

Northern Ireland Greenhouse Gas Projections Update

Based on 2018 Greenhouse Gas Inventory



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Northern Ireland Greenhouse Gas Projections Update Based on 2018 Greenhouse Gas Inventory

Key points

- The latest Northern Ireland Greenhouse Gas Inventory estimated 2018 emissions to be 19 million tonnes of carbon dioxide equivalent (MtCO_{2e}). This was a 20% decrease on the 24 MtCO_{2e} emitted in 1990.
- Projections are produced annually and provide an estimate of emissions of greenhouse gases in Northern Ireland from 2019 to 2030. The latest projection is that greenhouse gas emissions in Northern Ireland will reduce by 39% between 1990 and 2030 to 15 MtCO_{2e}.

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Introduction

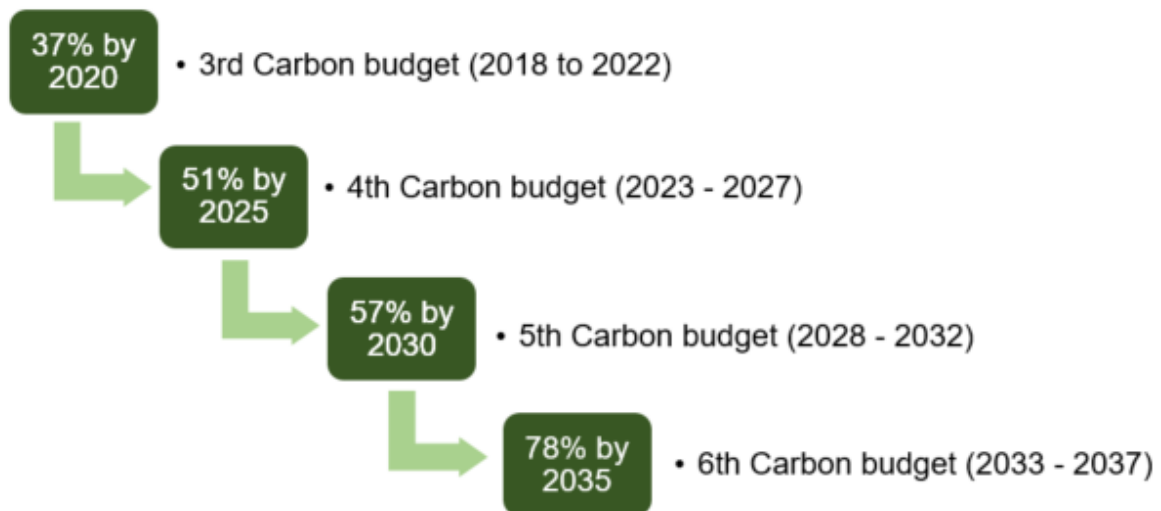
This paper details the impact of the annual update to the Northern Ireland (NI) greenhouse gas (GHG) projections. It projects emissions of GHGs in NI from 2019 to 2030 and considers the reduction in emissions from 1990 to 2030. The greenhouse gas inventory as well as projections data for energy, agriculture, population and land use change are used to estimate emissions from 2019 to 2030. A list of data sources is available in Annex 1.

Projecting to 2030 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 (hereafter referred to as 'The Act') introduced a legally binding target to reduce GHG emissions by at least 80% below the 1990 baseline by 2050.

To meet these targets, the government has set five-yearly carbon budgets which currently run until 2032. The UK is currently in the third carbon budget period (2018 to 2022) which has a target to reduce emissions by 37% by 2020 (on 1990 levels). The fourth, fifth and sixth carbon budgets have targets of 51% by 2025, 57% by 2030 and 78% by 2035¹ (Figure 1).

¹ [The CCC - Carbon budgets and targets](#)

Figure 1: Reductions in Greenhouse Gas emissions below 1990 levels



In 2019, The Act² was amended to require the UK to have a 100% reduction in greenhouse gas emissions by 2050 from 1990 levels, commonly referred to as the 'net zero 2050' target³.

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 and have suggested possible targets for NI⁴. Their 2030 target for all greenhouse gases is 48% reduction on 1990 levels increasing to 82% reduction by 2050. Further details on targets is included in Annex 3. The current projections for NI indicate a 39% reduction in greenhouse gas emissions over the period 1990 to 2030.

² [The Climate Change Act 2008](#)

³ [Net Zero - The UK's contribution to stopping global warming](#)

⁴ [Letter from CCC to DAERA on NI contribution](#)

Current Northern Ireland Overview

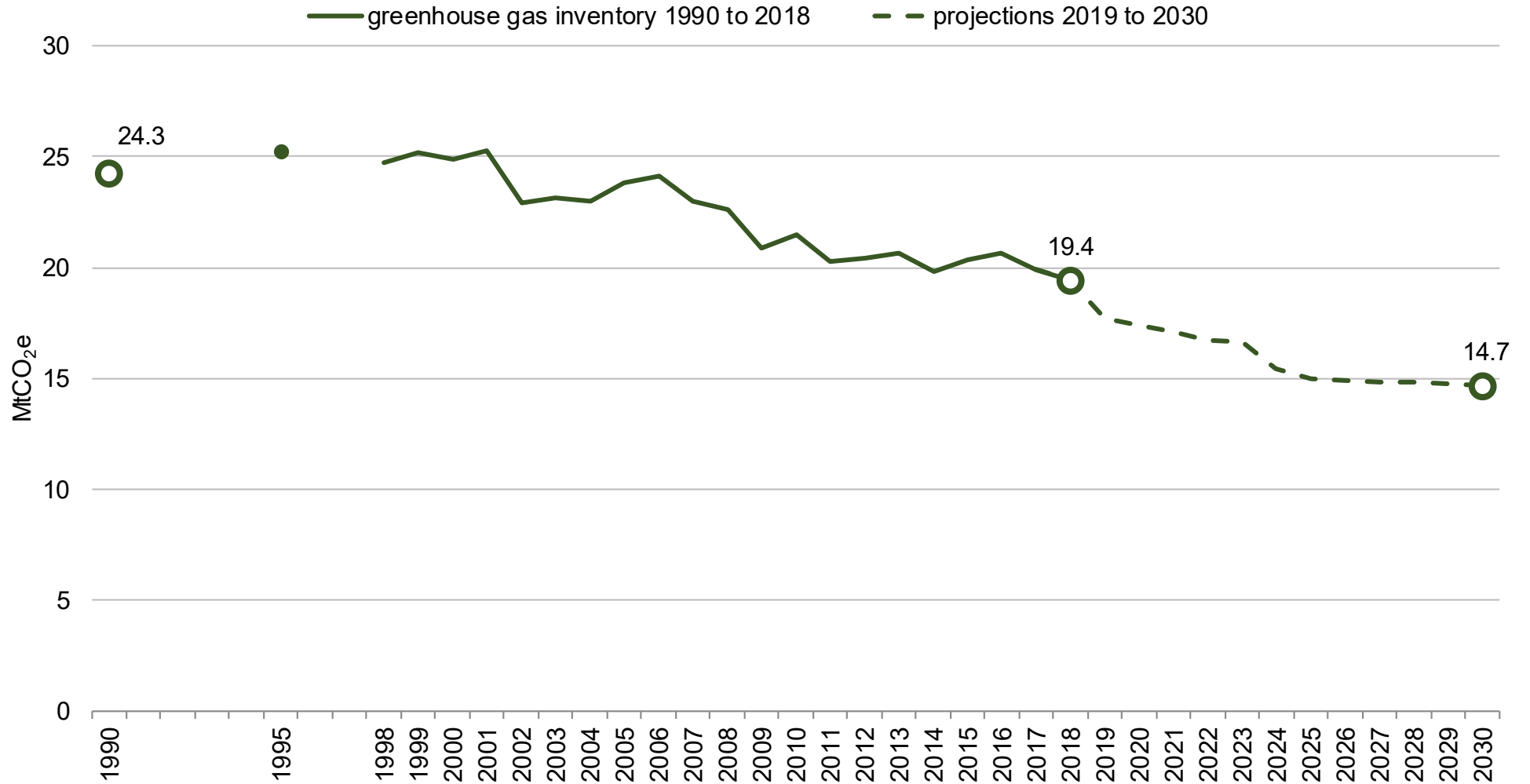
The main body of this report concentrates on the projected reduction in GHG emissions, based on those policies currently available. This publication will be followed up with a sensitivity analysis of these policies. The sensitivity analysis will examine the projections in terms of changes to the assumptions of the respective policies. This may include further information such as more detailed impacts of BREXIT and further initiatives to combat Climate Change.

The latest NI GHG Inventory estimated 2018 emissions to be 19 million tonnes of carbon dioxide equivalent (MtCO_{2e}). This was a 20% decrease on the 24 MtCO_{2e} emitted in 1990. The latest projections estimate a further 24% decrease from 2018 to 2030, with expected emissions of 15 MtCO_{2e} in 2030. Over the period 1990 to 2030 this would represent a total reduction in GHG emissions of 39%.

The projected emissions are shown on the line chart in Figure 2. For information about greenhouse gas emissions between 1990 and 2018, see the NI GHG statistical bulletin 1990-2018: [Link to Northern Ireland greenhouse gas inventory 1990-2018 statistical bulletin](#)

From 2019 to 2030 there is a projected gradual reduction in NI's GHG emissions. Emissions are expected to decrease year-on-year until 2025 when they level off. The downward trend is mainly driven by the energy supply sector with Kilroot power station closing in 2023 contributing to the decrease between 2019 and 2024 before levelling off as no further policy savings are available. With current policies in place, the early years of the projections indicate that NI is on target to meet the 39% reduction in GHG emissions for 2030 (as shown in chart in Annex 3), as suggested by the CCC. However, a lack of policy direction in the later years of the projections results in a decline in the decrease, causing GHG emissions to level off.

Figure 2: Total GHG emissions from latest GHG inventory (1990 to 2018) and updated projections (2019 to 2030)



Results by sector

Projected reductions for the five largest National Communication sectors⁵ is discussed below. Table 1 shows the estimated projected reduction alongside the 1990-2018 Inventory by sector. The latest NI GHG Inventory (1990-2018) provides the basis for each sector, with emissions projected forward using the available data.

All sectors, except public and industrial processes, are projected to see a continued improvement (i.e. a smaller increase or a bigger decrease) in emissions between 1990 and 2030 compared to the change to date, i.e. 1990 to 2018. The public and industrial processes sectors are expected to remain similar.

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

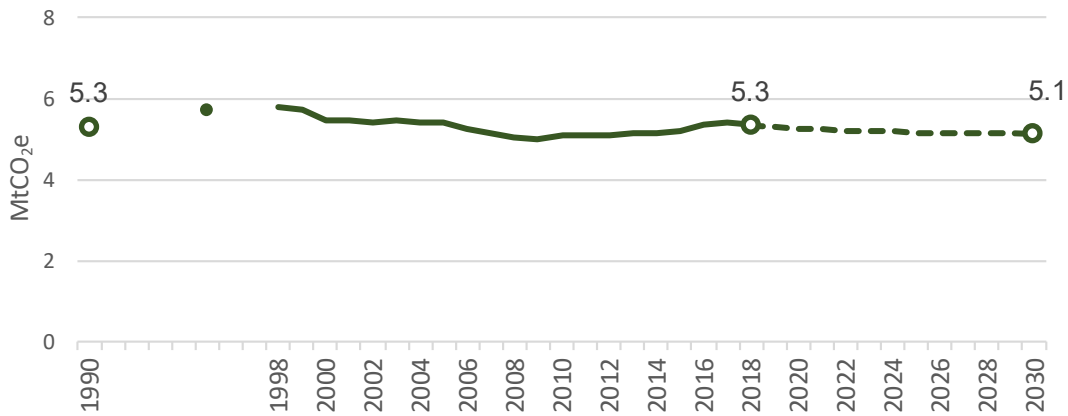
Sector	% of total emissions 2018	% change 1990 to 2018	% of total emissions 2030	% projected reduction 1990 to 2030
Agriculture	27	1	35	-3
Business	12	-23	7	-66
Energy supply	15	-45	9	-76
Industrial process	1	-77	1	-77
Land use change	3	32	3	25
Public	1	-69	1	-67
Residential	14	-25	14	-43
Transport	23	29	26	10
Waste management	4	-58	4	-72
Total	100	-20	100	-39

⁵ 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 3: Agriculture GHG emissions, 1990-2030

From the latest GHG inventory (1990 to 2018) and updated projections (2019 to 2030)



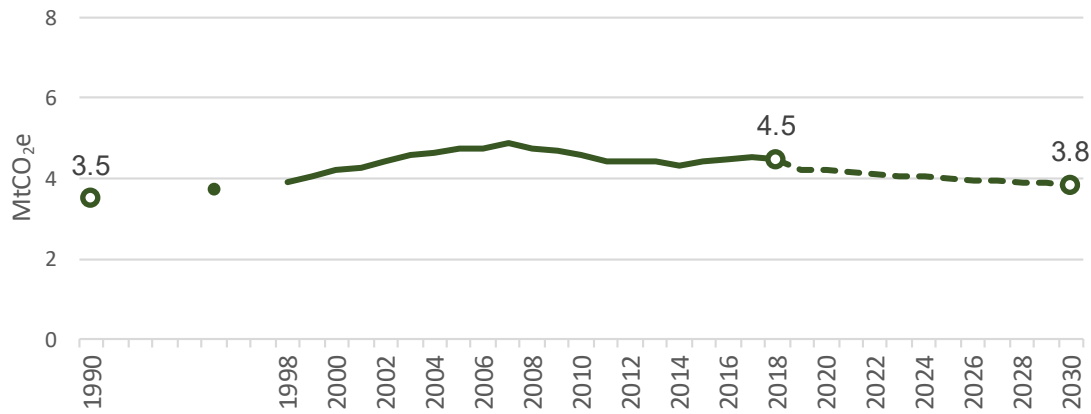
From 1990 to 2018, the agricultural sector increased emissions by 1%. With the current projections, emissions for this sector are expected to reduce by 4% between 2018 and 2030. This gives a total projected decrease in emissions from the agriculture sector of 3% between 1990 and 2030. Agriculture was the largest source of emissions for Northern Ireland in 2018 at 27%. This share is expected to increase to 35% in 2030 as other sectors reduce emissions at a faster rate.

This sector is based on current agricultural projections produced by the Agri-Food and Biosciences Institute (AFBI) for the UK (called FAPRI-UK). Updated agricultural projections were not available so the figures from previous years were carried forward. Livestock numbers are expected to decrease across the time series whilst emissions from agricultural soils have remained stable. 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 4: Transport GHG emissions, 1990-2030

From the latest GHG inventory (1990 to 2018) and updated projections (2019 to 2030)



From 1990 to 2018, transport emissions increased by 29% and are expected to decrease by 15% from 2018 to 2030. Overall, emissions from transport are expected to increase by 10% between 1990 and 2030. This is due to increased demand and fuel use. The share of total NI emissions in 2030 (26%) is expected to increase slightly in comparison to the 2018 share (23%).

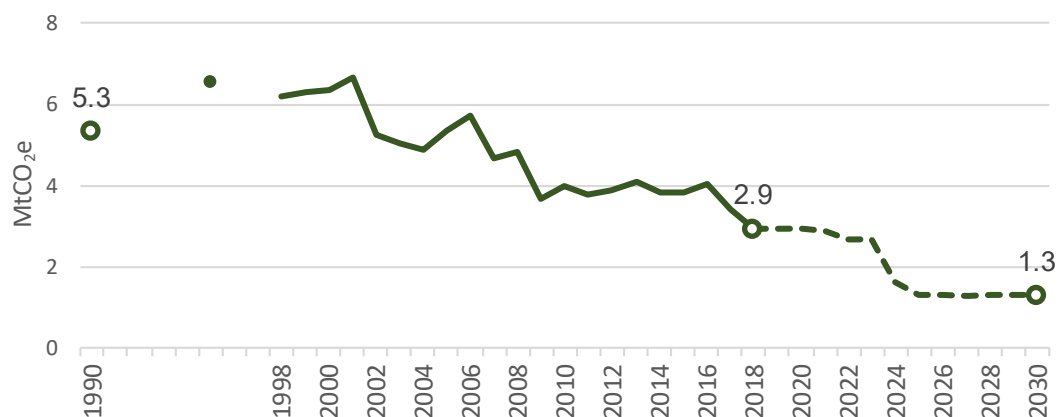
Department of Business, Energy & Industrial Strategy's (BEIS) energy projections and vehicle numbers were updated for road transport. Updated aviation forecasts were not available so the figures from previous years were carried forward. Fuel for road transport is expected to increase over the projected time series resulting in increasing emissions between 2018 and 2030. This is offset by policy savings in this sector.

In terms of policy savings included in this sector, there is NI-specific policy savings for the Travelwise schemes and a share of UK policy savings for Fuel Efficiency Policies (for car, LGV, HGV and PSV) and Transport Biofuels.

Energy Supply

Figure 5: Energy Supply GHG emissions, 1990-2030

From the latest GHG inventory (1990 to 2018) and updated projections (2019 to 2030)



Emissions from energy supply have made the biggest contribution to the NI overall decrease between 1990 and 2018 with a 45% decrease. The emissions from the sector are expected to continue along this trajectory with a projected reduction of 56% between 2018 and 2030. This results in a total projected decrease in emissions from this sector of 76% by 2030.

In 2018, this sector was the third largest sources of emissions in Northern Ireland with a 15% share of total NI emissions. In 2030, this share is expected to drop to 9% which would mean it moves to the fourth largest source of emissions in Northern Ireland below that of the residential (14% share) sector.

The BEIS' energy trends, SONI (System Operator NI) forecasts and GMO NI (Gas Market Operator NI) gas use and demand forecasts were updated for this sector. The closure of Kilroot in 2023, along with its reduction in capacity between 2020 and 2023, is also accounted for in the projections.

Demand for power in Northern Ireland has been relatively consistent over the last number of years and the expectation is that it will remain reasonably stable in the

future; SONI's median forecast scenario estimates an increase in demand of 4% in the 10 year period from 2020 to 2029⁶.

Whilst there has been a general decline in power sector gas demands over the years, the GMO NI forecasts that power sector gas demands will grow between 2020/21 and 2022/23, after which there will be a decline and a levelling off at 2025/26⁷. The gas forecasts used in the projections only consider the two current gas fired power stations, Ballylumford and Coolkeeragh, and do not consider the load from any proposed new power stations.

Presently, there is no target for renewable energy included in the projections. The previous Northern Ireland target of 40% by 2020 was achieved ahead of schedule and has been surpassed. The latest figures show that 47.7% of total electricity consumption in Northern Ireland was generated from renewable sources located in Northern Ireland in the 12 months to September 2020⁸.

The Department for the Economy (DfE) proposes a new target will be informed by its new energy strategy, and as such will be included in the projection tool update when it is available. The Northern Ireland Renewables Obligation (NIRO), a government support mechanism for renewable technologies, closed to all renewables technologies on the 31st March 2017, with exceptions in the form of grace periods. These grace periods have since expired (March 2018) and the NIRO is now closed to all new renewable electricity generation.

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.

⁶ [All-Island Generation Capacity Statement 2020-2029](#)

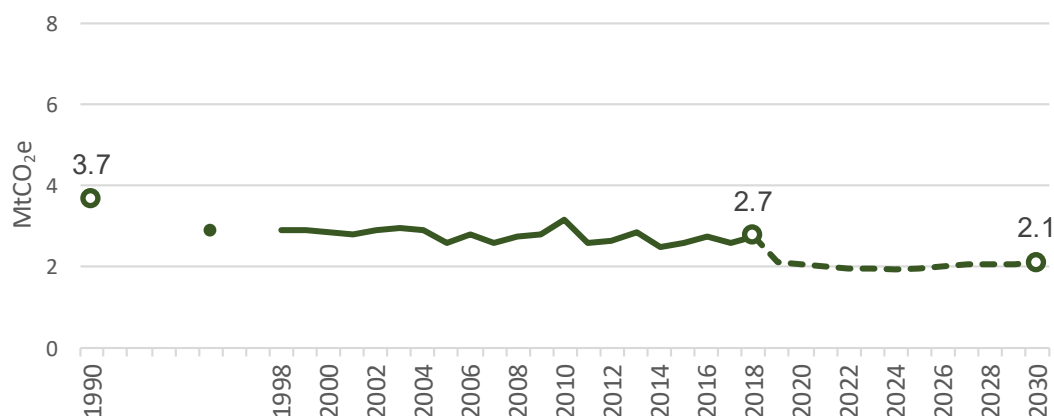
⁷ [Northern Ireland Gas Capacity Statement 2020/21 - 2029/30](#)

⁸ [Electricity consumption and renewable generation in Northern Ireland: October 2019 - September 2020](#)

Residential

Figure 6: Residential GHG emissions, 1990-2030

From the latest GHG inventory (1990 to 2018) and updated projections (2019 to 2030)



This sector is driven by fuel combustion in homes and therefore follows a similar trend to the energy supply sector with emissions decreasing in the earlier years as NI becomes less carbon intense and a slight increase from 2024 on as policy savings reduce.

Residential emissions have fallen by 25% between 1990 and 2018. The projections estimate that this decline will be maintained with a 23% decrease between 2018 and 2030, resulting in an overall decrease of 43% between 1990 and 2030. The share of total emissions from this sector will remain the same between 2018 and 2030, at 14%. By 2030, it is expected that emissions from the residential sector will become the third largest source in Northern Ireland.

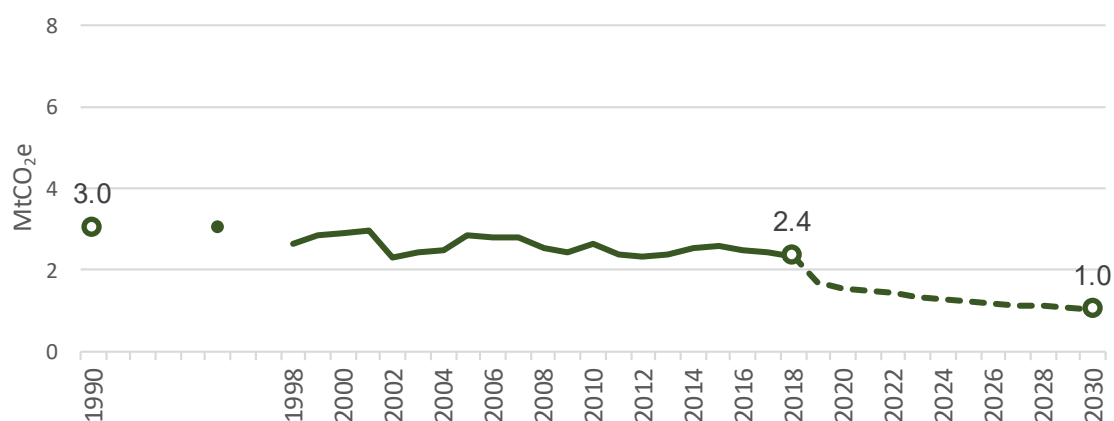
Updates to this sector include gas forecasts from GMO NI, revised UK-level energy projections and revised policy savings. A share of UK policy savings were taken for National Products Policy and F-gas regulations. NI-specific policy savings were included for Boiler Replacement Scheme, Code for Sustainable Homes, Heating Replacement Programme (heating, insulation/glazing), Warm Homes Scheme, Renewable Heat Incentive, Gas Extension to West, Gas Extension to East Down

and Uplift of Part F (Conservation of Fuel and Power) of The Building Regulations (Northern Ireland) 2012.

Business

Figure 7: Business GHG emissions, 1990-2030

From the latest GHG inventory (1990 to 2018) and updated projections (2019 to 2030)



Emissions from the business sector have fallen by 23% between 1990 and 2018. The projections estimate that this decline will continue with a 56% decrease between 2018 and 2030, resulting in an overall decrease of 66% between 1990 and 2030. The share of total emissions from this sector will fall from 12% in 2018 to 7% in 2030.

Updated gas forecasts from GMO NI, revised UK-level energy projections and revised policy savings suggest that emissions from the business sector will continue decreasing from 2015 onwards. Fuel for business use is expected to gradually decline over the projected time series resulting in decreasing emissions between 2018 and 2030. Emissions from this sector are further reduced by policy savings which show a steady increase over the same period.

For this sector a share of UK savings are taken for National Products Policy, Carbon Reduction Commitment Energy Efficiency Scheme, F-gas regulations and the Streamlined energy and carbon reporting framework for businesses. NI-specific

policy savings are included for Renewable Heat Incentive, Gas Extension to West, Gas Extension to East Down and Uplift of Part F (Conservation of Fuel and Power) of The Building Regulations (Northern Ireland) 2012.

Impact of Policy on Projections

Table 2 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. in the energy 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' updated energy and emission projections publication⁹.

⁹ [Updated Energy and Emission projections publication](#)

Table 2: Impact of separately-costed policies on projected GHG emissions

Policy	Sector impacted	NI-specific data available	NI share of UK impact	Impact on NI central projection (percentage points)
Car Fuel Efficiency Policies	Road transport		✓	2.2
Part F - Building Regulations	Business and Residential	✓		1.1
F-gas Regulation	Business and Residential		✓	1.0
Renewable Heat Incentive	Business and Residential	✓		0.9
Transport Biofuels	Road transport		✓	0.9
LGV Fuel Efficiency Policies	Road transport		✓	0.5
Gas Extension to West and to East Down	Business and Residential	✓		0.5
Products Policy	Business, Residential, Public		✓	0.2
Warm Homes Scheme	Residential	✓		0.2
HGV Fuel Efficiency Policies	Road transport		✓	0.2
Boiler Replacement Scheme	Residential	✓		0.1
Heating Replacement Programme	Residential	✓		0.1
Travelwise Initiative	Road transport	✓		0.1
PSV Fuel Efficiency Policies	Road transport		✓	0.0
NAP and METS2	Agriculture	✓		0.0
SECR1 framework for business	Business		✓	0.0
Carbon Reduction Commitment	Business and Public		✓	0.0
Code for Sustainable Homes	Residential	✓		0.0

¹ Nitrate Action Plan and Manure Efficiency Technology Scheme

² Streamlined energy and carbon reporting

Previous NI GHG Projections Publications

The previous update to the NI GHG projections was produced in January 2020. It was the third report presented by National Communication (NC) sector. 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 2017 greenhouse gas inventory) and current projections (based on 2018 greenhouse gas inventory) updates by sector. Some change, e.g. in waste, public and residential, is a result of the updated inventory data whilst other changes, e.g. in agriculture and business, are due to changes to the projections data. The updated projections also incorporated some new modelling assumptions, e.g. in business, which have changed the level of emissions reductions for these sectors.

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

Sector	2017-based projection	2018-based projection	Reason for change
Agriculture	-3%	-3%	Updates for the FAPRI projections for agriculture were not available this year and given the GHGI changed little for this sector between 2017 and 2018, projections remain similar. Note the FAPRI projections are not available on a more disaggregated form than that provided, limiting the dataset's usefulness in assessing the impact of policies affecting specific livestock or farming practices.
Business	-52%	-66%	Greater reductions are driven by updates to the UEP projections data, which now forecast less energy demand over the time-series (2019-2040). As trends are driven by the annual growth (or decline) of energy demand, this is reflected in the results. Increased policy savings since last year have also been included and contribute to the bigger projected decrease.
Energy Supply	-75%	-76%	The projected reduction is similar to last year. The source data for projections has showed a similar trend to the previous year and the inventory has revisions for this sector were minimal.
Industrial Process	-78%	-77%	Very similar trends. All changes are influenced by the update of 2018 projections with actual data from the DA GHG inventories.
Land Use Change	16%	25%	Updates to the latest version of LULUCF trends have caused significant recalculations throughout both the actual time-series, and the projections within this sector. This has been more pronounced since last year's LULUCF projections were based on 2016 inventory data.
Public	-59%	-67%	Inventory revisions have meant that emissions in the later part of the time series (2016 to 2018) have increased therefore emissions have a lower start point (in 2018) than previous and the emissions reduction is projected to be higher than previously estimated.

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

Sector	2017-based projection	2018-based projection	Reason for change
Residential	-33%	-43%	Policy savings have been revised up and fuel use projections revised down hence a larger predicted reduction for this sector.
Transport	10%	10%	2018 forecasts have increased fuel use and policy savings remained broadly similar, increasing slightly towards the end of the time series. Projected reduction consistent with last year.
Waste Management	-77%	-72%	Related to the 2018 inventory figures again, which demonstrated that landfill emissions had not reduced in line with landfilled quantities due to reductions in methane utilisation or flaring which offset the reduction. Therefore trends are reduced compared to the previous version.
TOTAL	-37%	-39%	

Statistical 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. We attempt to carry out a sensitivity analysis on the updated projection each year which gives an idea of the expected level of uncertainty. There was no sensitivity analysis undertaken on the 2016 nor the 2017 based projections, however, the 2015-based projected reduction of 31.2% was presented alongside a possible range of 17.9% to 43.9%¹⁰.

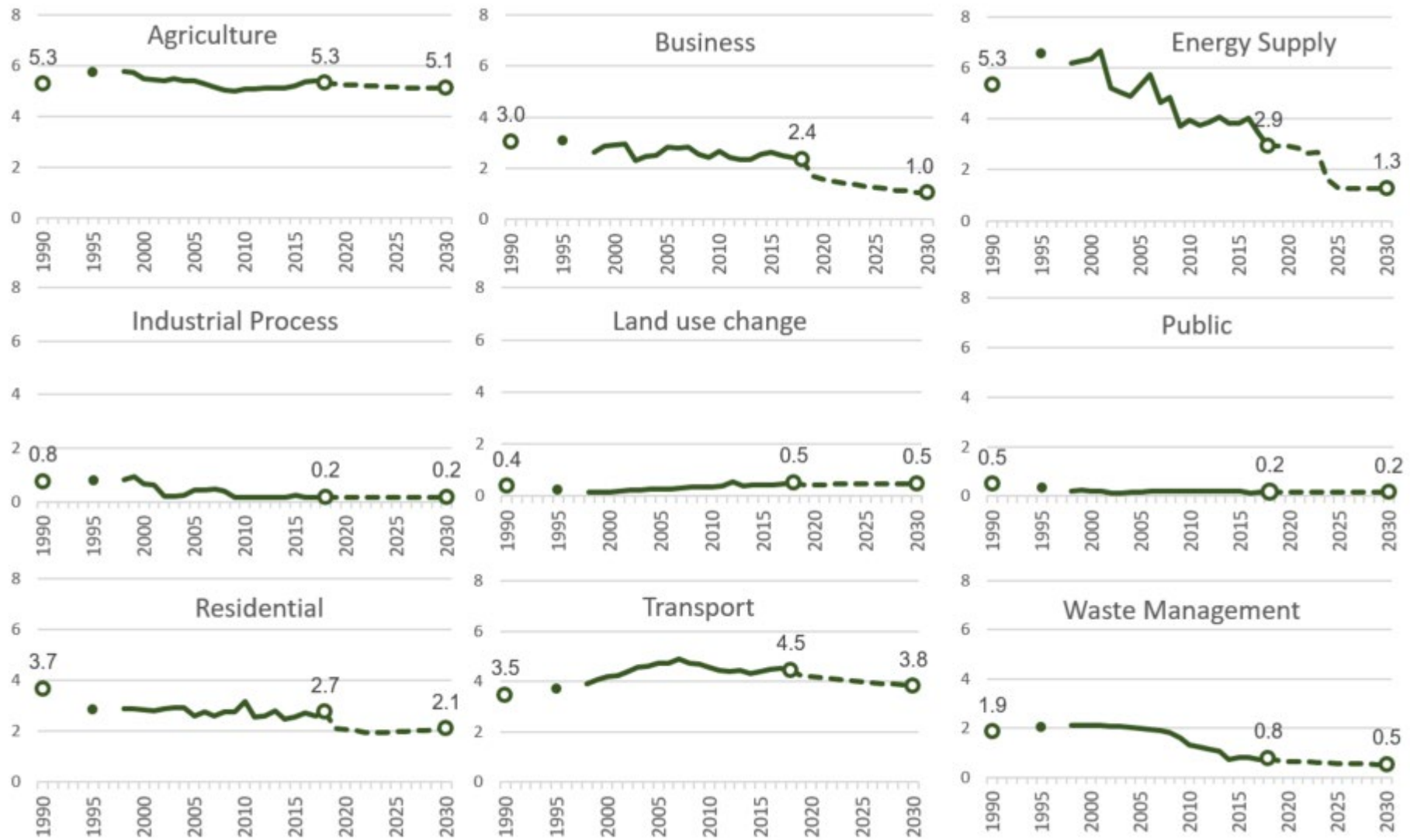
The greenhouse gas emission estimates which provide a foundation for projections are based on a wide range of data sources and sources of uncertainty include statistical differences, assumptions, proxy datasets and expert judgement. In addition, the natural variability in the processes that are being modelled introduce uncertainty. For example, carbon content of fuels and farming practices under different climatic conditions and soil types. The uncertainties are presented as confidence intervals. The width of the interval provides a measure of the accuracy of the estimate. Uncertainty estimates for Northern Ireland GHG emissions for the latest year (2018) at the 95% confidence interval is $\pm 7\%$.

¹⁰ [Sensitivity Analysis Around 2015-based NI Greenhouse Gas Emissions Projections](#)

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 2018
DUKES (Digest of UK Energy Statistics) conversion factors	All sectors	BEIS	2020
Updated energy and emissions projections	All sectors	BEIS	2019 to 2040
Power generation (historical)	Energy supply	BEIS	2004 to 2019
Power capacity and demand forecasts	Energy supply	SONI / EirGrid	2020 to 2029
Gas demand forecasts	Energy supply, business, residential	GMO NI	2021/21 to 2029/30
FAPRI-UK projections for NI	Agriculture	AFBI / DEFRA	2018 to 2027
LULUCF projections	LULUCF	Centre for Ecology and Hydrology / BEIS	2019 to 2050
UK non-CO ₂ GHG projections	Business, residential, public waste	BEIS	2019 to 2040
Population estimates and projections	Other	NI Statistics and Research Agency	2018-based

Annex 2: Northern Ireland Greenhouse gas emissions projections by sector (in MtCO_{2e})

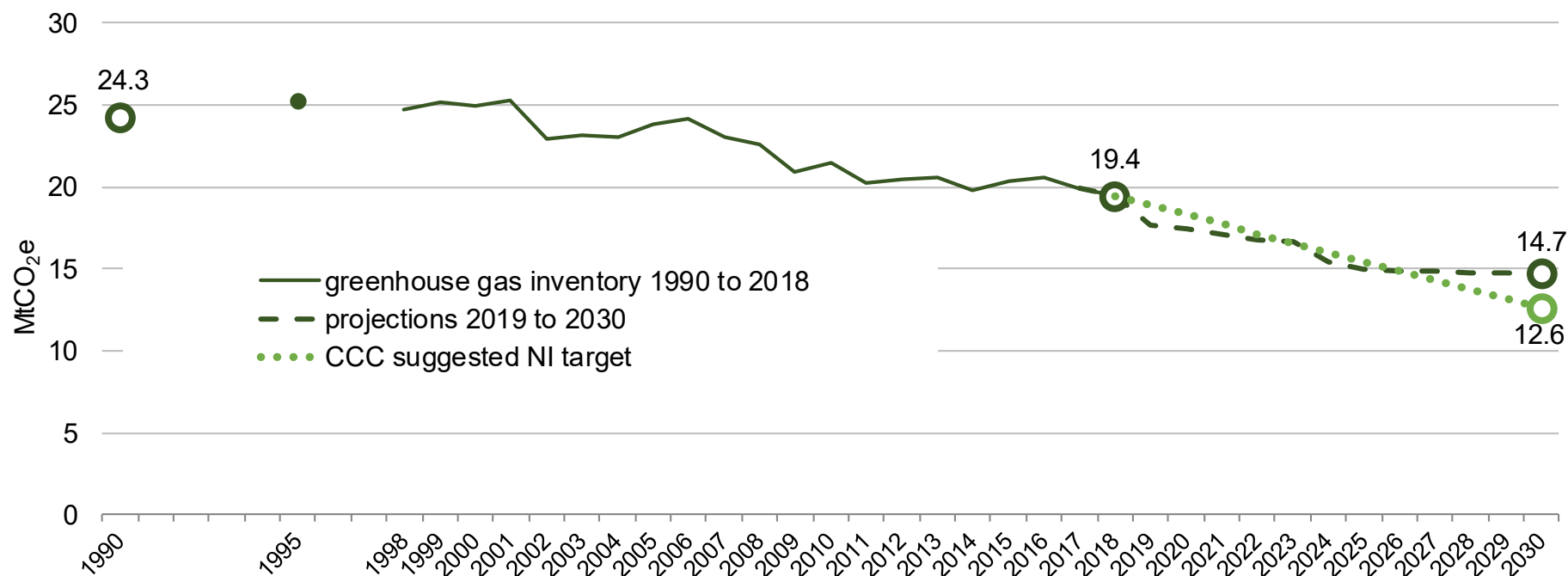


Annex 3: Possible targets in Northern Ireland Climate Change legislation

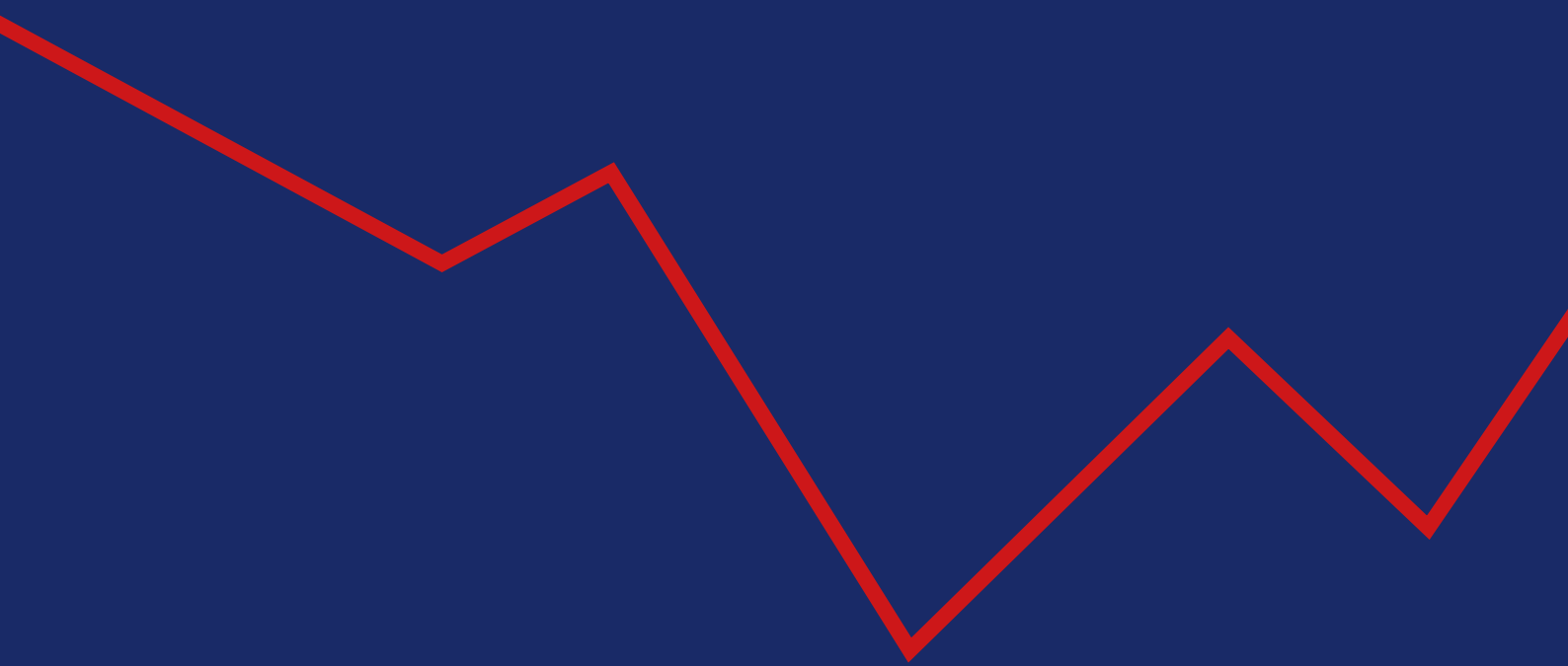
Category	All greenhouse gases	CO ₂ only	All GHGs excluding agricultural methane emissions	All GHGs excluding agricultural, land use and waste methane emissions
2030	48% reduction	56% reduction	53% reduction	52% reduction
UK Sixth Carbon Budget period (2033-2037)	60% reduction	70% reduction	67% reduction	67% reduction
2040	69% reduction	83% reduction	78% reduction	79% reduction
2050	82% reduction	Net Zero	93% reduction	96% reduction

Source: [Letter from CCC to DAERA on NI contribution](#)

Total GHG emissions from latest GHG inventory (1990 to 2018), updated projections (2019 to 2030) and suggested NI target



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