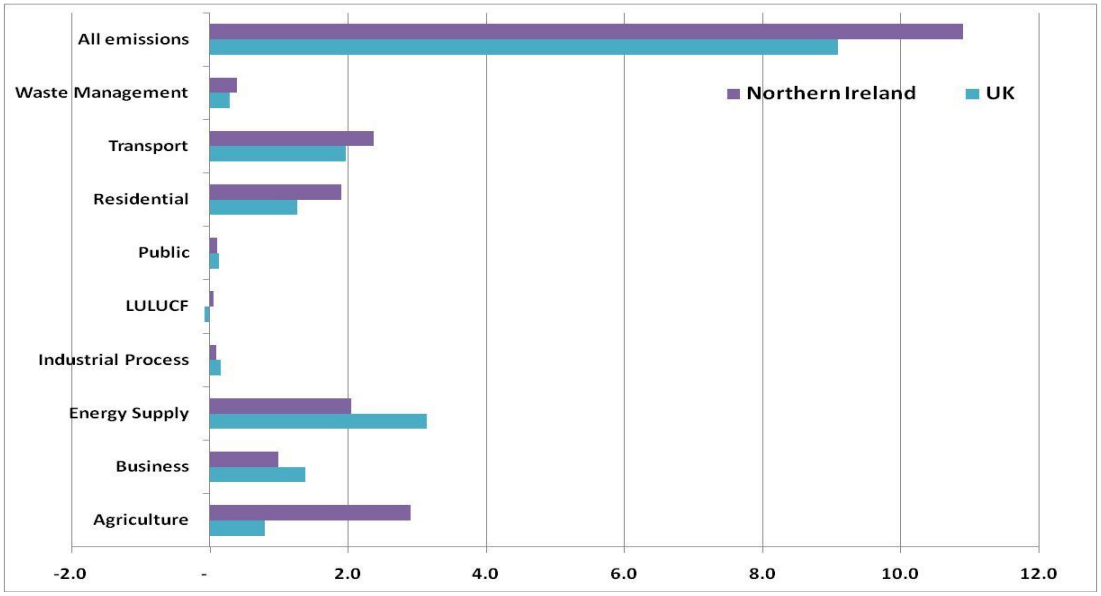
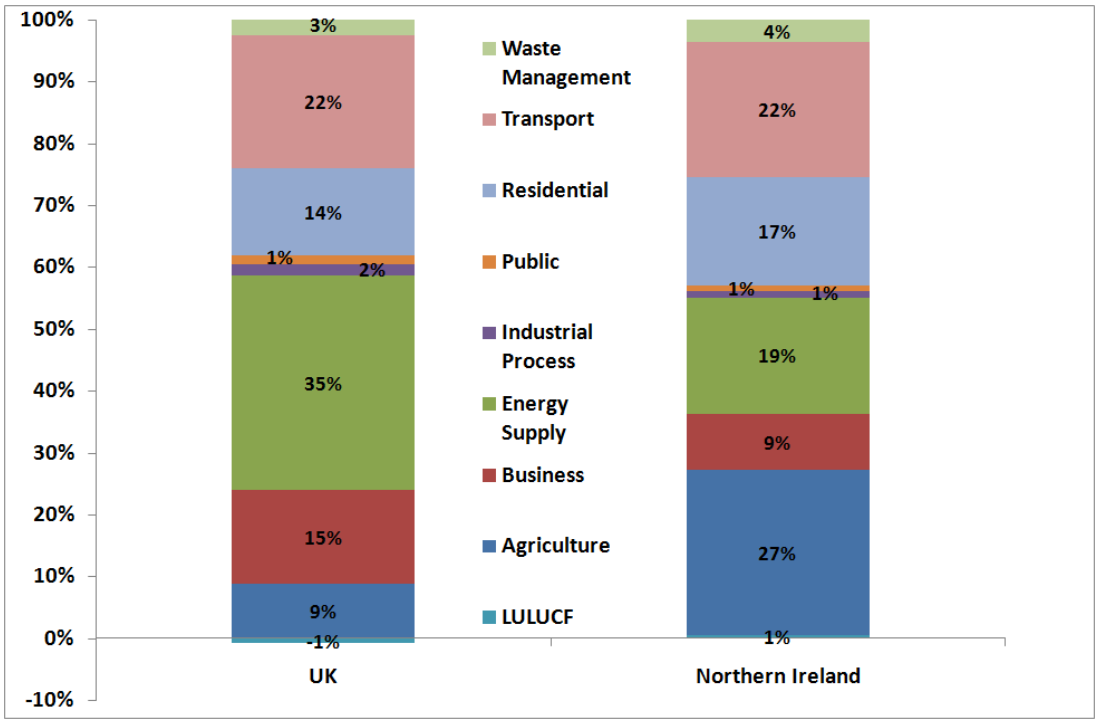


Figure 2: Sector shares of total GHG emissions: Northern Ireland and UK, 2009



Emissions per capita in energy supply and business / industry are notably below the UK average:

- **Energy supply**: Northern Ireland has relatively low shares of energy supply emissions, and low per capita emissions compared to the UK (19% versus 35% shares, 2.1 versus 3.2 tCO_2e per capita emissions). This reflects the absence of refineries, oil and gas terminals or coal mining activities in Northern Ireland. Energy supply emissions therefore

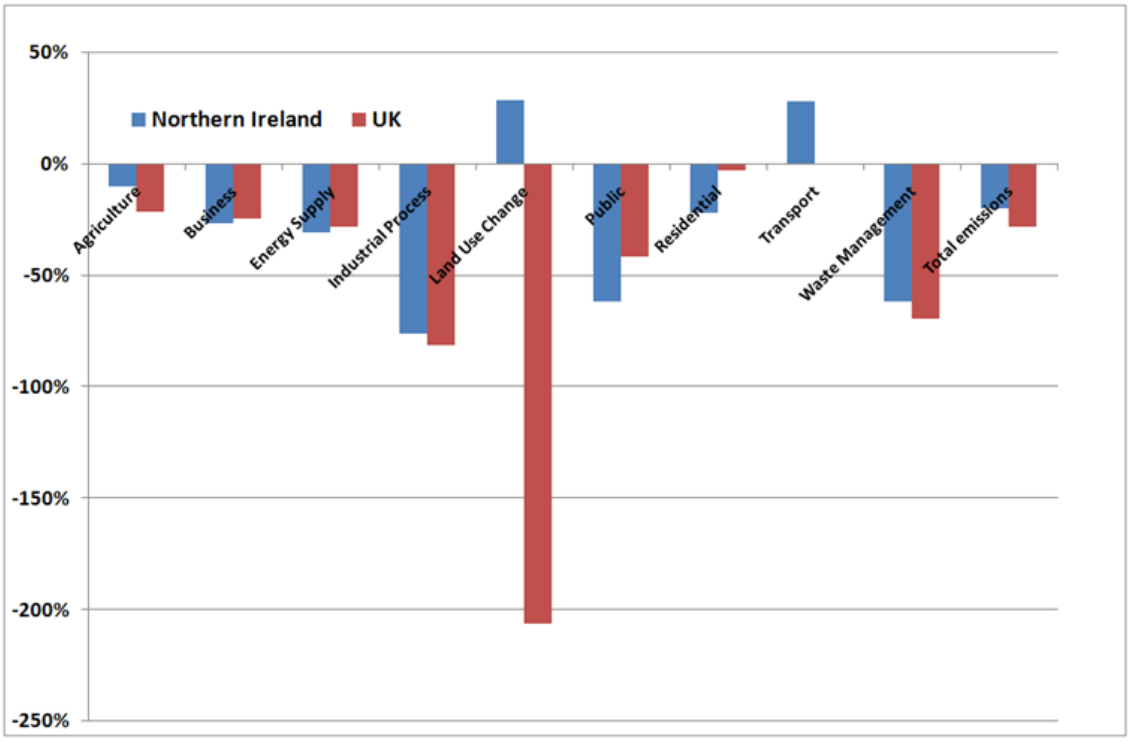
relate to the use of natural gas in power generation, mainly for the domestic market (in 2007–2009 Northern Ireland was a net importer of power from Great British market).

- **Business and industry:** Both emissions per capita and the share in total GHGs are lower than the UK average, due mainly to a relatively smaller industrial base.

Emission trends: 1990 - 2009

The latest data shows an overall reduction in Northern Ireland emissions of 20% from 1990 to 2009, compared to a reduction of 28% in the UK as a whole over the same period. The difference here can be largely explained in terms of relatively low agriculture emissions reductions in Northern Ireland, and increased emissions from transport (Figure 3).

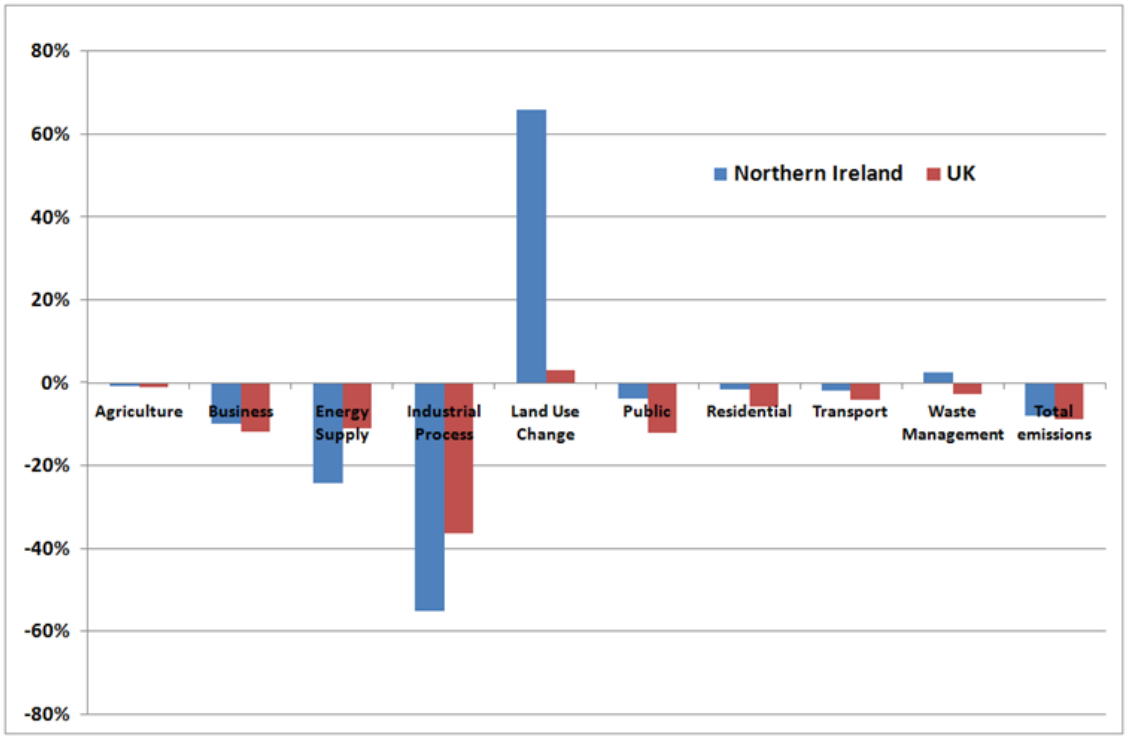
Figure 3: Percentage change in emissions from 1990 – 2009: Northern Ireland and UK



2009 emissions

In 2009, Northern Ireland emissions fell by 8%, compared to a 9% fall in the UK as a whole. As in the UK, Northern Ireland emissions reductions in 2009 were largely due to reduced energy demand resulting from the recession, with the most pronounced emissions reductions occurring in business, industry and energy supply (Figure 4):

Figure 4: Percentage change in emissions 2008 – 2009: Northern Ireland and UK



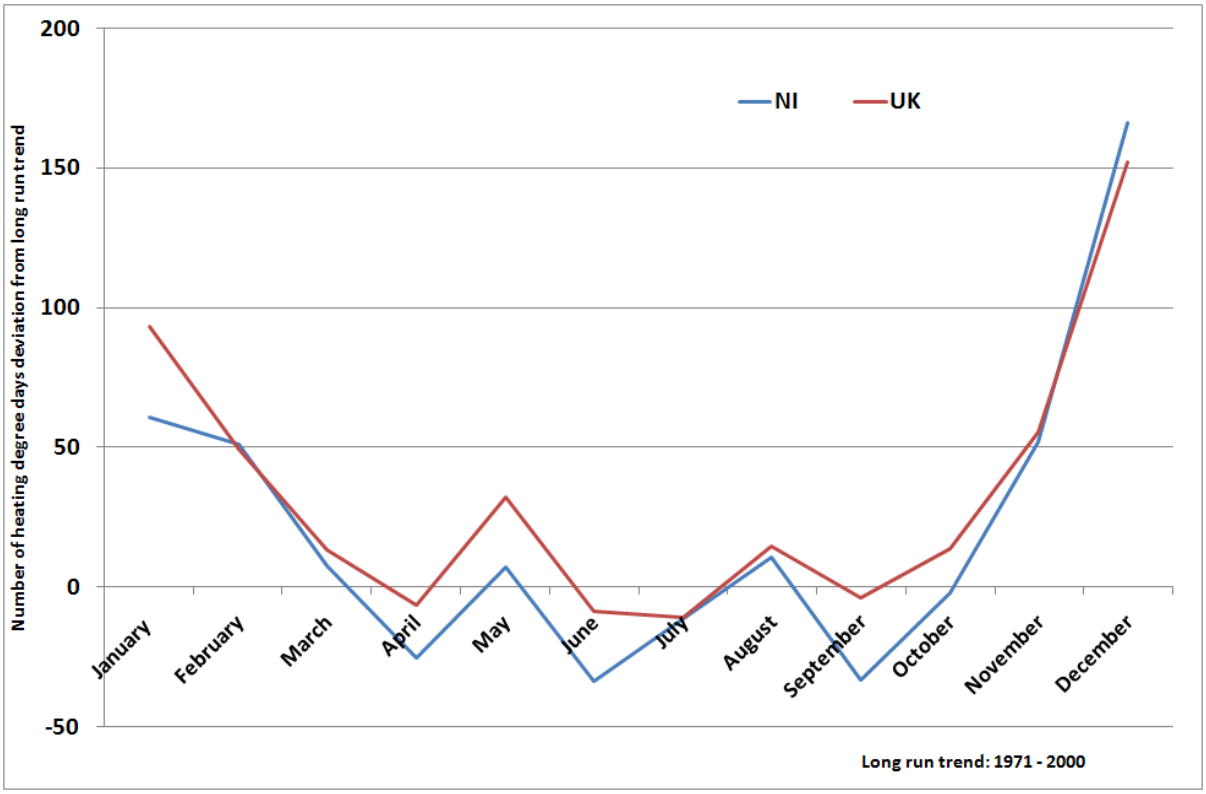
2010 emissions

2010 economy-wide emission data for Northern Ireland will not be available until September 2012. However, based on EU ETS, economic, and temperature data and inferences from more recent UK data, it is likely that emissions increased in 2010 as a result of economic recovery and the cold winter:

- Provisional EU ETS data shows that emissions in the traded sector (power stations and energy intensive industry) increased by 7% in Northern Ireland in 2010, compared to a 2% rise in the UK as a whole.

- Cold weather in the winter months of 2010 was the main driver of increased emissions from buildings (residential and commercial/public sector) in the UK in 2010. Northern Ireland also experienced temperatures significantly below the long run average (Figure 5). To the extent that households and businesses responded by increasing heating use, this is likely to have caused a corresponding increase in emissions in Northern Ireland also.

Figure 5: Deviation from long run trend in heating degree days[1] in 2010 – Northern Ireland and UK



2. Current policy and legislation

A mix of Executive, UK and EU policies and legislation covers greenhouse gas emissions in Northern Ireland.

In Northern Ireland:

- The **Northern Ireland Executive's 2007 Programme for Government** set out a target to reduce emissions by 25% in 2025 relative to 1990 levels[2]. However this was not accompanied at the time by an implementation strategy for emission reductions.

- In November 2009 the Northern Ireland Assembly's Environment Committee reported on its **inquiry into climate change**[3]. The inquiry remit was to understand the implications of climate change for Northern Ireland and to make recommendations on government poli-

[1] Heating degree days (HDDs) are calculated relative to a baseline temperature, typically 15.5°C, which is the outside temperature above which a building needs no heating. One HDD is the number of degrees centigrade deviation from the base temperature of the actual temperature on a given day (e.g. if the temperature was 5.5°C for one day the number of HDD would be 10).

[2] Northern Ireland Executive, *Programme for Government 2008-2011:* http://www.northernireland.gov.uk/index/programme-for-government-and-budget-v1.htm

[3] Northern Ireland Assembly, Environment Committee, *Inquiry into Climate Change:* http://www.niassembly.gov.uk/environment/2007mandate/inquiry_climatechange.htm

cies to mitigate the impacts of climate change, examine the economic implications and identify suitable adaptation initiatives. The Assembly Committee's report agreed that Northern Ireland should make a fair and proportionate contribution to UK greenhouse gas emission targets and develop an implementation strategy to address both mitigation and adaptation.

- In May 2010, the Environment Minister convened a **cross-departmental working group** on greenhouse gas emissions. Comprised of senior officials from across the Executive, part of the Group's remit was to examine performance to date and produce an **action plan** towards the 2025 target. This was published in February 2011[4].

  Based on 2008 emissions data and estimated abatement from existing or soon to be implemented policies, the plan estimated that:

  - Emissions (as measured before any trading of EUAs[5]) by 2020 would be 17.3 $MtCO_2e$, a 30% reduction from 1990. This is on course to achieve the 2025 target, but would be less than the UK's current level of ambition for 2020 (34% as measured on a net basis (i.e. after accounting for trade in EUAs), or 37% measured on the same basis as Northern Ireland's target);

  - Emissions would fall to 16.4 $MtCO_2e$ by 2025, a reduction of 33% relative to the 1990 baseline, outperforming the current target for a 25% reduction.

At the UK level:

- The 2008 UK Climate Change Act extends to Northern Ireland following consent by the Northern Ireland Executive and Assembly. The Act requires the UK to cut emissions by 80% by 2050 and also introduced legally-binding five-year carbon budgets, which set a ceiling on the levels of GHGs the UK can emit on course to the longer-term target.

- The currently legislated carbon budgets require the UK to reduce emissions (net of trading in EUAs) by 34% by 2020. The UK has also indicated it would move to a 42% reduction by 2020 if the EU increased its emission reduction target from a 20% to a 30% cut by 1990 and tightened the EU ETS cap accordingly.

- It is implicit that Northern Ireland contributes to the required reductions. However, the Act does not require specific targets or carbon budgets for Northern Ireland (or any other devolved administration)

- The **CRC Energy Efficiency Scheme** also applies in Northern Ireland. It is aimed at encouraging the uptake of all cost-effective energy efficiency measures in large non-energy

[4]Northern Ireland Executive - *Cross Departmental Working Group on Greenhouse Gas Emissions* (2011). Available from: http://www.doeni.gov.uk/northern_ireland_action_plan_on_greenhouse_gas_emissions_reductions.pdf

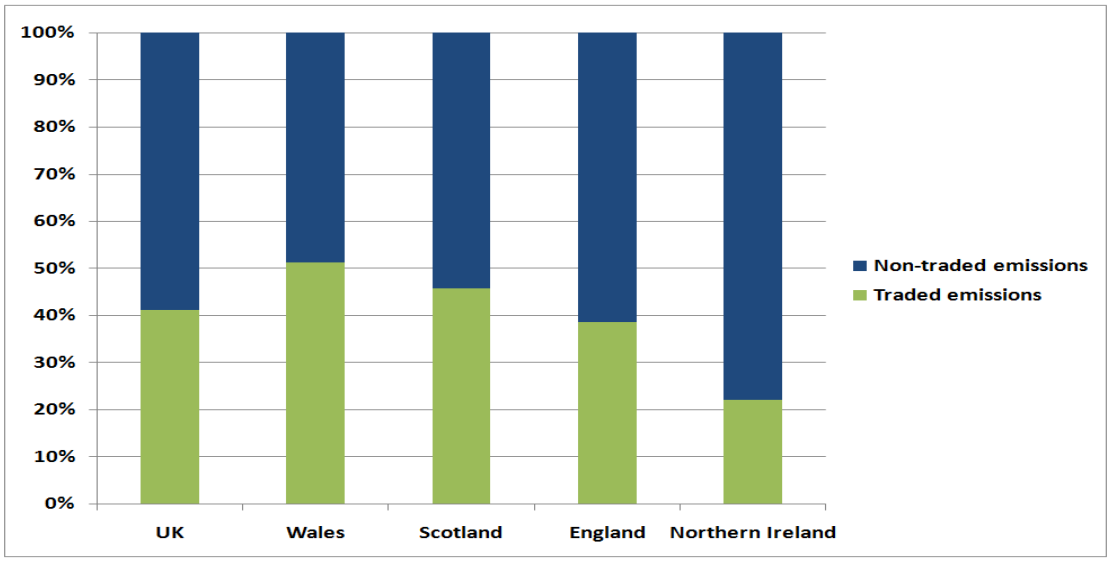
[5] The projections in the GHG Action Plan are for all GHG emissions and are as measured from the NAEI inventory - i.e. it does not account for any emission reductions in EU ETS through purchase of offset credits or EUAs (EU Allowances). The UK's 34% reduction is measured net of trading in EUAs - i.e. it reflects the level of the EU ETS cap for the UK, plus the targeted reduction for emissions outside the EU ETS (the non-traded sector). We have projected that the equivalent gross reduction would be a 37% cut from 1990.

intensive organisations in both the public and the private sector, which currently account for up to 1.5 $MtCO_2e$[6] in Northern Ireland.

At the EU level:

- The main policy for emission reductions in the EU is the **EU ETS**. This cap and trade system covers emissions from the power sector and energy-intensive industries across the EU.
- Phase III of the scheme will run from 2013 – 2020. It is estimated that the current cap in 2020 will deliver a 21% reduction compared to 2005 verified emissions across the EU.
- For the UK, it is estimated that the EU ETS will deliver around two-thirds of the emissions reductions required to meet the first three UK carbon budgets.
- However, the coverage of the EU ETS is much greater in the UK than in Northern Ireland (Figure 6):
  - CO_2 emissions covered by the EU ETS currently account for around 41% of total greenhouse gas emissions in the UK (2009 data[7]);
  - In Northern Ireland the share is only 22% of CO_2 emissions, reflecting a relatively small industrial sector (no refineries, iron and steelworks, or oil and gas terminals)[8]
  - Therefore there is less potential in Northern Ireland for economy-wide emission reductions to be delivered through the EU ETS than elsewhere in the UK;
  - The implication is that a relatively high share of overall emissions is within Northern Ireland's direct competence.

Figure 6: Share of total emissions covered by the EU ETS in Northern Ireland and rest of UK, 2009



[6] This has been calculated as non-traded emissions from the 'Business' and 'Public Sector' inventory categories.
[7] NAEI (2011) *DA Traded/Non-Traded Emissions Data:* http://naei.defra.gov.uk/reports.php
[8] For shares of CO_2 only, the equivalent coverage is 49% in the UK and 32% in Northern Ireland.

3. Analysis by sector

Agriculture and land use

By sector, agriculture represents the largest source of emissions in Northern Ireland, at around 27% of the total in 2009, or 5.2 $MtCO_2e$. It is a key sector of the Northern Irish economy, underpinning a food and drink export industry which accounts for 20% of export earnings for the Northern Ireland economy for example.

Land use currently represents a small net source of emissions in Northern Ireland (0.1 $MtCO_2e$), with the emissions associated with land being converted to cropland and settlements (+2.1 $MtCO_2e$) almost offset by the forest and grassland sinks in 2009 (-2.0 $MtCO_2e$).

In our advice on the fourth carbon budget, based on current understanding of technologies, we identified agriculture as a hard to treat sector, where scope for emissions reductions is limited relative to other sectors (e.g. power, heat, transport).

However, we have also identified an opportunity for significant emissions reductions over the next decade at the UK level (e.g. to reduce emissions by up to 30%). At the Northern Ireland level, we estimate that there is an opportunity for emissions cuts of up to around 1 $MtCO_2e$ in 2020. Many of the measures within this potential are those which improve efficiency and have associated cost-savings (i.e. avoiding excess application of nitrogen fertiliser use).

However, there is a high degree of uncertainty over this opportunity, reflecting scientific uncertainties around agriculture emissions and uncertainties over current farming practice, both of which should be resolved through development of a smart inventory (Box 1, Table 1). This raises questions about the approach to setting targets which we consider in Section 4 below.

The main policy in this area is the forthcoming Agriculture Greenhouse Gas Reduction Framework for Northern Ireland. This is being developed by stakeholder group which includes the Executive's Department of Agriculture and Rural Development, the Ulster Farmers Union, and the wider agri-food industry. It is aimed at improving the environmental efficiency of the sector, through voluntary measures, with an anticipated implementation date of late 2012.

Whether this will provide sufficient incentives for emissions reduction is currently unclear. It is our view, however, that approaches which go beyond information provision and voluntary action should be seriously considered in order to provide confidence that emissions reductions will ensue.

Given the size of the sector in Northern Ireland's emissions total and importance of the sector to the economy, agriculture is an area where it could be beneficial for the Executive to focus and encourage research and development resources.

Box 1 – Agriculture inventory – current uncertainties and improvement programme

Currently, the UK agriculture inventory uses IPCC[9] Tier 1 methodologies to calculate emissions from agriculture. This consists of a simplified approach, using generic emission factors:

- For **crops and soils** N_2O emissions are calculated using fertiliser surveys and Tier 1 standard emission factors
- For **livestock** generic CH_4 emission factors are multiplied by numbers of animals to determine aggregate emissions arising from enteric fermentation and manure

This has two key implications:

- The current inventory does not account for measures that improve efficiency of farming practices and reduce emissions. For example, for crops and soils, the use of measures that reduce the N_2O emissions arising from a particular level of fertiliser application would not be reflected (e.g. nitrification inhibitors), only reductions in its use. It would also not account for improvements in livestock diets that reduce methane production, only a reduction in herd numbers would reduce emissions in the inventory.
- It leads to a great range of uncertainty in the actual inventory estimates (see Table 1, which reports the lower and upper ranges for the UK inventory. Uncertainties are likely to be even greater at a devolved level, where in some instances assumptions have to be carried over from the UK level and country-specific factors are not accounted for).

Development of a smart inventory

Defra and the devolved administrations are jointly funding an agriculture inventory improvement programme[10] which is committed to developing more sophisticated, country-specific methodologies for measuring, reporting and verifying emissions across the inventory (Tier 2 or 3 methodologies). The first phase of this smarter inventory is due to be completed by 2014.

Table 1: Estimates of emissions factor uncertainty

GHG	Lower	Upper
Enteric fermentation (CH_4)	-16%	16%
Manure management (CH_4)	-25%	25%
All CH_4	-18%	43%
Manure management & soils (N_2O)	-93%	249%
Total	**-61%**	**152%**

[9] Intergovernmental Panel on Climate Change (IPCC): http://www.ipcc.ch/
[10] Agriculture Greenhouse Gas Research Platform: http://www.ghgplatform.org.uk/Home.aspx

Transport

Road transport represents the second largest source of emissions in Northern Ireland, at 22% of the total in 2009, or 4.3 $MtCO_2e$. Although emissions have increased by a greater percentage than elsewhere in the UK, this largely represents a catching up in car-ownership rates, which are now on a par with the GB average (at 476 cars per 1,000 population[11]).

However notwithstanding this catch-up effect, emissions per capita are now higher than the UK average. This reflects a number of factors, including a more dispersed rural population than the UK average[12], with a higher usage of private vehicles as opposed to public transport:

- 17% of the miles travelled on average per person in GB are by public transport; the equivalent figure for Northern Ireland is 8%.
- Within this, only 1% of miles travelled in Northern Ireland are by rail, compared to 9% in the UK as a whole

If Northern Ireland achieved emissions reductions in transport in line with the UK average in the Committee's scenario for 2020, this could reduce emissions by 1.2 $MtCO_2e$ by 2020.

Although Northern Ireland differs from the UK in that it has a more dispersed population, there is likely to be significant abatement potential through a range of supply-side (i.e. more efficient vehicles, low carbon vehicles, biofuels, public transport investment) and demand-side measures (e.g. smarter choices and eco-driving training).

Policies currently in place should support the implementation of supply side measures. In particular, EU targets for new vehicle efficiency and biofuels will impact on Northern Ireland. Foundations for longer term emissions reductions should be laid through development of electric vehicle charging infrastructure, to be funded under the UK Government's Plugged in Places initiative.

Incentives for demand-side measures could be provided through the Regional Transport Strategy, consulted on earlier this year, which acknowledges the role of transport in greenhouse gas emissions and aims to develop transport infrastructure that supports economic growth, at the same time as reducing emissions.

Residential

The residential sector accounts for 17% of emissions in Northern Ireland, or 3.4 $MtCO_2e$ in 2009.

Due to a limited gas network, the majority (68%) of households are largely reliant on oil as the main fuel source for heating (Figure 7). This is a factor in the extreme levels of fuel poverty in Northern Ireland (Table 2), with estimates that it costs £1,085 more each year to heat a home with oil, as opposed to gas[13]. The proportion of households dependent on oil for heating is higher in rural areas than the average (82%), and lower in urban areas (62%).

[11] IAM Motoring Facts 2011: http://www.iam.org.uk/policy_and_research/policyaresearch.html
[12] 132 people per km^2 in Northern Ireland compared to 255 in the UK as a whole.
[13] Consumer Council for Northern Ireland (2011): http://www.consumercouncil.org.uk/newsroom/738/

There is some evidence this feeds through to higher fuel poverty rates – 46% of rural households are in fuel poverty compared to 43% in urban areas.

Figure 7: Fuel used for central heating in Northern Ireland's households, 2001, 2006, 2009[14]

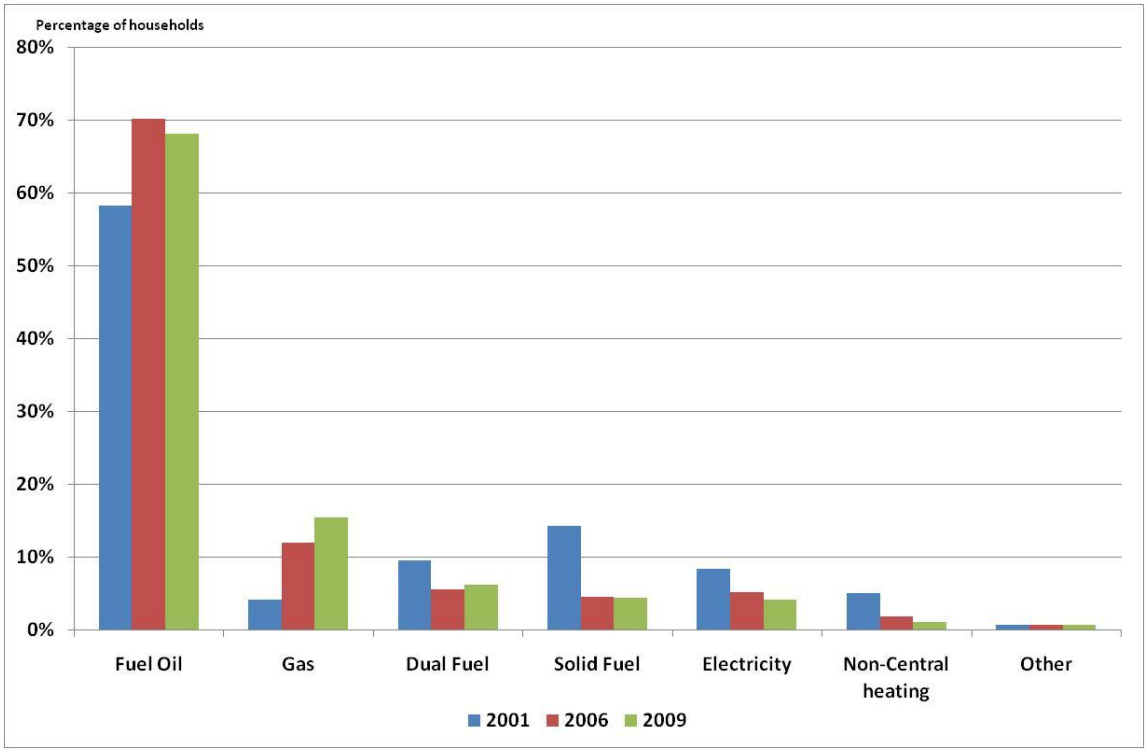


Table 2: Latest available fuel poverty statistics

	Northern Ireland	UK	Scotland	Wales	England
Percentage of households in fuel poverty	44% (2009)	21% (2009)	33% (2009)	26% (2008)	18% (2009)
Source: UK, England and Scotland statistics from DECC (2011[15]). Northern Ireland: House Condition Survey 2009 (see footnote 14). Wales: Living in Wales survey 2008[16].					

With 730,000 households, Northern Ireland accounts for around 3% of the UK building stock. The latest house condition survey (for 2009) finds:

- **Wall insulation**: Over 153,000 homes (21%) in Northern Ireland have no wall insulation. Insulation rates vary across tenures, with 89% of social dwellings having

[14] Northern Ireland Housing Executive, *House Condition Survey 2009*: http://www.nihe.gov.uk/index/corporate/housing_research/house_condition_survey.htm
[15] DECC (2011) *Annual Report on Fuel Poverty Statistics 2011:* http://www.decc.gov.uk/assets/decc/Statistics/fuelpoverty/2181-annual-report-fuel-poverty-stats-2011.pdf
[16] Welsh Government, *Living in Wales survey 2008:* http://cymru.gov.uk/topics/statistics/headlines/housing2010/1011261/;jsessionid=W3HrM2GVVS1wMnWjkmskL2BWnpTb1vXPr4xQZxzdpmsYXnkGZy7Y!-1406392113?lang=en

full cavity wall insulation, compared to 65% amongst owner-occupied dwellings and 50% in the private rented sector[17].

- **Loft insulation**: Although 96% of homes that are suitable for loft insulation have some installed (600,000), the latest fuel poverty strategy for Northern Ireland[18] notes that over 400,000 dwellings could still benefit from loft insulation top ups.

Efforts to cut emissions and to reduce fuel poverty should therefore be focused on loft insulation top ups, bringing cavity wall insulation in the private owned/rented sector in line with the social rented sector and insulating any remaining social rented sector dwellings, and developing policies to incentivise solid wall insulation. Given the high numbers of households not connected to a gas network there is particular scope for switching to renewable heating. Combined with energy efficiency measures, this could reduce emissions by around 1.2 $MtCO_2$ over the next decade.

UK policies to support insulation measures and renewable heat investment (e.g. the Green Deal, the Renewable Heat Incentive) do not apply to Northern Ireland. However, several schemes operate in Northern Ireland to support residential energy efficiency measures, while proposals on a renewable heat incentive have recently undergone public consultation. It should be ensured that national policies are designed so that the full take-up of measures and potential to reduce emissions is exploited.

Public sector

Although emissions from the public sector estate account for a low share of the total, emissions from publicly-owned industries account for a much larger share of the total:

- Public spending accounts for 63% of Northern Ireland's output (the equivalent is 40% in the UK)[19].
- Northern Ireland Water is a publicly owned company, and the single largest consumer of electricity in Northern Ireland[20].
- Translink, the main provider of bus and rail services across Northern Ireland is in public ownership.

There are significant opportunities to reduce these emissions through procurement policy, investment in the water company to improve system efficiency and reduce electricity consumption, and increased investment in public transport, combined with demand-side measures.

There is also an important leadership role for the Executive to play in demonstrating a

[17] These figures refer to full cavity wall insulation. Including the dwellings with partial cavity wall insulation and other internal/external insulation the figures are: 94% of social housing sector dwellings, 80% of owner-occupied, and 61% of privately rented. Source: NIHCS 2009: http://www.nihe.gov.uk/index/corporate/housing_research/house_condition_survey.htm

[18] Northern Ireland Executive, Department for Social Development (2011), *Warmer Healthier Homes – a new fuel poverty strategy for Northern Ireland'* http://www.dsdni.gov.uk/warmer-healthier-homes.pdf

[19] Northern Ireland Executive *Draft budget for 2011-2015.* http://www.northernireland.gov.uk/index/work-of-the-executive/budget2010/finance-ministers-final-budget-201115-statement.htm

[20] Northern Ireland Executive, *Greenhouse Gas Action Plan:* http://www.doeni.gov.uk/northern_ireland_action_plan_on_greenhouse_gas_emissions_reductions.pdf

commitment to reducing emissions through its own actions, for example travel and buildings emissions (by improving both electricity and heating efficiencies in public buildings).

Non-residential buildings and industry

Emissions from these sectors (1.96 $MtCO_2e$) account for around 10% of total Northern Ireland emissions, and comprise 0.23 $MtCO_2e$ building emissions and 1.73 $MtCO_2e$ industry emissions. The main opportunities for reducing emissions are through energy efficiency improvement and investment in renewable heat. We estimate that there is scope for a 0.3 $MtCO_2e$ emissions reduction by 2020.
The main policy levers to drive down emissions from non-residential buildings and industry are the Carbon Reduction Commitment (CRC) and the EU ETS. Although these should address some of the underlying potential, additional policies are required, for example to encourage energy efficiency improvement for SMEs and to support investment in renewable heat across buildings and industry sectors.

Power

Emissions from the power sector (3.7 $MtCO_2e$) account for 19% of total emissions in Northern Ireland, and are primarily due to the use of natural gas in power generation.

Going forward, power sector decarbonisation is central to reducing emissions in the wider economy, both because of significant opportunities for cost-effective investment in low carbon generation, and for extending the use of low carbon electricity in other sectors (i.e. surface transport and heat).

The main opportunity for Northern Ireland is likely to be in renewable power generation, both as regards wind and marine. While investment in renewable generation will be encouraged by the EU ETS, complementary polices will be required, both in terms of funding and planning. Northern Ireland's target to achieve 40% renewables penetration by 2020 is useful in this respect, although further clarification on domestic renewables investment is desirable, together with policies to support this investment.

4. Summary and recommendations

Our analysis has identified significant opportunities for emissions reductions across key sectors in Northern Ireland. For example, in the non-traded sector, we estimate that there is scope to reduce emissions by 3.6 $MtCO_2$ in 2020. This suggests there is scope in Northern Ireland for emission reductions in 2020 on a comparable scale to targets currently legislated in the UK as a whole.

The aim should be to address this opportunity, which would result in economic benefits in an increasingly carbon and resource constrained world. The alternative, to continue on a business as usual path, would result in increasing costs in line with rising carbon prices, and reliance on imported fossil fuels around which there are security of supply concerns.

Experience at the UK level and in Scotland suggests that legislation is helpful in underpinning low carbon objectives, by making long term commitments to reduce emissions, including through providing certainty to business and policymakers.

If targets are to be legislated, these should relate to emissions under the control of Northern

Ireland. This suggests an approach which focuses on the non-traded sector, rather than the traded sector, where there are a number of external factors which will drive emissions.

Given current uncertainties over agriculture emissions, and the significant share of agriculture emissions in the total, there would be questions of how this should be reflected in a legal framework. One option is to set targets now, but allow flexibility to revise these as uncertainties are resolved; but a phased approach could also be appropriate, delaying the introduction of legally binding targets until uncertainties around agriculture are resolved, through the implementation of a smart inventory from 2014.

Whether or not legislation is introduced, approaches should be focused on government leadership reducing emissions, reduction of fossil fuel consumption, and reduction of agriculture emissions. This will require new policies to encourage demand-side measures in transport, take-up of residential insulation and renewable heat, and possibly to go beyond voluntary approaches in agriculture.

Together with existing policies (e.g. to encourage take-up of more efficient vehicles) this would put Northern Ireland on a path to long term emissions reductions which will ultimately result in economic benefits compared to the alternative of continued use of and dependence on fossil fuels.