Northern Ireland Greenhouse Gas Projections Update

Based on 2020 Greenhouse Gas Inventory

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Northern Ireland Greenhouse Gas Projections Update Based on 2020 Greenhouse Gas Inventory

Key points

- The latest Northern Ireland Greenhouse Gas Inventory estimated 2020 emissions to be 21 million tonnes of carbon dioxide equivalent ($MtCO_2e$). This was a 24% decrease on the 28 $MtCO_2e$ emitted in the base year.

- Projections are produced annually; this year's provide an estimate of emissions of greenhouse gases in Northern Ireland from 2020 to 2031. The latest projection is that greenhouse gas emissions in Northern Ireland will reduce by 34% between the base year and 2031 to 18 $MtCO_2e$.

- Projected emissions from 2020 to 2031 are expected to decrease by 13% (3 $MtCO_2e$).

Contents

Introduction

This paper details the impact of the annual update to the Northern Ireland (NI) greenhouse gas (GHG) projections. It projects NI's territorial GHG emissions from 2021 to 2031 and considers the reduction in emissions from the base year to 2031. The base year is 1990 for carbon dioxide, methane and nitrous oxide and 1995 for the F-gases. The most recent GHG inventory data (2020) as well as projections data for energy, agriculture, population, electricity demand, gas, and land use change are used to estimate emissions from 2021 to 2031. A list of data sources is available in Annex 1.

The NI GHG projections tool projects emissions to 2031, it was initially designed to be consistent with the 2030 Climate and Energy Framework, which had a binding target to cut emissions in EU territory by at least 40% on 1990 levels by 2030.

Performance Towards targets

Northern Ireland Climate Change Act

Until 2022, Northern Ireland was the only devolved administration without its own specific climate change legislation to complement the requirements of the UK Climate Change Act. However, on the 9th March 2022, a bill committing Northern Ireland to net-zero greenhouse gas emissions by 2050 passed its final stage in the Northern Ireland assembly and Royal Assent was granted on the 6th June 2022[1].

The act clarifies that the Northern Ireland net zero by 2050 ambition will not require a level of methane emissions reduction of more than 46% by 2050 against baseline levels. The new legislation also states that interim targets for the years 2030 and 2040 must be set. Whilst yet to be finalised, the act requires these to be in line with the overall 2050 target and, the target for the year 2030 must be at least 48% lower than the baseline (see Annex 4 for further detail). In addition, the act requires that

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[1] Northern Ireland Climate Change Act

the emission targets for 2030 and 2040 be laid before the Northern Ireland Assembly within 24 months of the legislation receiving Royal Assent.

To meet these targets, there are 5-yearly carbon budget periods. Regulations will set the maximum total NI GHG emissions for each budgetary period. The carbon budgets will be consistent with meeting the emissions targets for 2030 and 2040, and the overall 2050 net zero target. The first carbon budget period runs from 2023-2027.

In order to meet the targets outlined above, additional policies and initiatives are being developed. Once finalised, policies and initiatives which provide emissions savings will be included in future projections publications.

UK Climate Change Act

The UK Climate Change Act 2008 introduced a legally binding target to reduce GHG emissions by at least 80% below the baseline by 2050. This target was made more ambitious in 2019 when the UK committed to a 'net zero' target and the Climate Change Act 2008[2] was amended, requiring the UK to reduce greenhouse gas emissions by at least 100% of baseline levels by 2050.

To meet these targets, the government has set five-yearly carbon budgets, the UK is currently in the fourth carbon budget period (2023 to 2027) which has a target to reduce emissions by 51% by 2025 (compared to baseline levels).

All administrations, including NI, contribute to the UK carbon budgets. Legally-binding carbon budgets act as stepping stones towards the 2050 target and provide a pathway to meet the overall UK climate change target. The Committee for Climate Change (CCC) published the Sixth Carbon Budget in December 2020; this being the first carbon budget to be set in line with the new net zero target. The Sixth Carbon Budget requires a 78% reduction in UK territorial emissions between the base year and 2035. This effectively brought forward the UK's previous 80% target by nearly 15 years.

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[2] The Climate Change Act 2008

Current Northern Ireland Overview

The main body of this report concentrates on the projected reduction in GHG emissions, based on existing policies currently costed in terms of emissions savings. It is recognised that additional policies will need to be incorporated as further initiatives are developed to combat climate change and meet the targets in the NI Climate Action Plan and corresponding sectoral plans. New policies or initiatives which are agreed as part of the Climate Action Plan will be included in future projections.

The latest NI GHG Inventory estimated 2020 emissions to be 21 million tonnes of carbon dioxide equivalent ($MtCO_2e$). This was a 24% decrease on the 28 $MtCO_2e$ emitted in the base year. The latest projections estimate a further 13% decrease from 2020 to 2031, with expected emissions of 18 $MtCO_2e$ in 2031. Between the base year and 2031 this would represent a total reduction in GHG emissions of 34%.

The projected emissions are shown on the line chart in Figure 1. For information about greenhouse gas emissions between 1990 and 2020, see the Northern Ireland Greenhouse Gas 1990-2020 statistical bulletin.

From 2020 to 2031 there is a projected gradual reduction in NI's GHG emissions. Emissions are expected to decrease year-on-year with an overall estimated reduction of 13% from 2020 to 2031. The downward trend is mainly driven by the energy supply sector as coal-fired electricity generation comes to an end and electricity generation switches to using more gas and renewables. The business sector also plays a considerable role, contributing almost a third of the overall reduction in emissions from 2020 to 2031 with increased policy savings across the projected time series.

Figure 1: Total GHG emissions from latest GHG inventory (1990 to 2020) and updated projections (2021 to 2031)[3]
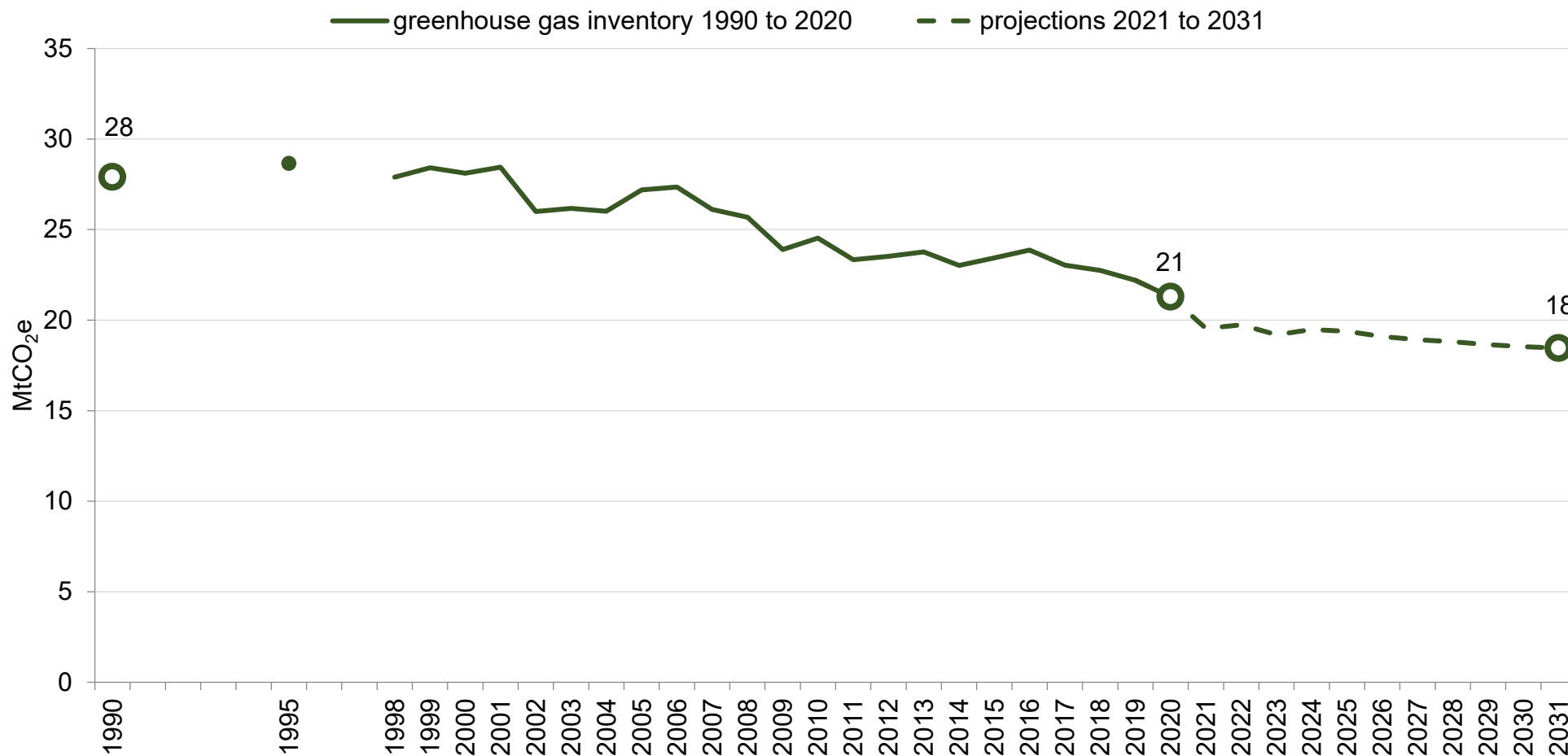
[3] Figures in this publication differ from those reported in the NI GHG inventory 2020 report as data presented in this report are calculated using AR5 GWPs while those in the 2020 inventory report were calculated using AR4 GWPs. More information is provided in the 'Changes to Global Warming Potentials'.. section of this report.

Results by sector

Table 1 shows the estimated projected reduction alongside the 1990-2020 Inventory by sector. The latest NI GHG Inventory (1990-2020) provides the basis for each sector, with emissions projected forward using available data.

Six of the nine National Communication sectors are projected to see a continued improvement. A continued improvement would be a smaller increase or a bigger decrease in emissions (in $MtCO2_e$) between the base year and 2031 compared to the change between the base year and 2020. The public and industrial processes sectors are expected to remain similar whilst the land use change sector sees a smaller decrease.

Table 1: Emissions share, reduction and projection reduction by sector

Sector	% of total emissions 2020	% change base year to 2020	% of total emissions 2031	% projected change base year to 2031
Agriculture	28	7	32	6
Business	13	-29	10	-51
Energy supply	13	-46	9	-67
Industrial process	1	-69	1	-69
Land use change	11	-16	14	-10
Public	1	-67	1	-63
Residential	13	-23	12	-41
Transport	16	-2	17	-10
Waste management	4	-61	4	-63
Total	**100**	**-24**	**100**	**-34**

Projected reductions for the six largest National Communication sectors[4] are discussed below.

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[4] Emissions are reported by National Communication sectors in accordance with international reporting guidelines from the United Nations Framework Convention on Climate Change Greenhouse gas inventory sector definitions

Agriculture

Figure 2: Agriculture GHG emissions, 1990-2031

From the latest GHG inventory (1990 to 2020) and updated projections (2021 to 2031)
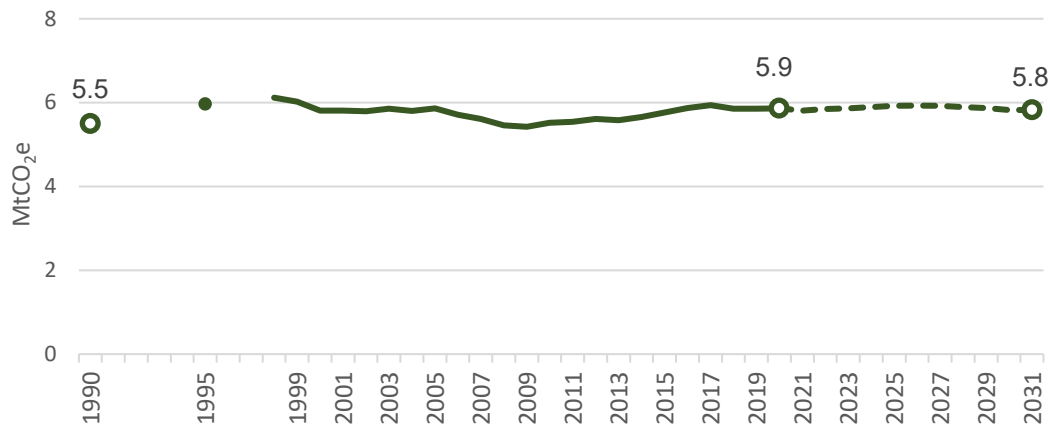

Between the base year and 2020, the agricultural sector increased emissions by 7% (0.4 MtCO2$_e$). With the current projections, emissions for this sector are expected to reduce by 1% between 2020 and 2031. This gives an overall projected increase in emissions from the agriculture sector of 6% (0.3 MtCO2$_e$) from the base year to 2031. Agriculture was the largest source of emissions for NI in 2020 at 28%. This share is expected to increase to 32% in 2031 as other sectors reduce emissions at a faster rate.

This sector is centred on agricultural projections based on the 1990 to 2020 GHG inventory and the FAPRI-UK 2021 agricultural forecasts. Across the projected time series emissions from enteric fermentation and agricultural soils increase by 1.9% while emissions from manure management and urea decrease by the same amount. There are NI-specific policy savings from the Nitrate Action Plan and Manure Efficiency Technology Scheme which have remained the same as previous years.

Transport

Figure 3: Transport GHG emissions, 1990-2031

From the latest GHG inventory (1990 to 2020) and updated projections (2021 to 2031)
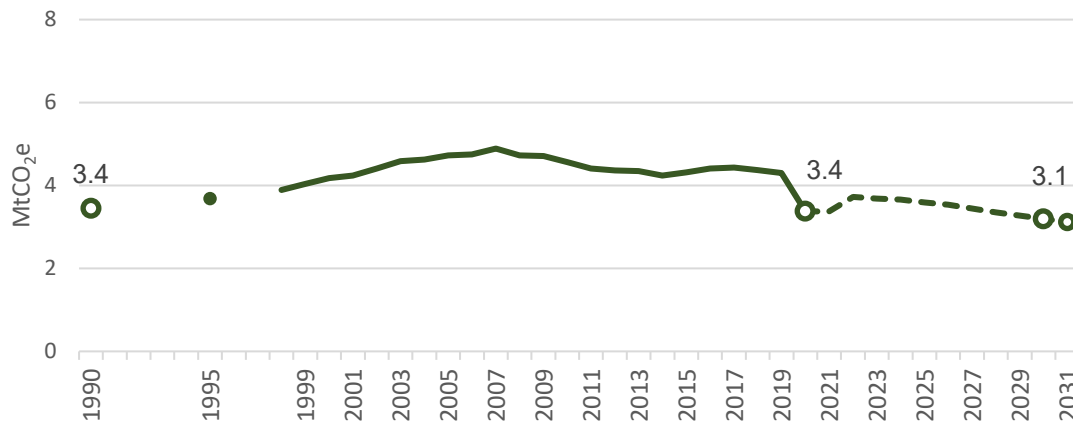
From the base year to 2020, transport emissions decreased by 2% and are projected to decrease by 8% (0.3 MtCO2$_e$) from 2020 to 2031. Between the base year and 2031, the projected 10% decrease in emissions from transport may largely be accounted for by new CO_2 regulations for cars, vans and HGVs as well as the expected increase in the uptake of electric vehicles. The share of total NI emissions in 2031 (17%) is predicted to remain like that of the 2020 share (16%).

Updated aviation forecasts were not available so the figures from previous years were carried forward. As these forecasts were 2017-based, adjustments were made to consider the impact of Covid-19 on the aviation sector. Department of Transport statistics on vehicle numbers were updated for road transport along with fuel use projections from the Department of Business, Energy & Industrial Strategy (BEIS). These figures indicated that fuel use for road transport was expected to increase most steeply from 2020 to 2022 as the transport sector recovers from Covid-19, however any anticipated increase in emissions across the time series with increased fuel use is offset by policy savings which are also projected to rise in this sector.

Policy savings in this sector, include a share of UK policy savings for Fuel Efficiency Policies (for car, LGV and HGV), Transport Biofuels and Streamlined Energy and Carbon Reporting Framework. NI-specific savings for public transport are also included.

Residential

Figure 4: Residential GHG emissions, 1990-2031

From the latest GHG inventory (1990 to 2020) and updated projections (2021 to 2031)
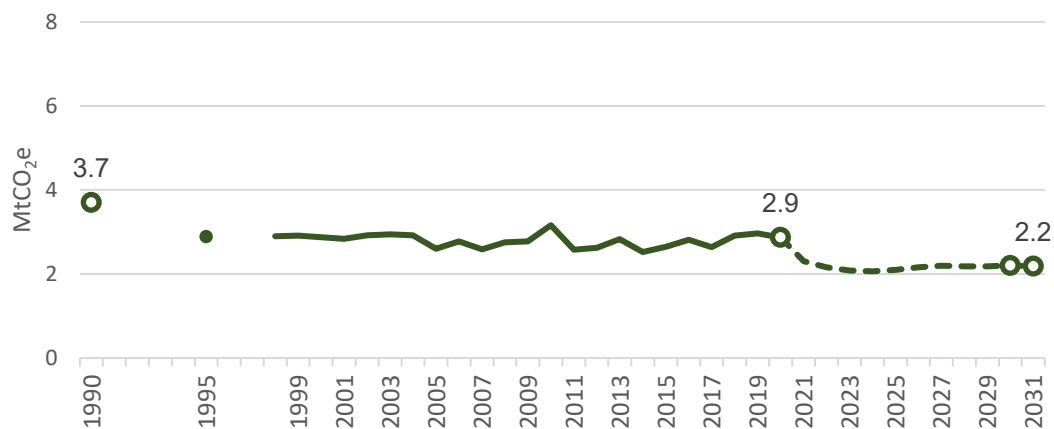
This sector is driven by fuel combustion in homes for heating and cooking which in turn may be affected by the weather, fuel prices and more recently the shift to home working. In the earlier projected years residential emissions are shown to decrease as NI becomes less carbon intense and homes become more energy efficient but will have a slight increase from 2025 on as policy savings reduce and fuel use projections for this sector predict a gradual increase.

Residential emissions have fallen by 23% (0.8 MtCO2$_e$) between the base year and 2020. The projections estimate decline will be maintained with a 24% decrease between 2020 and 2031, resulting in an overall decrease of 41% (1.5 MtCO2$_e$) between the base year and 2031. The share of total emissions from this sector will remain similar between 2020 and 2031, 13% compared to 12%. By 2031, it is expected that emissions from the residential sector will become the fourth largest source in NI.

Updates to this sector include gas forecasts from Gas Market Operator NI (GMO NI) and revised UK-level energy projections and policy savings from BEIS. A share of UK policy savings was taken for National Products Policy and F-gas regulations. NI-specific policy savings were included for Boiler Replacement Scheme, Code for Sustainable Homes, Heating Replacement Programme (heating, insulation/glazing), Warm Homes Scheme, Renewable Heat Incentive, Gas Extension to West and Uplift of Part F (Conservation of Fuel and Power) of The Building Regulations (Northern Ireland) 2012 and 2021.

Energy Supply

Figure 5: Energy Supply GHG emissions, 1990-2031

From the latest GHG inventory (1990 to 2020) and updated projections (2021 to 2031)
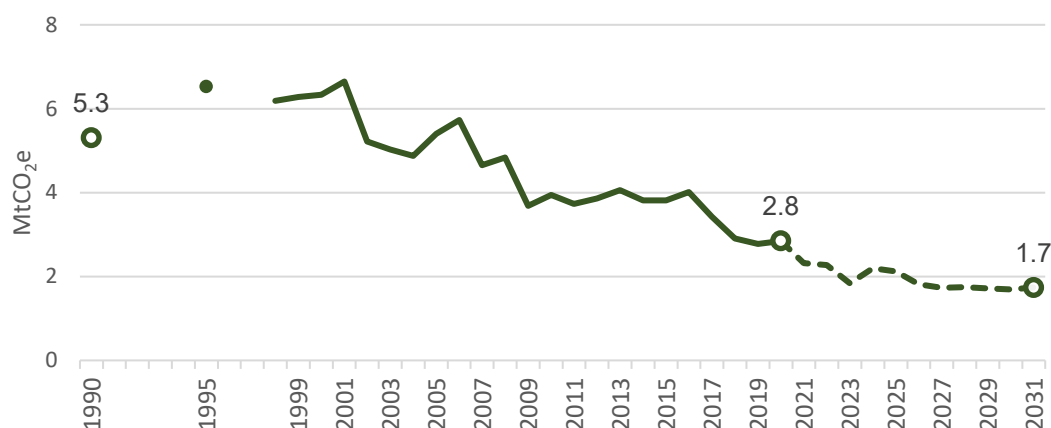
Emissions from energy supply have made the biggest contribution to the NI overall decrease from the base year to 2020 with a 46% (2.5 MtCO2$_e$) decrease. The emissions from the sector are expected to continue decreasing at a reduced rate with a projected reduction of 39% between 2020 and 2031. This results in a total projected decrease in emissions from this sector of 67% (3.6 MtCO2$_e$) by 2031.

In 2020, the energy supply sector represented a 13% share of total NI emissions. In 2031, this share is expected to drop to 9% making it the fourth smallest source of emissions in NI, just above the waste management (4%), industrial process (1%) and public (1%) sectors' share.

The BEIS' energy trends, System Operator NI (SONI) forecasts and GMO NI gas use and demand forecasts were updated for this sector. The closure of the Kilroot coal powered station in 2023 and the extended planned outage of other units along with the opening of two new gas units is accounted for in the projections.

Within the Northern Ireland Climate Change Act 2022[5] there is a target to meet 80% of energy consumption from renewable sources by 2030. This renewables target has been included in the projections. The latest figures show that 49.3% of total electricity consumption in NI was generated from renewable sources located in NI in the 12 months to September 2022[6].

Overall demand for electricity is expected to increase over the projected period. This is driven by the heat and transport sectors which are expected to increase due to predicted growth in the uptake of heat pumps and electric vehicles. SONI's median forecast scenario estimates an increase in demand of 19% in the 10-year period from 2022 to 2031[7].

In their 2022/23 to 2031/32 forecast, the GMO NI predicts a 10% increase in overall power sector demand. The forecast predicts a non-linear increase with demand peaking in 2023/34 and declining from 2023/34 to the end of the forecasted period.

The gas forecasts used in the projections consider the two current gas fired power stations, Ballylumford and Coolkeeragh, and the new gas fired power station that EPUKI proposes to bring into operation in Kilroot in 2023.

There are no policy savings accounted for in this sector's emissions as it is assumed that policy savings are included in the projection sources used for this sector. For example, SONI data which feed into the projections for energy supply considers the impact of policy drivers[8].
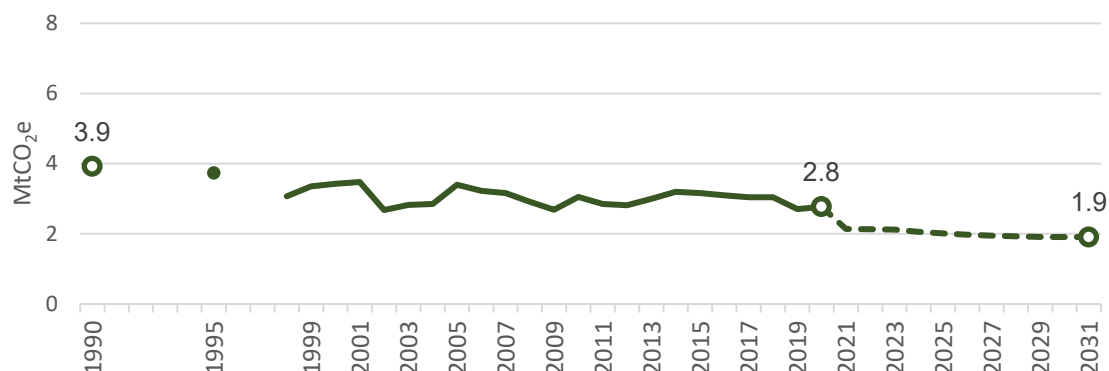
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[5] Northern Ireland Climate Change Act
[6] Electricity consumption and renewable generation in Northern Ireland: October 2021 - September 2022
[7] All-Island Generation Capacity Statement 2022-2031 (Table A1-1 Median Demand Forecast)

Business

Figure 6: Business GHG emissions, 1990-2031

From the latest GHG inventory (1990 to 2020) and updated projections (2021 to 2031)

Emissions from the business sector have fallen by 29% (1.2 MtCO2e) between the base year and 2020. The projections estimate that this decline will continue at a similar rate with a 31% decrease between 2020 and 2031, resulting in an overall decrease of 51% (2.0 MtCO2e) between the base year and 2031. The share of total emissions from this sector will fall from 13% in 2020 to 10% in 2031.

In this sector, gas forecasts from GMO NI were updated, revised UK-level energy projections and policy savings from BEIS were also included. Projections indicate that emissions from the business sector will decrease across the time series, thus continuing the decreasing trend in this sector observed from 2015 onwards.

The fuel use trends from BEIS's Energy and Emissions Projections: 2021 to 2040[8] remain stable across the projected time series. Emissions from this sector are reduced by policy savings which show a steady increase over the same period.

For this sector a share of UK savings is taken for National Products Policy, Carbon Reduction Commitment Energy Efficiency Scheme, F-gas regulations, the Streamlined Energy and Carbon Reporting Framework and the Energy Performance of Buildings Directive. NI-specific policy savings are included for Renewable Heat

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[8] Energy and Emission projections publication

Incentive, Gas Extension to West and Uplift of Part F (Conservation of Fuel and Power) of The Building Regulations (Northern Ireland) 2012 and 2021.

Land Use, Land Use Change and Forestry (LULUCF)

Figure 7: Land Use, Land Use Change and Forestry GHG emissions, 1990-2031

From the latest GHG inventory (1990 to 2020) and updated projections (2021 to 2031)
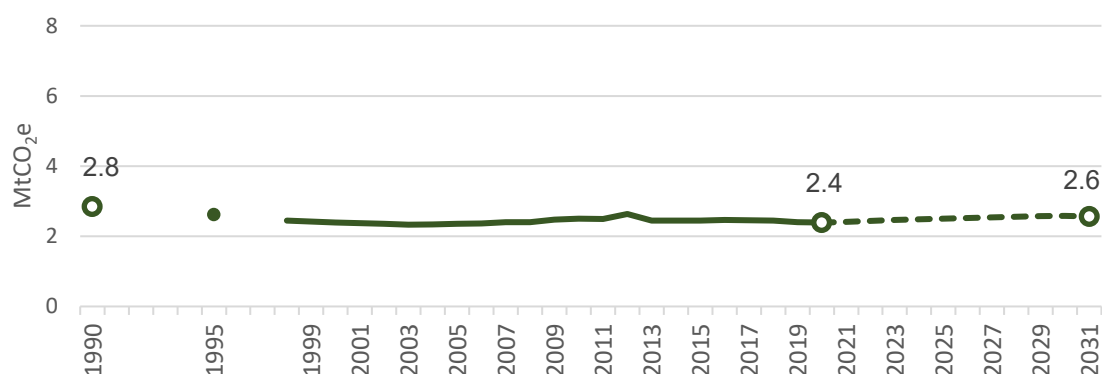
There were major changes to the LULUCF sector in the 2019 inventory to better represent emissions from peatlands and to bring reporting in line with the 2013 IPCC Wetlands Supplement[9]. For more details on these changes see Appendix A in the Northern Ireland Greenhouse Gas Emissions 2020 report. The LULUCF projections included in this publication are 2019 based as a 2020 update was unavailable.

LULUCF emissions decreased by 16% between the base year and 2020. The projections estimate that there will be a 7% increase in emissions from this sector between 2020 and 2031. This results in an overall decrease of 10% (0.3 MtCO2$_e$) from the base year to 2031. The share of total emissions from this sector will also see an increase from 11% in 2020 to 14% in 2031, making it the third largest source in NI.

Updated projections of GHG emissions and removals from LULUCF activities were not available for inclusion in this publication. Instead, the set of LULUCF projections

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[9] 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands

consistent with the 1990-2019 GHG Inventory, derived by the UK Centre for Ecology and Hydrology (UKCEH) for BEIS, were used and as such include the impact of the IPCC Wetlands supplement. There are no policy savings accounted for in this sector's emissions.

Impact of Policy on Projections

Table 2 shows the impacts of separately-costed policies on NI's overall projected emissions (see Annex 3). The term 'separately-costed' refers to policies for which carbon savings have been estimated, either at NI or UK level. The savings from policies have been grouped by sector and the impact estimated by comparing modelled emissions from scenarios which contain a policy or policies against those which do not.

There are some policy impacts that are embedded within the sector calculations themselves e.g., in the energy supply sector. Where possible, NI-specific savings are used, but often no such data exist, and a NI share of UK savings is used. UK policy savings are taken from BEIS' Energy and Emission Projections publication[10].

It is important to note that policies currently being developed for inclusion in the Climate Action Plan have not been included in this publication. New policies, once finalised, will be incorporated into future updates.

Table 2: Impact of policies on projected GHG emissions, by sector

Sector	Impact on NI projection, base year to 2031 (percentage points)
Agriculture	0.03
Business	2.50
Energy supply	-
Industrial process	-
Land use change	-
Public	0.02
Residential	1.88
Transport	4.46
Waste management	-
Total	**8.89**

'-' policy impacts embedded within sector calculations or no separately-costed policies available

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[10] Energy and Emission Projections publication

Changes to Global Warming Potentials

The emissions estimates in this report cover seven greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and nitrogen trifluoride (NF_3). Depending on their molecular weights, radiative properties and residence times in the atmosphere, each greenhouse gas has a different capacity to cause global warming.

Global warming potentials (GWPs) are used to estimate the climate change impacts of various GHG emissions and express them in a single unit – carbon dioxide equivalents (CO_2e). As such the GWP for each gas is defined as its warming influence relative to that of CO_2 over a given time period, typically 100 years.

The GWPs commonly used in GHG reporting are defined by the Intergovernmental Panel on Climate Change (IPCC), a primary authority on climate change science. The values for GWPs have been revised on a number of occasions, with each update incorporating the results of advances in scientific knowledge. Updated GWP values are set out in the IPCC's Assessment Reports.

In November 2021 during COP26, the international community agreed that GHG emissions reporting, under the Paris Agreement transparency framework, should use the 100-year GWPs (without climate feedback[10]) that are set out in the IPCC's Fifth Assessment report (AR5). For that reason and to align with the CCC's workings, GHG inventory emissions data used in these projections will be based on AR5 GWPs100 and as such any references to emissions from the GHG inventory 1990 to 2020 will not match those presented in the earlier publication, Northern Ireland Greenhouse Gas Emissions 2020.

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[10] The AR5 report presents two sets of GWP values, one that takes into account climate feedbacks, which measures the indirect effects of changes in carbon storage due to changes in climate, and one that does not. (IPCC, 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group 1 to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Technical Summary)

Previous NI GHG Projections Publications

The previous update to the NI GHG projections was produced in March 2022. It was the fifth report presented on a National Communication (NC) sector basis. The methodology and model used for the projections were updated in 2019 so that the model was built on the most recent version of NC codes and aligned with the NC sectors. Prior to the 2019 publication, the projections model was built on an older version of NC codes and sectors limiting comparisons.

Further details on NC sectors and the different versions is included in the projections report published in 2018: [Northern Ireland Greenhouse Gas Projections Update (based on 2015 greenhouse gas inventory)](#)

Table 3 compares the previous (based on 2019 greenhouse gas inventory) and current projections (based on 2020 greenhouse gas inventory) updates by sector. Some change is a result of the updated inventory data whilst other changes are due to changes to the projections data. Please note the comparison in table 3 is based on the change to 2030 as this is the last year of 2019-based projections data.

Table 3: Impact of updates on projected GHG emissions by sector, 1990-2030 trend (%)

Sector	2019-based projection	2020-based projection	Reason for change
Agriculture	5%	6%	Agriculture sector GHG projections, which use FAPRI-UK forecasts, were revised this year, and have increased since the previous update. Revisions to the 2020 GHG inventory resulted in a reduced trend from base year to the current year. The overall effect being a similar projected increase in emissions from this sector.
Business	-63%	-51%	The smaller reduction in projected emissions is driven by updates to the EEP projections data (2021 to 2040). These forecast higher energy demand over the time-series compared to previous projections (2019 to 2040). Trends are driven by the annual growth (or decline) of energy demand which is reflected in the results. Increased policy savings have been included and serve to negate some of the impact of increased fuel projections, resulting in a smaller decrease in this sector.
Energy Supply	-74%	-68%	Source data (electricity demand and power sector gas use) for this sector's projected emissions have increased from the previous year's forecasts. The result is a reduced trend, despite a projected increase in renewables this year.
Industrial Process	-68%	-69%	Similar projected reduction. All changes are influenced by the update of the projections model with the latest (2020 based) actual data from the DA GHG inventories.

Table 3: continued

Sector	2019-based projection	2020-based projection	Reason for change
Land Use Change	31%	-9%	The 1990 to 2019 inventory incorporated significant methodological changes in the LULUCF sector to take account of peatland emissions. The change in trend seen between the 2019 and 2020 based projections reflects the impact of this methodological change in the inventory. The underlying LULUCF projections data have not been updated and therefore remain based on the 2019 inventory and the same as in the previous year. Therefore the change in projected emissions is indicative of methodological changes to the underlying LULUCF trend as opposed to an improvement in emissions.
Public	-69%	-64%	The smaller reduction in emissions from this sector is driven by higher fuel use projections however this is slightly offset by higher policy savings in the latter part of the time series.
Residential	-39%	-41%	Fuel use projections have been revised down while policy savings have been revised up for the latter part of the time series, resulting in a slightly larger predicted reduction for this sector.
Transport	2%	-7%	Road transport emissions are projected to be lower, as fuel use projections have been revised down slightly and policy savings have been revised up for the latter part of the time series. Road transport emissions in the 2020 GHG inventory data were impacted by travel restrictions during the COVID-19 pandemic resulting in a lower start point for the projections.
Waste Management	-71%	-63%	Landfill emissions were projected to be higher in the 2020 model than the 2019 model. This is linked to an increase in the NI/UK split in waste emissions used in the model, resulting in a smaller projected reduction.
TOTAL	**-32%**	**-34%**	

Further Information

1. The Kyoto Protocol, a 1997 addition to the United Nations Framework Convention on Climate Change treaty, requires countries to monitor emissions and report on and emission reduction target. The UK's reduction in emissions is set against a base line of emissions in 1990 (for carbon dioxide, methane and nitrous oxide) and 1995 (for the F-gases, i.e. hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride). The sum of these emissions in 1990 and 1995 is called the base year emissions.

2. The GHG inventory provides the foundation the projections are based on. The inventory uses a wide range of data sources and sources of uncertainty include statistical differences, assumptions, proxy datasets and expert judgement. In addition, the natural variability in the processes being modelled introduce uncertainty. For example, the carbon content and therefore the emissions from fuels will vary and emissions from farming practices can vary with climatic conditions and soil types. Uncertainties are presented as confidence intervals; the width of the interval provides a measure of the accuracy of the estimate. A close approximation of the 95% confidence interval for the NI GHG emissions for the latest year (2020) is ±6%.

3. It should be noted that the GHG inventory data are for the period up to 2020. Therefore, they report on the initial impact of the Covid-19 pandemic, in terms of greenhouse gas emissions within NI. These impacts are most evident in the reduction in transport emissions.

4. The GHG projections are estimated using forecasted data (e.g., energy, gas, aviation, LULUCF and agriculture projections). All modelled forecasts will have a level of associated uncertainty and represent best estimates based on underlying assumptions and expert knowledge. Events such as the Covid-19 pandemic and Brexit introduce further uncertainty and can make it more difficult to accurately predict future situations. 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.

5. A primary source for the GHG projections is the BEIS Energy and Emissions Projections. It was noted in the 2021 projections, published in December 2022, that to account for the Covid-19 pandemic, some projections are based on 2019 data. This is to avoid long-term distortion to projected energy demand in some sectors caused by the pandemic in 2020.

Annex 1: Key data sources for the latest update to the NI GHG projections

| Dataset	Sector	Source	Latest version
NI GHG Inventory	All sectors	Ricardo Energy & Environment	1990 to 2020
Greenhouse gas reporting: conversion factors 2022	All sectors	BEIS	2022
Energy and Emissions Projections	All sectors	BEIS	2021 to 2040
Electricity generation (historical)	Energy supply	BEIS	2017 to 2021
Power capacity and demand forecasts	Energy supply	SONI / EirGrid	2022 to 2031
Gas demand forecasts	Energy supply, business, residential	GMO NI	2022/23 to 2031/32
Agriculture sector GHG projections using FAPRI-UK forecasts for NI	Agriculture	AFBI / Defra	2020 to 2040
LULUCF projections	LULUCF	Centre for Ecology and Hydrology / BEIS	2020 to 2050
UK non-CO_2 GHG projections	Business, residential, waste	BEIS	2021 to 2040
Population projections	Other	NISRA (NI) / ONS (UK)	2020-based
UK Aviation Forecasts	Transport	DfT	2017 to 2050

Annex 2: Northern Ireland Greenhouse gas emissions projections by sector (in MtCO₂e)

Annex 3: Separately costed policies included in the model, by sector

Sector	UK / NI	Policies
Agriculture	NI specific data available	Nitrate Action Plan Manure Efficiency Technology Scheme
Business	NI specific data available	Renewable Heat Incentive Uplift of Part F - Building Regulations 2012 and 2021 Gas Extension to West
	NI share of UK impact	Energy Performance of Buildings Directive Carbon Reduction Commitment F-gas regulation 2015 Products policy Streamlined Energy and Carbon Reporting
Public	NI share of UK impact	Carbon Reduction Commitment Products policy Streamlined Energy and Carbon Reporting
Residential	NI specific data available	Boiler Replacement Scheme Code for Sustainable Homes Heating Replacement Programme Warm Homes Scheme Renewable Heat Incentive Gas Extension to West Uplift of Part F - Building Regulations 2012 and 2021
	NI share of UK impact	F-gas regulation 2015 Products policy
Transport	NI specific data available	Public transport
	NI share of UK impact	Car policies HGV policies LGV policies Transport biofuels Streamlined Energy and Carbon Reporting

Annex 4: Total GHG emissions from latest GHG inventory (1990 to 2020) and updated projections (2021 to 2031) against Climate Change NI targets*
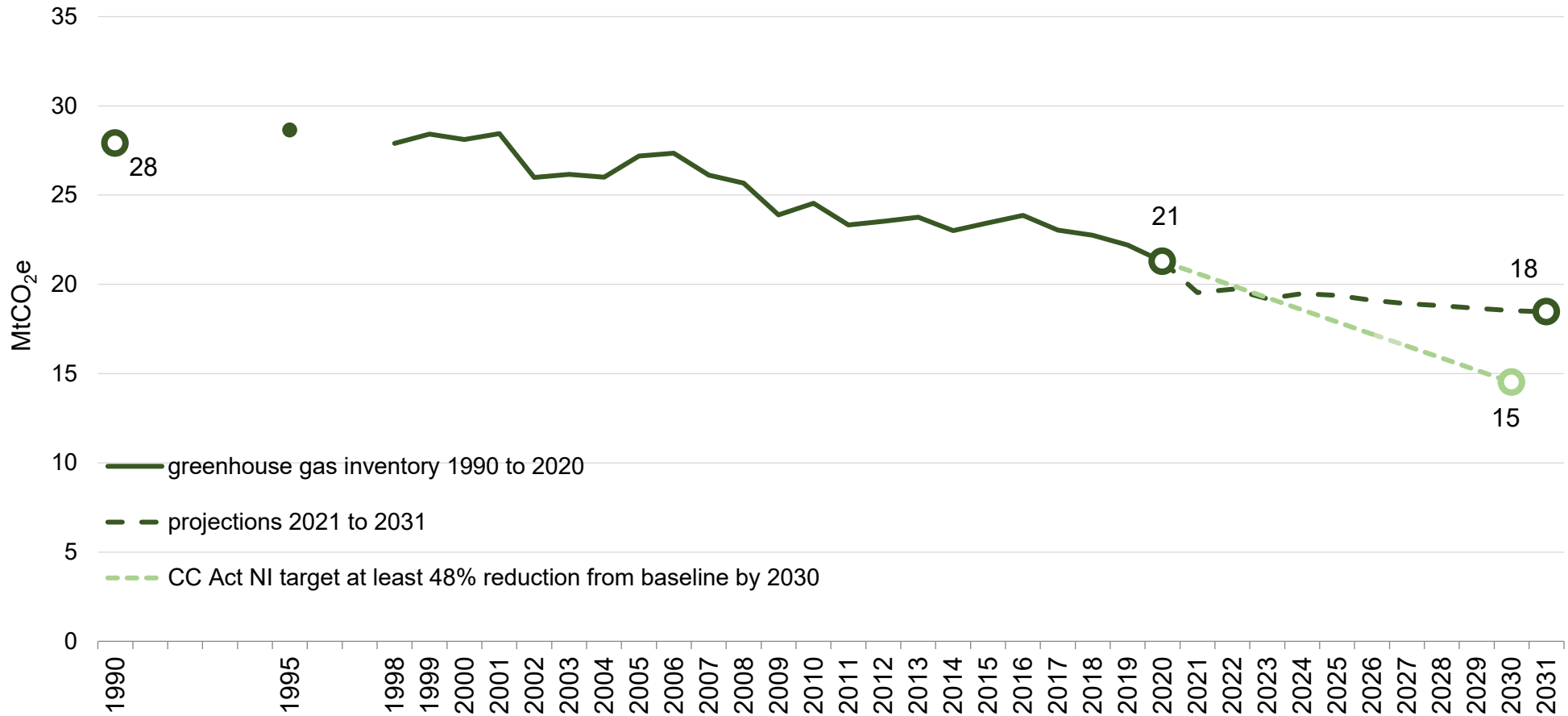
* Please note these data do not include international shipping or aviation emissions

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