



BELFAST

Profiling Health,
Wellbeing & Prosperity



THE DATA BEHIND THE PEOPLE & THE CITY

PLANET

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Introduction

The core themes in Phase VII (2019 – 2025) of the World Health Organization's European Healthy Cities Network are:

- **investing in the people who make up our cities;**
- **designing urban places that improve health and wellbeing;**
- **fostering greater participation and partnerships for health and wellbeing;**
- **improving community prosperity and access to common goods and services;**
- **promoting peace and security through inclusive societies; and**
- **protecting the planet from degradation, including through sustainable consumption and production.**

These six themes are interdependent and mutually supportive. WHO advocate cities will achieve more in these areas by linking up policies, investments and services, and by focusing on leaving no one behind. Combining governance approaches to make health and wellbeing possible for everyone will foster innovation and orient investments towards promoting health and preventing disease.

Belfast was successfully designated to the WHO Phase VII Network in 2021 and, whilst developing a city health profile is a requirement of being a designated member of the WHO Network, the profile is an invaluable resource for agencies and citizens in the city.

A summary of the City Health Profile, 'BELFAST Profiling Health, Wellbeing & Prosperity', for the city of Belfast, provides data and analysis from an expanded range of sources according to this '6P' framework and, although a large amount of the comprehensive range of data provided are publicly available, the added value of the City Profile is the presentation in an accessible, concise, and integrated format. In addition to the summary document, a full chapter is available on each of the six P themes.

The People chapter focuses on Demography; Population health; Pregnancy and early years; Adult health and wellbeing; Mental health and wellbeing and Use of health care services. The Prosperity chapter focuses on the Labour Market; Income; Poverty & Deprivation and Education. The Place chapter focuses Transport; Housing including housing conditions; characteristics; demand; supply; private and social rented sectors; housing-related benefits and homelessness.

This chapter focuses on the theme of Planet and provides data and analysis from an expanded range of sources on the following:

- Carbon Emissions
- Climate Change Impacts
- Carbon Emission Projections for Belfast
- Climate Change Projections
- Energy consumption
- Decarbonisation of electricity supply
- Decarbonisation of private transport
- Climate change adaptation and mitigation
- Resource use
- Surface water status
- Public drinking water quality
- Air quality
- Noise

Where possible, trends over time are assessed, with an evaluation on whether those trends are favourable or unfavourable. The health inequalities potential for population groups is outlined, where feasible; this information provides the basis for targeted action to improve health and wellbeing and reduce inequalities across the many determinants affecting the lives of people in the city. Data on some issues referenced by WHO within the Planet theme are not routinely collected in Northern Ireland and are, therefore, not included in this chapter.

PLANET: PROTECTING THE PLANET FROM DEGRADATION, INCLUDING THROUGH SUSTAINABLE CONSUMPTION AND PRODUCTION

A healthy city leads by example by ensuring that the protection of the planet is at the heart of all city policies, both internal and external.

Priority issues

Under this theme, the following issues are of relevance to most cities and represent areas of promise for improving health and well-being.

Climate change mitigation and adaptation

Demonstrating the relationship between sustainable development and health is a powerful argument to support climate change mitigation and adaptation, as measurable health outcomes can generate public and political interest. The health sector is one of the most intensive users of energy and a significant producer of waste, including biological and radioactive waste. It therefore has an essential part to play in mitigating the effects of climate change and in reducing pollution by taking steps to limit its significant climate footprint and negative impact on the environment.

Protected biodiversity and transformed urban places

Cities and local governments have a key role to play in transforming urban places to prevent biodiversity loss and environmental degradation. This includes transforming brownfield sites and retrofitting existing buildings; greening cities and promoting new models of management of green spaces to support local ecosystems; strengthening local food systems; reducing chemical and pollutant exposure; reducing soil degradation; and requiring new developments to protect biodiversity.

Health-promoting and sustainable municipal policies

Action to improve health and well-being starts with leading by example. This means reviewing and addressing the internal policies and processes of local administrations seeking to become healthy cities. This includes reviewing municipal procurement policies for food, transport and other public tenders, divesting from health and environment-harming industries, and greening municipal buildings/vehicles/services through retrofitting. The use of health impact assessments and health-in-all-policies approaches should be mainstreamed for both internal and external action.

Waste, water and sanitation

Safe waste disposal, clean water and good sanitation are critical for the health and well-being of urban populations. The vast majority of all wastewater from homes, cities, industry and agriculture flows back to nature without being treated or reused, polluting the environment and losing valuable nutrients and other recoverable materials along the way. Recycled water can satisfy most water demands when adequately treated to ensure appropriate quality. In homes, for example, greywater, the relatively clean wastewater from baths, sinks, washing machines and other appliances can be reused on gardens and lawns. In cities, wastewater can be treated and reused for green spaces. In industry and agriculture, discharged water can be treated and recycled for cooling systems or irrigation. The costs of wastewater management are greatly outweighed by their benefits to human health, economic development and environmental sustainability.

SECTION 1

Carbon Emissions

1.1 Total Carbon Emissions

IMPORTANCE

Climate change is the single biggest health threat facing humanity. Climate change affects the social and environmental determinants of health – clean air, safe drinking water, sufficient food, and secure shelter. Reducing emissions of greenhouse gases through better transport, food and energy-use choices can result in improved health, particularly through reduced air pollution. The Intergovernmental Panel on Climate Change (IPCC) has concluded that to avert catastrophic health impacts and prevent millions of climate change-related deaths, the world must limit temperature rise to 1.5°C.¹

Carbon dioxide is the main greenhouse gas, accounting for about 80% of the UK's greenhouse gas emissions in 2019.² The UK Government has set a target to reach net-zero carbon emissions by 2050 to limit average levels of warming to 1.5°C, in line with the UK's commitment to global climate action under the Paris Agreement.

The Intergovernmental Panel on Climate Change (IPCC) has estimated that in a business-as-usual scenario, the global carbon budget to limit warming to 1.5°C will have been used up within a decade.

In October 2019, Belfast City Council signed the Climate Emergency Declaration, and made a commitment to reaching net-zero carbon emissions. Belfast's share of the global carbon budget has been estimated at 14 million tonnes (t) from 2020.³ At Belfast's current rate of carbon emissions of 1.5 million t a year, its carbon budget will have been used by 2030.

1. Climate change and health (who.int) (Last accessed 6 July 2022)
2. UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK (www.gov.uk) (Last accessed 29 June 2022)
3. https://pcancities.org.uk/sites/default/files/Belfast%20Net-Zero%20Carbon%20Roadmap_0.pdf A Net-Zero Carbon Roadmap For Belfast (pcancities.org.uk) (Last accessed 22 July 2022)

DEFINITION

The data show:

- “Territorial” emissions, that is, emissions that occur within the UK’s borders
- Emissions allocated on an end-user basis where emissions are distributed according to the point of energy consumption (or point of emission if not energy related)
- Emissions from the production of goods exported are included; emissions from the production of goods imported are excluded, except for the energy industry

Emissions from large industrial sites, railways, motorways, and land use are included in this indicator.

Information is from GOV.UK, UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019.⁴

PROFILE FINDINGS

In 2019, in Belfast LGD, total carbon emissions were 1,437.6 ktCO₂, representing 10.38% of Northern Ireland’s total carbon emissions

Between 2009 and 2019:

- In Belfast LGD, total carbon emissions decreased by 680.0 ktCO₂, from 2,117.6 to 1,437.6 ktCO₂
- Belfast LGD’s percentage share of Northern Ireland’s total carbon emissions decreased by 2.15 percentage points from 12.53% to 10.38%.

4. UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK (www.gov.uk) (Last accessed 22 July 2022)

KEY COMPARISONS

Comparison with Northern Ireland

In 2019, Northern Ireland's total carbon emissions were 13,855.0 ktCO₂.

Between 2009 and 2019, total carbon emissions decreased:

- In Belfast by 680.0 ktCO₂, from 2,117.6 to 1,437.6 ktCO₂ (a percentage decrease of 32.11%)
- In Northern Ireland by 3,049.0 ktCO₂, from 16,904.0 to 13,855.0 ktCO₂ (a percentage decrease of 18.04%)

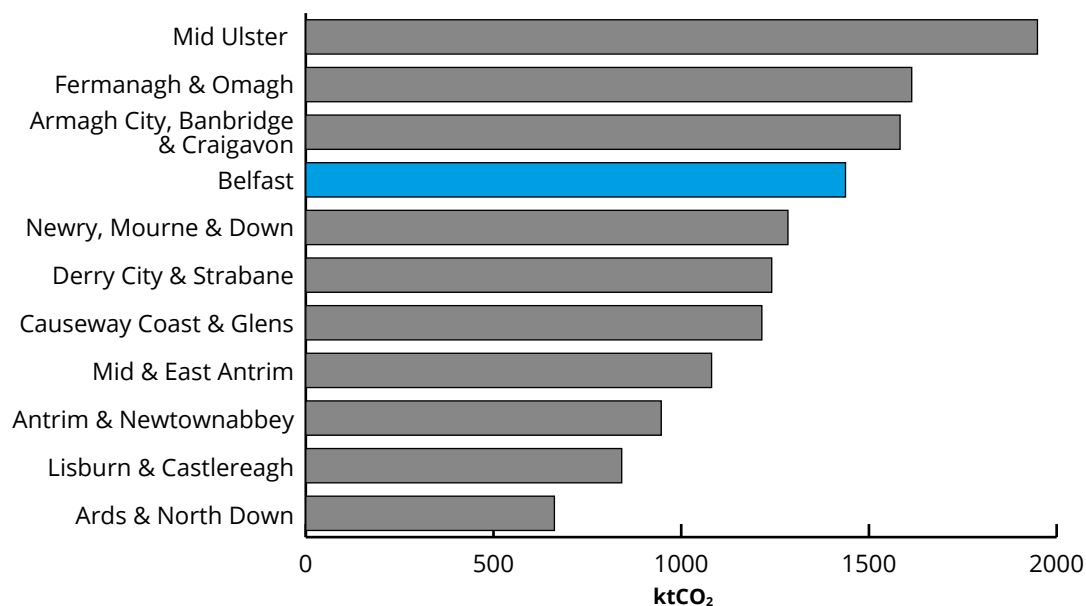
Comparison with other LGDs

In 2019, when compared with other LGDs:

- Belfast LGD had the fourth highest total carbon emissions at 1,437.6 ktCO₂
- Mid Ulster LGD had the highest total carbon emissions at 1,948.9 ktCO₂
- Ards & North Down LGD had the lowest total carbon emissions at 662.2 ktCO₂
- Derry City & Strabane LGD had the median value at 1,241.1 ktCO₂ (see Planet Figure 1)

PLANET FIGURE 1:

Total carbon emissions (ktCO₂) by LGD, 2019



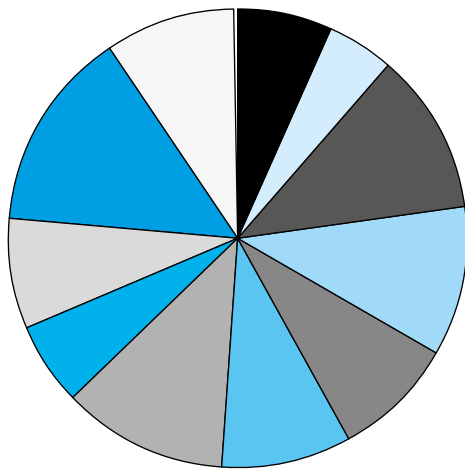
Source: 2005 to 2019 UK local and regional CO₂ emissions – data tables; Full dataset

In 2019, of Northern Ireland's total carbon emissions:

- Belfast LGD had the fourth highest percentage share at 10.38%
- Mid Ulster LGD had the highest at 14.07%
- Ards & North Down LGD had the lowest at 4.78%
- Derry City & Strabane LGD had the median value at 8.96% (see Planet Figure 2)

PLANET FIGURE 2:

Percentage share (%) of Northern Ireland's total carbon emissions by LGD, 2019



Source: 2005 to 2019 UK local and regional CO₂ emissions – data tables; Full dataset

HIGHLIGHTS

In 2019, Belfast's total carbon emissions comprised one-tenth of those for Northern Ireland.

In 2019, in Belfast, total carbon emissions were the fourth highest among LGDs.

Between 2009 and 2019, total carbon emissions decreased in Belfast and in Northern Ireland, although the percentage decrease was greater in Belfast and the gap between the two widened with greater carbon reduction in Belfast. In addition, Belfast's percentage share of Northern Ireland's total carbon emissions decreased.

1.2 Total Carbon Emissions Within the Scope of Influence of Local Authorities

IMPORTANCE

Climate change is the single biggest health threat facing humanity. Climate change affects the social and environmental determinants of health – clean air, safe drinking water, sufficient food, and secure shelter. Reducing emissions of greenhouse gases through better transport, food and energy-use choices can result in improved health, particularly through reduced air pollution.⁵

Carbon dioxide is the main greenhouse gas, accounting for about 80% of the UK's greenhouse gas emissions in 2019.⁶

The UK Government has set a target to reach net-zero carbon emissions by 2050 to limit average levels of warming to 1.5°C, in line with the UK's commitment to global climate action under the Paris Agreement.

The Intergovernmental Panel on Climate Change (IPCC) has estimated that in a business-as-usual scenario, the global carbon budget to limit warming to 1.5°C will have been used up within a decade.

In October 2019, Belfast City Council signed the Climate Emergency Declaration, and made a commitment to reaching net-zero carbon emissions. Belfast's share of the global carbon budget has been estimated at 14 million tonnes (t) from 2020.⁷ At Belfast's current rate of carbon emissions of 1.5 million t a year, its carbon budget will have been used by 2030.

DEFINITION

Data show:

- "Territorial" emissions, that is, emissions that occur within the UK's borders
- Emissions allocated on an end-user basis where emissions are distributed according to the point of energy consumption (or point of emission if not energy related)
- Emissions from the production of goods exported, but not from the production of goods imported (except for the energy industry)

5. Climate change and health (who.int) (Last accessed 6 July 2022)

6. UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK (www.gov.uk) (Last accessed 29 June 2022)

7. A Net-Zero Carbon Roadmap For Belfast (pcancities.org.uk) (Last accessed 22 July 2022)

Information is from GOV.UK, UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019.⁸ The Subset dataset of Local Authority territorial CO₂ emissions estimates, estimates within the scope of influence of Local Authorities was used.⁹

PROFILE FINDINGS

In 2019, in Belfast LGD, total carbon emissions within the scope of influence of local authorities were 1,373.5 ktCO₂.

Between 2009 and 2019, in Belfast LGD, total carbon emissions within the scope of influence of local authorities decreased by 671.1 ktCO₂, from 2,044.6 to 1,373.5 ktCO₂.

KEY COMPARISONS

Comparison with Northern Ireland

In 2019, Belfast LGD represented 12.73% of Northern Ireland's total carbon emissions within the scope of influence of local authorities.

Between 2009 and 2019, Belfast LGD's percentage share of Northern Ireland's total carbon emissions within the scope of influence of local authorities decreased by 1.97 percentage points from 14.70% to 12.73%.

Between 2009 and 2019, total carbon emissions within the scope of influence of local authorities decreased:

- In Belfast LGD by 671.1 ktCO₂, from 2,044.6 to 1,373.5 ktCO₂ (a percentage decrease of 32.82%)
- In Northern Ireland by 3,122.3 ktCO₂, from 13,910.1 to 10,787.8 ktCO₂ (a percentage decrease of 22.45%)

Comparison with other LGDs

In 2019, when compared with other LGDs:

- **Belfast LGD had the highest total carbon emissions within the scope of influence of local authorities at 1,373.5 ktCO₂**

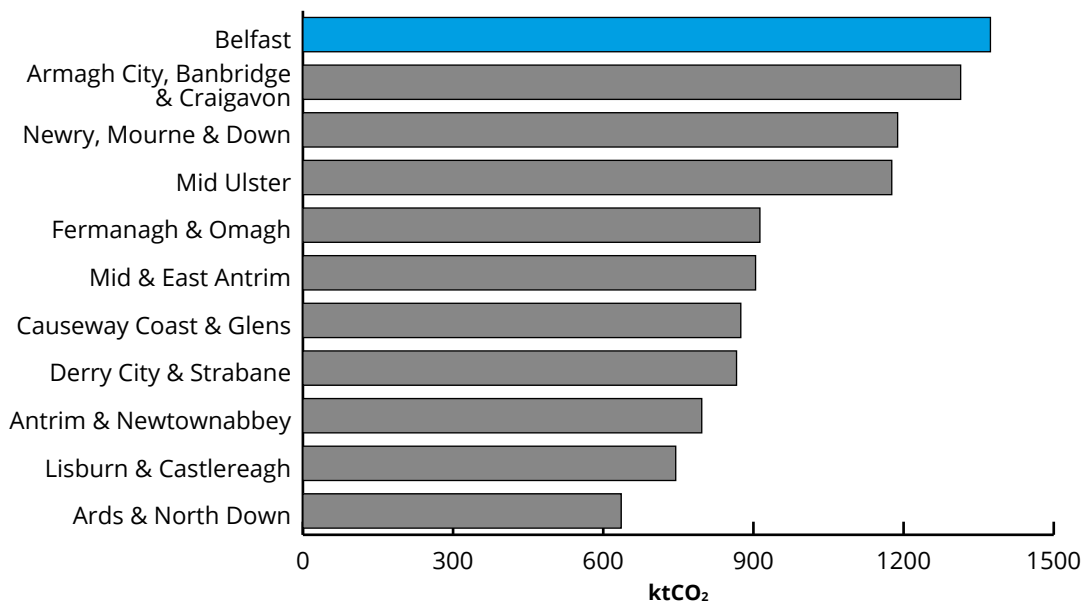
8. UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK (www.gov.uk) (Last accessed 22 July 2022)

9. Excludes emissions from large industrial sites, railways, motorways, and land use

- Ards & North Down LGD had the lowest total carbon emissions within the scope of influence of local authorities at 635.8 ktCO₂
- Mid & East Antrim LGD had the median value at 904.3 ktCO₂ (see Planet Figure 3)

PLANET FIGURE 3:

Total carbon dioxide emissions (ktCO₂) within the scope of influence of local authorities by LGD, 2019



Source: 2005 to 2019 UK local and regional CO₂ emissions – data tables; Subset dataset

HIGHLIGHTS

In 2019, Belfast’s total carbon emissions within the scope of influence of local authorities comprised just over one-eighth of those for Northern Ireland.

In 2019, in Belfast, total carbon emissions within the scope of influence of local authorities were the highest among LGDs.

Between 2009 and 2019, total carbon emissions within the scope of influence of local authorities decreased in Belfast and in Northern Ireland, although the percentage decrease was greater in Belfast and the gap between the two widened with greater carbon reduction in Belfast. In addition, Belfast’s percentage share of Northern Ireland’s total carbon emissions within the scope of influence of local authorities decreased.

1.3 Carbon Emissions in the Domestic Housing Sector Within the Scope of Influence of Local Authorities

IMPORTANCE

The UK has some of the oldest and least energy-efficient homes in Europe. In the National Infrastructure Strategy, it is recognised that to meet the UK's climate goals there is a need to increase the pace of heat decarbonisation and of improvements in the energy efficiency of homes.¹⁰

Domestic central heating in Northern Ireland is unique when compared with other parts of the UK due to high levels of dependency on oil, which has a higher emission of carbon than gas, 0.3 kg CO₂ per kilowatt hour compared with 0.2 kg CO₂ per kilowatt hour, although this dependence on oil is not as marked in the Belfast MUA (see Place Chapter, page 105).

In 2019, when compared with other parts of the UK, Northern Ireland had the highest domestic carbon emissions per capita at 1.8 t per person.¹¹

In October 2019, Belfast City Council signed the Climate Emergency Declaration, and made a commitment to reaching net-zero carbon emissions. Domestic housing sector carbon emissions can help to model future levels of emissions and to assess the effectiveness of various interventions and/or scenarios to reduce the sector's carbon emissions. In an analysis of the Top Ten most carbon-effective emission reduction options for Belfast over the period 2020 to 2050, four relate to the domestic sector:

- **Insulating domestic buildings – ranked first, with a carbon reduction potential of 1,162 ktCO₂e**
- **Upgraded heating controls in domestic buildings – ranked third, with a carbon reduction potential of 998 ktCO₂e**
- **Electrical upgrades in domestic buildings – ranked fifth, with a carbon reduction potential of 811 ktCO₂e**
- **Installing heat pumps in domestic buildings – ranked sixth, with a carbon reduction potential of 808 ktCO₂e¹²**

10. National Infrastructure Strategy - GOV.UK (www.gov.uk) National Infrastructure Strategy - GOV.UK (www.gov.uk) (Last accessed 7 July 2022)

11. 2019 Local Authority Carbon Dioxide Emissions (publishing.service.gov.uk) (Last accessed 22 July 2022)

12. A Net-Zero Carbon Roadmap For Belfast (pcancities.org.uk) (Last accessed 22 July 2022)

DEFINITION

The data show:

- “Territorial” emissions, that is, emissions that occur within the UK’s borders
- Emissions allocated on an end-user basis where emissions are distributed according to the point of energy consumption (or point of emission if not energy related)
- Emissions from the production of goods exported, but not from the production of goods imported (except for the energy industry)

Carbon emissions from the domestic sector comprise:

- Domestic electricity
- Domestic gas
- Domestic ‘other fuels’

Information is from GOV.UK, UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019.¹³ The Subset dataset has been used of Local Authority territorial CO₂ emissions estimates, estimates within the scope of influence of Local Authorities.¹⁴

PROFILE FINDINGS

In 2019, in Belfast LGD:

- Total carbon emissions within the scope of influence of local authorities were 1,373.5 ktCO₂,
- 45.58% of these carbon emissions were from the domestic sector, at 626.1 ktCO₂ (see Planet Figure 4)

13. UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK (www.gov.uk) (Last accessed 22 July 2022)

14. Excludes large industrial sites, railways, motorways, and land use

Between 2009 and 2019, in Belfast LGD:

- Carbon emissions from the domestic sector within the scope of influence of local authorities decreased by 135.6 ktCO₂, from 761.7 to 626.1 ktCO₂
- The percentage share within an LGD of carbon emissions from the domestic sector within the scope of influence of local authorities increased by 8.33 percentage points, from 37.25% to 45.58%

Between 2009 and 2019, Belfast's percentage share of Northern Ireland's carbon emissions for the domestic sector within the scope of influence of local authorities increased by 1.44 percentage points, from 17.04% to 18.48%.

KEY COMPARISONS

Comparison with Northern Ireland

In 2019, when compared with Northern Ireland, the percentage share of carbon emissions for the domestic sector within the scope of influence of local authorities was higher by 14.18 percentage points in Belfast LGD, 45.58% compared with 31.40%.

Between 2009 and 2019, carbon emissions from the domestic sector within the scope of influence of local authorities decreased:

- In Belfast LGD by 135.6 ktCO₂, from 761.7 to 626.1 ktCO₂ (a percentage decrease of 17.80%)
- In Northern Ireland by 1,083.0 ktCO₂, from 4,470.8 to 3,387.8 ktCO₂ (a percentage decrease of 24.22%)

Between 2009 and 2019, the percentage share of carbon emissions from the domestic sector within the scope of influence of local authorities:

- Increased in Belfast LGD by 8.33 percentage points, from 37.25% to 45.58%
- Decreased in Northern Ireland by 0.74 percentage points, from 32.14% to 31.40%

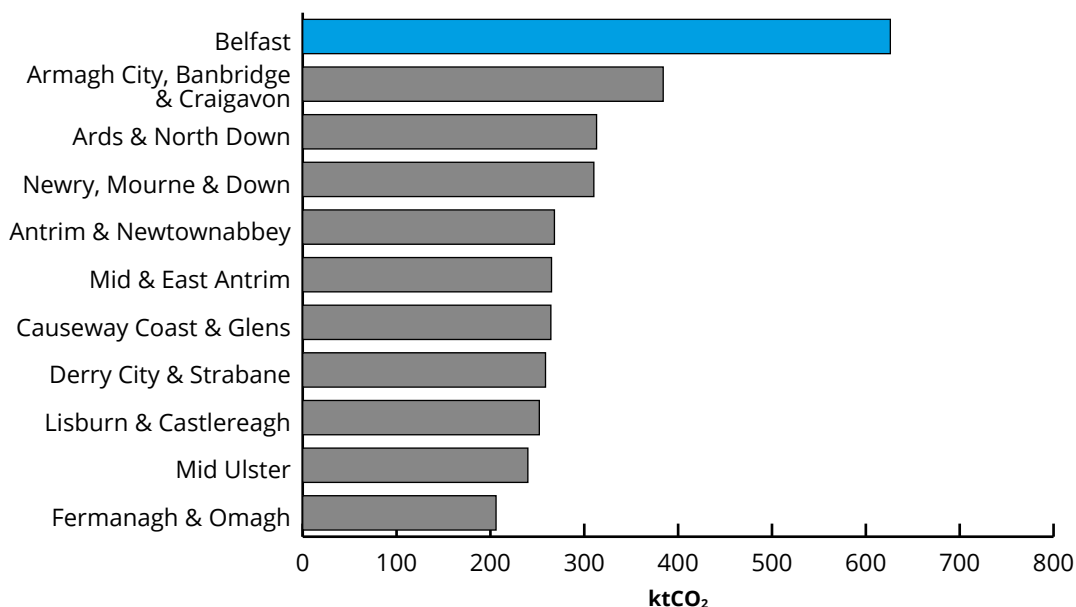
Comparison with other LGDs

In 2019, when compared with other LGDs:

- Belfast LGD had the highest carbon emissions for the domestic sector within the scope of influence of local authorities at 626.1 ktCO₂
- Fermanagh & Omagh LGD had the lowest at 206.0 ktCO₂
- Mid & East Antrim LGD had the median value at 265.1 ktCO₂ (see Planet Figure 4)

PLANET FIGURE 4:

Carbon emissions (ktCO₂) for the domestic sector within the scope of influence of local authorities by LGD, 2019



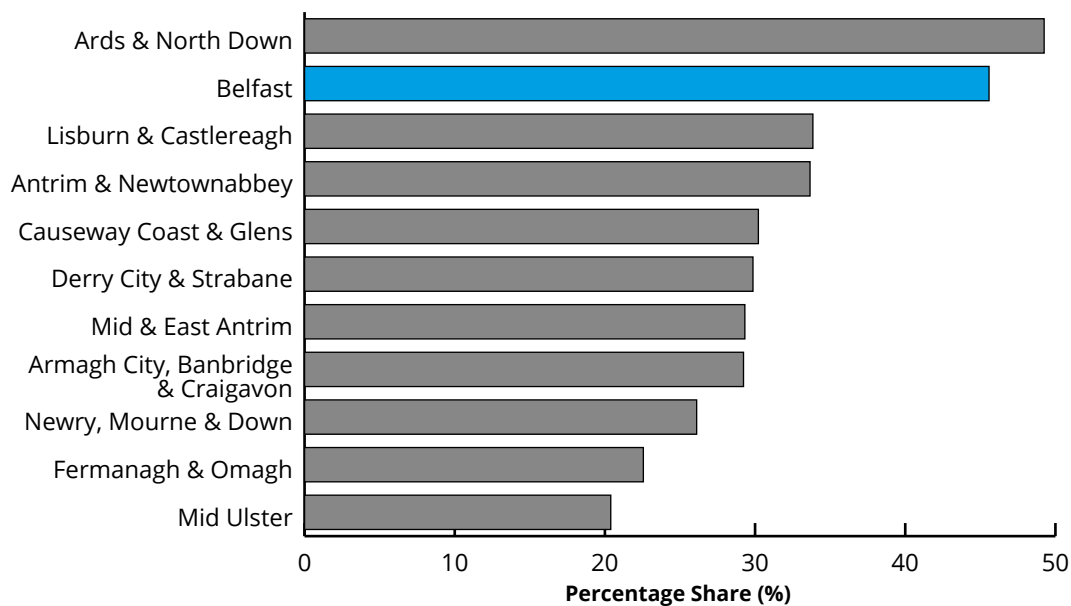
Source: 2005 to 2019 UK local and regional CO₂ emissions – data tables; Subset dataset

In 2019, within an LGD, for carbon emissions from the domestic sector within the scope of influence of local authorities:

- Belfast had the second highest percentage share at 45.58%
- Ards & North Down had the highest at 49.25%
- Mid Ulster LGD had the lowest at 20.39%
- Derry City & Strabane LGD had the median value at 29.86% (see Planet Figure 5)

PLANET FIGURE 5:

Percentage share (%) within an LGD of carbon emissions from the domestic sector within the scope of influence of local authorities by LGD, 2019



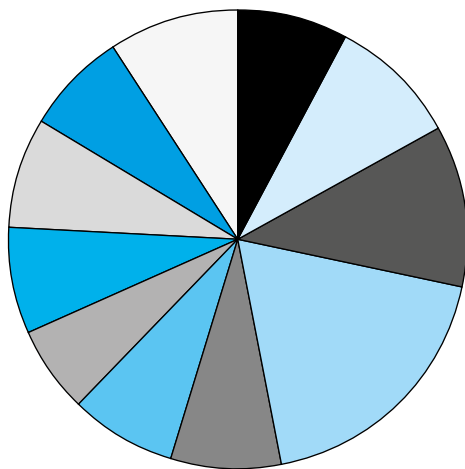
Source: 2005 to 2019 UK local and regional CO₂ emissions – data tables; Subset dataset

In 2019, of Northern Ireland’s carbon emissions for the domestic sector within the scope of influence of local authorities:

- Belfast LGD had the highest percentage share at 18.48%%
- Fermanagh & Omagh LGD had the lowest at 6.08%
- Mid & East Antrim had the median value at 7.83% (see Planet Figure 6)

PLANET FIGURE 6:

Percentage share (%) of Northern Ireland's carbon emissions from the domestic sector within the scope of influence of local authorities by LGD, 2019



- Antrim & Newtownabbey
- Ards & North Down
- Armagh City, Banbridge & Craigavon
- Belfast
- Causeway Coast & Glens
- Derry City & Strabane
- Fermanagh & Omagh
- Lisburn & Castlereagh
- Mid & East Antrim
- Mid Ulster
- Newry, Mourne & Down

Source: 2005 to 2019 UK local and regional CO2 emissions – data tables; Subset dataset

HIGHLIGHTS

In 2019, in Belfast, the domestic sector was responsible for almost half of carbon emissions within the scope of influence of local authorities whereas in Northern Ireland it was responsible for slightly less than one-third of carbon emissions within the scope of influence of local authorities.

Between 2009 and 2019, carbon emissions from the domestic sector within the scope of influence of local authorities decreased in Belfast and in Northern Ireland, although the percentage decrease was greater in Northern Ireland, and the gap between the two widened with greater carbon reduction in the domestic sector in Northern Ireland than in Belfast.

Moreover, between 2009 and 2019, within Belfast LGD, the percentage share of carbon emissions from the domestic sector within the scope of influence of local authorities increased.

In 2019, among LGDs, Belfast had:

- **The highest carbon emissions from the domestic sector within the scope of influence of local authorities**
- **The second highest percentage share within an LGD of carbon emissions from the domestic sector within the scope of influence of local authorities**

In Belfast, the domestic sector is the largest source of carbon emissions within the scope of influence of local authorities.

INDICATIVE PROJECTIONS

Projections from A Net Zero Carbon Roadmap for Belfast¹⁵

In A Net Zero Carbon Roadmap for Belfast, local authority emissions data from 2005 to 2018 were used:

- **To develop a baseline for carbon emissions**
- **To develop projections for carbon emissions from 2020 to 2050**

In 2020, the carbon emissions for Belfast LGD were estimated at 1,674 ktCO₂e. Of the four sectors included in the analysis, the domestic housing sector had the highest percentage share of carbon emissions at 39%.

By 2050, it was estimated that in a business-as-usual scenario, the percentage share of carbon emissions for the domestic housing sector in Belfast LGD would increase by 11 percentage points, from 39% to 50%.

15. A Net-Zero Carbon Roadmap For Belfast (pcancities.org.uk) (Last accessed 7 July 2022)

1.4 Total Carbon Emissions in the Transport Sector

IMPORTANCE

In the UK, transport is the largest sector of carbon dioxide emissions in the economy, accounting for 28% of domestic emissions in 2019.¹⁶ Reducing emissions from all modes of transport is key to achieving the UK Government's target of net zero by 2050.

DEFINITION

Data show:

- "Territorial" emissions, that is, emissions that occur within the UK's borders
- Emissions allocated on an end-user basis where emissions are distributed according to the point of energy consumption (or point of emission if not energy related)
- Emissions from the production of goods exported, but not from the production of goods imported (except for the energy industry)

Carbon emissions from the transport sector comprise emissions from:

- Road transport: A roads
- Road transport: motorways
- Road transport: minor roads
- Diesel railways
- Transport other

Information is from GOV.UK, UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019.¹⁷

16. CP 329 – National Infrastructure Strategy – Fairer, faster, greener – November 2020 (publishing.service.gov.uk) (Last accessed 15 July 2022)
17. UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK (www.gov.uk) (Last accessed 15 July 2022)

PROFILE FINDINGS

In 2019, in Belfast LGD, total carbon emissions in the transport sector were 306.2 ktCO₂, representing 8.28% of Northern Ireland's total.

Between 2009 and 2019, in Belfast LGD, total carbon emissions in the transport sector decreased by 54.2 ktCO₂, from 360.4 to 306.2 ktCO₂.

KEY COMPARISONS

Comparison with Northern Ireland

In 2019, in Northern Ireland, total carbon emissions from the transport sector were 3,698.9 ktCO₂.

Between 2009 and 2019, total carbon emissions from the transport sector decreased:

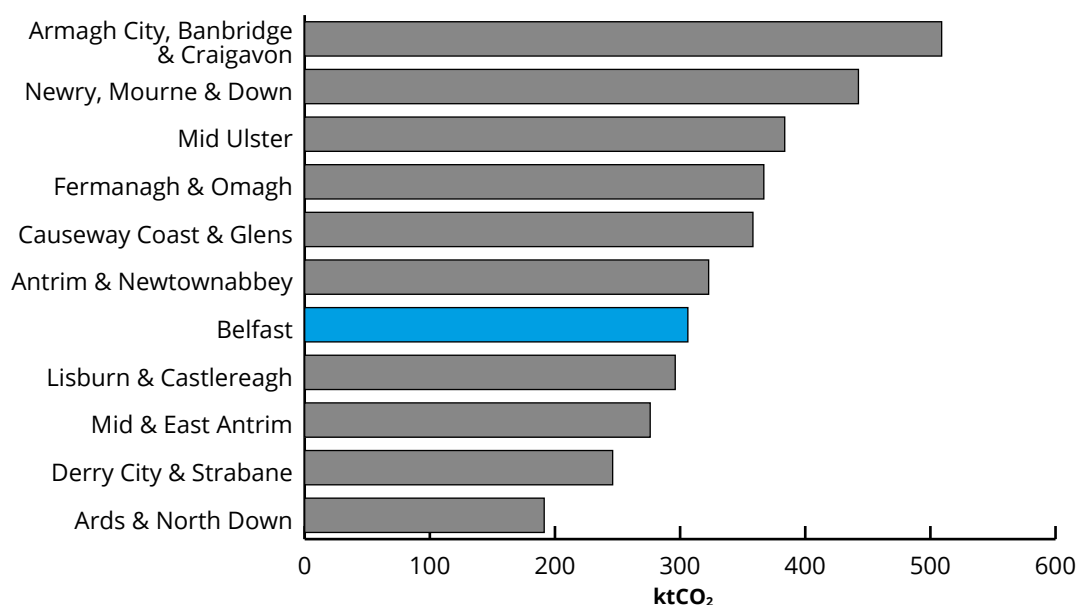
- In Belfast LGD by 54.2 ktCO₂, from 360.4 to 306.2 ktCO₂ (a percentage decrease of 15.04%)
- In Northern Ireland by 607.9 ktCO₂, from 4,306.8 to 3,698.9 ktCO₂ (a percentage decrease of 14.11%)

Between 2009 and 2019, Belfast's percentage share of Northern Ireland's total of carbon emissions from the transport sector decreased very slightly by 0.09 percentage points from 8.37% to 8.28%.

Comparison with other LGDs

In 2019, when compared with other LGDs:

- Belfast LGD had the fifth lowest total carbon emissions from the transport sector at 306.2 ktCO₂
- Armagh City, Banbridge & Craigavon LGD had the highest total carbon emissions from the transport sector at 509.0 ktCO₂
- Ards & North Down LGD had the lowest total carbon emissions from the transport sector at 191.4 ktCO₂
- Antrim & Newtownabbey LGD had the median value at 322.8 ktCO₂ (see Planet Figure 7)

PLANET FIGURE 7:**Total carbon emissions (ktCO₂) from the transport sector by LGD, 2019**

Source: 2005 to 2019 UK local and regional CO₂ emissions – data tables; Full dataset

HIGHLIGHTS

In 2019, in Belfast, total carbon emissions from the transport sector comprised less than one-tenth of Northern Ireland's total and, among LGDs, Belfast had a relatively low level of carbon emissions from the transport sector.

Between 2009 and 2019, total carbon emissions from the transport sector decreased in Belfast and in Northern Ireland with a slightly greater percentage decrease in Belfast.

1.5 Carbon Emissions in the Transport Sector Within the Scope of Influence of Local Authorities

IMPORTANCE

In the UK, transport is the largest of carbon dioxide emissions in the economy, accounting for 28% of domestic emissions in 2019.¹⁸ Reducing emissions from all modes of transport is key to achieving the UK Government's target of net zero by 2050.

In October 2019, Belfast City Council signed the Climate Emergency Declaration, and made a commitment to reaching net-zero carbon emissions. Transport sector carbon emissions can help to model future levels of emissions and to assess the effectiveness of various interventions and/or scenarios to reduce the sector's carbon emissions. In an analysis of the Top Ten most carbon-effective emission reduction options for Belfast over the period 2020 to 2050, five relate to the transport sector:

- **Petrol car to bicycle journeys – ranked second, with a carbon reduction potential of 1,014 ktCO₂e**
- **Petrol car to walk journeys – ranked fourth, with a carbon reduction potential of 982 ktCO₂e**
- **Petrol car to electric vehicle journeys – ranked seventh, with a carbon reduction potential of 725 ktCO₂e**
- **Petrol car to electric bus journeys – ranked eighth, with a carbon reduction potential of 700 ktCO₂e**
- **Diesel car to walk journeys – ranked ninth, with a carbon reduction potential of 675 ktCO₂¹⁹**

18. CP 329 – National Infrastructure Strategy – Fairer, faster, greener – November 2020 (publishing.service.gov.uk) (Last accessed 15 July 2022)

19. A Net-Zero Carbon Roadmap For Belfast (pcancities.org.uk) (Last accessed 15 July 2022)

DEFINITION

Data show:

- “Territorial” emissions, that is, emissions that occur within the UK’s borders
- Emissions allocated on an end-user basis where emissions are distributed according to the point of energy consumption (or point of emission if not energy related)
- Emissions from the production of goods exported, but not from the production of goods imported (except for the energy industry)

Carbon emissions estimates from the transport sector within the scope of influence of local authorities comprise:

- Road transport: A roads
- Road transport: minor roads
- Transport other

Information is from GOV.UK, UK local authority and regional greenhouse gas emissions national statistics, Carbon dioxide emissions, UK local authority and carbon dioxide emissions national statistics: 2005 to 2019.²⁰ The Subset dataset of Local Authority territorial CO₂ emissions estimates, estimates within the scope of influence of Local Authorities was used.²¹

PROFILE FINDINGS

In 2019, in Belfast LGD:

- Total carbon emissions within scope of influence of local authorities were 1,373.5 ktCO₂
- 17.96% of these carbon emissions were from the transport sector, at 246.7 ktCO₂

20. UK local authority and regional greenhouse gas emissions national statistics - GOV.UK (www.gov.uk) (Last accessed 22 July 2022)

21. Excludes large industrial sites, railways, motorways, and land use

Between 2009 and 2019, in Belfast LGD:

- Carbon emissions from the transport sector within scope of influence of local authorities decreased by 44.1 ktCO₂, from 290.8 to 246.7 ktCO₂
- The percentage share within an LGD of carbon emissions for the transport sector within the scope of influence of local authorities increased by 3.74 percentage points, from 14.22% to 17.96%

Between 2009 and 2019, Belfast's percentage share of Northern Ireland's carbon emissions from the transport sector within the scope of influence of local authorities decreased 0.10 percentage points from 7.47% to 7.37%.

KEY COMPARISONS

Comparison with Northern Ireland

In 2019, when compared with Northern Ireland, the percentage share of carbon emissions from the transport sector within scope of influence of local authorities was lower in Belfast LGD by 13.05 percentage points, 17.96% compared with 31.01%.

Between 2009 and 2019, carbon emissions from the transport sector within the scope of influence of local authorities decreased:

- In Belfast LGD by 44.1 ktCO₂, from 290.8 to 246.7 ktCO₂ (a percentage decrease of 15.17%)
- In Northern Ireland by 547.1 ktCO₂, from 3892.9 to 3,345.8 ktCO₂ (a percentage decrease of 14.05%)

Between 2009 and 2019, the percentage share of carbon emissions from the transport sector within the scope of influence of local authorities increased:

- In Belfast LGD by 3.74 percentage points, from 14.22% to 17.96% (a percentage increase of 26.30%)
- In Northern Ireland by 3.02 percentage points, from 27.99% to 31.01% (a percentage increase of 10.79%)

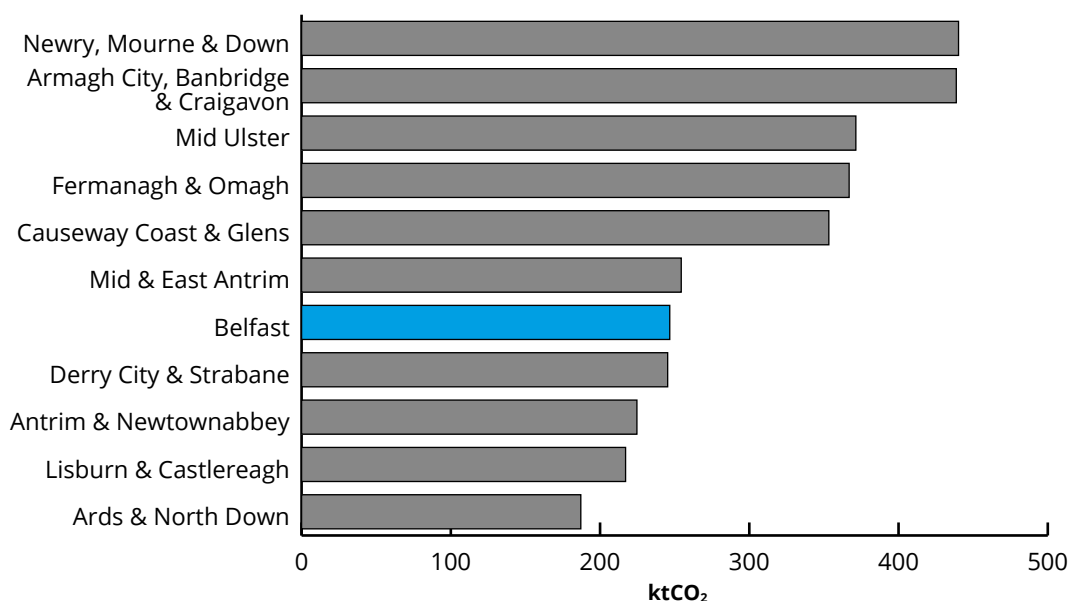
Comparison with other LGDs

In 2019, when compared with other LGDs:

- Belfast LGD had the fifth lowest carbon emissions in the transport sector within the scope of influence of local authorities at 246.7 ktCO₂
- Newry Mourne & Down LGD had the highest carbon emissions at 440.2 ktCO₂
- Ards & North Down LGD had the lowest carbon emissions at 187.1 ktCO₂
- Mid & East Antrim had the median value at 254.4 ktCO₂ (see Planet Figure 8)

PLANET FIGURE 8:

Carbon emissions (ktCO₂) in the transport sector within the scope of influence of local authorities by LGD, 2019



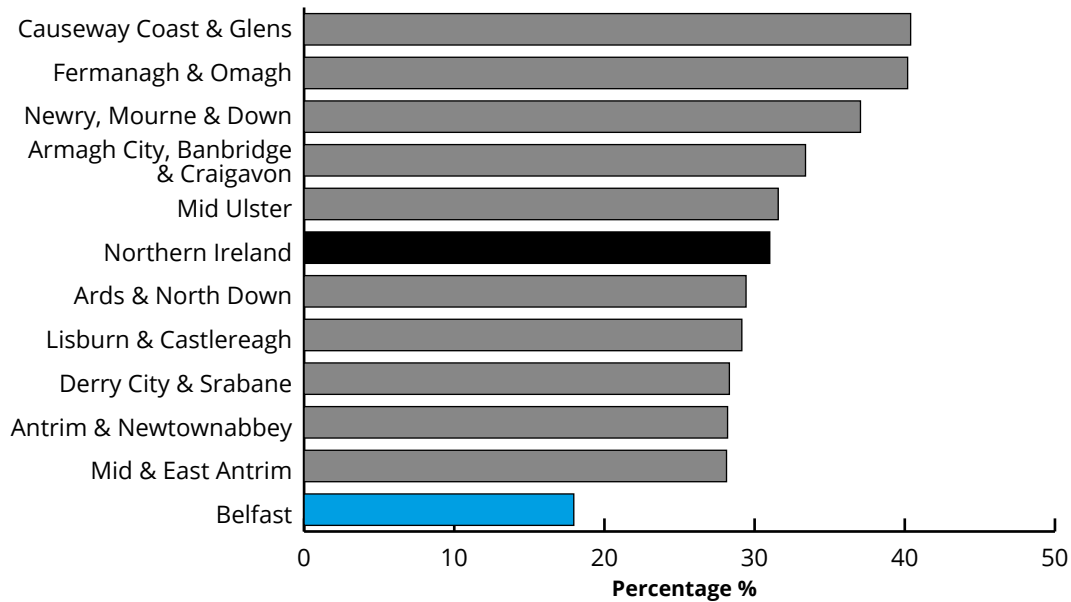
Source: 2005 to 2019 UK local and regional CO₂ emissions – data tables; Subset dataset

In 2019, when compared with other LGDs, within an LGD:

- Belfast LGD had the lowest percentage share of carbon emissions from the transport sector within the scope of influence of local authorities at 17.96%
- Causeway Coast & Glens LGD had the highest at 40.39%
- Ards & North Down LGD had the median percentage at 29.43% (see Planet Figure 9)

PLANET FIGURE 9:

Percentage share (%) within an LGD of total carbon emissions in the transport sector within the scope of influence of local authorities by LGD and Northern Ireland, 2019



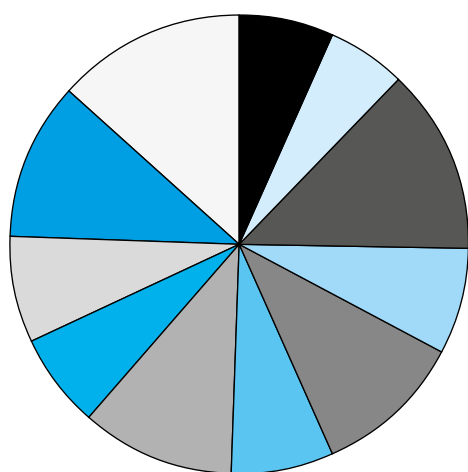
Source: 2005 to 2019 UK local and regional CO2 emissions – data tables; Subset dataset

In 2019, of Northern Ireland’s carbon emissions for the transport sector within the scope of influence of local authorities:

- Belfast LGD had the fifth lowest percentage share at 7.36%
- Newry, Mourne & Down LGD had the highest percentage share at 13.16%
- Ards & North Down LGD had the lowest percentage share at 5.59%
- Mid & East Antrim had the median value at 7.60% (see Planet Figure 10)

PLANET FIGURE 10:

Percentage share (%) of Northern Ireland's carbon emissions from the transport sector within the scope of influence of local authorities by LGD, 2019



- Antrim & Newtownabbey
- Ards & North Down
- Armagh City, Banbridge & Craigavon
- Belfast
- Causeway Coast & Glens
- Derry City & Strabane
- Fermanagh & Omagh
- Lisburn & Castlereagh
- Mid Ulster
- Mid & East Antrim
- Newry, Mourne & Down

Source: 2005 to 2019 UK local and regional CO2 emissions – data tables; Subset dataset

HIGHLIGHTS

In 2019, in Belfast, the transport sector was responsible for almost one-fifth of all carbon emissions within the scope of influence of local authorities, whereas in Northern Ireland the transport sector was responsible for almost one-third of carbon emissions within the scope of influence of local authorities.

Between 2009 and 2019, carbon emissions from the transport sector within the scope of influence of local authorities decreased in Belfast and in Northern Ireland, although the percentage decrease was slightly greater in Belfast, and the gap between the two widened slightly with greater carbon reduction in the transport sector in Belfast.

Between 2009 and 2019, within Belfast LGD, the percentage share of carbon emissions from the transport sector within the scope of influence of local authorities increased, as it did in Northern Ireland.

In 2019, among LGDs, Belfast had:

- Relatively lower carbon emissions from the transport sector within the scope of influence of local authorities
- Within an LGD the lowest percentage share of carbon emissions from the transport sector within the scope of influence of local authorities
- A relatively smaller contribution to Northern Ireland's carbon emissions from the transport sector within the scope of influence of local authorities

INDICATIVE PROJECTIONS

Projections from A Net Zero Carbon Roadmap for Belfast²²

In A Net Zero Carbon Roadmap for Belfast, local authority emissions data from 2005 to 2018 were used:

- To develop a baseline for carbon emissions
- To develop projections for carbon emissions from 2020 to 2050

In 2020, the carbon emissions for Belfast LGD were estimated at 1,674 ktCO₂e. Out of the four sectors included in the analysis, the transport sector had the third highest percentage share of carbon emissions at 20%.

By 2050, it was estimated that in a business-as-usual scenario, the percentage share of carbon emissions for the transport sector in Belfast LGD would increase by 1 percentage point, from 20% to 19%.

22. A Net-Zero Carbon Roadmap For Belfast (pcancities.org.uk) (Last accessed 7 July 2022)

1.6 Total Carbon Emissions per Capita

IMPORTANCE

Emissions per capita (per person) allow comparison between areas of different population size; however, emissions are driven by many factors other than resident population.

DEFINITION

Data show:

- “Territorial” emissions, that is, emissions that occur within the UK’s borders
- Emissions allocated on an end-user basis where emissions are distributed according to the point of energy consumption (or point of emission if not energy related)
- Emissions from the production of goods exported, but not from the production of goods imported (except for the energy industry)

Total carbon emissions per capita include carbon emissions from large industrial sites, railways, motorways, and land use.

Information is from GOV.UK, UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019.²³

PROFILE FINDINGS

In 2019, in Belfast LGD, total carbon emissions per capita were 4.2 t.

Between 2009 and 2019, in Belfast LGD, total carbon emissions per capita decreased by 2.2 t, from 6.4 to 4.2 t.

23. UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 - GOV.UK (www.gov.uk) (Last accessed 22 July 2022)

KEY COMPARISONS

Comparison with Northern Ireland

In 2019, when compared with Northern Ireland, total carbon emissions per capita were 3.1 t lower in Belfast LGD, 4.2 t compared with 7.3 t (see Planet Figure 11).

Between 2009 and 2019, total carbon emissions per capita decreased:

In Belfast LGD by 2.2 t, from 6.4 to 4.2 t (a percentage decrease of 34.38%)

In Northern Ireland by 2.1 t, from 9.4 to 7.3 t (a percentage decrease of 22.34%)

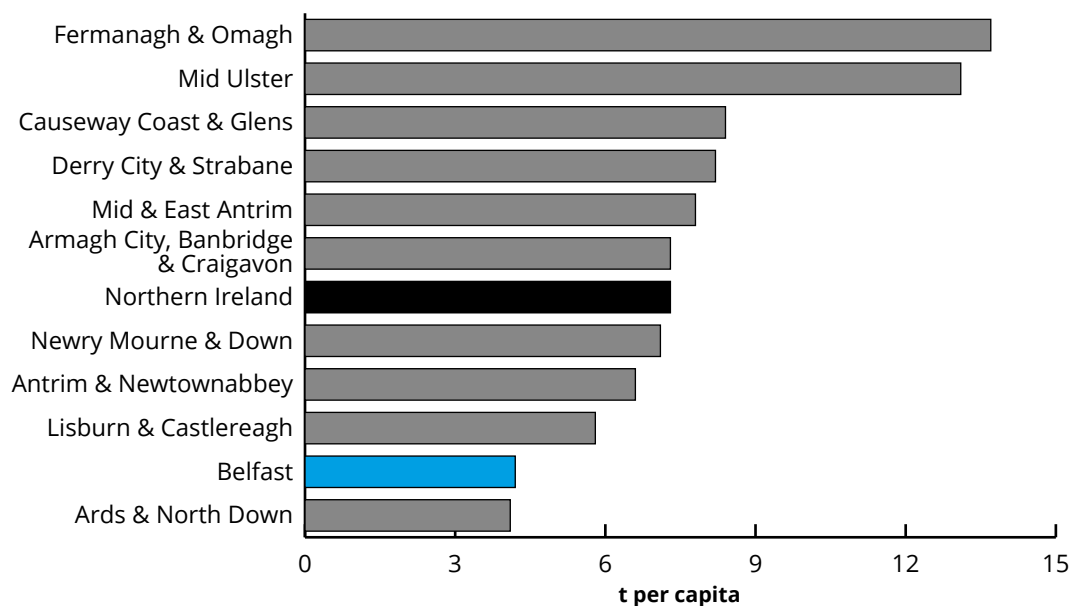
Comparison with other LGDs

In 2019, when compared with other LGDs:

- Belfast LGD had the second lowest total carbon emissions per capita at 4.2 t
- Fermanagh & Omagh LGD had the highest at 13.7 t
- Ards & North Down LGD had the lowest at 4.1 t
- Armagh City, Banbridge & Craigavon LGD had the median value at 7.3 t (see Planet Figure 11)

PLANET FIGURE 11:

Total carbon emissions per capita (tCO₂) by LGD and Northern Ireland, 2019



Source: 2005 to 2019 UK local and regional CO₂ emissions – data tables; Full dataset

HIGHLIGHTS

In 2019, In Belfast, total carbon emissions per capita were almost half of carbon emissions per capita for Northern Ireland. Among LGDs, Belfast had the second lowest total carbon emissions per capita.

Between 2009 and 2019, total carbon emissions per capita decreased in Belfast and Northern Ireland, although the percentage decrease was greater in Belfast, widening the gap between the two, with Belfast achieving a greater reduction in carbon emissions per capita and from a lower baseline.

1.7 Carbon Emissions per Capita Within the Scope of Influence of Local Authorities

IMPORTANCE

Emissions per capita (per person) allow comparison between areas of different population size; however, emissions are driven by many factors other than the resident population.

DEFINITION

Data show:

- “Territorial” emissions, that is, emissions that occur within the UK’s borders
- Emissions allocated on an end-user basis where emissions are distributed according to the point of energy consumption (or point of emission if not energy related)
- Emissions from the production of goods exported, but not from the production of goods imported (except for the energy industry)

Information is from GOV.UK, UK local authority and regional greenhouse gas emissions national statistics, Carbon dioxide emissions, UK local authority and carbon dioxide emissions national statistics: 2005 to 2019.²⁴ The Subset dataset of Local Authority territorial CO₂ emissions estimates, estimates within the scope of influence of Local Authorities was used.²⁵

PROFILE FINDINGS

In 2019, in Belfast LGD, carbon emissions per capita within the scope of influence of local authorities were 4.0 t.

Between 2009 and 2019, in Belfast LGD, carbon emissions per capita within the scope of influence of local authorities decreased by 2.2 t, from 6.2 to 4.0 t.

24. UK local authority and regional greenhouse gas emissions national statistics - GOV.UK (www.gov.uk) (Last accessed 22 July 2022)

25. Excludes large industrial sites, railways, motorways, and land use

KEY COMPARISONS

Comparison with Northern Ireland

In 2019, when compared with Northern Ireland, carbon emissions per capita within the scope of influence of local authorities were 1.7 t lower in Belfast LGD, 4.0 t compared with 5.7 t.

Between 2009 and 2019, carbon emissions per capita within the scope of influence of local authorities decreased:

- In Belfast LGD by 2.2 t, from 6.2 t to 4.0 t (a percentage decrease of 35.48%)
- In Northern Ireland by 2.1 t, from 7.8 t to 5.7 t (a percentage decrease of 26.92%)

Comparison with other LGDs

In 2019, when compared with other LGDs:

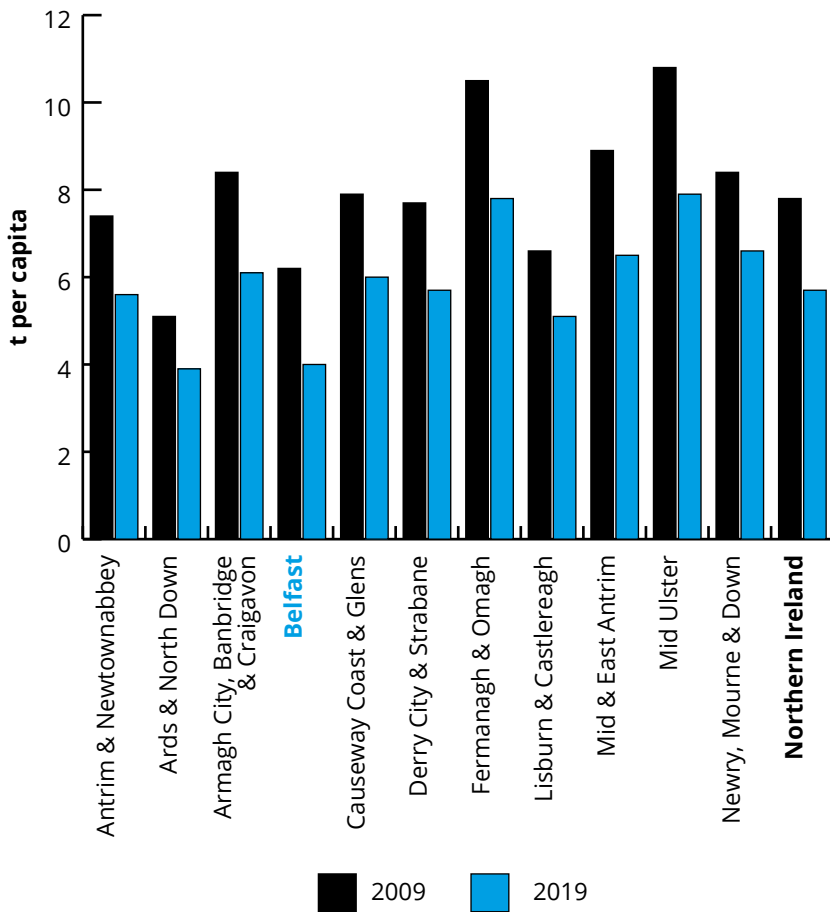
- Belfast LGD had the second lowest carbon emissions per capita within the scope of influence of local authorities at 4.0 t
- Mid Ulster LGD had the highest at 7.9 t
- Ards & North Down LGD had the lowest at 3.9 t
- Causeway Coast & Glens LGD had the median value at 6.0 t (see Planet Figure 12)

Between 2009 and 2019, there was a decrease in carbon emissions per capita within the scope of influence of local authorities across all LGDs, ranging from 1.2 to 2.9 t:

- Belfast LGD had the largest decrease, decreasing by 2.2 t, from 6.2 to 4.0 t (a percentage decrease of 35.48%)
- Newry, Mourne & Down LGD had the smallest decrease, decreasing by 1.8 t, from 8.4 to 6.6 t (a percentage decrease of 21.43%)
- Fermanagh & Omagh LGD had the median decrease, decreasing by 2.7 t, from 10.5 to 7.8 t (a percentage decrease of 25.71%; see Planet Figure ?)

PLANET FIGURE 12:

Carbon emissions per capita (t) within the scope of influence of local authorities by LGD and Northern Ireland, 2009 and 2019



Source: 2005 to 2019 UK local and regional CO2 emissions – data tables; Subset dataset

HIGHLIGHTS

In 2019, although the total carbon emissions for Belfast within the scope of influence of local authorities (see page 47) were the second highest of all LGDs, Belfast had the second lowest carbon emissions per capita within the scope of influence of local authorities. Belfast also had lower carbon emissions per capita within the scope of influence of local authorities than Northern Ireland.

Between 2009 and 2019, carbon emissions per capita within the scope of influence of local authorities decreased in Belfast and in Northern Ireland, although the percentage decrease was greater in Belfast and the gap between the two widened with Belfast achieving a greater reduction in carbon emissions per head of population and from a lower level. Belfast also had the largest percentage decrease among LGDs.

1.8 Carbon Emissions per Capita by Capital City

IMPORTANCE

Emissions per capita (per person) allow comparison between areas of different population size; however, emissions are driven by many factors other than the resident population.

DEFINITION

Belfast Primary Urban Area (PUA) comprises Belfast LGD and Lisburn & Castlereagh LGD.

Information is from the Centre for Cities Data Tool, Travel and Environment, CO₂ Emissions per Capita.²⁶

PROFILE FINDINGS

In 2019, the carbon emissions per capita in Belfast PUA was 4.66 t.

Between 2018 and 2019, the carbon emissions per capita in Belfast PUA decreased by 0.17 t, from 4.83 to 4.66 t.

KEY COMPARISONS

Comparison with other UK capital cities

In 2019, when compared with other capital cities:

- Belfast PUA had the highest carbon emissions per capita at 4.66 t
- London had the lowest at 3.39 t
- The median value was 4.22 t (see Planet Figure 13)

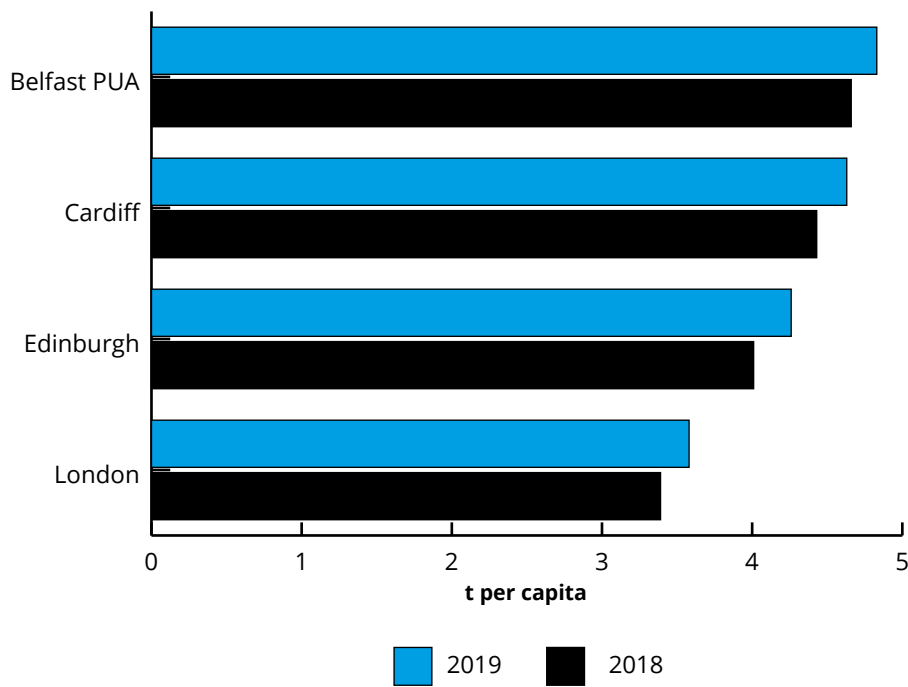
26. Centre For Cities: Outlook Data Tool (Last accessed 17 July 2022) No detailed metadata is provided by source

Between 2018 and 2019, carbon emissions per capita in all the UK's capital cities decreased:

- In Belfast by 0.17 t, from 4.83 to 4.66 t (a percentage decrease of 3.52%)
- In Cardiff by 0.20 t, from 4.63 to 4.43 t (a percentage decrease of 4.32%)
- In Edinburgh by 0.25 t, from 4.26 to 4.01 t (a percentage decrease of 5.87%)
- In London by 0.19 t, from 3.58 to 3.39 t (a percentage decrease of 5.31%; (see Planet Figure 13))

PLANET FIGURE 13:

Carbon emissions per capita (t) by UK capital city, 2018 and 2019



Source: Centre for Cities Data Tool, Travel and Environment, CO2 Emissions per Capita

HIGHLIGHTS

In 2019, Belfast PUA (Belfast and Lisburn & Castlereagh LGDs combined) had the highest carbon emissions per capita of the UK's capital cities. Moreover, between 2018 and 2019, Belfast PUA had the smallest percentage decrease among the UK's capital cities.

SECTION 2

Climate Change Impacts

2.1 Flood Risk: Aggregated Annual Average Damages

IMPORTANCE

Flooding poses a significant risk to people, communities, and the built environment with approximately 1.9 million people across the UK currently living in areas at significant risk from river, coastal or surface water flooding.²⁷

The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009 established a framework for the assessment and management of flood risks to reduce the adverse consequences of flooding on human health, the environment, cultural heritage, and economic activity. Belfast is at risk of pluvial (surface water), fluvial (river), and coastal flooding.²⁸

DEFINITION

In the Northern Ireland Flood Risk Assessment (NIFRA) 2018 methodology (based on, but different from, the 2011 methodology):

- Areas predicted to be at risk of flooding from one or more sources (pluvial, fluvial or coastal) were designated as Flood Risk Areas (FRAs)
- The aggregated annual average damages (AAAD) in respect of fluvial, coastal, and pluvial flooding were used to identify Areas of Potential Significant Flood Risk (APSFs); an AAAD value of £1 million was judged as an appropriate threshold at which an FRA should be identified as 'significant' in the context of Northern Ireland

Information is from the Department for Infrastructure NIFRA 2018.²⁹

27. CCRA3-Briefing-Flooding-and-Coastal-Change.pdf (ukclimaterisk.org) (Last accessed 3 July 2022)

28. Northern Ireland Flood Risk Assessment (NIFRA) 2018 - Revised May 2019 (infrastructure-ni.gov.uk) (Last accessed 3 July 2022)

29. Northern Ireland Flood Risk Assessment (NIFRA) 2018 - Revised May 2019 (infrastructure-ni.gov.uk) (Last accessed 3 July 2022)

PROFILE FINDINGS

In the Northern Ireland Flood Risk Assessment (NIFRA) 2018, Belfast was designated:

- A Flood Risk Area (FRA)
- An Area of Potential Significant Flood Risk (APSFR), covering an area of 105 m²

The Belfast FRA and APSFR are in the North Eastern RBD (see page 000).

In NIFRA 2018, in Belfast LGD, the AAAD was estimated at £16.18 million, representing 28.76% of the total for Northern Ireland.

KEY COMPARISONS

Comparison with Northern Ireland

In the NIFRA 2018, there were:

- 45 FRAs
- 12 APSFRs – Ballymena, Bangor, Belfast, Carrickfergus, Londonderry³⁰, Glengormley and Mallusk, Larne, Lurgan, Newry, Newtownabbey, Omagh, and Portadown and Craigavon, of which Belfast was the largest

In the NIFRA 2018, for Northern Ireland, the AAAD was estimated at £56.26 million.

Comparison with other FRAs

In NIFRA 2018, when compared with other FRAs:

- Belfast had the highest AAAD at £16.18 million
- Magherafelt had the lowest AAAD at £0.12 million
- Ballyclare had the median AAAD at £0.58 million

30. As designated in NIFRA 2018

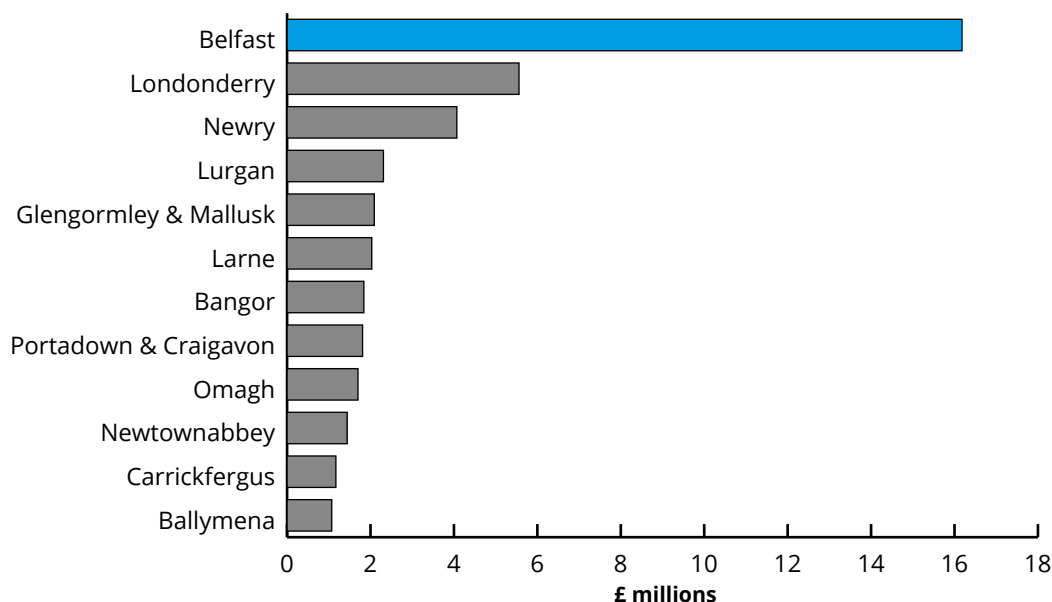
Comparison with other APSFRs

In the NIFRA 2018, when compared with other APSFRs:

- Belfast had the highest AAAD at £16.18 million
- Ballymena had the lowest AAAD at £1.07 million
- The median AAAD was £1.94 million (see Planet Figure 14)

PLANET FIGURE 14:

Aggregated annual average damages (AAAD; £ millions) due to flood risk by APSFR, 2018



Source: NIFRA 2018, Table 5.2, page 33

HIGHLIGHTS

In the NIFRA 2018, Belfast was the most economically affected of all flood risk areas comprising more than one-quarter of the total AAAD for Northern Ireland.

2.2 Extreme Weather Events

IMPORTANCE

Climate change is projected to worsen the intensity and impacts of extreme weather events. A warming climate can lead to more intense heat waves and increased evaporation. This worsens droughts, creating ideal conditions for wildfires. Warmer air holds more moisture, resulting in heavy rainfall, snowstorms, and flooding. Warming seawater can fuel stronger, more destructive hurricanes. Warm, moist air over the oceans increases hurricane-related rainfall and flooding. Sea level rise – caused by expansion of seawater as it warms and melting ice and glaciers adding water to the oceans – can result in destructive storm surge and flooding.³¹

In a US Global Change Research Program Climate and Health Assessment, the main potential impacts of extreme weather events relating to climate change were identified as:

1. **Health impacts, including death, injury and illness, the exacerbation of underlying medical conditions, and adverse effects on mental health (high confidence in predictions), and increased exposure risk to frequency and/or intensity of drought, wildfires, and extreme precipitation (medium confidence)**
2. **Disruption of essential infrastructure, including power, water, transportation, and communication systems, all of which are also essential to maintaining access to healthcare and emergency response services and to safeguarding human health (high confidence)**
3. **Increased risk of exposure to coastal flooding due to increases in extreme precipitation and rainfall rates as well as sea-level rise and the resulting increase in storm surge (high confidence)³²**

31. Health Impacts of Extreme Weather - Climate Change and Human Health (nih.gov) (Last accessed 16 July 2022)

32. Chapter 4: Extreme Events | Climate and Health Assessment (globalchange.gov) (Last accessed 7 July 2022)

Monitoring the scale and frequency of extreme weather events helps policymakers:

- To accelerate the development and implementation of climate mitigation and adaptation strategies
- To prepare and adapt local infrastructure to minimise the impact of extreme weather events
- To estimate the true cost of extreme weather events in human and socio-economic terms, such as harms to homes, lives, and livelihoods

DEFINITION

Data were collated from reports in the online archives of local newspapers and Met Office information about weather events from 2000 to 2019. The date, description, and impact of extreme weather events were categorised into four groups:

1. high winds and storms
2. heavy rainfall and flooding
3. snow and extreme cold
4. exceptional heat and dry weather

Information is from Climate Northern Ireland (CNI).³³

PROFILE FINDINGS

Number of extreme weather events

Between 2000-2004 and 2015-2019, Northern Ireland experienced an increase in the occurrence of extreme weather events (see Planet Figure 15):

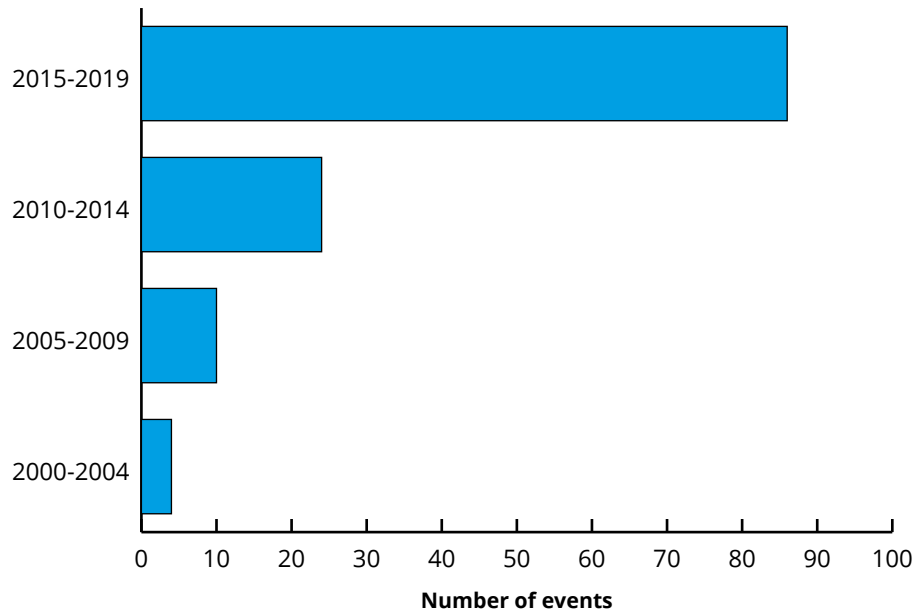
- In 2000-2004, there were 4 events
- In 2005-2009, there were 10 events
- In 2010-2014, there were 24 events
- In 2015-2019, there were 86 events (see Planet Table 15)

33. Extreme Weather Events in Northern Ireland | Climate NI (climatenorthernireland.org.uk) (Last accessed 6 July 2022)

Between 2000-2004 and 2015-2019, there has been an increase in the number of extreme weather events by 82, from 4 to 86, a percentage increase of 2,050%.

PLANET FIGURE 15:

Number of extreme weather events in Northern Ireland, 2000-2004 to 2015-2019



Source: CNI: Extreme Weather Event Timeline (2000-2022)

Nature and impact of extreme weather events

The nature and impact of extreme weather events in Northern Ireland over three time periods from 2000-2004 to 2010-2014 are shown in Planet Table 1. [For details of the nature and impact of extreme weather events in 2015-2019, refer to the CNI: Extreme Weather Event Timeline (2000-2022), see footnote 33 for weblink.]

PLANET TABLE 1:**Nature and impact of extreme weather events in Northern Ireland, 2000-2004, 2005-2009, and 2010-2014³⁴**

Nature/impact of event involved:	Time period		
	Of the 4 events in 2000-2004:	Of the 10 events in 2005-2009:	Of the 24 events in 2010-2014
Heavy rainfall	2 events	3 events	8 events
Storms		1 event	
Flooding/flash flooding	1 event	3 events	7 events
Tidal surge			1 event
Heavy snowfall	1 event	2 events	5 events
Ice storm			1 event
Strong winds	2 events	1 event	5 events
Hurricane Katja			1 event
Lack of rainfall/dry period		1 event	1 event
High temperatures		2 events	5 events
Low temperatures		2 events	4 events
Damage to infrastructure		1 event: 2 bridges collapse	3 events: Boundary wall swept away Power lines & home damaged Homes damaged
Impact on agriculture			1 event: 40,000 cattle deaths
Impact on fishing fleet			1 event: Fleet unable to leave harbour
Travel disruption	1 event	3 events	10 events
Disruption to children's education			2 events: 9 schools close >30 schools close
Power loss	1 event: 4,000 homes	2 events: 35,000 homes 26,000 homes	6 events: 100,000 homes 700 homes 13,000 homes Power cuts 30,000 homes 10,000 homes
Water supply disruption			1 event: 500 homes
RNLI callouts			1 event: 20% increase in callouts
Increased hospital activity		1 event: Dehydration in older people Sunburn in children	
Death		1 fatality	

Source: Source: CNI: Extreme Weather Event Timeline (2000-2022)

34. One event may comprise several components, e.g., strong winds and heavy snowfall, heavy rainfall flash flooding and travel disruption, or loss of power to households due to strong winds

HIGHLIGHTS

Since 2000-2004, in Northern Ireland, the number of extreme weather events has increased, causing damage to property and infrastructure, and in some cases loss of life.

The nature and impact of extreme weather events in Northern Ireland have been characterised by:

- In 2000-2004, heavy rainfall, flooding/flash flooding, heavy snowfall, strong winds, travel disruption, and loss of power to homes during one event
- In 2005-2009, heavy rainfall, storms, flooding/flash flooding, heavy snowfall, strong winds, a period of a lack of rainfall, periods of high temperatures with increased hospital attendance during one event (high temperatures), periods of low temperatures, travel disruption during five events, loss of power to homes during two events, loss of water supply to homes during one event, damage to infrastructure during one event, and a fatality during one event (strong winds)
- In 2010-2014, heavy rainfall, flooding/flash flooding, heavy snowfall, strong winds, periods of high temperatures, periods of low temperatures, with rarer events of an wildfires, an ice storm, a tidal surge, and a hurricane, and travel disruption during ten events, a loss of power to homes during six events, school closures during two events, damage to infrastructure and/or homes during three events, and impacts on agriculture, and fisheries during one event

Inequalities with the potential for inequity

In the UK Climate Change Risk Assessment, low-income households were identified as being particularly susceptible to the impacts of climate change.³⁵

35. Committee on Climate Change - UK Climate Change Risk Assessment 2017 Synthesis Report - July 2016 (theccc.org.uk) (Last accessed 15 July 2022)

SECTION 3

Carbon Emissions Projections for Belfast

3.1 - Total Carbon Emissions: Scope 1 and Scope 2, 2020 - Total Carbon Emissions: Scope 1 and Scope 2, 2050

IMPORTANCE

In the Belfast Climate Commission's document, "A Net-Zero Carbon Roadmap for Belfast", it is acknowledged that Belfast needs to adopt a clear and ambitious climate action plan. The case for the adoption of such a plan is supported by the evidence that much of the action required to limit global warming by 1.5°C can be based on win-win, low-carbon options that will simultaneously improve economic, social and health outcomes across the city.³⁶

DEFINITION

The focus is on Scope 1 and 2 emissions and excludes consideration of long-distance travel and of Scope 3 or consumption-based emissions.

- **Scope 1 emissions represent locally consumed fuel (e.g., petrol, diesel, or gas) used directly within an area**
- **Scope 2 emissions represent electricity used within an area even if it is generated elsewhere, which can be more directly controlled and monitored**

Scope 1 and Scope 2 emissions combined are sometimes referred to as 'territorial emissions', that is, emissions that occur within the UK's borders.

36. A Net-Zero Carbon Roadmap For Belfast (pcancities.org.uk) (Last accessed 15 July 2022)

Local authority emissions data 2005-2018 were used to establish a baseline, together with the percentage share of emissions that can be attributed to:

- **Households**
- **Public and commercial buildings**
- **Transport**
- **Industry**

Emissions from land use were not considered.

Current emissions levels were then projected to 2050 based on the following assumptions:

- **Ongoing decarbonisation of electricity in line with government commitments (full decarbonisation by 2045)**
- **A continuation of background trends in economic and population growth (1.5% and 0.5% per annum, respectively)**
- **Ongoing improvements in energy use and energy efficiency**

Information is from the Belfast Climate Commission, "A Net-Zero Roadmap for Belfast".³⁷

PROFILE FINDINGS

Projections to 2020

In 2020, in Belfast LGD, the projected carbon emissions were 1,674 ktCO₂e.

The percentage share of these carbon emissions for each sector was:

- **39% for housing**
- **24% for public and commercial buildings**
- **20% for transport**
- **18% for industry (see Planet Figure 16)**

Projections to 2050

37. A Net-Zero Carbon Roadmap For Belfast (pcancities.org.uk) (Last accessed 15 July 2022)

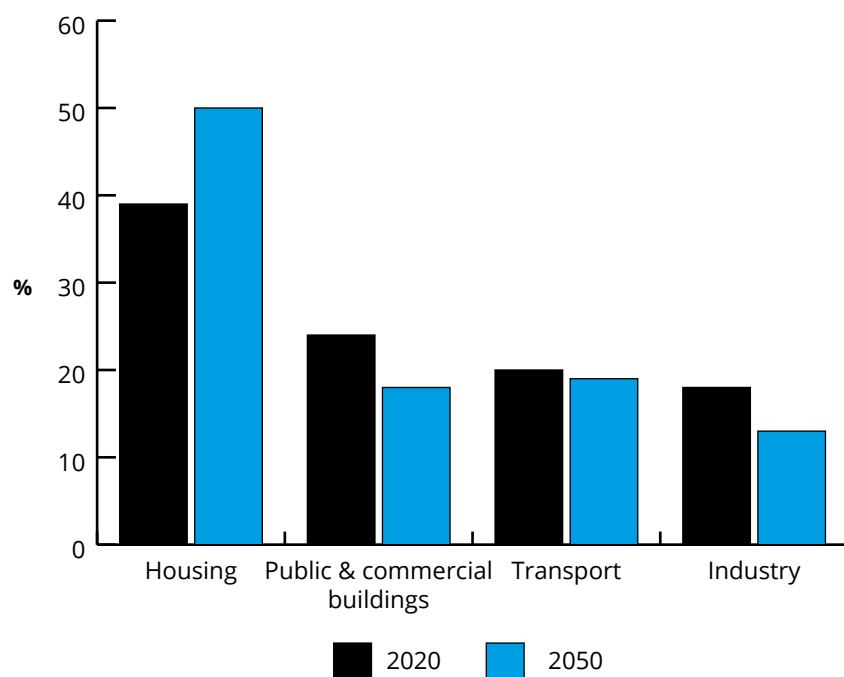
In 2050, in Belfast LGD, the projected carbon emissions were 1,363 ktCO₂e.

The percentage share of these carbon emissions for each sector was:

- 50% for housing
- 18% for public and commercial buildings
- 19% for transport
- 13% for industry (see Planet Figure 16)

PLANET FIGURE 16:

Percentage share (%) of Belfast's carbon footprint (Scope 1 and Scope 2 emissions) by sector, 2020 and 2050



Source: Belfast Climate Commission: "A Net-Zero Roadmap for Belfast", Figure 2, page 19

Between 2020 and 2050, in Belfast LGD, it was projected that:

- Carbon emissions would decrease by 311 ktCO₂e, from 1,674 to 1,363 ktCO₂e (a percentage decrease of 18.58%)
- The percentage share of the housing sector would increase by 11 percentage points, from 39% to 50% (a percentage increase of 28.21%)
- The percentage share of the public and commercial buildings sector would

decrease by 6 percentage points, from 24% to 18% (a percentage decrease of 25.00%)

- The percentage share of the transport sector would decrease by 1 percentage point, from 20% to 19% (a percentage decrease of 5.00%)
- The percentage share of the industry sector would decrease by 5 percentage points, from 18% to 13% (a percentage decrease of 27.78%)

KEY COMPARISONS

Global carbon emissions

The Intergovernmental Panel on Climate Change (IPCC) has argued that from 2020, keeping within a global carbon budget of 344 Gt (i.e., 344 billion tonnes) of carbon dioxide emissions would mean there is a 66% chance of limiting average warming to 1.5°C and thereby avoiding dangerous levels of climate change.

Dividing this global figure on an equal basis by population and adjusting the budget to account for other gases that contribute to climate change, Belfast was estimated to have a total carbon budget of about 14 Mt over the period between the present and 2050.

At current rates of emissions output, Belfast would use up this budget during the winter of 2030. Belfast could stay within its carbon budget by reducing emissions by about 8.4% year on year.

HIGHLIGHTS

In a business-as-usual scenario, although Belfast's projected carbon emissions are expected to decrease by 18.58% between 2020 and 2050, this rate of decrease would not be sufficient to keep Belfast within its estimated share of the global carbon budget to limit average climate warming to 1.5°C. The Belfast Climate Commissions emphasises that radical action is needed to cut Belfast's carbon emissions otherwise the city is likely to exceed its carbon budget for net-zero emissions by 2030.

Main features of the city's carbon footprint projections to 2050 are the expansion of the percentage share of the housing sector, and only a slight decrease in the percentage share of the transport sector when compared with the decreases in the public and commercial buildings sector and the industry sector.

SECTION 4

Climate Change Projections

4.1 Belfast: Daily Summer Maximum Temperature

IMPORTANCE

Climate change risk assessments help to identify:

- The scale of future risks and opportunities associated with climate change
- The necessary adaptation programmes to address the risks

In the UK Climate Change Risk Assessment 2017 Synthesis report: priorities for the next five years, Northern Ireland is predicted to have warmer, wetter weather, although final outcomes will depend on actions over the next decade to reduce global carbon emissions.³⁸

DEFINITION

In the UK Climate Change Projections 2009 (UKCP09), the medium-emissions scenario, A1B in the Special Report on Emissions Scenarios (SRES), was used to estimate the daily summer maximum temperature (June to August) for the UK's capital cities.

The medium-emissions scenario, A1B, assumes rapid economic growth, a global population that reaches 9 billion by 2050 and then gradually declines, the quick spread of new and effective technologies, a convergent world (income and way of life converge between regions, and there are extensive social and cultural interactions worldwide), and a balanced emphasis on all energy sources. This scenario reflects globalisation, a homogenous world, and greater economic focus.

Information is from the Committee on Climate Change UK Climate Change Risk Assessment 2017 Evidence Report: Summary for Northern Ireland.³⁹

38. Committee on Climate Change - UK Climate Change Risk Assessment 2017 Synthesis Report - July 2016 (theccc.org.uk) (Last accessed 22 July 2022)

39. UK-CCRA-2017-Northern-Ireland-National-Summary.pdf (theccc.org.uk) (Last accessed 2 July 2022)

PROFILE FINDINGS

In 1961-1990, in Belfast capital city, the observed daily summer maximum temperature was 25.9°C.

In Belfast capital city, the projected daily summer maximum temperature for 2041-2060 under the medium-emissions scenario, SRES A1B, was 28.5°C, representing an increase of 2.6°C.

KEY COMPARISONS

Comparison with other capital cities in the UK

In 1961-1990, the observed daily summer maximum temperature in the UK's capital cities was:

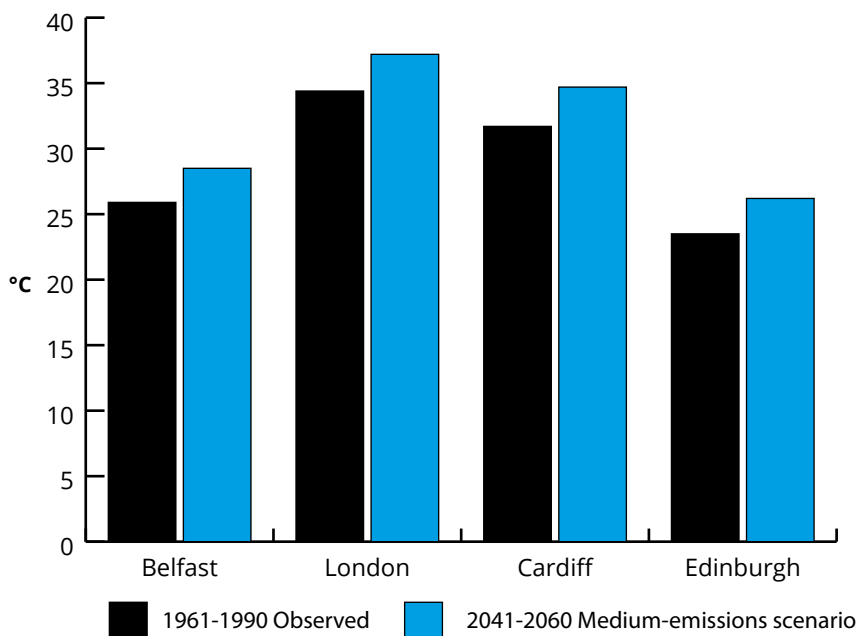
- 25.9°C for Belfast
- 34.4°C for London
- 31.7°C for Cardiff
- 23.5°C for Edinburgh

The projected daily summer maximum temperature in the UK's capital cities for 2041-2060 under the medium-emissions scenario, SRES A1B, was:

- 28.5°C in Belfast, representing an increase of 2.6°C (a percentage increase of 10.04%)
- 37.2°C in London, representing an increase of 2.8°C (a percentage increase of 8.14%)
- 34.7°C in Cardiff, representing an increase of 3.0°C (a percentage increase of 9.46%)
- 26.2°C in Edinburgh, representing an increase of 2.7°C (a percentage increase of 11.49%; see Planet Figure 17)

PLANET FIGURE 17:

Observed and projected daily maximum surface temperature (°C) in summer (June-August) in the UK's capital cities, 1961-1990 and 2041-2060 under the medium-emissions scenario, SRES A1B (UKCP09)



Source: Committee on Climate Change UK Climate Change Risk Assessment 2017 Evidence Report: Summary for Northern Ireland, Table NI1, page 6

HIGHLIGHTS

Between 1961 and 1990, Belfast had the second lowest observed daily summer maximum temperature among the UK's capital cities.

By 2041-2060, although Belfast is projected to have the second lowest daily summer maximum temperature of the UK's capital cities, it is expected to have the second greatest percentage increase in daily summer maximum temperature.

Thus, by 2041-2060, under the medium-emissions scenario (SRES A1B, UKCP09), Belfast is expected to have increases in extreme summer temperatures by more than 2°C.

4.2 Belfast: 5-Day Winter Rainfall Accumulation

IMPORTANCE

Climate change risk assessments help to identify:

- The scale of future risks and opportunities associated with climate change
- The necessary adaptation programmes to address the risks

In the UK Climate Change Risk Assessment 2017 Synthesis report: priorities for the next five years, Northern Ireland is predicted to have warmer, wetter weather, although final outcomes will depend on actions over the next decade to reduce global carbon emissions.⁴⁰

DEFINITION

In the UK Climate Change Projections 2009 (ULCP09), the medium-emissions scenario, A1B in the Special Report on Emissions Scenarios (SRES) was used to estimate the 5-day winter rainfall accumulation for the UK's capital cities.

The medium-emissions scenario A1B assumes rapid economic growth, a global population that reaches 9 billion by 2050 and then gradually declines, the quick spread of new and effective technologies, a convergent world (income and way of life converge between regions, and there are extensive social and cultural interactions worldwide), and a balanced emphasis on all energy sources. This scenario reflects globalisation, a homogenous world, and greater economic focus.

Information is from the Committee on Climate Change UK Climate Change Risk Assessment 2017 Evidence Report: Summary for Northern Ireland.⁴¹

40. Committee on Climate Change - UK Climate Change Risk Assessment 2017 Synthesis Report - July 2016 (theccc.org.uk) (Last accessed 22 July 2022)

41. UK-CCRA-2017-Northern-Ireland-National-Summary.pdf (theccc.org.uk) (Last accessed 2 July 2022)

PROFILE FINDINGS

In 1961-1990, in Belfast capital city, the observed 5-day winter rainfall accumulation was 70.3 mm.

In Belfast capital city, the projected 5-day winter rainfall accumulation for 2041-2060 under the medium-emissions scenario, SRES A1B, was 76.9 mm, representing an increase of 6.6 mm.

KEY COMPARISONS

Comparison with other capital cities in the UK

In 1961-1990, the observed 5-day winter rainfall accumulation in the UK's capital cities was:

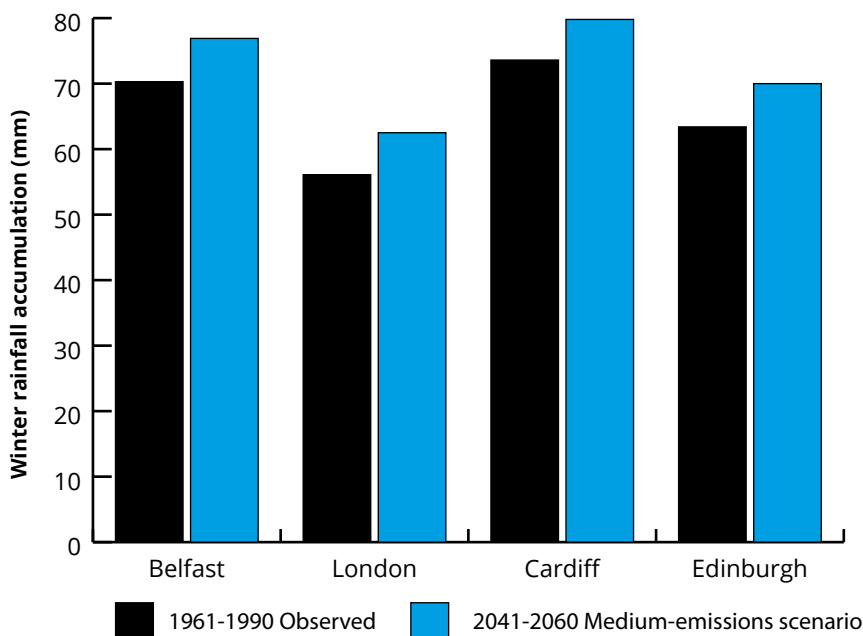
- 70.3 mm for Belfast
- 56.1 mm for London
- 73.6 mm for Cardiff
- 63.4 mm for Edinburgh

The projected 5-day winter rainfall accumulation in the UK's capital cities for 2041-2060 under the medium-emissions scenario, SRES A1B, was:

- 76.9 mm in Belfast, representing an increase of 6.6 mm (a percentage increase of 9.39%)
- 62.5 mm in London, representing an increase of 6.4 mm (a percentage increase of 11.41%)
- 79.8 mm in Cardiff, representing an increase of 6.2 mm (a percentage increase of 8.42%)
- 70.0 mm in Edinburgh, representing an increase of 6.6 mm (a percentage increase of 10.41%; see Planet Figure 18)

PLANET FIGURE 18:

Observed and projected accumulated rainfall (mm) over five consecutive days in winter (December-February) in the UK's capital cities, 1961-1990 and 2041-2060 under the medium-emissions scenario, SRES A1B (UKCP09)



Source: Committee on Climate Change UK Climate Change Risk Assessment 2017 Evidence Report: Summary for Northern Ireland, Table NI1, page 6

HIGHLIGHTS

Between 1961 and 1990, Belfast had the second highest observed 5-day winter rainfall accumulation among the UK's capital cities.

By 2041-2060, although Belfast is projected to have the second highest 5-day winter rainfall accumulation of the UK's capital cities, it is expected to have the second lowest percentage increase in 5-day winter rainfall accumulation.

Thus, by 2041-2060, under the medium-emissions scenario (SRES A1B, UKCP09), Belfast is expected to have increased winter rainfall.

4.3 Belfast: Change in Sea Level

IMPORTANCE

Sea level can rise by two different mechanisms with respect to climate change:

1. As the oceans warm due to an increasing global temperature, seawater expands—taking up more space in the ocean basin and causing a rise in water level
2. The melting of ice over land, which then adds water to the ocean⁴²

UK coastal flood risk is expected to increase over the 21st century and beyond under all representative concentration pathway (RCP) climate-change scenarios (see 'Definition'), with an increase in the frequency and magnitude of extreme water levels around the UK coastline. This increased future flood risk will be dominated by the effects of sea-level rise, rather than changes in atmospheric storminess associated with extreme coastal sea-level events.⁴³

Sea-level rise and flooding is one of the two key climate change hazards expected to have the greatest projected impact on Belfast.⁴⁴

DEFINITION

In the UK Climate Projections 2018 (UKCP18), the relative sea-level rise is provided, i.e., the local sea level rise experienced at a particular location including land movements.

In UKCP18, the change in sea levels was estimated relative to the 1981-2000 average for every decade from 2020 to 2100 for three emissions scenarios – low, medium, and high – for the UK's capital cities:

- The low-emissions scenario is known as representative concentration pathway (RCP) 2.6, a scenario that stabilises radiative forcing at 2.6 W/m² in 2100 without ever exceeding that value
- The medium-emissions scenarios are RCP4.5, a scenario that stabilises radiative forcing at 4.5 W/m² in 2100 without ever exceeding that value, and RCP6.0, which stabilises radiative forcing at 6.0 W/m² in 2100 without ever exceeding that value

42. How is sea level rise related to climate change? (noaa.gov) (Last accessed 2 July 2022)

43. ukcp18-marine-report-updated.pdf (metoffice.gov.uk) (Last accessed 7 July 2022)

44. Belfast Resilience Assessment (belfastcity.gov.uk) (Last accessed 6 July 2022)

- **The high-emissions scenario is RCP8.5, a scenario that stabilises radiative forcing at 8.5 W/m² in 2100 without ever exceeding that value**

Information is from the Met Office Marine climate change projections, Probabilistic and sea level projections.⁴⁵

PROFILE FINDINGS

In Belfast, the projected change in sea levels relative to the 1981-2000 average is an increase for every decade from 2020 to 2100, under each of the three emissions scenarios, low (RCP2.5), medium (RCP4.5), and high (RCP8.5; see Planet Table 2).

In Belfast, under the medium-emissions scenario (RCP4.5), the change in sea level is projected to increase by:

- **0.02-0.08 metres by 2020**
- **0.06-0.19 metres by 2040**
- **0.1-0.32 metres by 2060**
- **0.15-0.48 metres by 2080**
- **0.18-0.64 metres by 2100**

In Belfast, by 2100, the change in sea level is projected to increase by:

- **0.11-0.52 metres under the low-emissions scenario (RCP2.6)**
- **0.33-0.94 metres under the high-emissions scenario (RCP8.5)**

45. Marine climate change projections - Met Office Last accessed 2 July 2022)

PLANET TABLE 2:

Projected increases in sea level (5th-95th percentile; m) in Belfast under the low (RCP2.6), medium (RCP4.5) and high (RCP8.5) emissions scenarios, 2020 to 2100 (UKCP18) relative to the 1981-2000 average

Decade	Increase in sea level (m) by emissions scenario		
	Low: RCP2.6	Medium: RCP4.5	High: RCP8.5
2020	0.02-0.08	0.02-0.08	0.03-0.08
2030	0.04-0.13	0.04-0.13	0.05-0.14
2040	0.05-0.18	0.06-0.19	0.08-0.21
2050	0.07-0.23	0.08-0.25	0.11-0.30
2060	0.08-0.29	0.10-0.32	0.15-0.40
2070	0.09-0.34	0.13-0.40	0.19-0.52
2080	0.10-0.40	0.15-0.48	0.24-0.65
2090	0.10-0.46	0.16-0.56	0.28-0.80
2100	0.11-0.52	0.18-0.64	0.33-0.94

Source: Met Office: UKCP18 key results: Probabilistic and sea level projections (xlsx spreadsheet), Sea Level Rise to 2100 tab

KEY COMPARISONS

Comparison with other capital cities in the UK

For London, Cardiff, Edinburgh and Belfast, the projected change in sea levels relative to the 1981-2000 average is an increase for every decade from 2020 to 2100, under each of the three emissions scenarios: low (RCP2.5), medium (RCP4.5), and high (RCP8.5).

Among the UK's capital cities:

- Belfast has the second lowest set of projected increases in sea level relative to the 1981-2000 average for every decade from 2020 to 2100, under each of the three emissions scenarios: low (RCP2.5), medium (RCP4.5), and high (RCP8.5)
- London has the highest set of projected increases
- Cardiff has the second highest set of projected increases
- Edinburgh has the lowest set of projected increases (see Planet Table 3 where the medium-emissions scenario for 2020, 2060 and 2100 has been used as an illustration of the trends)

PLANET TABLE 3:

Projected increases in sea level (5th-95th percentile; m) in the UK's capital cities under the medium emissions scenario (RCP4.5), 2020, 2060 and 2100 (UKCP18) relative to the 1981-2000 average

UK capital city	Increase in sea level (m)		
	2020	2060	2100
London	0.07-0.13	0.22-0.44	0.37-0.83
Cardiff	0.06-0.12	0.21-0.43	0.35-0.81
Edinburgh	0.01-0.07	0.08-0.30	0.15-0.61
Belfast	0.02-0.08	0.10-0.32	0.18-0.64

Source: Met Office: UKCP18 key results: Probabilistic and sea level projections (xlsx spreadsheet), Sea Level Rise to 2100 tab

HIGHLIGHTS

In Belfast, the projected change in sea levels relative to the 1981-2000 average is an increase for every decade from 2020 to 2100, under each of the three emissions scenarios: low (RCP2.5), medium (RCP4.5), and high (RCP8.5).

By the end of the century, in 2100, the projected increase in sea level for Belfast is expected to be:

- **0.11-0.52 metres under the low-emissions scenario**
- **0.18-0.64 metres under the medium-emissions scenario**
- **0.33-0.94 metres under the high-emissions scenario**

When compared with the other UK capital cities, projected increases in sea level in Belfast are expected to be the second lowest for every decade from 2020 to 2100 for each of the three scenarios modelled. The reason why Belfast maintains the same position relative to the other UK capital cities is because in general the magnitude of increases in sea level is greater at more southern latitudes, and Belfast is the second northernmost of the UK's capital cities.

4.4 Belfast: Properties at Risk of Tidal Flooding

IMPORTANCE

Climate change will increase sea levels and associated coastal flooding and erosion, as well as altering rainfall patterns leading to changes in river, surface water and groundwater flooding. Flooding poses a significant risk to people, communities, and the built environment with approximately 1.9 million people across the UK currently living in areas at significant risk from river, coastal or surface water flooding. The number of people at risk could double as early as the 2050s.⁴⁶

Coastal and pluvial flood risks are sensitive to climate change. In a high-level risk assessment commissioned by Belfast City Council (BCC), sea-level rise and flooding was one of the two key climate change hazards expected to have the biggest projected impact on Belfast.⁴⁷

DEFINITION

Information is from Belfast City Council, Belfast Resilience Assessment, and NISRA Statistical Bulletin, Northern Ireland Household Projection (2016-based), page 28.⁴⁸ Profile Findings In Belfast LGD, it has been estimated that the number of properties at risk of tidal flooding:

- **By 2065 will be 3,410 properties, 2,640 of which will be residential and 770 of which will be commercial**
- **By 2115 will be 7,910 properties, 6,050 of which will be residential and 1,860 will be commercial**

Although the currently available Northern Ireland household projections do not extend to the year 2065 and beyond, using the household projections data (2016-based) for 2041 for Belfast LGD (353,300 households), the percentage of residential properties at risk of tidal flooding:

- **By 2065, could be around 0.75%**
- **By 2115, could be around 1.71%**

46. CCRA3-Briefing-Flooding-and-Coastal-Change.pdf (ukclimaterisk.org) (Last accessed 3 July 2022)

47. Belfast Resilience Assessment (belfastcity.gov.uk) (Last accessed 16 July 2022)

48. Belfast Resilience Assessment (belfastcity.gov.uk) and Statistical Bulletin - 2016-based household projections (nisra.gov.uk) (Last accessed 16 July 2022)

HIGHLIGHTS

By 2065, in Belfast, it is estimated that 2,640 residential properties and 770 commercial properties will be at risk of tidal flooding, and by 2115 the numbers will increase to 6,050 residential properties and 1,860 properties at risk of tidal flooding.

4.5 Northern Ireland

- Winter Temperatures
- Winter Rainfall
- Summer Temperatures
- Summer Rainfall

IMPORTANCE

For the UK climate projections in 2018 (UKCP18), five emissions scenarios were used from two models:

1. The medium-emissions scenario, known as A1B, from the Special Report on Emissions Scenarios (SRES) published by the Intergovernmental Panel on Climate Change (IPCC) in 2000
2. The low-, medium-, and high-emissions scenarios developed by the Met Office (Hadley Centre) and based on radiative forcing (see Definition)

DEFINITION

SRES A1B scenario

The medium-emissions scenario in the SRES assumes rapid economic growth, a global population that reaches 9 billion by 2050 and then gradually declines, the quick spread of new and effective technologies, a convergent world (income and way of life converge between regions, and there are extensive social and cultural interactions worldwide), and a balanced emphasis on all energy sources. This scenario reflects globalisation, a homogenous world, and greater economic focus.

Met Office (Hadley Centre) scenarios

The low-emissions scenario is known as representative concentration pathway (RCP) 2.6, a scenario that stabilises radiative forcing at 2.6 W/m² in 2100 without ever exceeding that value; the medium-emissions scenarios are RCP4.5, a scenario that stabilises radiative forcing at 4.5 W/m² in 2100 without ever exceeding that value, and RCP6.0, which stabilises radiative forcing at 6.0 W/m² in 2100 without ever exceeding that value; the high-emissions scenario is RCP8.5, a scenario that stabilises radiative forcing at 8.5 W/m² in 2100 without ever exceeding that value.

All projections were estimated for a location central to each part of the UK.

Information is from the Met Office, UKCP headline findings, UKCP18 and recent projections for the UK climate, UKCP18: Climate change over land.⁴⁹

PROFILE FINDINGS

Projections from the SRES A1B scenario

Under the SRES A1B model, it is projected that by 2080-2099, Northern Ireland will have:

- A median winter temperature of 2.2°C warmer, ranging from 0.4°C warmer to 4.4°C warmer
- A median winter rainfall of 12% wetter, ranging from 9% drier to 36% wetter
- A median summer temperature of 3°C warmer, ranging from 0.9°C warmer to 5.3°C warmer
- A median summer rainfall of 19% drier, ranging from 42% drier to 4% wetter

Projections from the RCP4.5 scenario

Under the RCP4.5 model, it is projected that by 2080-2099, Northern Ireland will have:

- A median winter temperature of 1.9°C warmer, ranging from 0.3°C warmer to 3.6°C warmer
- A median winter rainfall of 10% wetter, ranging from 8% drier to 29% wetter
- A median summer temperature of 2.7°C warmer, ranging from 0.6°C warmer to 5.0°C warmer
- A median summer rainfall of 16% drier, ranging from 36% drier to 4% wetter

49. UKCP headline findings - Met Office (Last accessed 8 July 2022)

KEY COMPARISONS

Comparison with other parts of the UK

Projections from the SRES A1B scenario

When compared with Scotland, Wales, and England, the projected median value for Northern Ireland in 2080-2099:

- For winter temperature was equal lowest with Scotland (percentage warmer)
- For winter rainfall was lowest (percentage wetter)
- For summer temperature was second lowest (percentage warmer)
- For summer rainfall was second lowest (percentage drier)

Projections from the RCP4.5 scenario

When compared with Scotland, Wales, and England, the projected median value for Northern Ireland in 2080-2099:

- For winter temperature was equal lowest with Scotland (percentage warmer)
- For winter rainfall was lowest (percentage wetter)
- For summer temperature was second lowest (percentage warmer)
- For summer rainfall was lowest (percentage drier)

HIGHLIGHTS

The climate change projections for Northern Ireland using the scenarios from the two models are similar, although median values and ranges tend to be lower overall with the RCP4.5 scenario. Thus, by 2080-2099, it is expected that in Northern Ireland there will be:

- **Warmer, wetter winters**
- **Hotter, drier summers**

When compared with Scotland, Wales and England, Northern Ireland's relative position is similar under both scenarios, apart from a slight difference for summer rainfall:

- **Winters in Northern Ireland will not be as warm as those in Wales and England, nor will they be as wet as those in Scotland, Wales, and England**
- **Summers in Northern Ireland will not be as hot as those in Wales and England, nor will they be as dry as those in Wales and England, and possibly Scotland**

SECTION 5

Energy Consumption

5.1 Domestic Electricity Consumption

IMPORTANCE

Much of the growth in electricity consumption in OECD countries since 1974 has taken place in the residential sector and in the commercial and public services sector. By contrast, industry's share of consumption has been in long-term decline with the result that, as of 2019, these three sectors have a roughly equal share of consumption; the remaining consumption sectors – transport, agriculture, and fishing – are relatively small consumers of electricity. Road transport, however, has recently experienced strong growth as electric vehicles gain market share across OECD countries, particularly in Europe.⁵⁰

All forms of electricity generation have an environmental impact, but it varies. Producing and using electricity more efficiently reduces the amount of:

- **Fuel needed to generate electricity**
- **Greenhouse gases and other air pollution emitted as a result**
- **Electricity from renewable resources such as solar, geothermal, and wind generally does not contribute to climate change or local air pollution since no fuels are combusted.**⁵¹

Of electricity generated in the UK in 2019, gas accounted for 40.9%, whereas coal accounted for only 2.1%. Renewables' share of electricity generation increased to 36.9%, due to increased capacity. Nuclear generation's share declined when compared with 2018, due to reactor outages and required maintenance.⁵² In Northern Ireland, between April 2019 and March 2020, 46.8% of total electricity consumption was generated from renewable sources located in Northern Ireland, representing an increase of 3.9 percentage points on the previous 12-month period (April 2018 to March 2019).⁵³

50. Electricity consumption – Electricity Information: Overview – Analysis - IEA (Last accessed 20 July 2022)

51. Learn about Energy and its Impact on the Environment | US EPA (Last accessed 20 July 2022)

52. Press_Notice_March_2020.pdf (publishing.service.gov.uk) (Last accessed 20 July 2022)

53. Issue-15-electricity-consumption-renewable-generation-northern-ireland.pdf (economy-ni.gov.uk) (Last accessed 20 July 2022)

DEFINITION

This information is based on meter point consumption data provided by Northern Ireland Electricity (NIE) Networks. Data for the mean and median electricity consumption per meter point are presented in kilowatt hours (kWh).

Information is from GOV.UK Sub-national electricity consumption statistics in Northern Ireland, Northern Ireland sub-national electricity consumption 2009 to 2020.⁵⁴

PROFILE FINDINGS

In 2019/20, in Belfast LGD:

- Mean domestic electricity consumption was 2,905 kWh per meter
- Median domestic electricity consumption was 2,507 kWh per meter

Between 2015/16 and 2019/20, in Belfast LGD:

- Mean domestic electricity consumption decreased by 194 kWh per meter, from 3,099 to 2,905 kWh per meter
- Median domestic electricity consumption decreased by 152 kWh per meter, from 2,659 to 2,507 kWh per meter

KEY COMPARISONS

Comparison with Northern Ireland

In 2019/20, when compared with Northern Ireland:

- Mean domestic electricity consumption in Belfast LGD was lower by 565 kWh per meter, 2,905 compared with 3,470 kWh per meter
- Median domestic electricity consumption in Belfast LGD was lower by 459 kWh per meter, 2,507 compared with 2,966 kWh per meter

54. Sub-national electricity consumption statistics in Northern Ireland - GOV.UK (www.gov.uk) (Last accessed 20 July 2022)

Between 2015/16 and 2019/20, mean domestic electricity consumption decreased:

- In Belfast LGD by 194 kWh per meter, from 3,099 to 2,905 kWh per meter (a percentage decrease of 6.26%)
- In Northern Ireland by 149 kWh per meter, from 3,619 to 3,470 kWh (a percentage decrease of 4.12%)

Between 2015/16 and 2019/20, median domestic electricity consumption decreased:

- In Belfast LGD by 152 kWh per meter, from 2,659 to 2,507 kWh per meter (a percentage decrease of 5.72%)
- In Northern Ireland by 134 kWh per meter, from 3,100 to 2,966 kWh (a percentage decrease of 4.32%)

Comparison with other LGDs

In 2019/20, when compared with other LGDs:

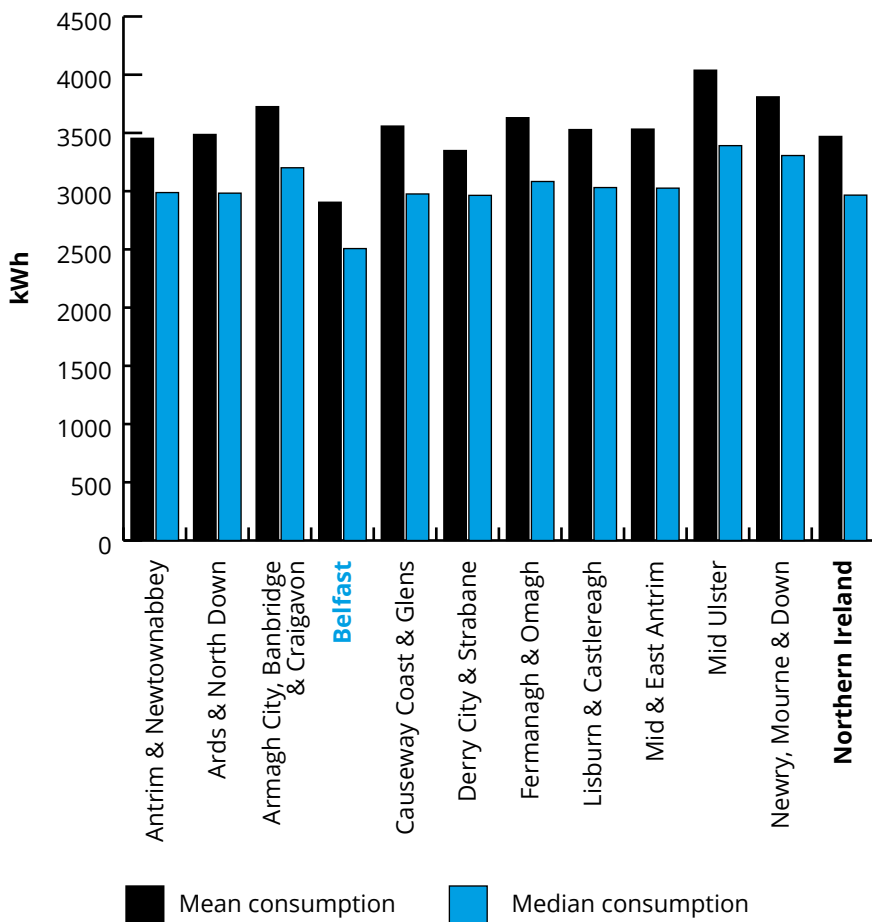
- Belfast LGD had the lowest mean domestic electricity consumption at 2,905 kWh per meter
- Mid Ulster LGD had the highest mean domestic electricity consumption at 4,039 kWh per meter
- Mid & East Antrim LGD had the median value at 3,533 kWh per meter (see Planet Figure 19)

In 2019/20, when compared with other LGDs:

- Belfast LGD had the lowest median domestic electricity consumption at 2,507 kWh per meter
- Mid Ulster LGD had the highest median domestic electricity consumption at 3,391 kWh per meter
- Mid & East Antrim LGD had the median value at 3,026 kWh per meter (see Planet Figure 19)

PLANET FIGURE 19:

Mean and median domestic electricity consumption (kWh) per meter by LGD ad Northern Ireland, 2019/20



Source: Northern Ireland sub-national electricity consumption 2009 to 2020, Tab labelled 2019

HIGHLIGHTS

In 2019/20, Belfast had lower mean and median domestic electricity consumption per meter when compared with Northern Ireland and had the lowest mean and median domestic electricity consumption per meter among LGDs. These data may partly explain the lower carbon emissions per capita when compared with Northern Ireland and other LGDs (see pages 000 and 000).

Between 2015/16 and 2019/20, both the mean and the median domestic electricity consumption decreased in Belfast and Northern Ireland, but in both cases the percentage decrease was greater for Belfast, widening the gap between the two with better outcomes for Belfast.

SECTION 6

Decarbonisation of Electricity Supply

- 6.1 - Number of Renewable Electricity Sites**
- Renewable Electricity Capacity**
- Renewable Electricity Generation**

IMPORTANCE

The electricity mix in the UK is becoming greener, with the carbon intensity of the UK grid having been reduced by 50% in the five years up to 2019. Given the pivotal role of electricity in delivering net-zero emissions, there is a need to fully decarbonise the power system by 2050.⁵⁵

There are many benefits to renewable energy, including:

- **Environmental** – lower carbon emissions and reduced air pollution
- **Health** – wind power, solar power and hydropower produce little or no pollution, and biomass power and geothermal power emit pollutants at much lower rates than most conventional fuels, which is beneficial for respiratory health
- **Employment** – this sector employs an increasing number of people worldwide due to rising investment, decreasing costs, technological improvements, and government policies to support renewables
- **Resilience** – as some renewable energy technologies are deployed in a distributed, modular way, they are less prone to large-scale failure, such as during severe weather events
- **Access to energy**, for instance, in rural areas⁵⁶

55. Transitioning to zero emission cars and vans: 2035 delivery plan (publishing.service.gov.uk) (Last accessed 1 July 2022)

56. Benefits (irena.org) (Last accessed 6 July 2022)

In 2018, Northern Ireland accounted for 3.6% of total renewable electricity generated in the UK, and almost 10% of all renewable electricity generated from UK onshore wind sources. In 2018, using comparable data among the different parts of the UK, Northern Ireland had the second highest percentage of electricity generated from renewable sources (Scotland had the highest). Between 2008 and 2018, in Northern Ireland, the percentage of electricity generated from renewable sources, increased almost sevenfold from 6.3% to 42.3%.

In 2018, in Northern Ireland, wind was the predominant source of installed renewable capacity at 76%. Between 2008 and 2018, in Northern Ireland, installed renewable capacity increased eightfold, from 228 to 1,845 MW, with a notable increase in installed solar photovoltaic technology.

In general, in Northern Ireland, most of the renewable electricity capacity and generation is in rural areas. Large urban areas account for a very small proportion of renewable capacity and generation.⁵⁷

DEFINITION

Renewable refers to any form of generation that either does not use fuel to generate, such as solar, wind or tidal generation, or generation that uses fuels that can be replenished. Renewable fuels include plant biomass, animal biomass, biogas, and renewable waste.

Generation technologies are described by their capacity, which is the maximum output a generator can produce.⁵⁸

Information is from the Department for the Economy, Energy in Northern Ireland 2020, and Energy in Northern Ireland 2018.⁵⁹

PROFILE FINDINGS

Number of renewable electricity sites

In 2018, in Belfast LGD, the number of sites for renewable electricity generation was 19, representing 0.07% of Northern Ireland's total.

Between 2016 and 2018, in Belfast LGD, the number of sites for renewable electricity generation increased by 7, from 12 to 19.

57. Energy in Northern Ireland 2020 | Department for the Economy (economy-ni.gov.uk) (Last accessed 6 July 2022)

58. Electricity statistics methodology note (publishing.service.gov.uk) (Last accessed 7 July 2022)

59. Energy in Northern Ireland 2020 | Department for the Economy (economy-ni.gov.uk) and Energy in Northern Ireland 2018 | Department for the Economy (economy-ni.gov.uk) (Last accessed 1 July 2022)

Renewable electricity capacity

In 2018, in Belfast LGD, the capacity for renewable electricity generation was 14 MW, representing 0.76% of Northern Ireland's total.

Between 2016 and 2018, in Belfast LGD, the capacity for renewable electricity generation increased by 7 MW, from 7 to 14 MW.

Renewable electricity generation

In 2018, in Belfast LGD, the generation of renewable electricity was 37,154 MWh representing 0.98% of Northern Ireland's total.

Between 2016 and 2018, in Belfast LGD, the renewable electricity generated increased by 24,282 MWh, from 12,872 to 37,154 MWh.

KEY COMPARISONS

Comparison with Northern Ireland

Number of renewable electricity sites

In 2018, in Northern Ireland, the number of sites for renewable electricity generation was 25,416, of which 24,200 (95%) were unallocated to an LGD.

Between 2016 and 2018, the number of sites for renewable electricity generation increased:

- In Belfast LGD by 7, from 12 to 19 (a percentage increase 58.33%)
- In Northern Ireland by 1543, from 23,873 to 25,416 (a percentage increase of 6.46%)

Renewable electricity capacity

In 2018, in Northern Ireland, the capacity for renewable electricity generation was 1,845 MW, of which 127 MW (7%) were unallocated to an LGD.

Between 2016 and 2018, the capacity for renewable electricity generation increased:

- In Belfast LGD by 7 MW, from 7 to 14 MW (a percentage increase 100%)
- In Northern Ireland by 733 MW, from 1,112 to 1,845 MW (a percentage increase of 65.92%)

Renewable electricity generation

In 2018, in Northern Ireland, the renewable electricity generated was 3,787,949 MWh.

Between 2016 and 2018, the renewable electricity generated increased:

- In Belfast LGD by 24,282 MWh, from 12,872 to 37,154 MWh (a percentage increase of 188.64%)
- In Northern Ireland by 1,463,275 MWh, from 2,324,674 to 3,787,949 MWh (a percentage increase of 62.95%)

Comparison with other LGDs

Number of renewable electricity sites

In 2018, when compared with other LGDs:

- Belfast LGD had the smallest number of sites for renewable electricity generation at 19
- Fermanagh & Omagh LGD had the largest number at 181
- Mid & East Antrim LGD had the median number at 126

Between 2016 and 2018, the number of sites for renewable electricity generation increased in all LGDs:

- Belfast LGD had the median percentage increase, increasing from 12 to 19 (a percentage increase of 58.33%)
- Fermanagh & Omagh LGD had the largest percentage increase, increasing by 87, from 94 to 181 (a percentage increase of 92.55%)
- Derry City & Strabane LGD had the smallest percentage increase, increasing by 31, from 97 to 128 (a percentage increase of 31.96%)

Renewable electricity capacity

In 2018, when compared with other LGDs:

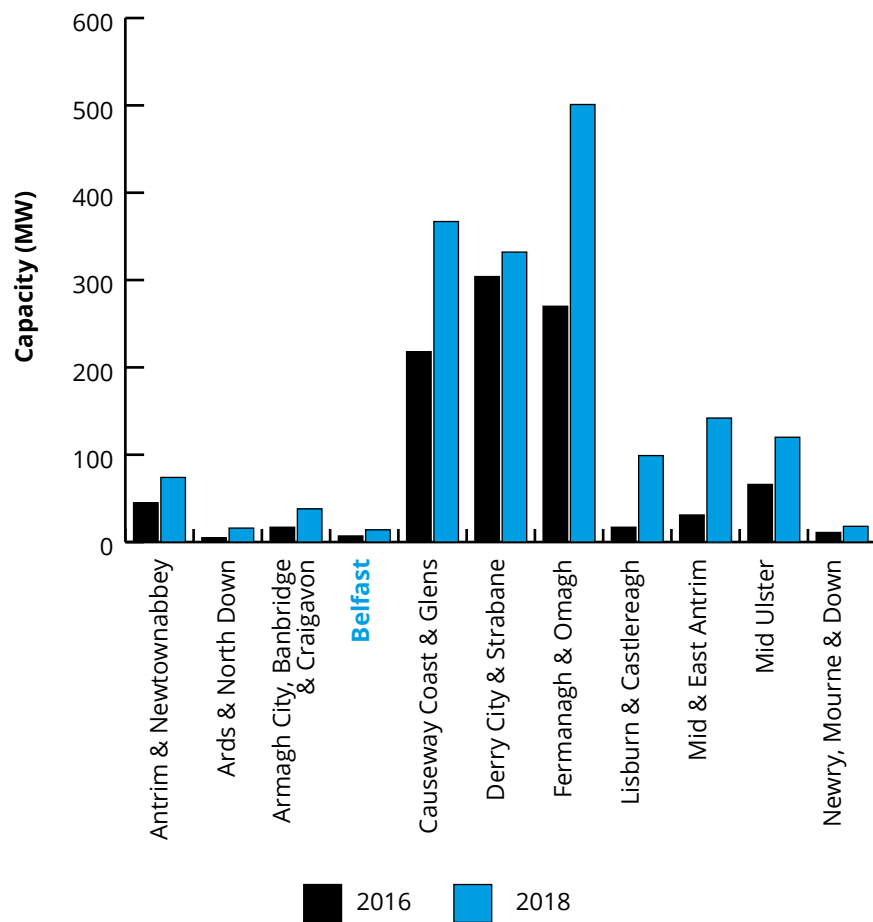
- Belfast LGD had the lowest capacity for energy generation at 14 MW
- Fermanagh & Omagh LGD had the highest capacity at 501 MW
- Lisburn & Castlereagh LGD had the median capacity at 99 MW (see Planet Figure 20)

Between 2016 and 2018, the capacity for renewable electricity generation increased in all LGDs:

- Belfast LGD had the fifth largest percentage increase, increasing by 7MW, from 7 to 14 MW (a percentage increase of 100%)
- Lisburn & Castlereagh LGD had the largest percentage increase, increasing by 82 MW, from 17 to 99 MW (a percentage increase of 482.35%)
- Derry City & Strabane LGD had the smallest percentage increase, increasing by 28 MW, from 304 to 332 MW (a percentage increase of 9.21%)
- Fermanagh & Omagh had the median percentage increase, increasing by 231 MW, from 270 to 501 MW (a percentage increase of 85.56%; see Planet Figure 20)

PLANET FIGURE 20:

Capacity for renewable electricity (MW) by LGD, 2016 and 2018



Source: BEIS data used by the Department for the Economy: Energy in Northern Ireland 2020, Table 4.6, page 67, and Energy in Northern Ireland 2018, Table 4.5, page 63

Renewable electricity generation

In 2018, when compared with other LGDs:

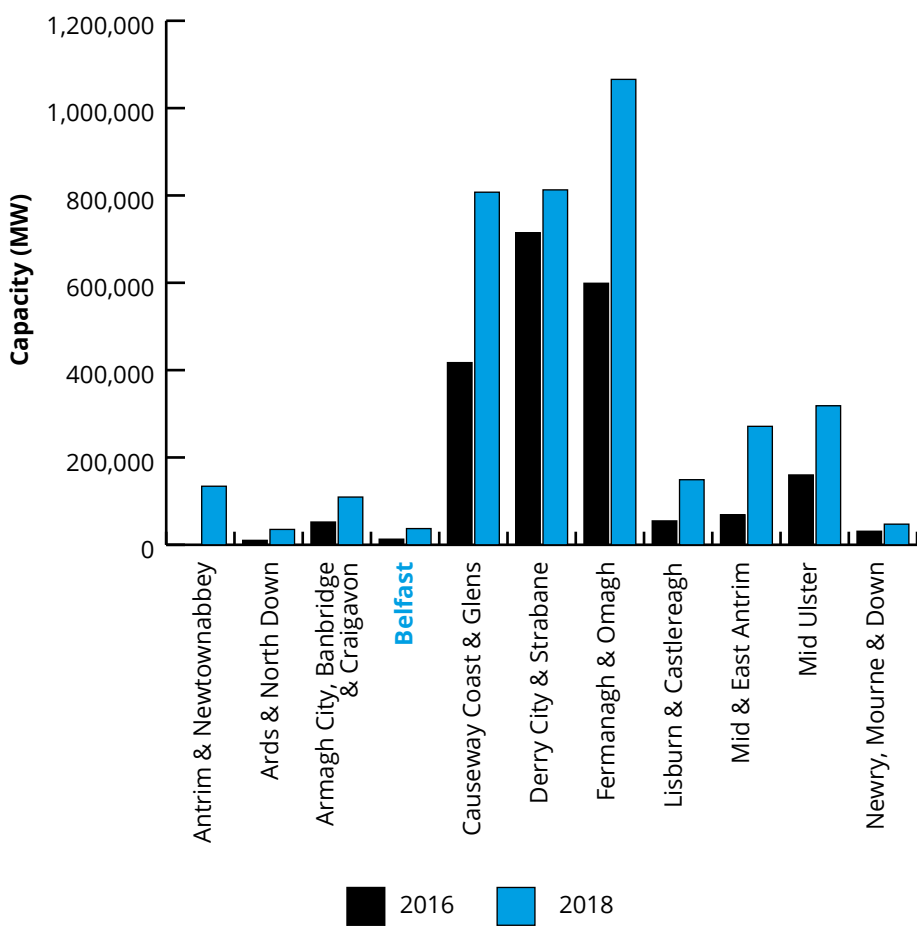
- Belfast LGD had the second lowest generation of renewable electricity at 37,154 MWh
- Fermanagh & Omagh had the highest generation at 1,065,797 MWh
- Ards & North Down LGD had the lowest generation at 35,216 MWh
- Lisburn & Castlereagh LGD had the median value for generation of renewable electricity at 149, 043 MWh (see Planet Figure 21)

Between 2016 and 2018, the generation of renewable electricity increased in all LGDs:

- Belfast LGD had the third highest percentage increase for generation of renewable electricity, increasing by 24,282 MWh, from 12,872 to 37,154 MWh (a percentage increase of 188.64%)
- Mid & East Antrim LGD had the highest percentage increase, increasing by 202,576 MWh, from 68,711 to 271,287 MWh (a percentage increase of 294.82%)
- Derry City & Strabane LGD had the lowest percentage increase, increasing by 98,122 MWh, from 714,676 to 812,798 MWh (a percentage increase of 13.73%)
- Mid Ulster LGD had the median percentage increase, increasing by 158,431 MWh, from 159,982 to 318,413 MWh (a percentage increase of 99.03%; see Planet Figure 21)

PLANET FIGURE 21:

Renewable electricity generation (MWh) by LGD, 2016 and 2018



Source: BEIS data used by the Department for the Economy Energy in Northern Ireland 2020, Table 4.6, page 67, and Energy in Northern Ireland 2018, Table 4.5, page 63

HIGHLIGHTS

In 2018, Belfast had less than 1% of Northern Ireland's:

- Sites for renewable electricity generation
- Renewable electricity capacity
- Renewable electricity generation

Between 2016 and 2018, the number of sites for renewable electricity generation, renewable electricity capacity, and renewable energy generation all increased in Belfast and in Northern Ireland. Although for each of these indicators, the percentage increase was greater in Belfast than in Northern Ireland, and the gaps between the two narrowed, this was because the values for Belfast are very small, and any increases will be apparent as large percentage increases.

In 2018, among LGDs, Belfast had the lowest number of sites for renewable electricity generation, the lowest renewable electricity capacity, and the second lowest renewable electricity generation.

SECTION 7

Decarbonisation of Private Transport

7.1 Electric Vehicles: Likelihood of Purchasing an Electric Vehicle as the Next Vehicle

IMPORTANCE

In combination with other sustainable transport options, such as public transport and active travel, electric vehicles (EVs) can contribute to population health by improving air quality and reducing noise pollution and carbon emissions.⁶⁰

The UK Government has ambitions to decarbonise transport as part of commitments to reach net-zero emissions by 2050. In an analysis by the Climate Change Committee, EVs were found to have substantially lower greenhouse gas emissions than conventional internal combustion engine vehicles, even when accounting for the current generation mix of the electricity to charge these vehicles and battery production. As the UK's electricity mix becomes cleaner, so will the lifetime emissions of electric cars and vans. The UK Government's targets for the decarbonisation of cars and vans are:

- By 2030, end the sale of all new petrol and diesel cars and vans
- By 2035, all new cars and vans must be zero emission at the tailpipe⁶¹

There are three main types of EV:

1. pure electric
2. plug-in hybrid
3. hybrid without plug-in capability

60. Belfast City Air Quality Action Plan 2021-2026 (Last accessed 22 July 2022)

61. Transitioning to zero emission cars and vans: 2035 delivery plan (publishing.service.gov.uk) (Last accessed 1 July 2022)

Collectively, these vehicles are known as ultra-low-emission vehicles (ULEVs). The Department for Infrastructure is committed to encouraging people to drive ULEVs,⁶² and there are currently more than 4,000 ULEVs on the roads in Northern Ireland.⁶³

DEFINITION

There is a question in the CHS: “How likely are you to buy an electric vehicle as your next vehicle?”. There are four response options:

- **Definitely buy**
- **Strongly consider buying**
- **Unlikely to consider buying**
- **Would not consider buying**

Information is from the Department for Infrastructure, Attitudes towards electric vehicles Northern Ireland 2019/20.⁶⁴

PROFILE FINDINGS

In 2019/20, in Belfast LGD, the percentage of people likely to purchase an electric vehicle (EV) as their next vehicle was:

- **4% who would definitely buy an EV**
- **26% who would strongly consider buying an EV**
- **31% who would be unlikely to consider buying an EV**
- **39% who would not consider buying an EV (see Planet Figure 22)**

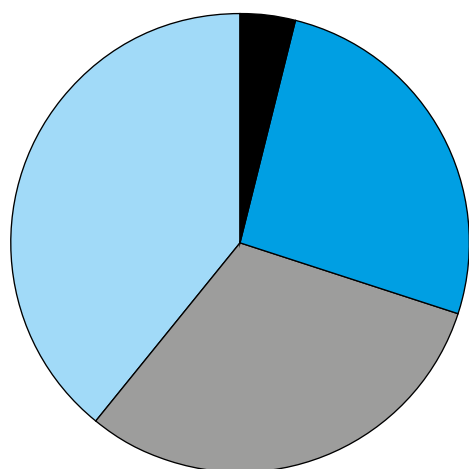
62. Attitudes towards electric vehicles in Northern Ireland 2019 2020 (infrastructure-ni.gov.uk) (Last accessed 22 July 2022)

63. Electric vehicles | nidirect (Last accessed 22 July 2022)

64. Attitudes towards electric vehicles Northern Ireland 2019/2020 | Department for Infrastructure (infrastructure-ni.gov.uk) (Last accessed 22 July 2022)

PLANET FIGURE 22:

Percentage (%) of people likely to purchase an EV as their next vehicle (%), 2019/20



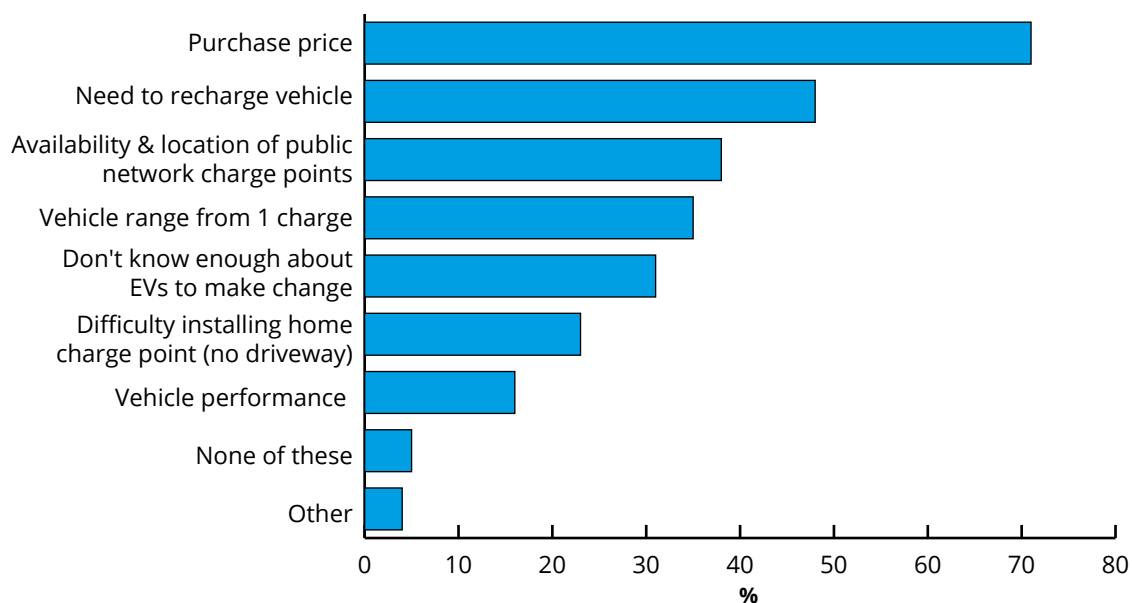
Source: DfI: Attitudes towards electric vehicles Northern Ireland 2019/20, Table 2.1

In 2019/20, in Belfast LGD, the main factors for discouraging people from purchasing an EV were:

- Purchase price at 71%
- Need to recharge the vehicle at 48%
- Availability and locations of the 337 public charge points at 38%
- Vehicle range from one charge (now up to 250 miles) at 35%
- Don't know enough about EVs to make the change from petrol/diesel at 31% (see Planet Figure 23 for all factors mentioned)

PLANET FIGURE 23:

Factors that discourage people from purchasing an EV (%) in Belfast LGD, 2019/20



Source: Source: Dfi: Attitudes towards electric vehicles Northern Ireland 2019/20, Table 3.1

KEY COMPARISONS

Comparison with Northern Ireland

In 2019/20, when compared with Northern Ireland, the percentage of people who would:

- **Definitely buy an EV was 2 percentage points higher, 4% compared with 2%**
- **Strongly consider buying an EV was 3 percentage points higher, 26% compared with 23%**
- **Be unlikely to consider buying an EV was 2 percentage points lower, 31% compared with 33%**
- **Not consider buying an EV 3 percentage points lower, 39% compared with 42%**

In 2019/20, when compared with Northern Ireland, when combining the two response options indicating a likelihood of purchasing an EV as the next vehicle, the percentage was higher by 5 percentage points in Belfast LGD, 30% compared with 25%.

Comparison with other LGDs

In 2019/20, when compared with other LGDs:

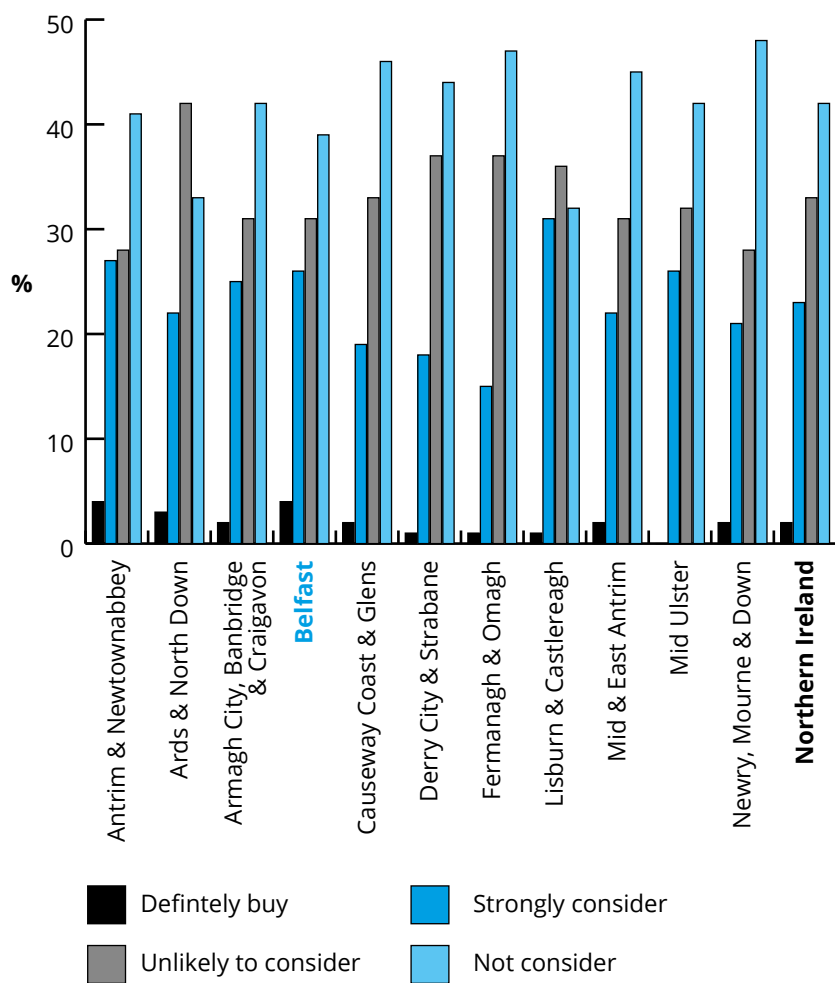
- Belfast LGD had the equal highest percentage of people who would definitely buy an EV at 4%, Mid Ulster LGD had the lowest percentage at 0%, and four LGDs had the median value at 2%
- Belfast LGD had the equal third highest percentage of people who would strongly consider buying an EV at 26%, together with Mid Ulster LGD, Lisburn & Castlereagh LGD had the highest percentage at 31%, Fermanagh & Omagh LGD had the lowest percentage at 15%, and Ards & North Down LGD and Mid & East Antrim LGD had the median percentage at 22%
- Belfast LGD had the second equal lowest percentage of people who would be unlikely to purchase an EV at 31%, Ards & North Down LGD had the highest percentage at 42%, Antrim & Newtownabbey LGD and Newry, Mourne & Down LGD had the lowest percentage at 28%, and Mid Ulster LGD had the median percentage at 32%
- Belfast LGD had the third lowest percentage of people who would not consider buying an EV at 39%, Newry, Mourne & Down LGD had the highest percentage at 48%, Lisburn & Castlereagh LGD had the lowest percentage at 32%, and Armagh City, Banbridge & Craigavon LGD and Mid Ulster LGD had the median percentage at 42% (see Planet Figure 24)

In 2019/20, when combining the two response options indicating a likelihood of purchasing an EV as the next vehicle:

- Belfast LGD had the third highest percentage at 30%
- Lisburn & Castlereagh LGD had the highest percentage at 32%
- Fermanagh & Omagh had the lowest percentage at 16%
- Ards & North Down LGD had the median percentage at 25%

PLANET FIGURE 24:

Percentage (%) of people likely to purchase an EV as their next vehicle (%) by LGD and Northern Ireland, 2019/20



Source: DfI: Attitudes towards electric vehicles Northern Ireland 2019/20, Table 2.1

HIGHLIGHTS

In 2019/20, in Belfast:

- Less than 1 out of every 10 people who definitely purchase an EV as their next vehicle, similar to Northern Ireland
- Between 2 and 3 out of every 10 people would strongly consider buying an EV, compared with over 2 out of every 10 people in Northern Ireland
- 7 out of every 10 people, however, would be unlikely to or would not consider buying an EV, compared with between 7 and 8 out of every 10 people in Northern Ireland

The main reasons that discouraged people in Belfast from considering purchasing an EV were:

- Purchase price
- The need to recharge the vehicle
- The availability and locations of public network charge points (see page 100)
- The vehicle's range from one charge

7.2 - Electric Vehicle Charging Infrastructure

- Total Public Charging Devices
- Total Public Rapid Charging Devices
- Rate of Public Charging Devices
- Rate of Public Rapid Charging Devices

IMPORTANCE

There are four barriers to drivers shifting to electric vehicles (EVs):

- Range limitation
- Range anxiety
- Cost
- Infrastructure

The success of EV uptake is heavily reliant on efficient batteries and adequate charging infrastructure.⁶⁵

Policymakers need to establish appropriate market and price signals for charging infrastructure and grid services to enable the emergence of viable business models and to facilitate smooth EV integration into power grid operations. Policies that strategically map out an interconnected charging network along critical transport routes and urban areas to allow for ease of access are critical for mass EV adoption. In addition, those that subsidise the capital cost of the charger or provide cost reductions per kWh can also be beneficial, depending on the broader context.⁶⁶

In 2012, the e-car NI Project consortium introduced EV charging infrastructure to Northern Ireland. The e-car public charge point network is owned, operated, and maintained by the Electricity Supply Board (ESB).

65. Why we need to invest in infrastructure for electric vehicles | World Economic Forum (weforum.org) (Last accessed 7 July 2022)

66. Electric Vehicles – Analysis - IEA (Last accessed 1 July 2022)

DEFINITION

The number of publicly available electric vehicle charging devices by local authority.

Charging device location data are sourced from the electric vehicle charging platform Zap-map and represent devices reported as operational at midnight, 1 April 2020. A charging device may have a number of connectors of varying speeds, however, not all can charge more than one vehicle at the same time. It is not possible to identify whether individual devices have this capability.

'Total devices' represent publicly available charging devices at all speeds. 'Rapid devices' are those whose fastest connector is rated at 43 kW or above. A device can have a number of connectors of varying speeds.

Information is from GOV.UK Official Statistics, Electric vehicle charging device statistics: April 2020.⁶⁷

PROFILE FINDINGS

Total public charging devices

At 1 April 2020, in Belfast LGD, the number of total public charging devices was 47, representing 15.41% of Northern Ireland's total.

Total public rapid charging devices

At 1 April 2020, in Belfast LGD, the number of total public rapid charging devices was 5, representing 26.32% of Northern Ireland's total.

Rate of public charging devices

At 1 April 2020, in Belfast LGD, the rate of total public charging devices was 13.7 per 100,000 population.

Rate of public rapid charging devices

At 1 April 2020, in Belfast LGD, the rate of total public rapid charging devices was 1.5 per 100,000 population.

67. Electric vehicle charging device statistics: April 2020 - GOV.UK (www.gov.uk) (Last accessed 1 July 2022)

KEY COMPARISONS

Comparison with Northern Ireland

Total public charging devices

At 1 April 2020, in Northern Ireland, the number of total public charging devices was 305.

Total public rapid charging devices

At 1 April 2020, in Northern Ireland, the number of total public rapid charging devices was 19.

Rate of public charging devices

At 1 April 2020, when compared with Northern Ireland, the rate of public charging devices was lower by 2.5 per 100,000 population in Belfast LGD, 13.7 compared with 16.2 per 100,000 population (see Planet Figure 25).

Rate of public rapid charging devices

At 1 April 2020, when compared with Northern Ireland, the rate of public rapid charging devices was higher by 0.5 per 100,000 population in Belfast LGD, 1.5 compared with 1.0 per 100,000 population.

Comparison with other LGDs

Total public charging devices

At 1 April 2020, when compared with other LGDs:

- Belfast LGD had the largest number of total public charging devices at 47
- Lisburn & Castlereagh LGD had the smallest number at 11
- Causeway Coast & Glens had the median number at 27

Total public rapid charging devices

At 1 April 2020, when compared with other LGDs:

- Belfast LGD had the largest number of total public charging devices at 5
- Ards & North Down LGD had the smallest number at 0
- Five LGDs had the median number at 2

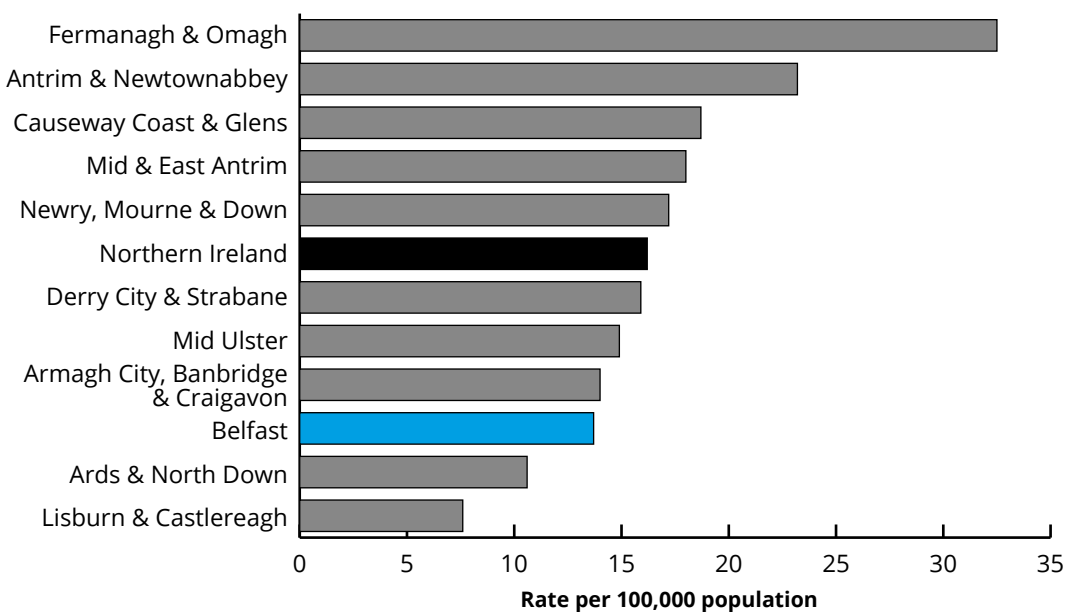
Rate of public charging devices

At 1 April 2020, when compared with other LGDs:

- Belfast had the third lowest rate of public charging devices at 13.7 per 100,000 population
- Fermanagh & Omagh LGD had the highest rate at 32.5 per 100,000 population
- Lisburn & Castlereagh LGD had the lowest rate at 7.6 per 100,000 population
- Derry City & Strabane LGD had the median rate at 15.9 per 100,000 population (see Planet Figure 25)

PLANET FIGURE 25:

Rate of public charging devices per 100,000 population by LGD and Northern Ireland, 1 April 2020



Source: Electric vehicle charging device statistics: April 2020 data tables, Table EVCD_01

Rate of public rapid charging devices

At 1 April 2020, when compared with other LGDs:

- Belfast LGD had the second highest rate of public rapid charging devices at 1.5 per 100,000 population
- Fermanagh & Omagh LGD had the highest rate at 1.7 per 100,000 population
- Ards & North Down LGD had the lowest rate at 0.0 per 100,000 population
- Newry, Mourne & Down LGD had the median rate at 1.1 per 100,000 population

HIGHLIGHTS

At 1 April 2020, Belfast had:

- Between 1 and 2 out of every 10 public charging devices in Northern Ireland
- Between 2 and 3 out of every 10 public rapid charging devices in Northern Ireland

At 1 April 2020, although Belfast had the highest number of public charging devices among LGDs, it had one of the lowest rates of such devices. In contrast, Belfast had the highest number of public rapid charging devices and the second highest rate of such devices among LGDs.

SECTION 8

Climate Change Adaptation and Mitigation

8.1 Public Attitudes to Forestry in Respect of Climate Change

IMPORTANCE

The rate of build-up of carbon dioxide in the atmosphere can be reduced by taking advantage of the fact that atmospheric carbon dioxide can accumulate as carbon in vegetation and soils in terrestrial ecosystems. Under the United Nations Framework Convention on Climate Change (UNFCCC) any process, activity or mechanism which removes a greenhouse gas from the atmosphere is referred to as a "sink".⁶⁸ A forest or other ecosystem that absorbs carbon, removing it from the atmosphere, is a carbon sink, thereby helping to offset carbon dioxide emissions.⁶⁹

Human activities, however, can have an impact on terrestrial sinks, through land use, land-use change and forestry (LULUCF)⁷⁰ activities, and alter the exchange of carbon dioxide between the terrestrial biosphere system and the atmosphere (known as the carbon cycle).⁷¹ As such, LULUCF activities can, therefore, contribute to carbon emissions or help to reduce them.

Tree-planting is an important component of the UK's action to reach net-zero carbon emissions. The net-zero scenarios developed by the UK Climate Change Committee (CCC) show that the area of woodland cover in the UK needs to increase from 13% to 17-19% by 2050, based on annual tree-planting levels reaching at least 30,000 and possibly up to 50,000 hectares by 2024; overall, this would involve planting 90-120 million trees.⁷²

68. Land Use, Land-Use Change and Forestry (LULUCF) | UNFCCC (Last accessed 5 July 2022)

69. carbon sink — European Environment Agency (europa.eu) (Last accessed 5 July 2022)

70. Land use, land use change and forestry (LULUCF) is a greenhouse gas inventory sector that encompasses greenhouse gas emissions to and removals from the atmosphere

71. Land Use, Land-Use Change and Forestry (LULUCF) | UNFCCC (Last accessed 5 July 2022)

72. <https://www.theccc.org.uk/publication/land-use-policies-for-a-net-zero-uk/> (Last accessed 15 June 2021)

As part of Resilient Belfast, Belfast City Council has pledged to work with public, private sector, and voluntary partners to plant one million trees across Belfast by 2035. The aims are to reduce carbon, improve air quality, reduce flooding, increase urban cooling, and improve physical and mental health and wellbeing.⁷³

DEFINITION

Public Opinion of Forestry surveys measure the opinions of respondents to forestry and forestry-related issues. The survey contains two statements directly related to climate change:

1. **Ways in which forests and woodlands can impact on climate change**
2. **Management of Northern Ireland's forests in response to the threat of climate change**

There was also one statement which had 14 options, two of which related to climate change, as follows:

Reasons to support forestry with public money:

1. **To combat climate change**
2. **To provide renewable energy**

Results are presented for respondents who 'agree' or 'strongly agree' with the statement.

Information is from Forest Research, Tools and Resources, Public Opinion of Forestry, Previous Reports, 2019: Northern Ireland.⁷⁴

73. One Million Trees (belfastcity.gov.uk) and Belfast Resilience Ambitions: A climate plan for Belfast (belfastcity.gov.uk) (Last accessed 5 July 2022)

74. Public Opinion of Forestry - Forest Research (Last accessed 5 July 2022)

PROFILE FINDINGS

Ways in which forests and woodlands can impact on climate change
In 2019, in the Public Opinion of Forestry Survey: Northern Ireland:

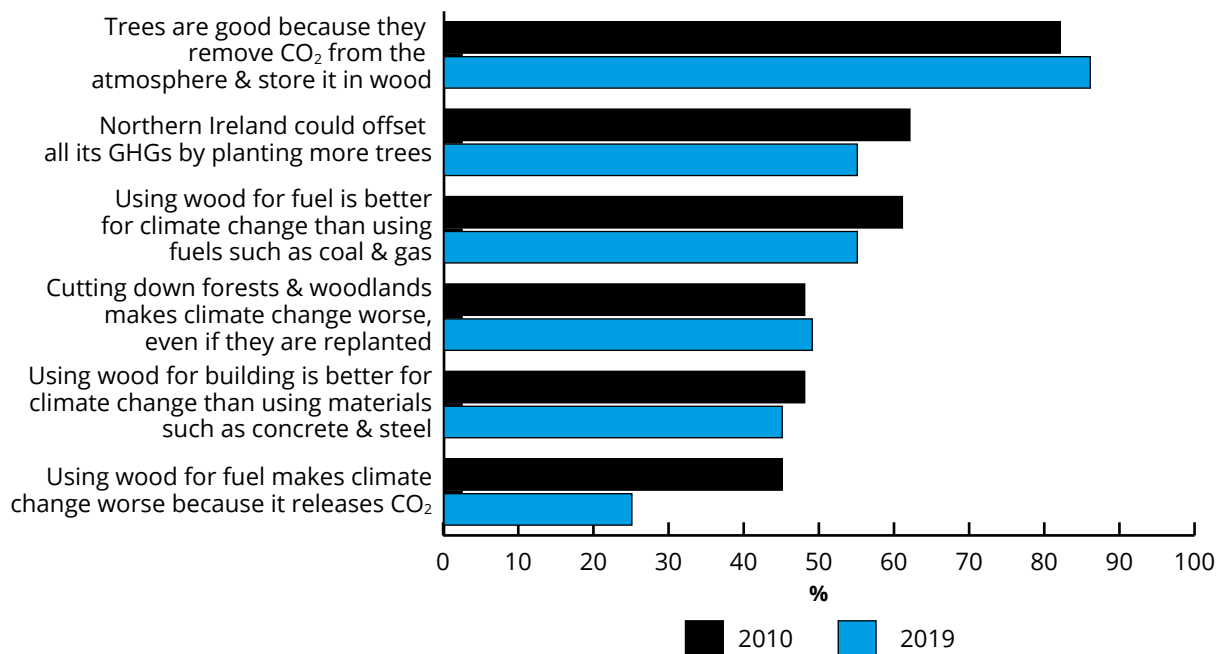
- 82% agreed that trees are good because they remove carbon dioxide from the atmosphere and store it in wood
- 62% agreed that Northern Ireland could offset all its greenhouse gas emissions by planting more trees
- 61% agreed that using wood for fuel is better for climate change than using fuels such as coal and gas
- 48% agreed that cutting down forests and woodlands makes climate change worse, even if they are replanted
- 48% agreed that using wood for building is better for climate change than using materials such as concrete and steel
- 45% agreed that using wood for fuel makes climate change worse because it releases carbon dioxide

Between 2010 and 2019, the percentage of people who agreed with the statements about ways in which forests and woodlands can impact on climate change increased, except for the two following statements for which the percentage of people agreeing decreased:

- “Trees are good because they remove carbon dioxide from the atmosphere and store it in wood” (a decrease of 4 percentage points, from 86% to 82%, a percentage decrease of 4.65%)
- “Cutting down forests and woodlands makes climate change worse even if they are replanted” (a decrease of 1 percentage point from 49% to 48%, a percentage decrease of 2.04%; see Planet Figure 26).

PLANET FIGURE 26:

Percentage (%) of people who agree or strongly agree with statements about ways in which forests and woodlands can impact on climate change, Northern Ireland 2010 and 2019



Source: Public Opinion of Forestry, Previous Reports, 2019: Tables in EXCEL format: Northern Ireland, Table 3

Management of Northern Ireland's forests in response to the threat of climate change

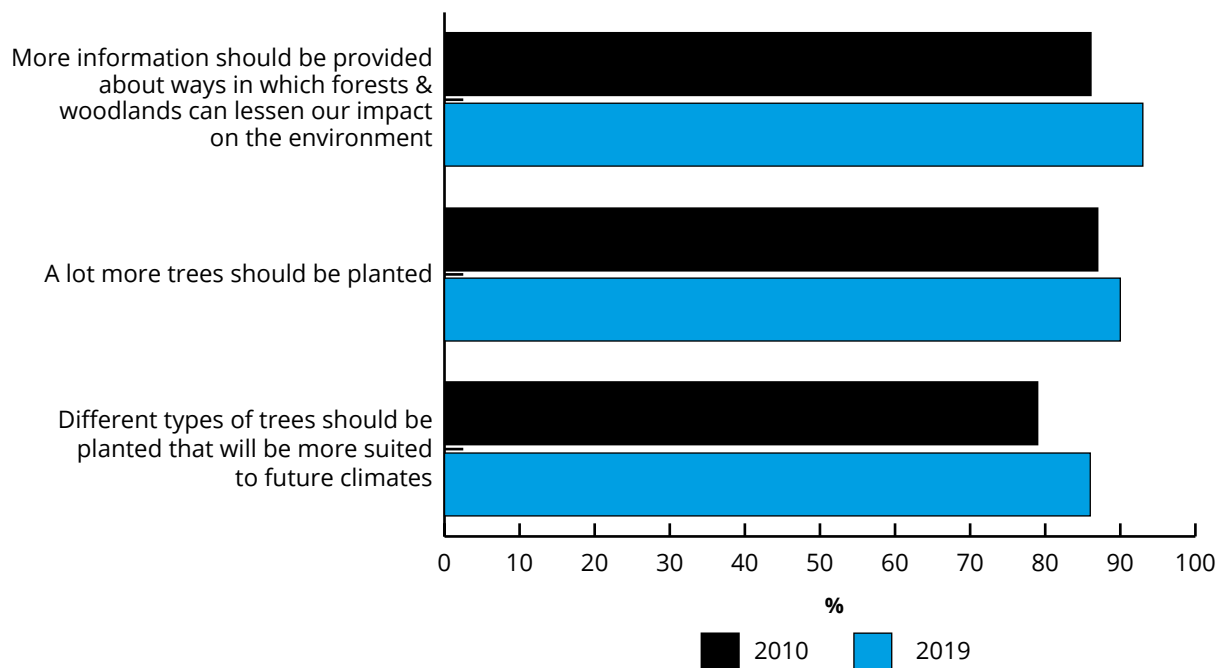
In 2019, in the Public Opinion of Forestry Survey: Northern Ireland:

- 93% of people agreed that more information should be provided about ways in which forests and woodlands can lessen our impact on the environment
- 90% agreed a lot more trees should be planted
- 86% agreed different types of trees should be planted that will be more suited to future climates

Between 2010 and 2019, the percentage of people who agreed with the statements about the management of Northern Ireland's forests in response to the threat of climate change increased (see Planet Figure 27).

PLANET FIGURE 27:

Percentage (%) of people who agree or strongly agree with statements about the management of Northern Ireland's forests in response to the threat of climate change, Northern Ireland, 2010 and 2019



Source: Public Opinion of Forestry, Previous Reports, 2019: Tables in EXCEL format: Northern Ireland, Table 4

Reasons to support forestry with public money

In 2019, in the Public Opinion of Forestry Survey: Northern Ireland, among reasons to support forestry with public money:

- 53% of people agreed with the option to combat climate change
- 42% of people agreed with the option to provide renewable energy

Between 2010 and 2019, the percentage of people agreeing with these options among reasons to support forestry with public money increased:

- To combat climate change increased by 6 percentage points, from 47% to 53% (a percentage increase of 12.77%)
- To provide renewable energy increased by 2 percentage points, from 40% to 42% (a percentage increase of 5.00%)

HIGHLIGHTS

In 2019, in the Public Opinion of Forestry Survey: Northern Ireland:

- 8 out of every 10 respondents agreed that trees are good because they remove carbon dioxide from the atmosphere and store it in wood
- 6 out of every 10 respondents agreed that Northern Ireland could offset all its greenhouse gas emissions by planting more trees
- 6 out of every 10 respondents agreed that using wood for fuel is better for climate change than using fuels such as coal and gas
- Over 9 out of every 10 respondents agreed that more information should be provided about ways in which forests and woodlands can lessen our impact on the environment
- 9 out of every 10 respondents agreed a lot more trees should be planted
- Between 8 and 9 out of every 10 respondents agreed different types of trees should be planted that will be more suited to future climates
- Over 5 out of every 10 respondents agreed combatting climate change was a reason to support forestry with public money

Between 2010 and 2019, although there was an increase in the percentage of respondents agreeing with most of the statements about forestry in relation to climate change, it is notable that there was a decrease in the percentage of respondents agreeing that trees are good because they remove carbon dioxide from the atmosphere and store it in wood.

8.2 Woodland Area

IMPORTANCE

Trees, woods, and forests play a key role in mitigating the effects of climate change. Placing woodland creation at the heart of any response will result in efficient and effective carbon capture. In addition, all trees, and woodlands irrespective of location, have additional benefits beyond carbon capture, including:

- Improving air quality
- Reducing the urban heat island effect
- Providing spaces to improve health and wellbeing
- Reducing flood risk
- Potential to reduce the costs of water treatment
- A source of timber, and wood and wood fibre products⁷⁵

DEFINITION

In Northern Ireland, woodland is defined as land under stands of trees with a canopy cover of at least 25% or having the potential to achieve this. The definition relates to land use, rather than land cover, therefore, integral open space and felled areas awaiting restocking are included as woodland.⁷⁶

The estimates are based on UK data published by Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC), supplemented by data from individual certificates and other sources. Where possible, figures are for the woodland area certified, rather than the land. All certified woodland is certified under the FSC scheme or PEFC scheme, with many woodlands certified under both schemes.

Information is from Forestry Research, Tools and Resources, Data downloads, Time series data, Woodland statistics, and Forestry Statistics 2019 Report.⁷⁷

75. Leaflet: Responding to the climate emergency with new trees and woodlands - GOV.UK (www.gov.uk) (Last accessed 6 July 2022)

76. Forestry Statistics 2019 - Forest Research (Last accessed 6 July 2022)

77. Data Downloads - Forest Research and Forestry Statistics 2019 - Forest Research (Last accessed 6 July 2022)

PROFILE FINDINGS

Woodland area

In 2019, in Northern Ireland, the woodland area comprised 113,000 hectares (Ha):

- 62,000 Ha (54.87%) were owned by the Forest Service Northern Ireland
- 51,000 Ha (45.13%) were privately owned

Between 2009 and 2019, in Northern Ireland, the woodland area increased by 25,000 Ha, from 88,000 Ha to 113,000 Ha:

- Forest Service NI woodland area increased by 1,000 Ha, from 61,000 to 62,000 Ha (a percentage increase of 1.64%)
- Privately owned woodland area increased by 25,000 Ha, from 26,000 Ha to 51,000 Ha (a percentage increase of 96.15%)

Woodland area as a percentage of land area

In 2019, in Northern Ireland, woodland area comprised 8% of total land area.

KEY COMPARISONS

Comparison with other parts of the UK

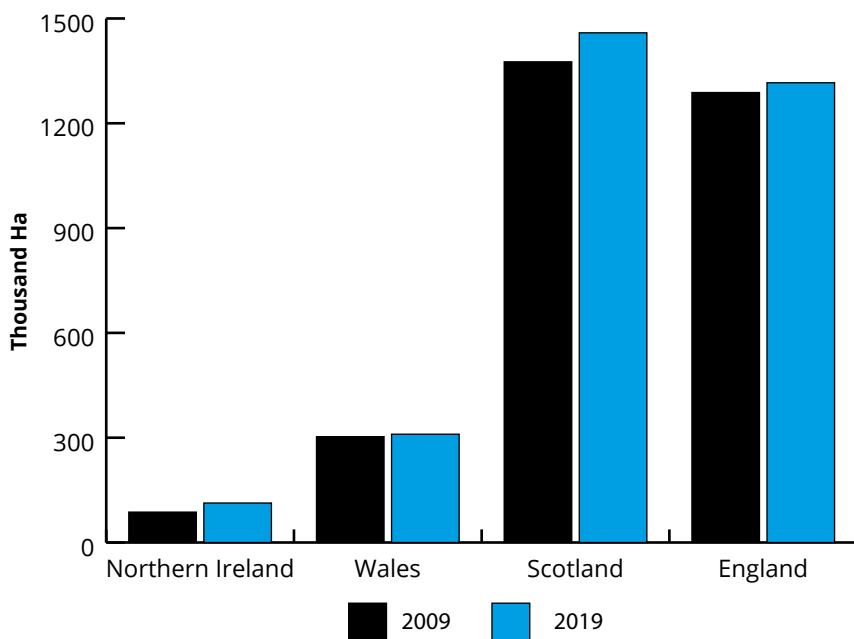
Woodland area

In 2019, when compared with other parts of the UK:

- Northern Ireland had the smallest woodland area at 113,000 Ha
- Scotland had the largest at 1,459,000 Ha
- The median value was 813,000 Ha (see Planet Figure 28)

Between 2009 and 2019, the woodland area increased in all parts of the UK:

- Northern Ireland had the greatest percentage increase, increasing by 26,000 Ha, from 87,000 to 113,000 Ha (a percentage increase of 29.89%)
- England had the smallest percentage increase, increasing by 28,000 Ha, from 1,288,000 to 1,316,000 Ha (a percentage increase of 2.17%)
- The median percentage increase was 4.17% (see Planet Figure 28)

PLANET FIGURE 28:**Woodland area (thousand Ha) by parts of the UK, 2009 and 2019**

Source: Forestry Research, Woodland Statistics, Woodland area, UK, 1990 to 2022, Tables A1-A4

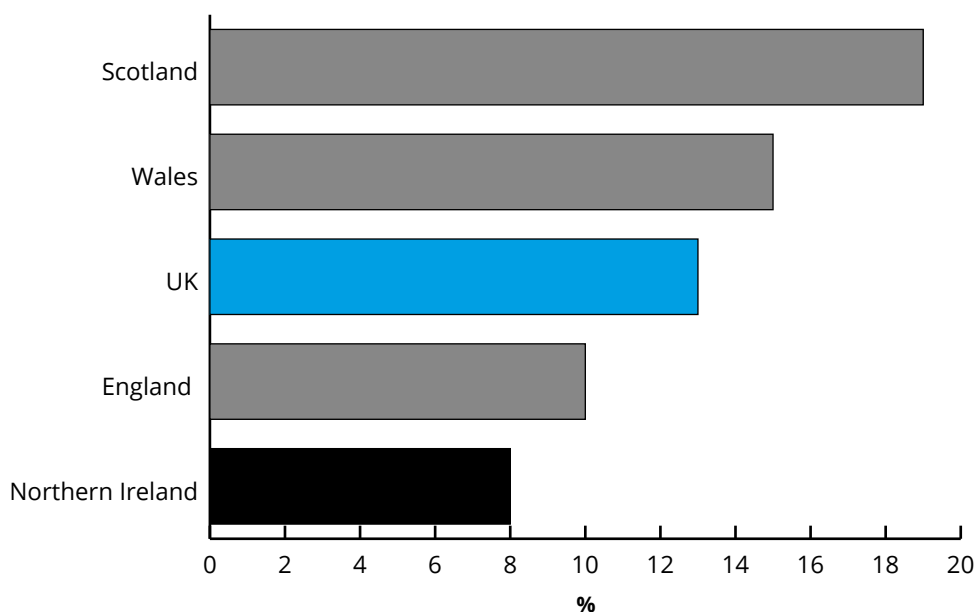
Woodland area as a percentage of land area

In 2019, when compared with other parts of the UK:

- Northern Ireland had the lowest percentage of total land area as woodland area at 8%
- Scotland had the highest at 19%
- The median percentage was 12.5% (see Planet Figure 29)

PLANET FIGURE 29:

Percentage (%) of total land area as woodland area, by parts of the UK, 2019



Source: Forest Research: Forestry Statistics 2019 first release, page 9

HIGHLIGHTS

In 2019, in Northern Ireland, there were 113,000 hectares of woodland area, just over half of which was owned by the Forest Service NI. This woodland area comprised 8% of the total land area in Northern Ireland.

In 2019, across the different parts of the UK, Northern Ireland had the smallest area of woodland, and the smallest percentage of total land area as woodland.

Between 2009 and 2019, when compared with different parts of the UK, Northern Ireland had the greatest percentage increase in woodland area, but the size of this increase reflects the initially smaller woodland area.

8.3 Green and Open Spaces/Biodiversity

IMPORTANCE

In a study for the Scottish Government, it was found that:

- At community scale, green space quantity in a neighbourhood and residents' perceived stress and mental wellbeing were linked; relationships varied by gender and likely amount of time spent at home
- In deprived urban communities, more green space is associated with lower levels of self-reported stress and stress shown by salivary cortisol patterns for a sample of middle-aged men and women not in work; more green space had a greater effect on cortisol concentrations in women than in men in these groups
- Individuals and social groups attached different meanings to green space, and experienced differing wellbeing benefits from using such places; the social dimension of green space use is important for understanding wellbeing benefits
- Larger urban green spaces provide multiple functions for communities of place, and communities of interest; smaller areas of green space provide important spaces for short periods outdoors. There is significant community interest in involvement in decision-making about local green spaces
- The visibility of green space can make a significant difference to the interpretation of accessibility (and safety) of urban places⁷⁸

Belfast's Green and Blue Infrastructure Plan 2020 provides a spatial framework for a range of spaces, including natural areas and water bodies, to support the effective functioning of natural processes and the ecosystem services they provide.⁷⁹ The aim of Belfast's Open Space strategy is to provide: "a well-connected network of high-quality open spaces recognised for the value and benefits they provide to everyone who lives and works and visits our city".⁸⁰

78. The contribution of green and open spaces in public health | The James Hutton Institute (Last accessed 17 July 2022)

79. BCC-AD-GBIP.pdf (pacni.gov.uk) (Last accessed 5 July 2022)

80. Appendix 1.pdf (belfastcity.gov.uk) (Last accessed 16 July 2022)

In January 2021, inspired by the '30 by 30' campaign,⁸¹ Belfast City Council committed to returning 30% of the city to nature by 2030. Belfast's '30 by 30' Biodiversity Campaign recognises the ecological and recreational importance of smaller non-designated sites, such as gardens, alleyways, and industrial land, as important habitats for urban wildlife, and shared spaces for local communities to improve mental health and physical wellbeing. Belfast's '30 by 30' biodiversity campaign will educate, inform, and support citizens and communities to maximise green spaces around their homes, and support urban biodiversity in the city.⁸²

The urban gardening movement can be important in areas with limited open space. In a recent literature review of mainly cross-sectional studies, there was a positive association between urban gardening and mental and social health.⁸³

DEFINITION

In Belfast City Council's Open Spaces Strategy, open spaces are defined as 'land where the primary function is related to their community, amenity, recreation, play and sport value; whether in public or private ownership'. This includes parks, playing fields, play areas and civic space. Open spaces may have secondary biodiversity benefits and form part of a wider 'green infrastructure' network.

Information is from:

- **Belfast City Council Open Spaces Strategy**⁸⁴
- **Ulster Wildlife**⁸⁵
- **The Belfast Hills Partnership (BHP)**⁸⁶
- **The Green Flag Award, run by Keep Northern Ireland Beautiful**⁸⁷

81. Campaign For Nature (Last accessed 16 July 2022)

82. Motion - Cllr Smyth - 30 by 30 Biodiversity Campaign.pdf (belfastcity.gov.uk) (Last accessed 17 July 2022) Further information can be found at the following weblink: Belfast council looks at returning 30 percent of the city to nature by 2030 - Belfast Live (Last accessed 22 July 2022)

83. Urban collective garden participation and health: a systematic literature review of potential benefits for free-living adults | Nutrition Reviews | Oxford Academic (oup.com) (Last accessed 17 July 2022).

84. Appendix 1.pdf (belfastcity.gov.uk) (Last accessed 16 July 2022)

85. Homepage | Ulster Wildlife (Last accessed 16 July 2022)

86. belfasthills.org - Caring for the Belfast Hills, their wildlife and people (Last accessed 16 July 2022)

87. Keep Northern Ireland Beautiful, Green Flag Award (Last accessed 16 July 2022)

PROFILE FINDINGS

Belfast is framed by hills:

- To the north and west are the Belfast Hills
- To the east are the Castlereagh and Holywood Hills

The valley contains semi-natural habitats such as wet meadows and marshes as well as woodland.

In Belfast, there is a range of open spaces from parks, playing fields and play areas to amenity spaces, civic spaces, growing spaces, and cemeteries, comprising about one-quarter of the city's total area, at 2,388.4 hectares.

Statutory and voluntary organisations work in partnership to protect unique local habitats, biodiversity, and community engagement with the natural world.

Ulster Wildlife protects three nature reserves at:

1. Bog Meadows
2. Edenderry
3. Slievenacloy

The Belfast Hills encompass diverse habitats for animal and plant life:

- Heathland and bog
- Freshwater
- Grassland
- Woodland and hedges
- Quarries and cliffs

In the Belfast Hills, there are six local conservation areas:

1. Cavehill Country Park
2. Divis and Black Mountain
3. Ligoneil Dams and Park
4. Colin Glen Forest Park
5. Carnmoney Hill
6. Slievenacloy Nature Reserve

In 2020/21, Belfast City Council operated 20 of the 78 sites in Northern Ireland that received a Green Flag Award, an award that recognises high environmental standards and community involvement in the management of open spaces (see below).

Parks and open spaces operated by Belfast City Council that received a Green Flag Award, 2020/21

- Barnett demesne
- Belfast Botanic Gardens (Heritage)
- Belmont Park
- Cavehill Country Park
- Connswater Community Greenway
- Drumglass Park
- Dunmurry Village
- Dunville Park
- Falls Park
- Grove Park
- Half Moon Lake
- Knocknagoney Park
- Lagan Meadows
- Musgrave Park
- Ormeau Park
- Roselawn Cemetery
- Sir Thomas and Lady Dixon Park
- Tullycarnet Park
- Waterworks Park
- Woodvale Park

Source: Keep Northern Ireland Beautiful: The Green Flag Award

Wildflower Alley in South Belfast⁸⁸ and Three Sisters Gardening Group in West Belfast⁸⁹ are examples where residents have transformed derelict or unsightly areas into attractive, safe green spaces for the benefit of people and wildlife.

88. South Belfast alley completely transformed into garden paradise - Belfast Live (Last accessed 16 July 2022)

89. West Belfast group transforms derelict land into welcoming community gardens - Belfast Live (Last accessed 16 July 2022)

HIGHLIGHTS

Belfast has a diversity of habitats, including:

- **Six local conservation areas in the hills around the city**
- **Three nature reserves**

In 2020/21, a quarter of the Green Flag Award sites in Northern Ireland were operated by Belfast City Council.

Belfast also has examples of non-designated sites maintained by residents that contribute to the city's urban green spaces and biodiversity.

SECTION 9

Resource Use

9.1 Household Waste per Capita

IMPORTANCE

Household waste has become an urban challenge, with increased quantities of waste being generated and with more complex material compositions, often containing toxic and hazardous elements. Critical systems theory understands cities as urban metabolisms, with different material and energy flows, highlighting the circularity in production, consumption, and discard.⁹⁰

DEFINITION

Local authority collected municipal waste data relate to all waste which is collected under arrangements made by a council.

Household waste includes materials collected directly from households via kerbside collections, material taken to bring sites and civic amenity sites as well as several other smaller sources.

The population figures are NISRA mid-year population estimates for 2019.

Information is from the Department of Agriculture, Environment and Rural Affairs (DAERA) Northern Ireland local authority collected municipal waste management statistics: 2019/20 NI LAC municipal waste management statistics 2019/20 annual report, and 2015/16 NI LAC municipal waste management statistics 2015/16 annual report.⁹¹

90. Household waste and health risks affecting waste pickers and the environment in low- and middle-income countries - PMC (nih.gov) (Last accessed 30 June 2022)

91. Northern Ireland local authority collected municipal waste management statistics | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) and Northern Ireland local authority collected municipal waste management statistics 2019/20 annual report | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) and Northern Ireland local authority collected municipal waste management statistics 2015/16 annual report | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (Last accessed 30 June 2022)

PROFILE FINDINGS

In 2019/20, in Belfast LGD, household waste per capita was 419 kg.

Between 2015/16 and 2019/20, in Belfast LGD, household waste per capita increased by 1 kg, from 418 to 419 kg.

KEY COMPARISONS

Comparison with Northern Ireland

In 2019/20, when compared with Northern Ireland, household waste per capita was 46 kg lower, 419 kg compared with 465 kg (see Planet Figure 30).

Between 2015/16 and 2019/20, household waste per capita:

- In Belfast LGD increased by 1 kg, from 418 to 419 kg (a percentage increase of 0.24%)
- In Northern Ireland stayed the same at 465 kg (see Planet Figure 30)

Comparison with other LGDs

In 2019/20, when compared with other LGDs:

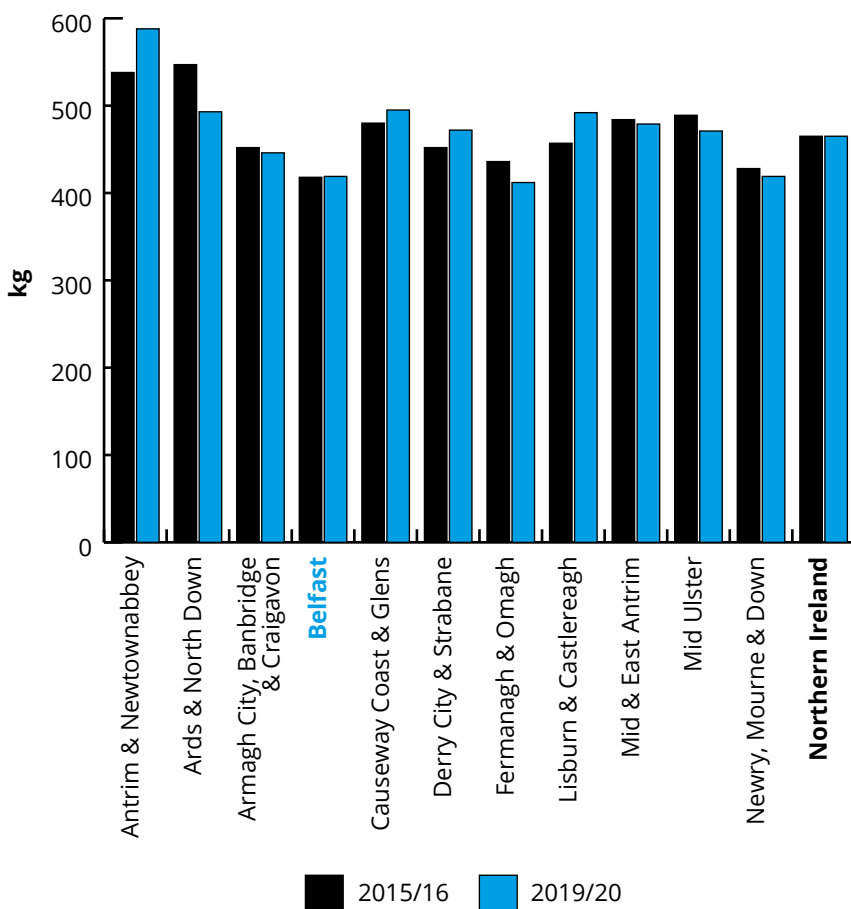
- Belfast LGD had the equal second lowest household waste per capita at 419 kg, together with Mid Ulster LGD
- Antrim & Newtownabbey LGD had the highest household waste per capita at 588 kg
- Fermanagh & Omagh LGD had the lowest household waste per capita at 412 kg
- Derry City & Strabane LGD had the median value at 472 kg (see Planet Figure 30)

Between 2015/16 and 2019/20, household waste per capita decreased in six LGDs and increased in five LGDs, including Belfast LGD:

- Belfast LGD had the smallest percentage increase, increasing by 1 kg from 418 to 419 kg (a percentage increase of 0.24%)
- Antrim & Newtownabbey LGD had the largest percentage increase, increasing by 50 kg, from 538 to 588 kg (a percentage increase of 9.29%; see Planet Figure 30)

PLANET FIGURE 30:

Household waste per capita (kg) by LGD and Northern Ireland, 2015/16 and 2019/20



Source: Northern Ireland local authority collected municipal waste management statistics 2019/20 annual report – LAC Municipal Waste Data Tables, Table 18; Northern Ireland local authority collected municipal waste management statistics 2015/16 annual report – Data tables appendix, Table 17

HIGHLIGHTS

In 2019/20, Belfast's household waste per person was much lower than that in Northern Ireland and the second equal lowest among LGDs.

Between 2015/16 and 2019/20, household waste per person increased very slightly in Belfast but remained the same in Northern Ireland, with a small narrowing of the gap between the two as Belfast had a much lower value.

Between 2015/16 and 2019/20, household waste per person increased in five LGDs, including Belfast, but Belfast's percentage increase was very small and lowest among the LGDs in which there had been an increase.

9.2 Household Waste Sent for Preparing for Re-use, Dry Recycling, and Composting

IMPORTANCE

A circular economy is an economic model designed to minimise resource input, as well as waste and emission production. The target for a circular economy is to rebuild all types of capital, including financial, human, social, and natural. The aims of a circular economy are:

- To reach maximum efficiency in the use of finite resources
- The gradual transition to renewable resources
- Recovery of the materials and products at the end of their useful life

The circular economy is an alternative to the traditional linear economy of make, use, and dispose.⁹²

In 2019/20, in Northern Ireland, of all waste collected by local councils, 88.2% was household waste, 51.9% of which was recycled,⁹³ which exceeded the 2020 target in the Northern Ireland waste management strategy for municipal waste:

“To achieve a recycling rate of 50% (including preparing for re-use) of household waste by 2020”.⁹⁴

DEFINITION

Local authority collected municipal waste data relate to all waste which is collected under arrangements made by a council.

Household waste includes materials collected directly from households via kerbside collections, material taken to bring sites and civic amenity sites as well as several other smaller sources.

The household waste recycling rate is calculated by dividing total tonnage of household waste sent for reuse, recycling or composting by total household waste arising, expressed as a percentage.

Information is from the Department of Agriculture, Environment and Rural Affairs

92. Circular Economy - Overview, Principles, Types of Cycles (corporatefinanceinstitute.com) (Last accessed 6 July 2022)

93. Northern Ireland local authority collected municipal waste management statistics annual report 2019/20 - GOV.UK (www.gov.uk) (Last accessed 22 July 2022)

94. Delivering Resource Efficiency - Northern Ireland Waste Management Strategy | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (page 39; last accessed 22 July 2022)

(DAERA) Northern Ireland local authority collected municipal waste management statistics: 2019/20 NI LAC municipal waste management statistics 2019/20 annual report, and 2015/16 NI LAC municipal waste management statistics 2015/16 annual report.⁹⁵

PROFILE FINDINGS

In 2019/20, in Belfast LGD, the percentage of household waste sent for preparing for re-use, dry recycling and composting was 45.4%.

Between 2015/16 and 2019/20, in Belfast LGD, the percentage of household waste sent for preparing for re-use, dry recycling and composting increased by 5.4%, from 40.0% to 45.4%.

KEY COMPARISONS

Comparison with Northern Ireland

In 2019/20, when compared with Northern Ireland, the percentage of household waste sent for preparing for re-use, dry recycling and composting was lower by 6.5 percentage points, 45.4% compared with 51.9%.

Between 2015/16 and 2019/20, the percentage of household waste sent for preparing for re-use, dry recycling, and composting increased:

- In Belfast LGD by 5.4 percentage points, from 40.0% to 45.4% (a percentage increase of 13.5%)
- In Northern Ireland by 9.7 percentage points, from 42.2% to 51.9% (a percentage increase of 22.99%; see Planet Figure 31)

95. Northern Ireland local authority collected municipal waste management statistics | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) and Northern Ireland local authority collected municipal waste management statistics 2019/20 annual report | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) and Northern Ireland local authority collected municipal waste management statistics 2015/16 annual report | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (Last accessed 30 June 2022)

Comparison with other LGDs

In 2019/20, when compared with other LGDs:

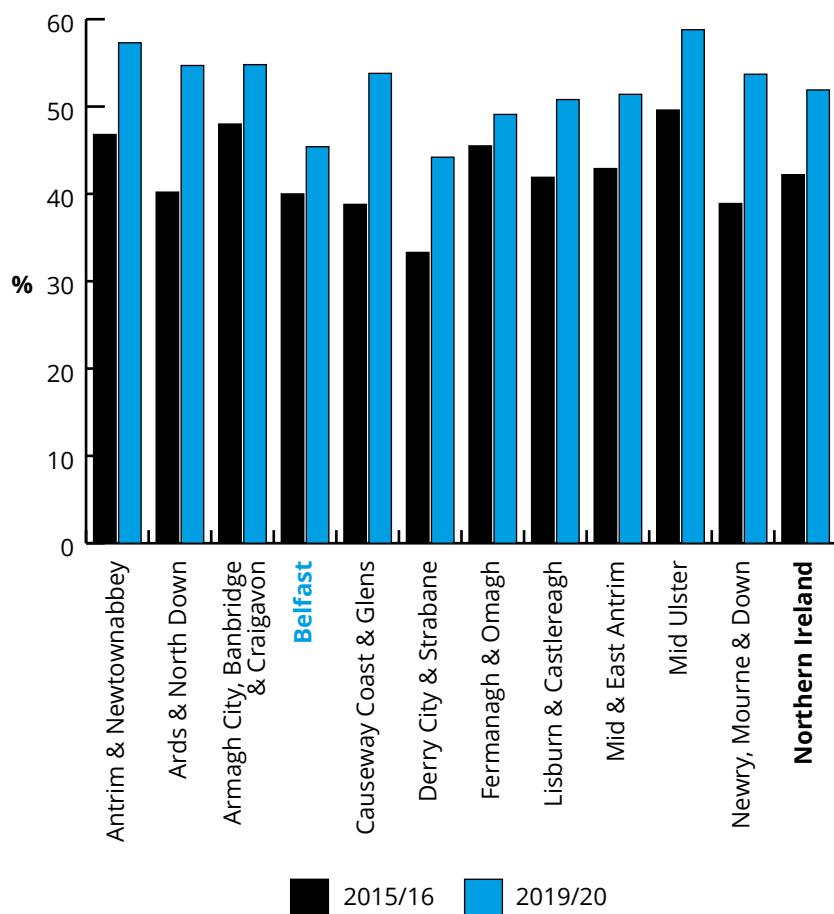
- Belfast LGD had the second lowest percentage of household waste sent for preparing for re-use, dry recycling, and composting at 45.4%
- Mid Ulster LGD had the highest at 58.8%
- Derry City & Strabane LGD had the lowest at 44.2%
- Newry, Mourne & Down LGD had the median value at 53.7% (see Planet Figure 31)

Between 2015/16 and 2019/20, the percentage of household waste sent for preparing for re-use, dry recycling and composting increased in all LGDs:

- Belfast LGD had the second lowest percentage increase, increasing by 5.4 percentage points from 40.0% to 45.4% (a percentage increase of 13.50%)
- Causeway Coast & Glens LGD had the largest percentage increase, increasing by 15.0 percentage points, from 38.8% to 53.8% (a percentage increase of 38.66%)
- Fermanagh & Omagh LGD had the lowest percentage increase, increasing by 3.6 percentage points, from 45.5% to 49.1% (a percentage increase 7.91%; see Planet Figure 31)

PLANET FIGURE 31:

Percentage (%) of household waste sent for preparing for re-use, dry recycling and composting by LGD and Northern Ireland, 2015/16 and 2019/20



Source: Northern Ireland local authority collected municipal waste management statistics 2019/20 annual report – LAC Municipal Waste Data Tables, Table 17; Northern Ireland local authority collected municipal waste management statistics 2015/16 annual report – Data tables appendix, Table 15a

HIGHLIGHTS

In 2019/20, Belfast had a lower percentage of household waste sent for preparing for re-use, dry recycling, and composting than Northern Ireland, and Belfast’s percentage was second lowest among LGDs. Belfast’s percentage was also 4.6 percentage points lower than Northern Ireland’s 2020 target of 50% for the recycling of household waste.

Between 2015/16 and 2019/20, the percentage of household waste sent for preparing for re-use, dry recycling, and composting increased in Belfast and in Northern Ireland, although the percentage increase was greater in Northern Ireland and the gap between the two widened. Among LGDs, Belfast had the second lowest percentage increase in the percentage of household waste sent for preparing for re-use, dry recycling, and composting.

9.3 Household Waste Sent to Landfill

IMPORTANCE

In the waste hierarchy, sending waste to landfill is the least preferable option and should be limited to the necessary minimum. Landfilled municipal waste can have dangerous effects on human health and on the environment. The generation of leachate can contaminate groundwater and methane is produced, which is a potent greenhouse gas. In addition, where recyclable waste is landfilled, materials are unnecessarily lost from the economy.⁹⁶

In the Northern Ireland Waste Management Strategy, one of the municipal waste targets was to recycle 50% of household waste by 2020.⁹⁷

DEFINITION

Household Waste is defined in the Waste and Contaminated Land (NI) Order 1997 (the 1997 Order) and Schedule 1 to the Controlled Waste Regulations (NI) 2002 (as amended) and means waste from a domestic property or other specified premises.⁹⁸

Local authority collected municipal waste data relate to all waste which is collected under arrangements made by a council. Household waste includes materials collected directly from households via kerbside collections, material taken to bring sites and civic amenity sites as well as several other smaller sources.

The household waste landfill rate is calculated by dividing total tonnage of household waste sent to landfill by total household waste arisings.

Information is from the Department of Agriculture, Environment and Rural Affairs (DAERA) Northern Ireland local authority collected municipal waste management statistics: 2019/20 NI LAC municipal waste management statistics 2019/20 annual report, and 2015/16 NI LAC municipal waste management statistics 2015/16 annual report.⁹⁹

96. Landfill waste (europa.eu) (Last accessed 5 July 2022)

97. Delivering Resource Efficiency - Northern Ireland Waste Management Strategy | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (page 39; last accessed 22 July 2022)

98. Delivering Resource Efficiency - Northern Ireland Waste Management Strategy | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (Last accessed 5 July 2022)

99. Northern Ireland local authority collected municipal waste management statistics | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) and Northern Ireland local authority collected municipal waste management statistics 2019/20 annual report | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) and Northern Ireland local authority collected municipal waste management statistics 2015/16 annual report | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (Last accessed 5 July 2022)

PROFILE FINDINGS

In 2019/20, in Belfast LGD, the percentage of household waste sent to landfill was 27.5%.

Between 2015/16 and 2019/20, in Belfast LGD, the percentage of household waste sent to landfill decreased by 12.5 percentage points, from 40.0% to 27.5%.

KEY COMPARISONS

Comparison with Northern Ireland

In 2019/20, when compared with Northern Ireland, the percentage of household waste sent to landfill was 3.8 percentage points higher in Belfast LGD, 27.5% compared with 23.7%.

Between 2015/16 and 2019/20, the percentage of household waste sent to landfill decreased:

- In Belfast LGD by 12.5 percentage points, from 40.0% to 27.5% (a percentage decrease of 31.25%)
- In Northern Ireland by 16.00 percentage points, from 39.7% to 23.7% (a percentage decrease of 40.30%; see Planet Figure 32)

Comparison with other LGDs

In 2019/20, when compared with other LGDs:

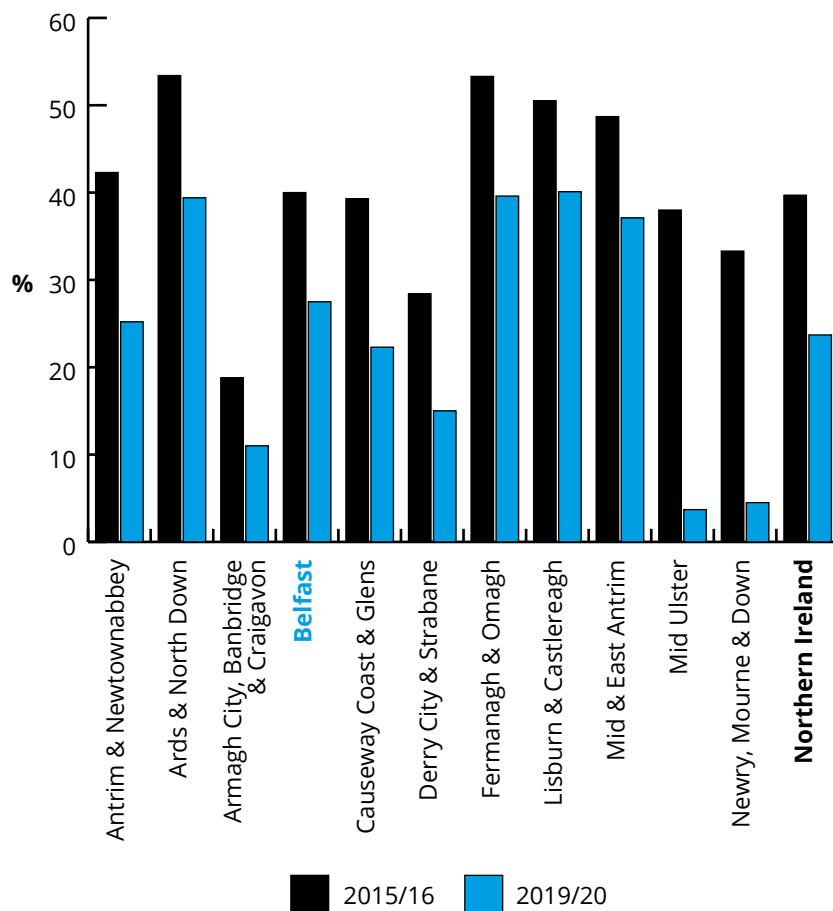
- Belfast LGD had the fifth highest percentage of household waste sent to landfill at 27.5%
- Lisburn & Castlereagh LGD had the highest at 40.1%
- Mid Ulster LGD had the lowest at 3.7%
- Antrim & Newtownabbey LGD had the median percentage at 25.2% (see Planet Figure 32)

Between 2015/16 and 2019/20, the percentage of household waste sent to landfill decreased in all LGDs:

- Belfast LGD had the fifth lowest percentage decrease, decreasing by 12.5 percentage points, from 40.0% to 27.5% (a percentage decrease of 31.25%)
- Mid Ulster LGD had the largest percentage decrease, decreasing by 34.3 percentage points from 38.0% to 3.7% (a percentage decrease of 90.26%)
- Lisburn & Castlereagh LGD had the smallest percentage decrease, decreasing by 10.4 percentage points, from 50.5% to 40.1% (a percentage decrease of 20.59%)
- Antrim & Newtownabbey LGD had the median percentage decrease, decreasing by 17.1 percentage points, from 42.3% to 25.2% (a percentage decrease of 40.43%; see Planet Figure 32)

PLANET FIGURE 32:

Percentage (%) of household waste sent to landfill by LGD and Northern Ireland, 2015/16 and 2019/20



Source: Northern Ireland local authority collected municipal waste management statistics 2019/20 annual report – LAC Municipal Waste Data Tables, Table 17; Northern Ireland local authority collected municipal waste management statistics 2015/16 annual report – Data tables appendix, Table 15a

HIGHLIGHTS

In 2019/20, Belfast had a higher percentage of household waste sent to landfill when compared with Northern Ireland and had a relatively high percentage among LGDs.

Between 2015/16 and 2019/20, the percentage of household waste sent to landfill decreased in Belfast and in Northern Ireland, although the percentage decrease was greater in Northern Ireland and the gap between the two widened. Among LGDs, Belfast had a relatively lower percentage decrease in household waste sent to landfill.

9.4 Reducing Plastic Consumption: Carrier Bags Dispensed by Retailers Under the Carrier Bag Levy

IMPORTANCE

It was estimated that 300 million single-use plastic bags were consumed in Northern Ireland in 2012.¹⁰⁰ Reducing plastic bag consumption can reduce carbon emissions and reduce pollution of the environment.

Plastic in the environment in the form of macro- or microplastics contaminates and accumulates in food chains through agricultural soils, terrestrial and aquatic food chains, and the water supply. Environmental plastic can leach toxic additives, or concentrate toxins already in the environment, such that they become bioavailable again for direct or indirect human exposure. As plastic particles degrade, new surface areas are exposed, with continued leaching of additives from the core to the surface of the particle in the environment and in the body. Direct exposure to microplastics through ingestion or inhalation can lead to health impacts, including inflammation, genotoxicity, oxidative stress, apoptosis, and necrosis, which are linked to negative health outcomes including cancer, cardiovascular diseases, inflammatory bowel disease, diabetes, rheumatoid arthritis, chronic inflammation, auto-immune conditions, neurodegenerative diseases, and stroke.¹⁰¹

The Single Use Carrier Bags Charge Regulations (Northern Ireland) 2013 were made on 15 January 2013 and came into operation on 8 April 2013. From that date, all sellers of goods in Northern Ireland had to charge their customers at least 5 pence (“the levy”) for each single use carrier bag supplied new. From 19 January 2015, the levy was extended to all carrier bags with a retail price of less than 20 pence, whether they are considered single use or reusable.¹⁰²

DEFINITION

Bags within the scope of the Regulations

- **Bags at the lower rate are those costing the customer only the 5-pence levy**
- **Bags at the upper rate are those which have had a price added by the retailer in advance of the 5-pence levy being applied**

100. Carrier bag levy annual statistics 2019/20 | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (Last accessed 7 July 2022)

101. Plastic-and-Health-The-Hidden-Costs-of-a-Plastic-Planet-EXECUTIVE-SUMMARY-February-2019.pdf (ciel.org) (Last accessed 7 July 2022)

102. Carrier bag levy annual statistics 2019/20 | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (Last accessed 7 July 2022)

Prior to 19 January 2015 the levy covered single use carrier bags, typically costing 5 pence. Retailers could charge more than 5 pence although this was uncommon. After the levy was extended, the numbers of upper rate bags increased as more bags fell within the scope of the Regulations. The extension specifically targeted all carrier bags with a retail price of less than 20 pence, which included lower-priced reusable bags. Since then, several retailers, as part of their internal pricing policy, have increased the price of their low-cost reusable bags to 20 pence or above, thereby ensuring such bags were outside the scope of the levy. [This could be a source of under-reporting for the number of carrier bags dispensed in total.]

Information for Northern Ireland is from the DAERA Carrier bag levy annual statistics 2019/20.¹⁰³ Information for England is from Defra Single-use plastic carrier bags charge: data in England for 2019 to 2020.¹⁰⁴

Data for Northern Ireland are from 1 April 2019 to 31 March 2020 (data for the last week of the reporting period were affected by restrictions due to the COVID-19 pandemic), whereas data for England are from 7 April 2019 to 6 April 2020 (the last 2 weeks of the reporting period were affected by restrictions due to the COVID-19 pandemic).

Calculation of bags per capita

Information on the 2019 mid-year estimates of the populations for Northern Ireland (1,893,667) and England (56,286,961) is from ONS.¹⁰⁵

PROFILE FINDINGS

Number of bags dispensed

In 2019/20, in Northern Ireland, 80,480,957 carrier bags were dispensed by retailers under the carrier bag levy.

Between 2014/15 and 2019/20, in Northern Ireland, the number of carrier bags dispensed in a financial year by retailers under the carrier bag levy decreased by 11,000,739, from 91,481,696 to 80,480,957 (a percentage decrease of 12.03%).

103. Carrier bag levy annual statistics 2019/20 | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (Last accessed 7 July 2022)

104. Single-use plastic carrier bags charge: data in England for 2019 to 2020 - GOV.UK (www.gov.uk) (last accessed 5 July 2022)

105. Population estimates for the UK, England and Wales, Scotland and Northern Ireland - Office for National Statistics (ons.gov.uk) (Last accessed 5 July 2022)

Bags per capita

In 2019/20, in Northern Ireland, the number of bags per capita dispensed by retailers under the carrier bag levy was 42.51.

KEY COMPARISONS

Comparison with England¹⁰⁶

Number of bags dispensed

In 2019/20, when compared with England, the number of bags dispensed by retailers under the carrier bag levy was fewer by 483.5 million in Northern Ireland, 80.5 million compared with 564 million.

Bags per capita

In 2019/20, when compared with England, the number of bags per capita dispensed by retailers under the carrier bag levy was higher by 32.49 bags per capita in Northern Ireland, 42.51 compared with 10.02 bags per capita.

HIGHLIGHTS

In 2019/20 in Northern Ireland, the number of carrier bags dispensed by retailers under the carrier bag levy was around 80.5 million, a decrease in the number in 2014/15 by around 11 million carrier bags.

When compared with England, although retailers in Northern Ireland dispensed far fewer carrier bags under the levy, by 483.5 million, the number of carrier bags dispensed per person was four times lower in England.

106. Rounded figures for the number of carrier bags dispensed by retailers were used for this comparison to ensure data were comparable

SECTION 10

Surface Water Status

10.1 River Water Body Overall Status

IMPORTANCE

Maintaining the quality of the water environment helps to protect and improve public health, supports agriculture and industry, protects and improves biodiversity and ecosystems, supports tourism and recreation, and contributes to adaptation to, and protection from, the impacts of climate change.

In Northern Ireland, the Water Framework Directive (WFD) was transposed into the Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017. The Water (Amendment) (Northern Ireland) (EU Exit) Regulations 2019 ensures that the WFD (as transposed) and the various supporting pieces of water legislation continue to operate in Northern Ireland after 1 January 2021.¹⁰⁷

In these regulations an integrated approach to the protection, improvement and sustainable use of rivers, lakes, groundwater, estuaries, and coastal waters is adopted, with two main approaches to managing the water environment:

1. Establishing environmental objectives that apply to all surface waters
2. Use of a river basin management planning system

There are three river basin districts (RBDs) in the north of the island of Ireland:

- The North Eastern RBD
- The Neagh Bann RBD
- The North Western RBD

The North Eastern RBD is the only RBD to be situated wholly within Northern Ireland; the other two RBDs are shared with the Republic of Ireland.¹⁰⁸

107. <http://niopa.qub.ac.uk/handle/NIOPA/14535> (Last accessed 4 July 2022)

108. Rivers - pressures and impacts (fwrinformationcentre.co.uk) (Last accessed 4 July 2022)

DEFINITION

The Northern Ireland regulations use five status classifications for surface water bodies:

1. High
2. Good
3. Moderate
4. Poor
5. Bad

The combined classification of “High” and “Good”, referred to as “Good of better”, is defined as a pass for water bodies, whereas the combined classification of “Moderate”, “Poor” and “Bad”, referred to as “Moderate or worse” or “Less than good”, is defined as a fail for water bodies.

To determine the status class of a water body up to 40 tests are carried out and if one of these tests fails the overall water body status fails.

Information is from the Draft 3rd cycle River Basin Management Plan: For the North Western, Neagh Bann and North Eastern River Basin Districts (2021-2027).¹⁰⁹

PROFILE FINDINGS

Belfast is in the North Eastern River Basin District (RBD), which covers around 4,000 km², with a total of 89 river water bodies. The principal river systems are the:

- Lagan
- Bush
- Quoile

109 <http://niopa.qub.ac.uk/handle/NIOPA/14535> (Last accessed 4 July 2022)

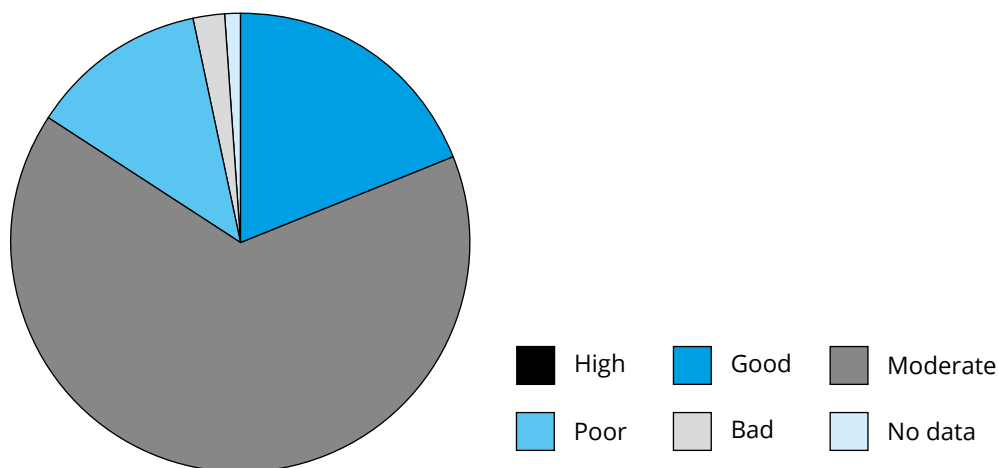
In 2018, in the North Eastern RBD, the number of river water bodies of:

- High status was 0 (0.0%)
- Good status was 17 (19.1%)
- Moderate status was 58 (65.2%)
- Poor status was 11 (12.4%)
- Bad status was 2 (2.2%; see Planet Figure 33)

There were no data for 1 river water body (1.1%).

PLANET FIGURE 33:

Percentage (%) of river water bodies by status in the North Eastern RBD, 2018



Source: Draft 3rd cycle River Basin Management Plan: For the North Western, Neagh Bann and North Eastern River Basin Districts (2021-2027), Table 19, page 65

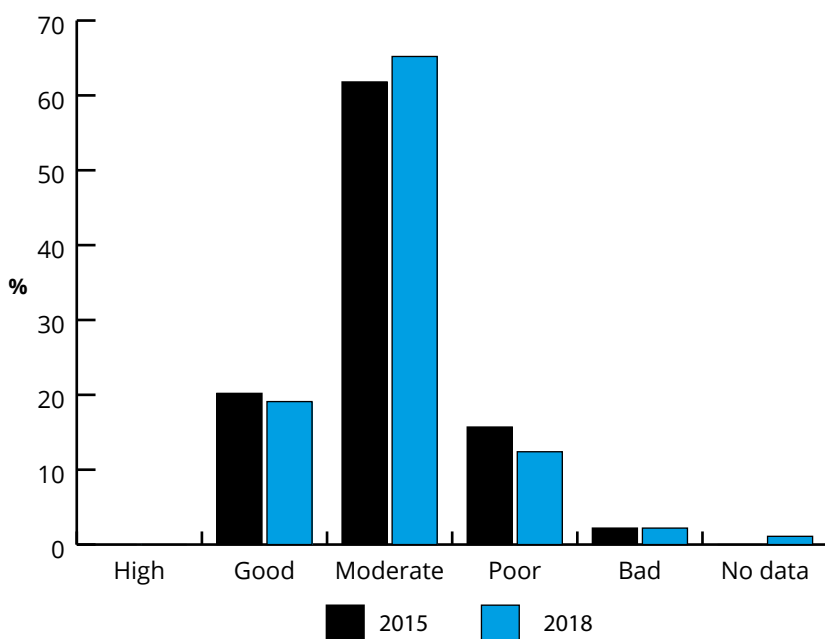
Between 2015 and 2018, in the North Eastern RBD, the number of river water bodies of:

- High status remained the same at 0 (0.0%)
- Good status decreased by 1, from 18 to 17 (20.2% to 19.1%)
- Moderate status increased by 3, from 55 to 58 (from 61.8% to 65.2%)
- Poor status decreased by 3 from 14 to 11 (from 15.7% to 12.4%)
- Bad status remained the same at 2 (2.2%; see Planet Figure 34)

The number of river water bodies for which there were no data increased by 1, from 0 to 1 (from 0.0% to 1.1%).

PLANET FIGURE 34:

Percentage (%) of river water bodies in the North Eastern RBD by status, 2015 and 2018



Source: Source: Draft 3rd cycle River Basin Management Plan: For the North Western, Neagh Bann and North Eastern River Basin Districts (2021-2027), Table 19, page 65

KEY COMPARISONS

Comparison across three RBDs in the north of the island of Ireland

In 2018, when compared with the north of the island of Ireland (across three RBDs), the percentage of river water bodies of:

- High status was 0.44 percentage points lower in the North Eastern RBD, 0.0% compared with 0.44%
- Good status was 11.79 percentage points lower in the North Eastern RBD, 19.1% compared with 30.89%
- Moderate status was 8.31 percentage points higher in the North Eastern RBD, 65.2% compared with 56.89%
- Poor status was 3.07 percentage points lower in the North Eastern RBD, 12.4% compared with 9.33%
- Bad status was 0.42 percentage points higher in the North Eastern RBD, 2.2% compared with 1.78% (see Planet Figure 35)

The percentage of river water bodies for which there were no data was 0.43 percentage points higher in the North Eastern RBD, 1.1% compared with 0.67%.

Between 2015 and 2018, the percentage of river water bodies of:

- High status remained the same in the North Eastern RBD at 0.0%, whereas it decreased by 1.34 percentage points in the north of the island of Ireland, from 1.78% to 0.44% (a percentage decrease of 75.28%)
- Good status decreased by 1.1 percentage points in the North Eastern RBD, from 20.2% to 19.1% (a percentage decrease of 5.45%), whereas it remained the same in the north of the island of Ireland at 30.89%
- Moderate status increased by 3.4 percentage points in the North Eastern RBD, from 61.8% to 65.2% (a percentage increase of 5.50%), and it increased by 2.44 percentage points in the north of the island of Ireland, from 54.45% to 56.89% (a percentage increase of 4.48%)
- Poor status decreased by 3.3 percentage points in the North Eastern RBD, from 15.7% to 12.4% (a percentage decrease of 21.02%), and it decreased in the north of the island of by 0.67 percentage points, from 10.0% to 9.33% (a percentage decrease of 6.70%)
- Bad status remained the same in the North Eastern RBD, at 2.2%, and in the north of the island of Ireland, at 1.78%

The percentage of river water bodies for which there were no data increased by 1.1 percentage points in the North Eastern RBD, from 0.0% to 1.1% (a percentage increase of 110%), whereas it decreased by 0.22 percentage points in the north of the island of Ireland, from 0.89% to 0.67% (a percentage decrease of 24.72%).

Comparison with other individual RBDs

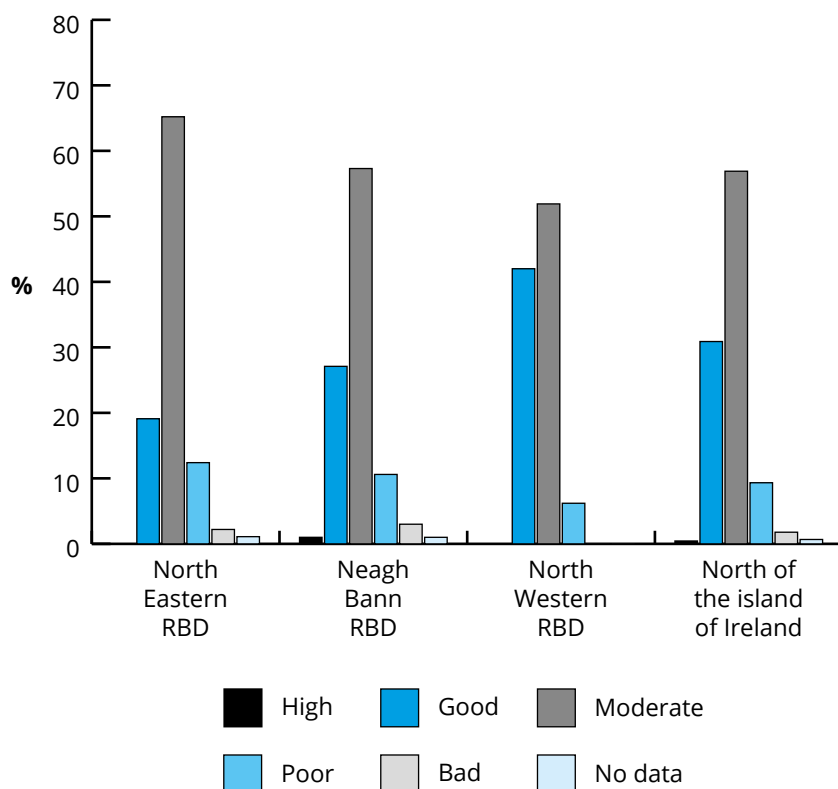
In 2018, when compared with other individual RBDs:

- The North Eastern RBD had the equal lowest percentage of river water bodies at high status at 0.0%, whereas Neagh Bann RBD had the highest percentage at 1.0%
- The North Eastern RBD had the lowest percentage of river water bodies at good status at 19.1%, whereas the North Western RBD had the highest at 42.0%
- The North Eastern RBD had the highest percentage of river water bodies at moderate status at 65.2%, whereas the North Western RBD had the lowest at 51.9%

- The North Eastern RBD had the highest percentage of river water bodies at poor status at 12.4%, whereas the North Western RBD had the lowest at 6.2%
- The North Eastern RBD had the median percentage of river water bodies at bad status at 2.2%, whereas the Neagh Bann RBD had the highest at 3.0%, and the North Western RBD had the lowest at 0.0%
- The North Eastern RBD had the highest percentage of river water bodies for which there were no data at 1.1%, compared with 1.0% in the Neagh Bann RBD and 0.0% in the North Western RBD (see Planet Figure 35)

PLANET FIGURE 35:

Percentage (%) of river water bodies by status and by individual RBD and all RBDs in the north of the island of Ireland, 2018



Source: Draft 3rd cycle River Basin Management Plan: For the North Western, Neagh Bann and North Eastern River Basin Districts (2021-2027), Table 1, page 45, Table 10, page 55, and Table 19, page 65

HIGHLIGHTS

In 2018, in the North Eastern RBD:

- There were no river water bodies of high status
- 2 river water bodies out of every 10 were of good status
- Between 6 and 7 out of every 10 were of moderate status
- Just over 1 out of every 10 were of poor status
- Only 2 rivers were of bad status

Therefore, only 2 out of every 10 rivers were classified as “Good or better” status in the North Eastern RBD, compared with:

- Almost 3 out of every 10 in the Neagh Bann RBD
- Over 4 out of every 10 in the North Western RBD
- 3 out of every 10 rivers across the three river basins in the north of the island of Ireland

This means that 8 out of every 10 river water bodies in the North Eastern RBD were of “Less than good” status.

Between 2015 and 2018, in the North Eastern RBD, overall there was deterioration in classification in one river water body from “Good or better” to “Less than good” status.

10.2 Water Body Status/Ecological Potential: Lagan Local Management Area

IMPORTANCE

Local Management Areas (LMAs) were established to manage and improve water quality at a local level through local involvement in the development of action plans.¹¹⁰

In Northern Ireland, the Water Framework Directive (WFD) was transposed into the Water Environment (Water Framework Directive) Regulations (Northern Ireland) 2017. The Water (Amendment) (Northern Ireland) (EU Exit) Regulations 2019 ensures that the WFD (as transposed) and the various supporting pieces of water legislation continue to operate in Northern Ireland after 1 January 2021.¹¹¹

In these regulations an integrated approach to the protection, improvement and sustainable use of rivers, lakes, groundwater, estuaries, and coastal waters is adopted, with two main approaches to managing the water environment:

1. Establishing environmental objectives that apply to all surface waters
2. Use of a river basin management planning system

The Lagan LMA is in the North Eastern RBD.

Belfast City Council's Green and Blue Infrastructure Plan (2020) recognises the social, economic, environmental and health benefits of the river for the city,¹¹² and the need to conserve and enhance Belfast's blue infrastructure, which is also highlighted in Northern Ireland's Regional Development Strategy 2035.¹¹³

Since 1994, a programme of dredging works in the River Lagan has had environmental and regeneration benefits for Belfast. In March 2020, a dredging project was completed which removed over 55,000 m³ of silt (largely organic material) to help the River Lagan's aeration system function more efficiently by ensuring a deeper water column. In addition, dredging will support flood management.¹¹⁴

110. Northern Ireland Local Management Areas - data.gov.uk (Last accessed 4 July 2022)

111. <http://niopa.qub.ac.uk/handle/NIOPA/14535> (Last accessed 4 July 2022)

112. BCC-AD-GBIP.pdf (pacni.gov.uk) (Last accessed 5 July 2022)

113. Regional Development Strategy 2035 | Department for Infrastructure (infrastructure-ni.gov.uk) (Last accessed 5 July 2022)

114. River Lagan dredging project | Department for Communities (communities-ni.gov.uk) (Last accessed 22 July 2022)

DEFINITION

The Northern Ireland regulations use five status classifications for surface water bodies:

1. High
2. Good
3. Moderate
4. Poor
5. Bad

The combined classification of “High” and “Good”, referred to as “Good of better”, is defined as a pass for water bodies, whereas the combined classification of “Moderate”, “Poor” and “Bad”, referred to as “Moderate or worse” or “Less than good”, is defined as a fail for water bodies.

If the surface water bodies have been designated as artificial or heavily modified, they are classified using ecological ‘potential’ rather than ecological ‘status’, i.e., Good/Moderate/Poor/Bad ecological potential.

Information is from the Northern Ireland Environment Agency (NIEA) Local Management Areas: Reasons for status for the water bodies within the Lagan LMA, December 2015.¹¹⁵

PROFILE FINDINGS

In 2015, in the Lagan LMA, there were 19 sampling sites:

- 13 were on natural water bodies
- 5 were on water bodies classified as heavily modified, such as the ‘impounded’ stretch of the River Lagan in Belfast from Stranmillis Weir to Lagan Weir,
- 1 was in the heavily modified water body of Belfast Harbour

115 <http://niopa@qub.ac.uk/handle/NIOPA/1131> (last accessed 4 July 2022)

Of the 13 natural water bodies:

- 11 were of moderate status
- 2 were of poor status (see Planet Table 4)

Of the 6 heavily modified water bodies, including Belfast Harbour:

- 4 were of moderate ecological potential
- 2 were of poor ecological potential (see Planet Table 5)

PLANET TABLE 4:

Status of natural water bodies in the Lagan LMA, 2015

Natural water body	Status	
	Poor	Moderate
Hillsborough Park Lake Stream		
River Lagan (Bull's Brook)		
Ravernet River (Sprucefield)		
River Lagan (Larch Hill)		
Ravernet River (Mount Pleasant)		
Ravernet Tributary		
River Lagan (Dromara)		
Eel Burn (Lagan)		
Edenordinary Stream		
Brookmount Stream		
Collin Glen River		
River Lagan (Lisburn)		
Minnowburn		

Source: NIEA) Local Management Areas: Reasons for status for the water bodies within the Lagan LMA, December 2015

PLANET TABLE 5:

Ecological potential of heavily modified water bodies in the Lagan LMA including Belfast Harbour, 2015

Heavily modified water body	Ecological potential	
	Poor	Moderate
Connswater		
Derriaghy River		
Blackstaff (Belfast) River		
River Lagan (Stranmillis)		
Lagan Estuary		
Belfast Harbour		

Source: NIEA) Local Management Areas: Reasons for status for the water bodies within the Lagan LMA, December 2015

HIGHLIGHTS

In 2015, in the Lagan LMA:

- There were no natural water bodies of high or good status, all were “less than good” or “moderate or worse”
- There were no heavily modified water bodies of good ecological potential, all were “less than good” or “moderate or worse”

SECTION 11

Public Drinking Water Quality

11.1 - Compliance with Standards

- Water-quality Events

- Customer Contacts and Complaints

IMPORTANCE

Safe, clean drinking water is important for public health, whether it is used for drinking, domestic use, food production or recreational purposes.

The WHO produces guidelines for drinking-water quality to promote and protect public health by advocating for:

- The development of locally relevant standards and regulations (health-based targets)
- The adoption of preventive risk management approaches covering catchment to consumer (Water Safety Plans)
- Independent surveillance to ensure that Water Safety Plans are being implemented and effective and that national standards are being met¹¹⁶

In Northern Ireland, standards for water quality and monitoring are enshrined in the Water Supply (Water Quality) Regulations (Northern Ireland) 2017, which are based on the European Directive on Drinking Water Quality and more stringent UK national standards. Water supplied for domestic use or food production is required to comply with these standards.

Future regulatory proposals, however, may be developed for chemical, microbiological and/or aesthetic parameters. For instance, research is being undertaken by Cranfield University on the potential exposure of consumers to

116. Guidelines for drinking-water quality: Fourth edition incorporating the first and second addenda (who.int) (Last accessed 5 July 2022)

microplastics through drinking water, as a basis for assessing any associated risks; there is currently a lack of information on the removal of microplastics in drinking water treatment processes.¹¹⁷

DEFINITION

Compliance with standards

Water quality is routinely monitored by the Drinking Water Inspectorate (DWI) for Northern Ireland against the following parameters:

- **Microbiological**
- **Physical**
- **Chemical**
- **Aesthetic**

Tests are carried out on samples taken from water treatment works, service reservoirs and customer taps.

Water quality events

Northern Ireland Water (NI Water) inform the DWI of events that have affected or are likely to affect drinking water quality or sufficiency and subsequently there may be a risk to consumers' health. Each event is assessed into one of five categories based on increasing severity:

- **Not significant**
- **Minor**
- **Significant**
- **Serious**
- **Major**

117. Research Programme - Drinking Water Inspectorate (dwi.gov.uk) (Last accessed 5 July 2022)

The event assessment process takes account of:

- **The area and estimate of the population/properties affected**
- **The nature and cause of the event**

Information is from the DWI, Drinking Water Quality in Northern Ireland, 2019: A Report by the Drinking Water Inspectorate for Northern Ireland.¹¹⁸

PROFILE FINDINGS

Compliance with standards

In 2019, in Northern Ireland, public drinking water compliance:

- **With chemical and microbiological standards was high at 99.90%**
- **At customers' taps or supply points was high at 99.84%**

In 2019, in Northern Ireland, a total of 99,371 tests of drinking water quality were undertaken:

- **54,074 for microbiological quality, 30 of which did not meet the standards (0.06%)**
- **45,297 for chemical quality, 70 of which did not meet the standards (0.13%; see Planet Table 6 for further details)**

Between 2015 and 2019, overall drinking water compliance increased by 0.07 percentage points, from 99.83% to 99.90%.

118. Drinking Water Quality Report for Northern Ireland, 2019.pdf (daera-ni.gov.uk) (Last accessed 22 July 2022)

PLANET TABLE 6:

Number of tests of water quality undertaken, and number not meeting test standards, by type of sampling point, Northern Ireland, 2019

Sampling point	Number of tests undertaken	Number of tests not meeting test standards and reason	
		Chemical	Microbiological
Leaving water treatment works	18,992: 6,488 chemical; 12,504 microbiological	7 (0.11%): turbidity	1 (0.01%): coliform bacteria
Water service reservoirs	29,846	-	13 (0.04%): coliform bacteria
Consumers' taps or supply points	50,533: 38,809 chemical; 11,724 microbiological	63 (0.16%): 61 zone chemical analysis; 2 supply-point chemical analysis	16 (0.14%): 13 coliform bacteria; 2 Clostridium perfringens; 1 E. coli

Source: DWI: Drinking Water Quality in Northern Ireland, 2019: A Report by the Drinking Water Inspectorate for Northern Ireland, Table 1.2, page 7

Water quality events

In 2019, in Northern Ireland, 52 water-quality events were reported to the DWI by Northern Ireland Water (NI Water), there were:

- 0 major events
- 2 'serious' events (3.85%) – in both cases, *Cryptosporidium* oocysts were detected at water treatment works (which supply Belfast among other settlements), but following advice from the Public Health Agency (PHA) detections were not considered to be of sufficient public health concern to put restrictions in place
- 30 'significant' events (57.70%)s, 20 of which occurred at water treatment works and were primarily related to difficulties with the treatment process or a lack of effective treatment with respect to aluminium, *Clostridium perfringens*, *Cryptosporidium*, individual pesticides (2-methyl-4-chlorophenoxyacetic acid, MCPA), odour and taste, trihalomethanes (THMs), and turbidity; where *Cryptosporidium* was detected in drinking water, NI Water sought advice from the PHA, however, the detections were not of sufficient concern to put restrictions in place
- 8 'minor' events (15.38%)
- 12 'not significant' events (23.08%)

Customer contacts and complaints

In 2019, in Northern Ireland, 5,661 customer contacts were made to NI Water about public drinking water:

- **63.93% related to appearance, with discolouration caused by suspended particles of iron and manganese accounting for almost two-thirds (62.37%) of these contacts**
- **15.17% related to taste and odour, with chlorinous taste accounting for almost half of these contacts (47%), almost double the percentage of customer contacts about chlorinous taste in 2018**

HIGHLIGHTS

In 2019, in Northern Ireland, compliance with drinking water quality standards was high, and has improved since 2015. In 2019, there were no water-quality events of public health concern, and over 6 out of every 10 customer contacts and complaints to NI Water were about discolouration of public drinking water.

SECTION 12

Air Quality

12.1 - Air Quality: Automatic Urban and Rural Network - Nitrogen Dioxide - Particulate Matter, PM_{2.5}

IMPORTANCE

Particulate matter (PM) and nitrogen dioxide (NO₂) are major components of urban air pollution:

- Particulate matter, a mixture of solid and liquid particles mainly produced by the combustion of fuels, is classified by aerodynamic size; PM_{2.5} are fine particles less than 2.5 µm in diameter, which pose a risk to health because they can be drawn deeper into the lungs – long-term exposure increases mortality and morbidity from cardiovascular and respiratory diseases
- Nitrogen dioxide is produced by combustion processes, together with nitric oxide – short-term exposure to nitrogen dioxide at high concentrations is a respiratory irritant that can cause inflammation of the airways; nitrogen dioxide is associated with reduced lung development and respiratory infections in early childhood, and effects on lung function in adulthood, together with reduced life expectancy¹¹⁹

Using 2011 data, the Air Quality Management Resource Centre at the University of the West of England found social inequalities in exposure to traffic-related pollution in England & Wales: although households in the ‘poorest’ areas emitted the least nitrogen oxides and particulate matter and households in the least ‘poor’ (more affluent) areas emitted the highest nitrogen oxides and particulate matter per kilometre travelled (due to higher vehicle ownership, more diesel vehicles, and longer travel distances), households in poorer areas had the highest concentrations of traffic-related pollution. It was also found that areas with the highest proportions of children under the age of 5 years and of young adults had the highest concentrations of traffic-related pollution.¹²⁰

119 Health matters: air pollution - GOV.UK (www.gov.uk) (Last accessed 2 July 2022)

120 Emissions vs exposure: Increasing injustice from road traffic-related air pollution in the United Kingdom - ScienceDirect (Last accessed 17 July 2022)

According to IQAir's 2019 World Air Quality Report, of 130 cities reported, Belfast was the UK's third most polluted city for PM_{2.5} pollution in 2019. There was an annual average of 12.9 µg/m³ PM_{2.5} concentration, which exceeded the WHO's guideline of an annual mean concentration of 10 µg/m³ by 29%.¹²¹

DEFINITION

A range of air quality monitoring is carried out in Northern Ireland. Some monitoring sites are run as part of UK-wide monitoring networks; others are operated by district councils to meet local objectives. There are two sites in Belfast that are part of the national Automatic Urban and Rural Network (AURN):

- **Belfast Centre – an urban background monitoring site for nitrogen dioxide and PM_{2.5}**
- **Belfast Stockman's Lane – a roadside monitoring site for nitrogen dioxide (added to the network in 2014)**

In the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland, the updated objectives for the annual mean concentrations are:

- **20 µg/m³ for PM_{2.5}**
- **40 µg/m³ for nitrogen dioxide¹²²**

Data for the AURN sites in Belfast were extracted from DEFRA UK Air, Air Information Resource, Annual and Exceedance Statistics – a tool that allows the user to select the monitoring network, pollutant, metric, sites, and time-period, and it returns the chosen statistics.¹²³

121. Northern Ireland Air Quality Index (AQI) and United Kingdom Air Pollution | IQAir (Last accessed 21 July 2022)

122. Air_Quality_Objectives_Update.pdf (defra.gov.uk) (Last accessed 22 July 2022)

123. Annual and Exceedance Statistics - Defra, UK (Last accessed 2 July 2022)

PROFILE FINDINGS

Nitrogen dioxide (NO₂)

Belfast Centre, AURN – Urban background monitoring site

In 2019, at Belfast Centre, the annual mean concentration for nitrogen dioxide was 24 µg/m³ which was 16 µg/m³ below the limit value of 40 µg/m³ for the annual mean (see Planet Table 7).

Between 2009 and 2019, at Belfast Centre:

- The annual mean concentration for nitrogen dioxide decreased by 9 µg/m³, from 33 to 24 µg/m³ (a percentage decrease of 27.27%)
- The annual minimum increased by 2 µg/m³, from 0 to 2 µg/m³
- The annual maximum decreased by 18 µg/m³, from 159 to 141 µg/m³ (a percentage decrease of 11.32%; see Planet Table 7)

PLANET TABLE 7:

Annual mean, minimum, and maximum concentrations for nitrogen dioxide at Belfast Centre, 2009 and 2019

Nitrogen dioxide	2009	2019
Annual mean (µg/m ³)	33	24
Annual minimum (µg/m ³)	0	2
Annual maximum (µg/m ³)	159	141

Source: Data extracted from Annual and Exceedance Statistics, UK AIR, Air Information Resource

Between 2009 and 2019, at Belfast Centre, there was no exceedance of the annual mean concentration for nitrogen dioxide with respect to the AQS objective for 2020.

Belfast Stockman's Lane, AURN – Roadside monitoring site

In 2019, at Belfast Stockman's Lane, the annual mean concentration for nitrogen dioxide was 45 µg/m³ which was 5 µg/m³ above the limit value of 40 µg/m³ for the annual mean (see Planet Table 8).

Between 2014 and 2019, at Belfast Stockman's Lane:

- The annual mean concentration for nitrogen dioxide decreased by 14 µg/m³, from 59 to 45 µg/m³ (a percentage decrease of 23.73%)
- The annual minimum stayed the same at 1 µg/m³

- The annual maximum decreased by 88 $\mu\text{g}/\text{m}^3$, from 275 to 187 $\mu\text{g}/\text{m}^3$ (a percentage decrease of 32.00%; see Planet Table 8)

PLANET TABLE 8:

Annual mean, minimum, and maximum concentrations for nitrogen dioxide at Belfast Stockman's Lane, 2014 and 2019

Nitrogen dioxide	2014	2019
Annual mean ($\mu\text{g}/\text{m}^3$)	59	45
Annual minimum ($\mu\text{g}/\text{m}^3$)	1	1
Annual maximum ($\mu\text{g}/\text{m}^3$)	275	187

Source: Data extracted from Annual and Exceedance Statistics, UK AIR, Air Information Resource

Between 2014 and 2019, at Belfast Stockman's Lane, there was an exceedance each year of the annual mean concentration for nitrogen dioxide with respect to the AQS objective for 2020.

Particulate matter, $\text{PM}_{2.5}$

Belfast Centre, AURN – Urban background monitoring site

In 2019, at Belfast Centre, the annual mean concentration for $\text{PM}_{2.5}$ was 11 $\mu\text{g}/\text{m}^3$ which was 9 $\mu\text{g}/\text{m}^3$ below the limit value of 20 $\mu\text{g}/\text{m}^3$ for the annual mean (see Planet Table 9).

Between 2009 and 2019, at Belfast Centre:

- The annual mean concentration for $\text{PM}_{2.5}$ decreased by 1 $\mu\text{g}/\text{m}^3$, from 12 to 11 $\mu\text{g}/\text{m}^3$ (a percentage decrease of 8.33%)
- The annual minimum remained the same at -1 $\mu\text{g}/\text{m}^3$
- The annual maximum decreased by 236 $\mu\text{g}/\text{m}^3$, from 310 to 74 $\mu\text{g}/\text{m}^3$ (a percentage decrease of 76.13%; see Planet Table 9)

PLANET TABLE 9:

Annual mean, minimum, and maximum concentrations for PM_{2.5} at Belfast Centre, 2009 and 2019

PM _{2.5}	2009	2019
Annual mean (µg/m ³)	12	11
Annual minimum (µg/m ³)	-1	-1
Annual maximum (µg/m ³)	310	74

Source: Data extracted from Annual and Exceedance Statistics, UK AIR, Air Information Resource

Between 2009 and 2019, at Belfast Centre, there was no exceedance of the annual mean concentration for PM_{2.5} with respect to the AQS objective for 2020.

HIGHLIGHTS

In 2019, as part of the UK's AURN:

- Belfast's urban background monitoring site at Belfast Centre for nitrogen dioxide concentration was below the limit value for the annual mean
- Belfast's urban background monitoring site at Belfast Centre for PM_{2.5} concentration was below the limit value for the annual mean
- Belfast's roadside monitoring site at Belfast Stockman's Lane for nitrogen dioxide concentration was above the limit value for the annual mean and reached the AQS objective

Between 2009 and 2019:

- At Belfast Centre, the annual mean concentrations for background nitrogen dioxide and PM_{2.5} decreased
- At Belfast Stockman's Lane, the annual mean concentration for roadside nitrogen dioxide decreased, although it remained above the limit value

Decreases in the concentrations of nitrogen dioxide and PM_{2.5} are important, even when concentrations are below the limit values. This is because there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects. Therefore, reductions in particulate matter or nitrogen dioxide concentrations below air quality standards are likely to bring additional health benefits.¹²⁴

124. Health matters: air pollution - GOV.UK (www.gov.uk) (Last accessed 2 July 2022)

12.2 - Air Quality: Local Air Quality Management

- Carbon Monoxide
- Benzene
- Metallic and Other Polluting Elements
- Ozone
- Particulate Matter, PM₁₀
- Particulate Matter, PM_{2.5}
- Nitrogen Dioxide

IMPORTANCE

Epidemiological studies have shown that long-term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality. There is also emerging evidence to suggest that air pollution:

- May affect the brain and is possibly linked to dementia and cognitive decline
- Is associated with early life effects such as low birth weight

The population groups more affected by air pollution are:

- Pregnant women
- Children
- Older people
- People with existing heart or lung problems
- Low-income communities
- Communities living in areas of higher pollution, such as close to busy roads¹²⁵

125. Health matters: air pollution - GOV.UK (www.gov.uk) (Last accessed 21 July 2022)

DAERA is developing a Clean Air Strategy for Northern Ireland to reduce emissions from transport, homes, agriculture, and industry to protect health and the environment and to promote green innovation.¹²⁶

DEFINITION

A wide range of air quality monitoring is carried out in Northern Ireland. Some monitoring sites are run as part of UK-wide monitoring networks; others are operated by district councils to meet local objectives. Local Air Quality Management (LAQM) provides the framework under the Environment Order (NI) 2002, within which air quality is managed by the 11 district councils in Northern Ireland. LAQM requires district councils to review and assess a range of air pollutants against the objectives set by the UK Air Quality Strategy, using a range of monitoring, modelling, observations, and corresponding analyses. For locations where objectives are not expected to be met by the relevant target date, district councils are required to declare an Air Quality Management Area (AQMA), and (along with relevant authorities), to develop an Action Plan addressing the problem.

In Belfast LGD, there are monitoring sites for:

- **Carbon monoxide (CO)**
- **Benzene**
- **Metallic and other polluting elements**
- **Ozone (O₃)**
- **Particulate matter, PM₁₀**
- **Particulate matter, PM_{2.5}**
- **Nitrogen dioxide (NO₂)¹²⁷**

The UK air quality standards and objectives relevant to specific pollutants monitored in Northern Ireland are shown in Planet Table 10.

126. Policy - Northern Ireland Air (airqualityni.co.uk) (Last accessed 1 July 2022)

127. Polycyclic aromatic hydrocarbons (PAHs) were not monitored in Belfast

PLANET TABLE 10:

UK air quality standards and objectives relevant to pollutants monitored as part of LAQM in Northern Ireland¹²⁸

Pollutant	Concentration	Measurement	Other information
Carbon monoxide	10 mg/m ³ AQS objective & EU limit value	Maximum daily running 8-hour mean	
Benzene	3.25 µg/m ³ AQS objective	Running annual mean	
Lead	0.25 µg/m ³ AQS objective 0.5 µg/m ³ EU limit value	Total content in PM ₁₀ fraction average over a calendar year	
Arsenic	6 ng/m ³ EU target value		
Cadmium	5 ng/m ³ EU target value		
Nickel	20 ng/m ³ EU target value		
Ozone	100 µg/m ³ not to be exceeded more than 10 times a year, AQS objective 120 µg/m ³ not to be exceeded more than 25 times a year averaged over 3 years, EU target value	Maximum daily running 8-hour mean	WHO guideline: 100 µg/m ³
PM10	50 µg/m ³ not to be exceeded more than 35 times a year, AQS objective & EU limit value	24-hour mean	
PM10	40 µg/m ³ AQS objective & EU limit value	Annual mean	
PM2.5	20 µg/m ³ AQS objective & EU Stage 2 limit value 25 µg/m ³ EU Stage 1 limit value	Annual mean	WHO guideline: 10 µg/m ³
Nitrogen dioxide	200 µg/m ³ not to be exceeded more than 18 times a year, AQS objective & EU limit value	1-hour mean	
Nitrogen dioxide	40 µg/m ³ AQS objective & EU limit value	Annual mean	

Source: DAERA, Northern Ireland Air, Air Quality in Northern Ireland, Reports, Air Quality in NI, Air Pollution in Northern Ireland – 2019.¹²⁹

128. Air_Quality_Objectives_Update.pdf (defra.gov.uk) and Air quality standards and objectives - Northern Ireland Air (airqualityni.co.uk) (Last accessed 22 July 2022)

129. Air Quality in NI. Air Pollution in Northern Ireland – 2019. Reports - Northern Ireland Air (airqualityni.co.uk) (Last accessed 22 July 2022)

PROFILE FINDINGS

Carbon monoxide

In 2019, carbon monoxide was monitored at only one site in Northern Ireland, at Belfast Centre. For the maximum daily running 8-hour mean, carbon monoxide concentrations did not exceed 10 mg/m^3 , thereby meeting:

- The Air Quality Strategy (AQS) objective
- The EU limit value

Benzene

In 2019, benzene was monitored at only one site in Northern Ireland, at Belfast Centre. For the running annual mean, benzene concentrations did not exceed $3.25 \text{ } \mu\text{g/m}^3$, thereby meeting the AQS objective.

Metallic and other polluting elements

In 2019, metallic and other polluting elements were monitored at only one site in Northern Ireland, at Belfast Centre (which is part of the Heavy Metals Network):

- For the annual mean, lead concentrations did not exceed the AQS objective of $0.25 \text{ } \mu\text{g/m}^3$ nor the EU limit value $0.5 \text{ } \mu\text{g/m}^3$
- For the total content in PM_{10} fraction average over a calendar year, concentrations of arsenic, cadmium, and nickel were within the EU target values for human health for these pollutants

Ozone

In 2019, ozone was monitored at three sites in Northern Ireland, one of which was at Belfast Centre. For the maximum daily running 8-hour mean, ozone concentrations at none of the sites exceeded:

- The AQS objective of $100 \text{ } \mu\text{g/m}^3$ not to be exceeded more than 10 times a year
- The EU target value for human health of $120 \text{ } \mu\text{g/m}^3$ not to be exceeded more than 25 times a year averaged over three years

Particulate matter, PM₁₀

In 2019, PM₁₀ was monitored at 11 sites in Northern Ireland, two of which were in Belfast: Belfast Centre and Belfast Stockman's Lane. PM₁₀ concentrations at none of the sites exceeded the AQS objectives and EU limit values of:

- 50 µg/m³ for the 24-hour mean, not to be exceeded more than 35 times a year
- 40 µg/m³ for the annual mean

Particulate matter, PM_{2.5}

In 2019, PM_{2.5} was monitored at three sites in Northern Ireland, one of which was at Belfast Centre. For the annual mean, PM_{2.5} concentrations at none of the sites exceeded:

- The AQS objective and EU Stage 2 limit value of 20 µg/m³
- The EU Stage 1 limit value of 25 µg/m³

Nitrogen dioxide

In 2019, nitrogen dioxide was monitored at 16 sites in Northern Ireland, five of which were in Belfast:

- Belfast Ormeau Road
- Belfast Centre
- Belfast Newtownards Road
- Belfast Westlink Roden Street
- Belfast Stockman's Lane

In 2019, for the 1-hour mean, nitrogen dioxide concentrations at none of the sites exceeded 200 µg/m³ more than 18 times a year, thereby meeting:

- The AQS objective
- The EU limit value

In 2019, for the annual mean, nitrogen dioxide concentrations at four of the 16 sites in Northern Ireland, including at Belfast Stockman's Lane, exceeded 40 µg/m³, thereby meeting:

- The AQS objective
- The EU limit value

Belfast Stockman's Lane is one of two sites in Belfast affiliated into the national network for monitoring compliance with the Air Quality Directive (see page 160). In 2019, for the annual mean, nitrogen dioxide concentrations at this site exceeded the EU limit value of 40 µg/m³.

KEY COMPARISONS

Comparison with other monitoring sites¹³⁰

Ozone

In 2019, of the 3 sites at which maximum daily running 8-hour mean concentrations of ozone were monitored, one of which was in Belfast:

- The highest value was recorded at Lough Navar
- Lower values that were similar were recorded at Belfast Centre and Derry Rosemount

In a trend analysis of ozone concentrations using Openair: a software package of tools for analysis of air pollution data, it was found that:

- Between 1980 and 2019, at Lough Navar, there was no significant trend in measured ozone concentrations
- Between 1992 and 2019, at Belfast Centre, however, there has been a significant increase of 0.24 µg/m³ per year (P=0.001)

130. Where more than one site is involved and at least one of the sites is in Belfast

Particulate matter, PM_{10}

In 2019, of the 11 sites at which annual mean concentrations of PM_{10} were monitored, two of which were in Belfast:

- The highest value was recorded at Belfast Stockman's Lane
- The lowest value was recorded at Lough Navar
- The median value was recorded at Belfast Centre

Particulate matter, $PM_{2.5}$

In 2019, of the three sites at which annual mean concentrations of $PM_{2.5}$ were monitored, one of which was in Belfast:

- The highest value was recorded at Belfast Centre
- The lowest value was recorded at Lough Navar
- The median value was recorded at Derry Rosemount

Nitrogen dioxide

In 2019, of the of the 16 sites at which annual mean concentrations of nitrogen dioxide were monitored, five of which were in Belfast:

- The highest value was recorded at Limavady Dungiven
- The lowest value was recorded at Derry Rosemount
- Belfast Stockman's Lane had the second highest value
- Belfast Westlink Roden Street had the sixth highest value
- Belfast Newtownards Road had the eighth highest value
- Belfast Centre had the seventh lowest value
- Belfast Ormeau Road had the sixth lowest value

HIGHLIGHTS

In 2019, local air quality management information for Belfast showed that nitrogen dioxide was the only pollutant for which there had been an exceedance of the AQS objective and EU limit value for the annual mean at Belfast Stockman's Lane.

For particulate matter, in 2019, although there were no exceedances of the AQS objectives and EU limit values for the annual mean and 24-hour mean for PM₁₀ and the annual mean for PM_{2.5}, when compared with other monitoring sites for these pollutants:

- **Belfast Stockman's Lane had the highest recorded concentration of PM₁₀**
- **Belfast Centre had the highest recorded concentration of PM_{2.5}**

Between 1992 and 2019, there has been a year-on-year increase in the concentration of ozone at Belfast Centre. It is likely that this is due to air-quality management reductions in nitrogen oxides emissions. A decrease in nitrogen oxides can lead to an increase in ozone in urban areas because there is limited nitrogen oxide available to react with and scavenge ozone. It is possible that this situation could result in exceedance of ozone limit values at Belfast Centre in future.¹³¹

131. Air Quality in NI. Air Pollution in Northern Ireland – 2019. Reports - Northern Ireland Air (airqualityni.co.uk) (Last accessed 21 July 2022)

12.3 - Air Quality: Local Air Quality Management - Air Quality Management Areas

IMPORTANCE

Epidemiological studies have shown that long-term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality. There is also emerging evidence to suggest that air pollution:

- **May also affect the brain and is possibly linked to dementia and cognitive decline**
- **Is associated with early life effects such as low birth weight**

The population groups more affected by air pollution are:

- **Pregnant women**
- **Children**
- **Older people**
- **People with existing heart or lung problems**
- **Low-income communities**
- **Communities living in areas of higher pollution, such as close to busy roads¹³²**

DAERA is developing a Clean Air Strategy for Northern Ireland to reduce emissions from transport, homes, agriculture, and industry to protect health and the environment and to promote green innovation.¹³³

132. Health matters: air pollution - GOV.UK (www.gov.uk) (Last accessed 21 July 2022)

133. Policy - Northern Ireland Air (airqualityni.co.uk) (Last accessed 1 July 2022)

DEFINITION

Local Air Quality Management (LAQM) provides the framework under the Environment Order (NI) 2002, within which air quality is managed by the 11 district councils in Northern Ireland. LAQM requires district councils to review and assess a range of air pollutants against the objectives set by the UK Air Quality Strategy, using a range of monitoring, modelling, observations, and corresponding analyses. For locations where objectives are not expected to be met by the relevant target date, district councils are required to declare an Air Quality Management Area (AQMA), and (along with relevant authorities), to develop an Action Plan addressing the problem.

Information is from DAERA, Northern Ireland Air, Air Quality in Northern Ireland, Reports, Air Quality in NI, Air Pollution in Northern Ireland – 2019.¹³⁴

PROFILE FINDINGS

In 2019, in Belfast LGD:

- There were four AQMAs, comprising 21.05% of Northern Ireland's total
- All four AQMAs were established to monitor nitrogen dioxide concentrations from road traffic

Between 2004 and 2019, in Belfast LGD:

- The number of AQMAs remained the same at four
- In 2016, one AQMA was amended to include PM_{2.5} concentrations in addition to nitrogen dioxide concentrations

KEY COMPARISONS

Comparison with Northern Ireland

In 2019, in Northern Ireland, the number of AQMAs was 19.

Comparison with other LGDs

In 2019, when compared with other LGDs:

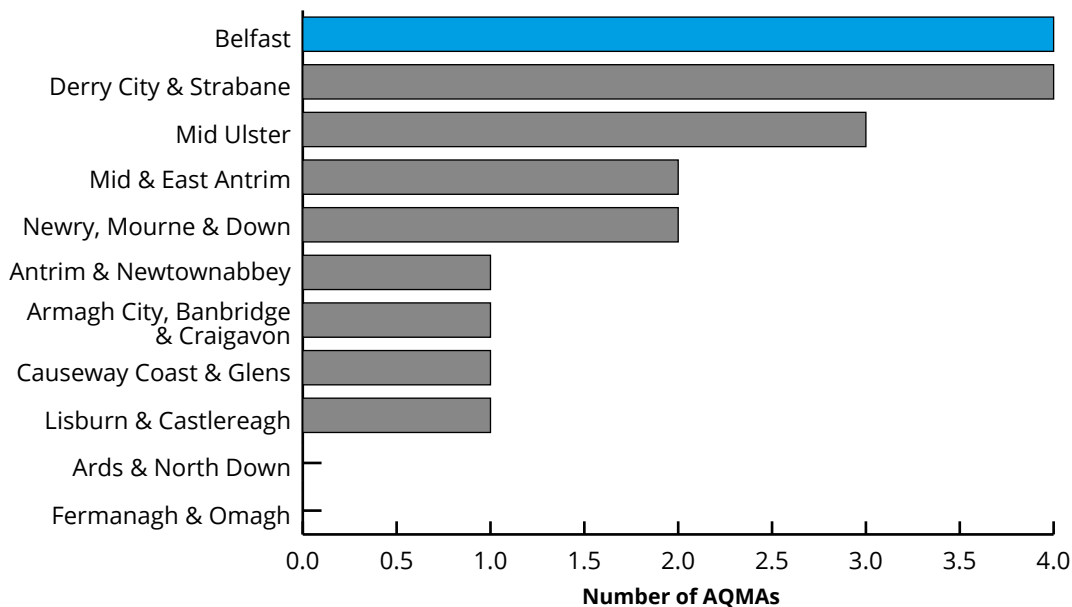
- Belfast LGD had the equal highest number of AQMAs at 4, together with Derry City & Strabane LGD

¹³⁴ Reports - Northern Ireland Air (airqualityni.co.uk) (Last accessed 2 July 2022)

- Ards & North Down LGD and Fermanagh & Omagh LGD had the equal lowest number at 0
- Four LGDs had the median number at 1 (see Planet Figure 36)

In 2019, of the LGDs that had AQMAs, all were established to monitor concentrations of nitrogen dioxide from road traffic, apart from one of the two in Mid & East Antrim LGD and one of the two in Newry, Mourne & Down LGD which were established to monitor concentrations of PM10 (coarse particles).

PLANET FIGURE 36:
Number of AQMAs by LGD, 2019



Source: DAERA: Air Pollution in Northern Ireland 2019, Table 3.1, page 9

HIGHLIGHTS

In 2019, Belfast had 2 out of every 10 AQMAs in Northern Ireland, as did Derry City & Strabane. Belfast and Derry City & Strabane also had the highest number of AQMAs among LGDs.

The four AQMAs in Belfast were established to monitor concentrations of nitrogen dioxide, but in 2016 one of the AQMAs was amended to include the monitoring of PM_{2.5} concentrations.

SECTION 13

Noise

13.1 - Total Noise Complaints Received

- Rate of Noise Complaints
- Number of Notices Served
- Rate of Notices Served

IMPORTANCE

The main health impacts of noise depend on the level of noise and its duration, but include:

- Sleep disturbance
- Cardiovascular effects
- Poorer work performance
- Poorer school performance
- Impaired hearing

Population groups who are more sensitive or vulnerable to noise include children, older people, and people with a long-term condition; shift workers are at increased risk of health and wellbeing impacts from excessive noise, and people on low incomes are likely to be affected disproportionately by excessive noise.¹³⁵

In a European Environment Agency noise health risk assessment, it was found that in Europe:

- Road traffic noise is a particular public health problem across many urban areas
- Long-term exposure to environmental noise contributes to new cases of heart disease and premature deaths every year

135. Noise (who.int) (Last accessed 21 July 2022)

- Annoyance and sleep disturbance account for the bulk of the burden of disease linked to noise¹³⁶

The most common complaints relating to excessive noise in Northern Ireland include:

- Lack of sleep
- Inability to relax
- Interruption to conversations or television programmes.¹³⁷
- Definition Noise complaints
- Noise complaints are categorised according to the source of the noise:
 - Domestic
 - Commercial & Leisure
 - Industrial
 - Noise in the Street
 - Construction, Demolition, and Roadworks
 - Transport

Notices served

There are two statutory instruments relating to noise in Northern Ireland:

1. **Clean Neighbourhoods and Environment Act (Northern Ireland) 2011 (CNEA), which gives district councils the power to deal with noise they consider to be prejudicial to health or noise that comprises a statutory nuisance**
2. **Noise Act 1996 (NA), which gives councils the power to issue warning and fixed penalty notices and in certain circumstances to seize noise-making equipment emitting noises during night hours**

136. Health risks caused by environmental noise in Europe — European Environment Agency (europa.eu) (Last accessed 22 July 2022)

137. Noise complaint statistics for Northern Ireland 2018 to 2019.PDF (daera-ni.gov.uk) (Last accessed 30 June 2022)

Information is from DAERA Noise, Noise complaints report, Noise complaint statistics for Northern Ireland 2018 to 2019, and Noise Complaint Statistics for Northern Ireland 2015 to 2016, 138 and NINIS Noise Complaints (administrative geographies).

PROFILE FINDINGS

Total noise complaints received

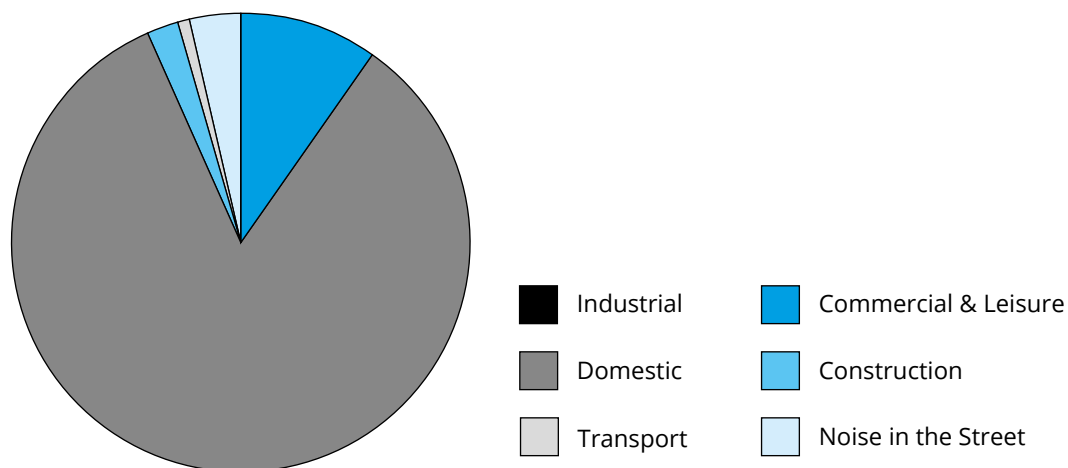
In 2018/19, in Belfast LGD, the total noise complaints received was 6,989, representing 55.63% of Northern Ireland's total.

In 2018/19, in Belfast LGD, the categories of total noise complaints received were:

- Domestic in 83.60% of cases
- Commercial & Leisure in 9.90% of cases
- Noise in the Street in 3.49% of cases
- Construction, demolition, and roadworks in 2.06% of cases (see Planet Figure 37 for all main categories of complaint)

PLANET FIGURE 37:

Main categories of noise complaints received (%) in Belfast LGD, 2018/19



Source: Noise Complaint Statistics for Northern Ireland 2018 to 2019, Table 1, pages 11-12

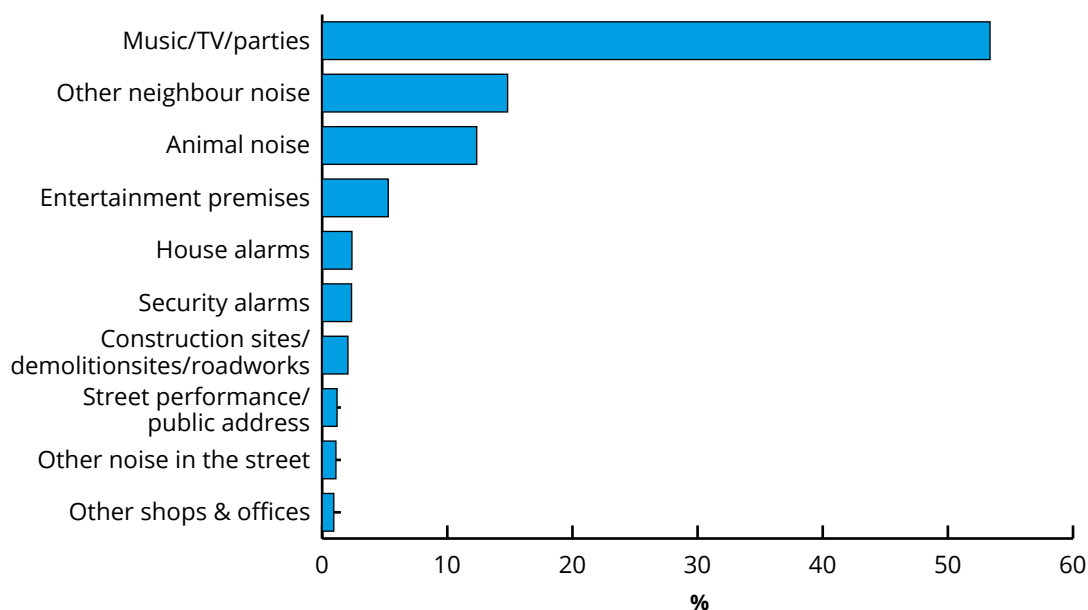
138. Noise | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk) (Last accessed 30 June 2022)

In 2018/19, in Belfast LGD, the main reasons for noise complaints were:

- **Domestic:** music/TV/parties, other neighbour noise, animal noise, and house alarms
- **Commercial & Leisure:** entertainment premises, security alarms, and other shops & offices
- **Construction sites/Demolition sites/Roadworks**
- **Noise in the Street:** street performance/public address, and other (see Planet Figure 38)

PLANET FIGURE 38:

Reasons for noise complaints (%) in Belfast LGD, 2018/19



Source: Noise Complaint Statistics for Northern Ireland 2018 to 2019, Table 1, pages 11-12

Between 2015/16 and 2019/20, the total noise complaints received increased by 762, from 6,227 to 6,989.

Rate of noise complaints

In 2017/18, in Belfast LGD, the rate of noise complaints was 19.92 per 1,000 population.

Between 2015/16 and 2017/18, in Belfast LGD, the rate of noise complaints increased by 1.55 per 1,000 population, from 18.37 to 19.92 per 1,000 population.

Number of notices served

In 2018/19, in Belfast LGD, the number of notices served was 511, representing 95.51% of Northern Ireland's total.

Between 2015/16 and 2018/19, the number of notices served increased by 30, from 481 to 511.

Rate of notices served

In 2018/19, in Belfast LGD, the rate of notices served was 7.31 per 100 complaints.

Between 2015/16 and 2018/19, the rate of notices served decreased by 0.41 per 100 complaints, from 7.72 to 7.31 per 100 complaints.

KEY COMPARISONS

Comparison with Northern Ireland

Total noise complaints received

In 2018/19, in Northern Ireland, the total noise complaints received was 12,563.

Between 2015/16 and 2018/19, the total noise complaints received increased:
In Belfast LGD by 762, from 6,227 to 6,989 (a percentage increase of 12.24%)
In Northern Ireland by 1,809, from 10,754 to 12,563 (a percentage increase of 16.82%)

Rate of noise complaints

In 2017/18, when compared with Northern Ireland, the rate of complaints was higher by 13.63 per 1,000 population in Belfast LGD, 19.92 compared with 6.29 per 1,000 population.

Between 2015/16 and 2017/18, the rate of complaints increased:

- In Belfast LGD by 1.55 per 1,000 population, from 18.37 to 19.92 per 1,000 population (a percentage increase of 8.44%)
- In Northern Ireland by 0.48 per 1,000 population, from 5.81 to 6.29 per 1,000 population (a percentage increase of 8.26%)

Number of notices served

In 2018/19, the number of notices served in Northern Ireland was 535.

Between 2015/16 and 2018/19, the number of notices served increased:

- In Belfast LGD by 30, from 481 to 511 (a percentage increase of 6.24%)
- In Northern Ireland by 27, from 508 to 535 (a percentage increase of 5.31%)

Rate of notices served

In 2018/19, when compared with Northern Ireland, the rate of notices served was higher by 3.05 per 100 complaints in Belfast LGD, 7.31 compared with 4.26 per 100 complaints (see Place Figure 39).

Between 2015/16 and 2018/19, the rate of notices served decreased:

- In Belfast LGD by 0.41 per 100 complaints, from 7.72 to 7.31 per 100 complaints (a percentage decrease of 5.31%)
- In Northern Ireland by 0.44 per 100 complaints, from 4.70 to 4.26 per 100 complaints (a percentage decrease of 9.36%; see Place Figure 39)

Comparison with other LGDs

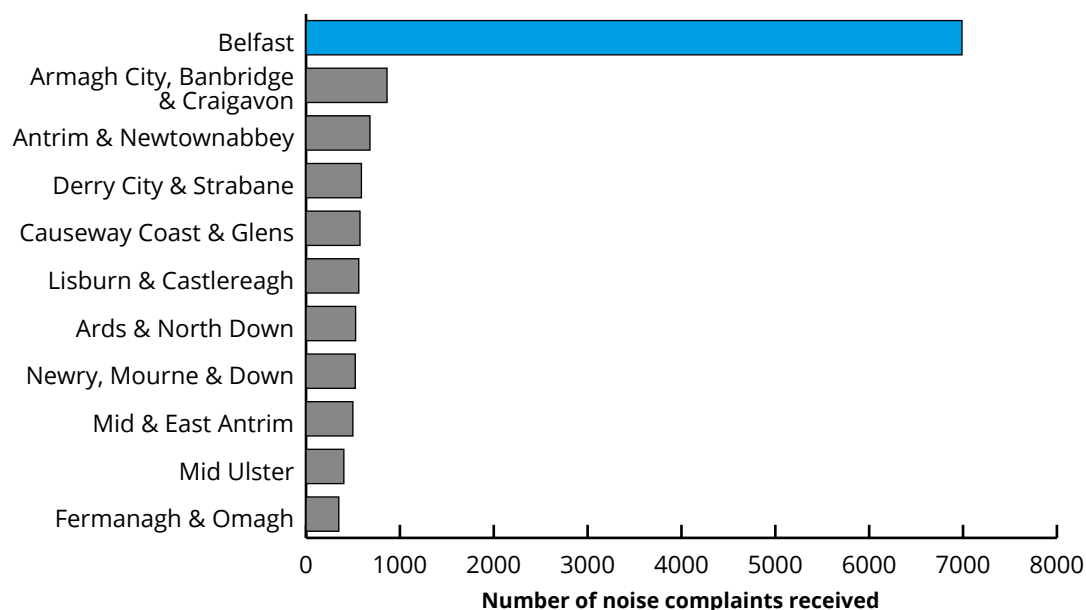
Total noise complaints received

In 2018/19, when compared with other LGDs:

- Belfast LGD had the highest total complaints received at 6,989
- Fermanagh & Omagh LGD had the lowest total at 349
- Lisburn & Castlereagh LGD had the median total at 562 (see Planet Figure 39)

PLANET FIGURE 39:

Total number of noise complaints received by LGD, 2018/19



Source: Noise Complaint Statistics for Northern Ireland 2018 to 2019, Table 1, pages 11-12

Rate of noise complaints

In 2017/18, when compared with other LGDs:

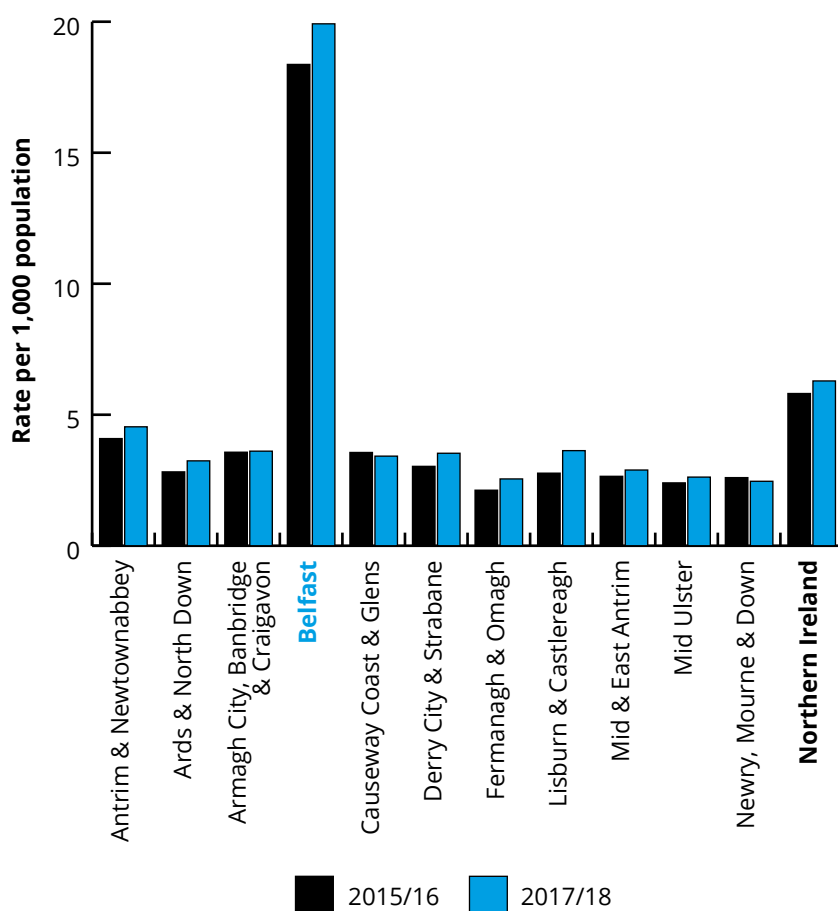
- Belfast LGD had the highest rate of noise complaints at 19.92 per 1,000 population
- Newry, Mourne & Down LGD had the lowest rate at 2.46 per 1,000 population
- Causeway Coast & Glens LGD had the median rate at 3.42 per 1,000 population (see Planet Figure 40)

Between 2015/16 and 2017/18, the rate of noise complaints:

- Increased in nine LGDs, including Belfast LGD
- Decreased in two LGDs (see Planet Figure 40)

PLANET FIGURE 40:

Rate of noise complaints per 1,000 population by LGD and Northern Ireland, 2015/16 and 2017/18



Source: NINIS: Noise Complaints (administrative geographies) Pivot Table

Number of notices served

In 2018/19, when compared with other LGDs:

- Belfast LGD had the highest number of notices served at 511
- Three LGDs had the lowest number of notices served at 0
- Four LGDs had the median number at 2

Rate of notices served

In 2018/19, when compared with other LGDs:

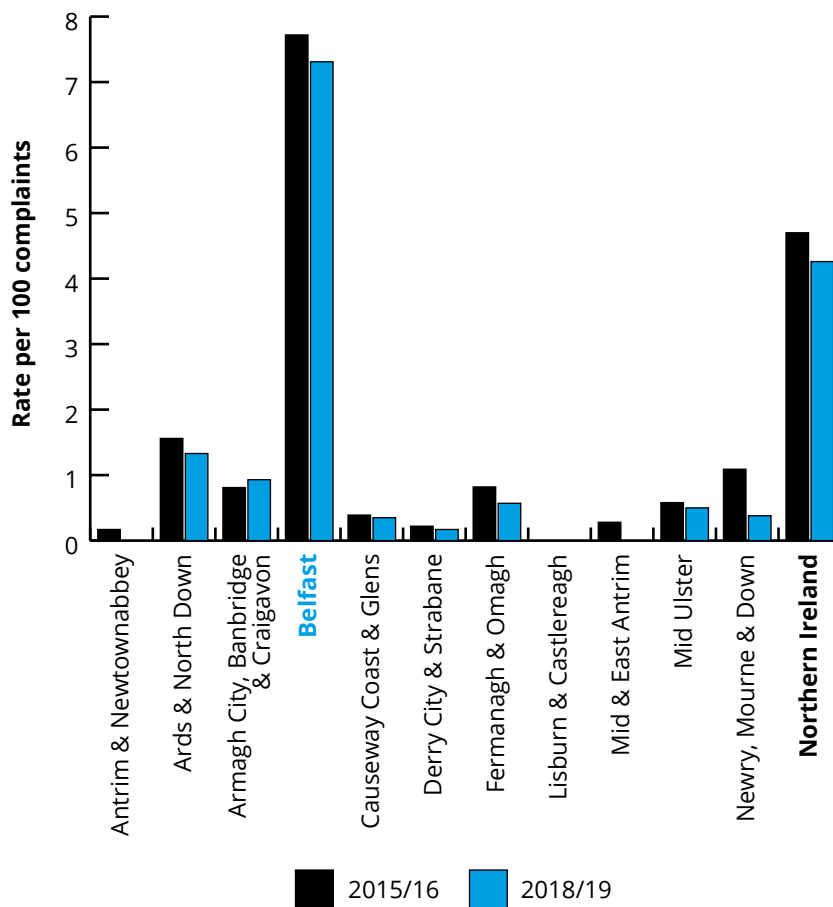
- Belfast LGD had the highest rate of notices served at 7.31 per 100 complaints
- Three LGDs had the lowest of notices served at 0.00 per 100 complaints
- Newry, Mourne & Down LGD had the median value at 0.38 per 100 complaints (see Planet Figure 41)

Between 2015/16 and 2018/19, the rate of notices served:

- Decreased in nine LGDs, including Belfast LGD
- Remained the same in one LGD
- Increased in one LGD (see Planet Figure 41)

PLANET FIGURE 41:

Rate of notices served per 100 complaints by LGD and Northern Ireland, 2015/16 to 2018/19



Source: Noise Complaint Statistics for Northern Ireland 2015 to 2016, Table 2, page 13; Noise Complaint Statistics for Northern Ireland 2018 to 2019, Table 2, page 18

HIGHLIGHTS

In 2018/19, between 5 and 6 out of every 10 noise complaints in Northern Ireland were made in Belfast, and Belfast had the highest total noise complaints of any LGD.

In 2018/19, in Belfast:

- More than 8 out of every 10 complaints were about domestic noise
- More than 5 out of every 10 complaints were about domestic noise from music, TV, and parties
- Only 1 out of every 10 complaints were about commercial and leisure noise
- Less than 1 out of every 10 complaints were about the other categories of noise

Between 2015/16 and 2018/19, the total noise complaints received increased in Belfast and in Northern Ireland, although the percentage increase was greater for Northern Ireland and the gap between the two widened.

In 2017/18, the rate of noise complaints in Belfast was three times higher than that in Northern Ireland, and almost five times or more higher than the rate in any other LGD.

Between 2015/16 and 2017/18, the rate of noise complaints increased in Belfast and in Northern Ireland, but the percentage increase in Belfast was slightly greater and the gap between the two widened.

In 2018/19, the number and the rate of notices served were higher in Belfast than in Northern Ireland and were the highest among LGDs. Although Belfast had the highest rate of notices served for noise complaints, less than 1 out of every 10 noise complaints in Belfast resulted in a notice being served. Moreover, between 2015/16 and 2018/19, although the number of notices served increased in Belfast, the rate of notices served decreased. The rate of notices served also decreased in Northern Ireland, but the percentage decrease was greater in Northern Ireland than in Belfast, and the gap between the two widened.



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