

Northern Ireland Greenhouse Gas Projections Update

Statistics and Analytical Services Branch
Department of Agriculture, Environment and Rural Affairs
15/12/2016

Introduction

This paper details the impact of the annual update to the Northern Ireland (NI) greenhouse gas (GHG) projection tool. It projects emissions of GHGs in NI from 2015 to 2030 and considers the reduction in emissions from 1990 to 2030.

The previous update to the NI GHG projection tool was produced in December 2015 by Analytical Services Branch (ASB) in the Department of the Environment (DOE). In May 2016 the number of NI government departments was reduced from twelve to nine. The environmental functions from the former DOE transferred to the new Department of Agriculture, Environment and Rural Affairs (DAERA). Consequently this update to the NI GHG projections has been produced by Statistics and Analytical Services Branch (SASB) in DAERA.

Table 1 summarises the key data sources used to project NI's GHG emissions. The latest NI GHG Inventory (1990-2014) provides the start point for each sector, which is then projected forwards using the available data.

Notable differences from previous projection

1. During this year's update the NI GHG projection tool was extended to 2030 rather than 2025. This is consistent with the 2030 Climate and Energy Framework which contains a binding target to cut emissions in EU territory by at least 40% on 1990 levels by 2030. The UK Climate Change Act 2008 introduced a legally binding target to reduce GHG emissions by at least 80% below the 1990 baseline in 2050, within interim targets of 35% by 2020, 50% by 2025 and 57% by 2030.
2. Last year there was a delay in one of the key datasets and consequently the land use, land use change and forestry (LULUCF) sector was excluded from last year's projection. The LULUCF data are now available to DAERA, and it is possible to quantify the impact the data would have had on last year's projection. Without the LULUCF sector, the previous projection tool estimated that NI's GHG emissions would decrease by 34.1% between 1990 and 2025. Had the LULUCF data been available the projected reduction would have been 32.6%.

Table 1: Key data sources for the 2016 update to the NI GHG projection tool

Dataset	Sector	Source	Latest version
NI GHG Inventory	All sectors	Ricardo Energy & Environment	1990 to 2014
DUKES conversion factors	All sectors	DECC	2016
Revised energy projections	All sectors	DECC	2008 to 2035
Power generation (historical)	Power	DECC	2008 to 2014
Power demand (historical)	Power	SONI / Eirgrid	2008 to 2015
Power demand forecasts	Power	SONI / Eirgrid	2015 to 2025
Gas demand forecasts	Power, industry, domestic	UREGNI	2015/16 to 2024/25
FAPRI-UK projections for NI	Livestock, agricultural soils	AFBI / DEFRA	2015 to 2025
LULUCF projections	LULUCF	CEH / DECC	2014 to 2050
UK non-CO ₂ GHG projections	Commerical, waste	DECC	2014 to 2035
Population estimates and projections	Other	NISRA	2015 & 2014-based

Results by sector

The latest NI GHG inventory estimated 2014 emissions to be 20.3 million tonnes of carbon dioxide equivalent (MtCO₂e). This was a 17% decrease on the 24.6 MtCO₂e emitted in 1990. The latest update from the projection tool estimates a further 17% decrease from 2014 to 2030, with expected emissions of 16.9 MtCO₂e in 2030. **Over the period 1990 to 2030 this would represent a total reduction in GHG emissions of 31.2%.**

Last year's projection reduction was 34.1% between 1990 and 2025. To enable comparison with this year's projection, the LULUCF sector was added and the projection was extended to 2030. See Figure 1 for impacts of these changes. Adding the LULUCF sector lessened the reduction by 1.6 percentage points as rate of decrease of LULUCF emissions was lower than overall emissions in NI. Extending from 2025 to 2030 lessened the reduction by 1.9 percentage points because

emissions were expected to increase between 2025 and 2030. Finally the data updates provided an additional 0.5 percentage points reduction, as discussed in more detail below.

Figure 1: Summary of updates from previous to current projection tool

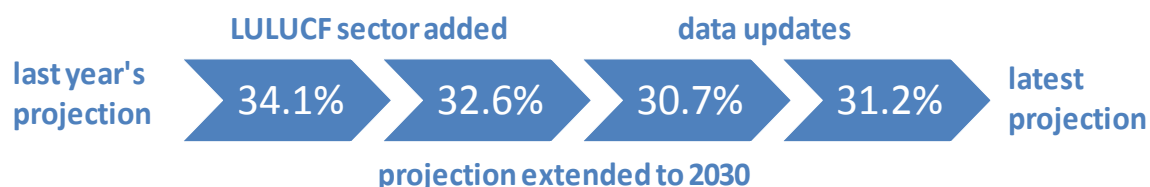


Table 2 shows the impacts of the various data updates on a sector-by-sector basis. The impact of each sector is considered in isolation. This is preferable to presenting results on an update-by-update basis because a single data update often impacts on more than one sector. The sectors that had the greatest impacts on NI's projected reduction in GHG emissions were power, road transport, commercial/other sources, domestic and livestock. These are described separately in this section.

Table 3 shows the impacts of the separately-costed policies on Northern Ireland's overall projected emissions. The term 'separately-costed' refers to policies for which carbon savings have been estimated, either at NI or UK level. There are some policy impacts that are embedded within the sector calculations themselves e.g. the Strategic Energy Framework renewable energy targets. Where possible, NI-specific savings are used, but often no such data exist and an NI share of UK savings is used. UK policy savings are taken from the Department of Business, Energy & Industrial Strategy's (BEIS) updated energy and emission projections publication.

Power

A number of updates impacted the power sector. Updated demand forecasts from the System Operator NI (SONI) reduced the expected demand for power in Northern Ireland by 3-4% between 2020 and 2025. The Northern Ireland Executive's target for renewable electricity remains at 40%. The programme for government target of 20% by 2015 was met and the official figure up to 31 March 2016 was 25.4%. The Northern Ireland Renewables Obligation will close to all renewables technologies by 31 March 2017 and the Department for the Economy has advised that, if all committed projects were to deploy, there would be enough renewable generation to get to 35% of electricity consumption from renewable sources by 2020. The projection tool assumes this will increase to 40% by 2025 and remain there to 2030.

Together the updates caused an **additional 2.0 percentage points reduction** in the projected 1990 to 2030 emissions. Assuming 35% of electricity consumption from renewable sources by 2020, the updated SONI demand forecast and the revised policy savings were the drivers for the change. This was offset by DECC's latest energy trends, which slightly increased the emission factor for natural gas, meaning greater emissions for a fixed quantity of natural gas.

Road Transport

Three data updates affected this sector but the greatest impact was from the GHG inventory. A methodological change to the GHG inventory resulted in the upward

revision of most years with later years increasing more than earlier years. The recalculations were due to a change in the factors used for fuel consumption to those recommended in international guidelines. The impact **lowered the projected reduction by 0.8 percentage points** between 1990 and 2030. The numbers of cars and vans were also updated using Driver and Vehicle Agency and Department for Transport data, and revised energy projections from DECC were included. Both had only small impacts at less than 0.1 percentage points.

Commercial and other sources

The commercial and 'other sources' sectors need to be considered simultaneously due to a change in how emissions from fluorinated gases (F-gases) are counted. These emissions relate mostly to refrigeration and air conditioning. F-gas emissions had previously been attributed to the 'other sources' category and had been projected forwards with an NI share of policy savings removed at the end. This annual update has moved historic F-gas emissions into the commercial sector, consistent with how the GHG inventory counts these F-gas emissions. They are projected forwards using the trend from the UK non-CO₂ projections, which include the expected future decline due to the European F-Gas Regulations. Previously the 'other sources' sector contained all of the F-gas emissions but none of the policy savings, hence the large change.

The impact increased emissions in the commercial sector, and decreased emissions in the 'other sources' sector, across all years. The combined impact across the two sectors was an **additional 0.6 percentage points reduction** in NI's GHG emissions between 1990 and 2030. This would suggest that the methodology used in the previous projections may have been underestimating the impact of the F-gas Regulations. Updating the commercial sector took 1.0 percentage points off the overall NI reduction, due to the inclusion of additional F-gas emissions. The impact of removing the F-gas emissions from the 'other sources' sector was no change on the 1990 emissions but a large decrease in emissions by 2030. This resulted in an increase of 1.6 percentage points on the NI level reduction between 1990 and 2030.

Domestic

This sector received several data updates including the GHG inventory, updated gas forecasts from the Utility Regulator, revised UK-level energy projections and revised policy savings. The combined effect of the updates **lowered the projected reduction in emissions by 0.9 percentage points** between 1990 and 2030. The GHG inventory had the biggest impact. Emissions in 2014 showed less of a decrease than expected so projected emissions were revised upwards due to the higher start point. Updated gas forecasts from the Utility Regulator raised the forecasted demand and consequently the projection tool increased the proportion of future demand met by natural gas rather than heating oil. This resulted in lower GHG emissions and offset some of the difference.

Livestock

There were only two data updates that impacted this sector. The updated FAPRI-UK baseline projections for Northern Ireland have changed the projected trajectory for livestock emissions from stable to small increases over the next five years and then stable. This was offset slightly by a small downward revision to livestock emissions in the latest GHG inventory, across all years 1990 to 2014. The overall impact was to

lower the projected reduction in emissions by 0.9 percentage points between 1990 and 2030.

Uncertainty

The uncertainty around this projection is not assessed in a statistically rigorous way. It is not possible for example, to provide a 95% confidence interval around the projection. Each year we carry out a sensitivity analysis on the updated projection. This gives an idea of the expected level of uncertainty. Last year's projected reduction of 34% was presented alongside a possible range of 22% to 48%. It is planned that the sensitivity analysis will be updated in early 2017.

Conclusions

Northern Ireland's latest greenhouse gas projection estimates that emissions in 2030 will total 17.3 million tonnes of carbon dioxide equivalent. This would mean a 31.2% decrease in emissions between 1990 and 2030. The projected emissions are shown on the line chart in Figure 2. For information about greenhouse gas emissions between 1990 and 2014, see the NI GHG statistical bulletin 1990-2014: <https://www.daera-ni.gov.uk/publications/northern-ireland-greenhouse-gas-inventory-1990-2014-statistical-bulletin>

From 2014 to 2030 we see a gradual reduction in NI's GHG emissions. The small increase in 2015 comes mostly from the domestic sector. The DECC energy projections expected energy demand in 2015 to be higher than 2014, which had lower than usual demand for energy due to warmer average temperatures. The rate of change decreases between 2020 and 2025, as shown by the shallower slope. This is because the projection tool assumes smaller increases in the percentage of electricity from renewable sources. Between 2025 and 2030 emissions show a small increase driven by increases in the power and domestic sectors due to increasing energy demand with no additional policy savings.

Table 2: Impact of updates on projected GHG emissions by sector

Sector	Baseline emissions 1990 (MtCO₂e)	Projected emissions 2030 (MtCO₂e)	Projected emissions reduction 1990 to 2030 (%)	Impact of total NI reduction (percentage points)
Projection based on 2013 GHG inventory	26.6	18.5	30.7 ¹	-
<i>Impact of sector updates, in isolation, on NI level emissions</i>				
Power	26.6	17.9	32.7	+2.0
Industry	26.6	18.5	30.5	-0.2
Aviation	26.6	18.4	30.8	+0.1
Road transport	26.6	18.7	29.9	-0.8
Commercial	26.6	18.7	29.7	-1.0
Domestic	26.7	18.7	29.8	-0.9
AFF combustion ²	26.6	18.5	30.6	-0.1
Livestock	26.5	18.6	29.8	-0.9
Agricultural soils	26.1	18.0	31.0	+0.3
LULUCF	25.2	17.4	30.9	+0.2
Waste	26.6	18.4	30.7	0.0
Other sources	26.6	18.0	32.3	+1.6
<i>Combined impact of all sector updates together</i>				
Projection based on 2014 GHG inventory	24.6	16.9	31.2	+0.5

Note: all figures in the table have been rounded to 1 decimal place. Projected emissions reductions and impacts were calculated using unrounded figures.

How to interpret Table 2

- The first row shows the percentage reduction 1990 to 2030 before updates. This means 'emissions in 2030 were projected to be 30.7% lower than in 1990'.
- The bottom row shows the same information after all updates were applied.
- The rows between consider the impact of each sector in isolation. A positive number in the impact column indicates that updating the data in that sector led to an additional reduction in NI's GHG emissions between 1990 and 2030. A negative number means that updating that sector lowered the reduction.
- For example, the power sector had an impact of +2.0 percentage points. Updating this sector added to NI's projected GHG emissions reduction between 1990 and 2030 by 2.0 percentage points from a 30.7% reduction to a 32.7% reduction.

¹ Last year's projection tool estimated a 34.1% reduction in emissions between 1990 and 2025 and excluded the LULUCF sector due to unavailable data. Including LULUCF and extending to 2030 would have lowered last year's figure to 30.7%.

² Emissions from combustion sources in agriculture, forestry and fishing e.g. stationary combustion, mobile machinery and fishing vessels.

Table 3: Impact of separately-costed policies on projected GHG emissions

Policy	NI-specific data?	NI share of UK data?	Impact on projected NI reduction 1990-2030 (perc. points)
Car Fuel Efficiency Policies		✓	+1.8
Products policy & climate change agreements		✓	+1.5
Transport Biofuels		✓	+1.2
Part F - Building Regulations	✓		+1.1
Renewable Heat Incentive	✓		+0.9
Gas Extension to West & East Down	✓		+0.5
Van Fuel Efficiency Policies		✓	+0.3
HGV Fuel Efficiency Policies		✓	+0.2
Warm Homes Scheme	✓		+0.2
Boiler Replacement Scheme	✓		+0.1
Heating Replacement Programme	✓		+0.1
Travelwise Initiative	✓		+0.1
Carbon Reduction Commitment		✓	+0.1
NAP and METS	✓		+0.0

* Nitrate Action Plan and Manure Efficiency Technology Scheme

Carbon savings associated with individual policies have been provided by relevant Departments. The impacts are shown to one decimal place.

Note: Table 3 is not an exhaustive list of all policies included in the model. Some policy impacts are embedded within the sector calculations e.g. Strategic Energy Framework renewable electricity targets and Fluorinated Gas Regulations.

Figure 2: Total greenhouse gas emissions
Northern Ireland, 1990 to 2030

