Guernsey Annual Greenhouse Gas Bulletin

2021

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The Greenhouse Gas Bulletin provides annual updates of Guernsey's greenhouse gas emissions inventory. The analysis is provided by Aether Limited who compile the figures as part of the UK National Atmospheric Emissions Inventory.

States of Guernsey

1.1 Introduction

The Greenhouse Gas Bulletin provides annual updates of Guernsey's greenhouse gas emissions inventory. The analysis is provided by Aether Limited who compile the figures as part of the UK National Atmospheric Emissions Inventory. The methodology behind the calculations is constantly being refined and, as such, the figures published in each of these annual reports should not be compared with those previously published.

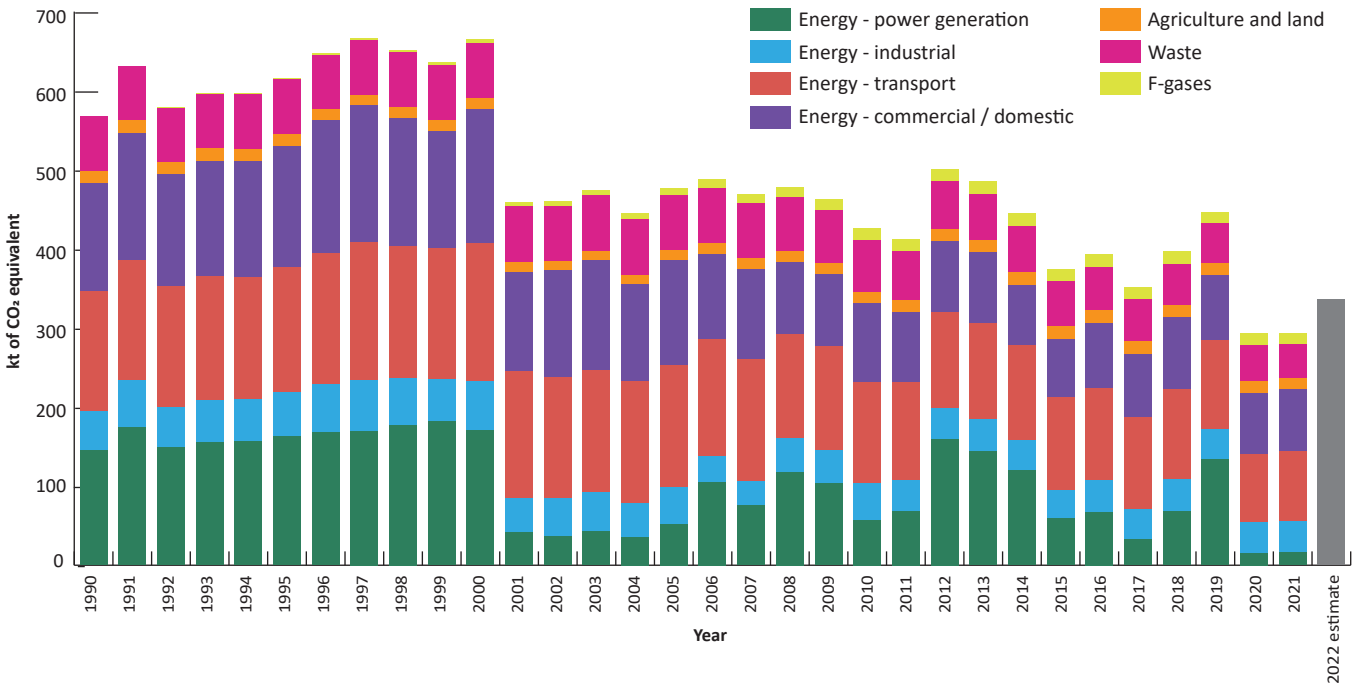
The Kyoto Protocol was extended to the Bailiwick of Guernsey in 2006. The Doha Amendment to the Kyoto Protocol was adopted in 2012 with a commitment period from 2013-2020. The Doha Amendment was extended to the Bailiwick of Guernsey on 1st September 2020, and came into effect on 31st December 2020 following receipt by the Depositary of the required number of ratifications.

The analysis provided in this bulletin uses 1990 as a base year for comparison. The inventory is for the island of Guernsey only.

1.2 Headlines

- Greenhouse gas emissions from Guernsey increased by 0.2% from 2020 to 2021; 293.2kt of carbon dioxide (CO_2) equivalent in 2021, compared to 292.5kt in 2020.
- The cumulative percentage change in Guernsey's greenhouse gas emissions between 1990 and 2021 was a decrease of 48.3% (or 273.7kt of CO_2 equivalent). Emissions in 1990 totalled 567.0kt.
- The provisional estimate for total greenhouse gas emissions in 2022 is 336kt.
- Transport contributed the largest proportion (30.4%) of the greenhouse gases emitted in 2021, followed by commercial and domestic combustion, at 26.6%.
- The majority (74.6%) of the emissions were in the form of carbon dioxide.

Figure 1.2.1 Total emissions by source



1.3 Key data

Greenhouse gas emissions need to be calculated in a consistent manner across all jurisdictions to ensure comparability and avoid double counting or omissions.

The content and structure of the inventory is based on the categories defined by the United Nations Economic Commission for Europe (UNECE). See **www.unece.org** for more information.

The methodology behind the calculations is constantly being refined and, as such, the figures published in each of these annual reports should not be compared with those previously published.

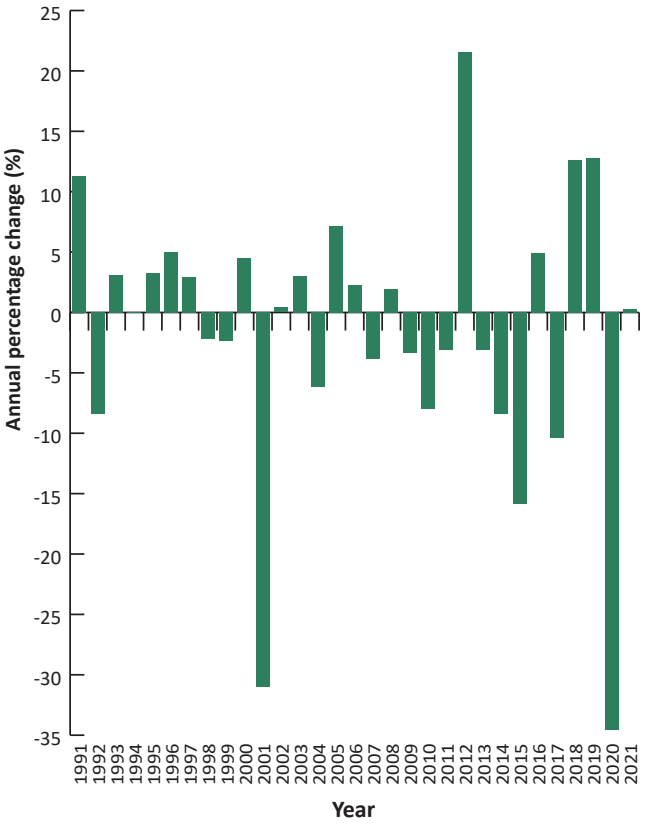
In 2021, Guernsey's emissions totalled 293.2kt of CO_2 equivalent, which equates to 4.6 tonnes per capita. The total was 0.2% higher than in 2020 (see **Table 1.3.1**) and 48.3% lower than in 1990.

An initial estimate of total greenhouse gas emissions for 2022, produced using forecasting methods, is 336kt (as shown in **Figure 1.2.1**). The expected rise is due to an increase in the amount of electricity produced on island in 2022, together with increased travel emissions due to the lifting of all COVID-19 travel restrictions.

Table 1.3.1 Key data

Date	Total emissions (kt of CO_2 equivalent)	Annual % change	Cumulative % change
1990	567.0		
1991	631.2	11.3%	11.3%
1992	578.3	-8.4%	2.0%
1993	596.3	3.1%	5.2%
1994	596.3	0.0%	5.2%
1995	615.8	3.3%	8.6%
1996	646.8	5.0%	14.1%
1997	665.7	2.9%	17.4%
1998	651.1	-2.2%	14.8%
1999	635.8	-2.3%	12.1%
2000	664.6	4.5%	17.2%
2001	458.4	-31.0%	-19.1%
2002	460.3	0.4%	-18.8%
2003	474.3	3.0%	-16.3%
2004	444.9	-6.2%	-21.5%
2005	476.9	7.2%	-15.9%
2006	487.7	2.3%	-14.0%
2007	468.9	-3.8%	-17.3%
2008	478.1	2.0%	-15.7%
2009	462.2	-3.3%	-18.5%
2010	425.4	-8.0%	-25.0%
2011	412.1	-3.1%	-27.3%
2012	501.0	21.6%	-11.6%
2013	485.5	-3.1%	-14.4%
2014	444.7	-8.4%	-21.6%
2015	374.3	-15.8%	-34.0%
2016	392.6	4.9%	-30.8%
2017	351.9	-10.4%	-37.9%
2018	396.2	12.6%	-30.1%
2019	447.0	12.8%	-21.2%
2020	292.5	-34.6%	-48.4%
2021	293.2	0.2%	-48.3%
2022 est	336.1	14.6%	-40.7%

Figure 1.3.1 Annual percentage change in total emissions



2.1 Emissions inventory - type

Emissions of the greenhouse gases; carbon dioxide, methane, nitrous oxide and fluorinated gases (hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride) are all estimated for the inventory. They are all presented in the form of carbon dioxide (CO_2) equivalents for ease of comparison.

In 2021, Guernsey's emissions totalled 293.2kt of CO_2 equivalent, which equates to 4.6 tonnes per capita.

Table 2.1.1 shows that the majority (218.9 kt) of Guernsey's emissions are in the form of carbon dioxide (CO_2). The main source of these emissions is combustion of fossil fuels for power generation, transport and heating, i.e. energy.

The variability in recent years as shown in **Figure 1.2.1** is largely due to changes in the amount of power being generated on island. Faults in the electricity cable between Guernsey and Jersey/ France were experienced in 2012/13 and again in 2018/19, resulting in more electricity being generated on island using heavy fuel oil.

Table 2.1.1 Emissions by type

Date	Carbon Dioxide (kt)	Methane (kt of CO_2 equivalent)	Nitrous Oxide (kt of CO_2 equivalent)	F-Gases (kt of CO_2 equivalent)
1990	475.8	83.6	7.6	0.0
1991	539.6	83.9	7.7	0.0
1992	486.6	84.2	7.4	0.1
1993	504.1	84.4	7.5	0.2
1994	503.6	84.5	7.7	0.5
1995	522.4	84.7	7.9	0.8
1996	555.8	82.0	7.6	1.3
1997	573.8	82.4	7.7	1.9
1998	558.6	82.3	7.6	2.6
1999	542.2	82.6	7.7	3.4
2000	570.3	82.5	7.6	4.2
2001	365.2	81.2	6.9	5.1
2002	367.0	80.7	6.8	5.9
2003	379.9	80.9	6.8	6.7
2004	349.7	80.9	6.7	7.6
2005	380.0	81.8	6.8	8.3
2006	389.0	81.8	6.7	10.2
2007	370.3	80.9	6.6	11.1
2008	379.3	80.0	6.9	12.0
2009	364.2	77.8	6.9	13.3
2010	327.5	76.7	7.2	14.1
2011	316.7	73.5	7.0	14.9
2012	406.4	71.8	7.2	15.6
2013	391.9	70.4	7.3	15.9
2014	351.6	69.9	7.4	15.8
2015	283.2	68.3	7.1	15.7
2016	303.1	66.6	7.2	15.7
2017	263.7	65.1	7.3	15.7
2018	309.9	63.6	7.4	15.4
2019	362.9	62.0	7.4	14.7
2020	213.7	57.8	6.9	14.1
2021	218.9	53.3	6.9	14.2

Figure 3.1.1 and **Figure 3.1.2** show the proportions of emissions contributed by different sources in 1990 and 2021. This data is also provided in **Tables 6.1.1 to 6.1.4** in the **Appendix**.

Transport contributed the largest proportion of emissions in 1990 and 2021, at 26.7% and 30.4% respectively.

Power generation contributed the second largest proportion in 1990 at 25.6%. In 2021 this was 5.4%.

Waste contributed 12.1% in 1990 and 14.5% in 2021.

Industrial combustion contributed 8.8% in 1990 compared with 13.4% in 2021, whilst commercial and domestic combustion went from 24.0% in 1990 to 26.6% in 2021.

Agriculture, land use, land use change and forestry contributed 2.8% in 1990 and 4.8% in 2021.

F-Gases, which contributed less than 0.1% in 1990, contributed 4.8% in 2021.

In 2021, the total emissions by mass were 293.2kt of CO_2 equivalent, whereas in 1990, the total emissions by mass were 567.0kt of CO_2 equivalent.

The changes in emissions by mass from each source, are given on **pages 7** to **13** and in **Table 6.1.1** on **page 14**.

Figure 3.1.1 Percentage contribution of emissions by source in 1990

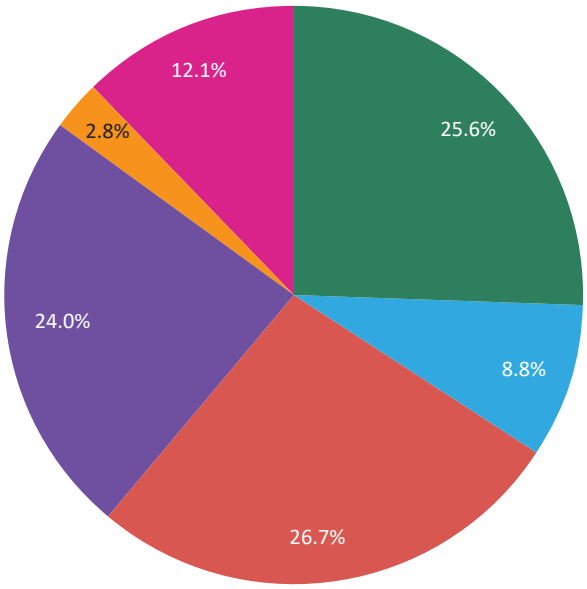


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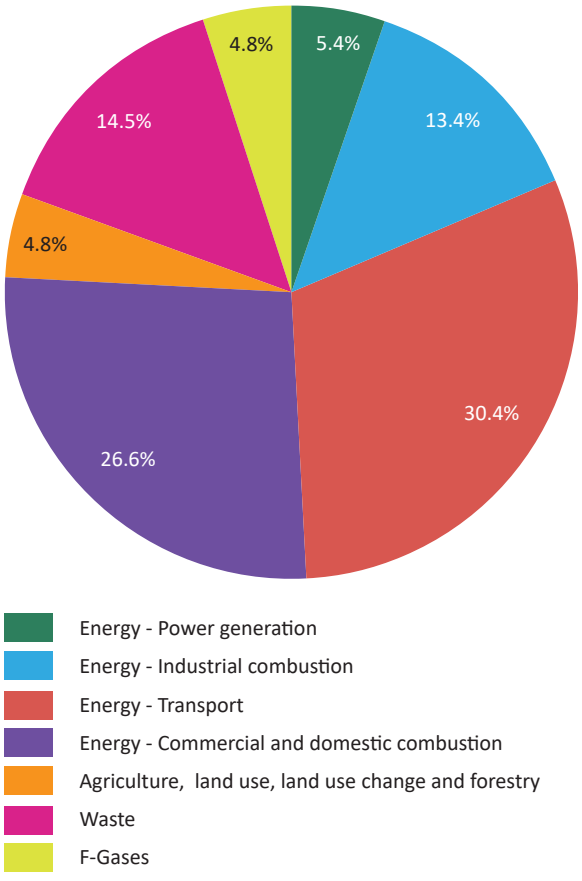
Figure 3.1.2 Percentage contribution of emissions by source in 2021



3.1 Emissions inventory - source

The emissions inventory is “source based”, which means it reflects only emissions released from Guernsey. As such, emissions resulting from the generation of electricity in Europe, which is imported for consumption in Guernsey, are not included. Electricity has been imported via a cable link to France since 2001, resulting in a significant decrease in the amount of power generated on-island.

Combustion of fuels for energy (including electricity generation, heating, industrial processes and transport) has contributed the largest proportion of emissions since 1990. The majority of the emissions are in the form of carbon dioxide, but methane and nitrous oxide are also released in the combustion processes. In 2021, emissions from fuels for energy constituted 75.8% of the total emissions.

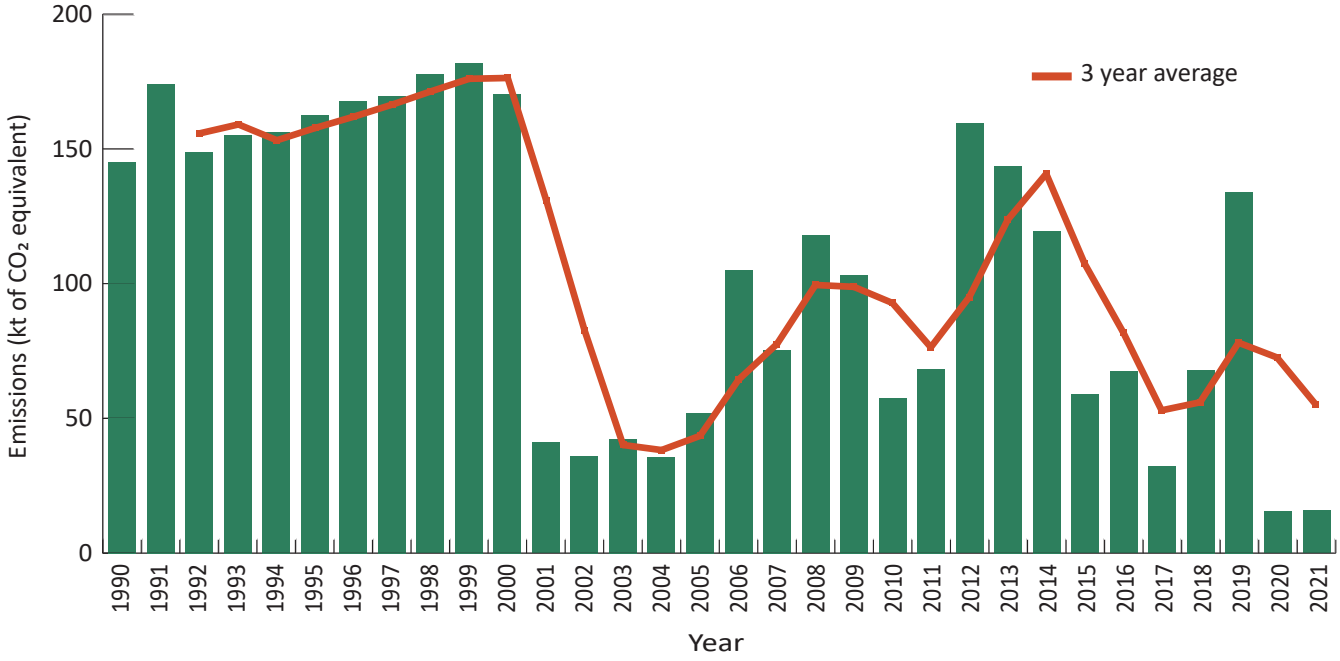
Landfilled waste is the next largest contributor to Guernsey’s total emissions and the proportion it has contributed has changed little since 1990. The emissions are mostly in the form of methane gas, which is released by decomposing material. There was a large reduction in the amount of waste sent to Guernsey landfill in 2019, and the emissions will decrease gradually as the waste decays.

Agriculture, land use, land use change and forestry combined contribute a small proportion of total emissions (4.8% in 2021). The majority of the emissions are methane released by the digestive processes of cattle. Nitrous oxide is also released as a result of the combustion of fuels for energy and as a result of waste disposal and agricultural processes, but at comparatively low levels.

The fluorinated gases (“F-gases”) are not estimated by source in the same way as the other three gases mentioned above. They are associated with chemicals used in refrigeration, air-conditioning and heat pump systems and can be released as greenhouse gases if the systems leak or are disposed of improperly.

More detail and analysis of Guernsey emissions by source is provided over the next pages, with summary tables in the **Appendix** on **pages 14 to 17.**

Figure 4.1.1 Energy emissions - power generation



Combustion of fuels for power generation contributed 5.4% of Guernsey's total greenhouse gas emissions in 2021 (see **Figure 3.1.2**). The majority (>99%) of these emissions are in the form of carbon dioxide, but small amounts of methane and nitrous oxide are also released in the combustion processes.

Electricity has been imported via a cable link to France since 2001, reflected by a 75.9% decrease in power generation emissions between 2000 and 2001 (see **Figure 4.1.1**).

Prior to 2000, when all of Guernsey's electricity was generated on island, power generation was one of the largest component contributors to Guernsey's total emissions. For the years 1990 to 2000 it accounted for between 25% and 29% of total emissions.

Some electricity is still generated on island and it is this amount which impacts most noticeably on the total level of emissions.

The amount of electricity generated on island varies from year to year. In 2012 a fault in the cable link to France led to the need to generate electricity on island, resulting in an increase in power generation emissions between 2011 and 2012. In the latter part of 2018 and throughout most of 2019 there was another cable fault, again leading to increased power generation emissions.

In total, the emissions from power generation decreased by 89.1% (or 129.4kt of CO_2 equivalent) between 1990 and 2021.

4.1 Emissions by source - energy - industrial combustion

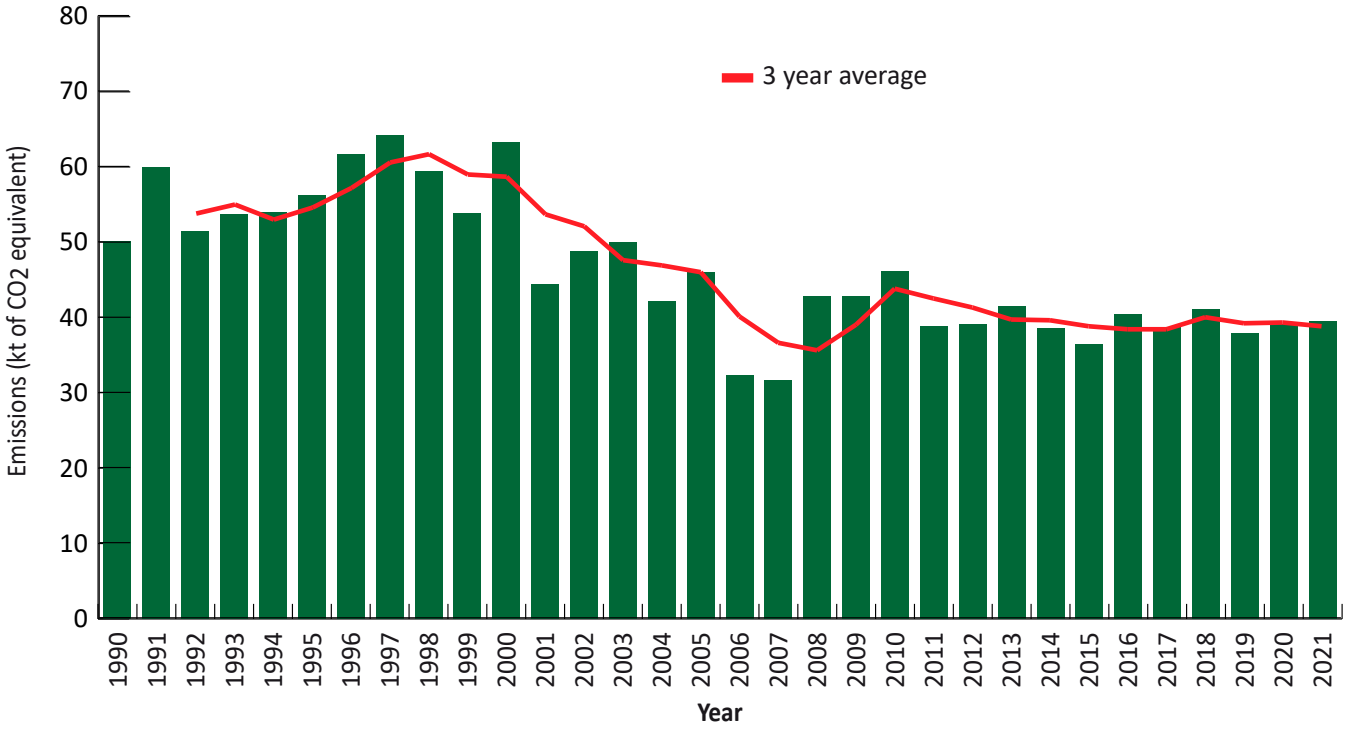
Energy emissions also include industrial combustion emissions (relating to building processes, use of generators etc), which decreased by 21.2% (or 10.6kt of CO_2 equivalent) between 1990 and 2021 and increased by 0.9% between 2020 and 2021 (see **Figure 4.1.2** and **Tables 6.1.1 to 6.1.4**). The red line on the chart below shows the historical three year average.

The majority (>99%) of the emissions are in the form of carbon dioxide, but small amounts of methane and nitrous oxide are also released in the combustion processes.

This source was the fourth largest contributor to emissions in 2021, at 39.4kt of CO_2 equivalent.

In 2021, emissions from industrial combustion contributed 13.4% to the total.

Figure 4.1.2 Energy emissions - industrial combustion



4.1 Emissions by source - energy - transport

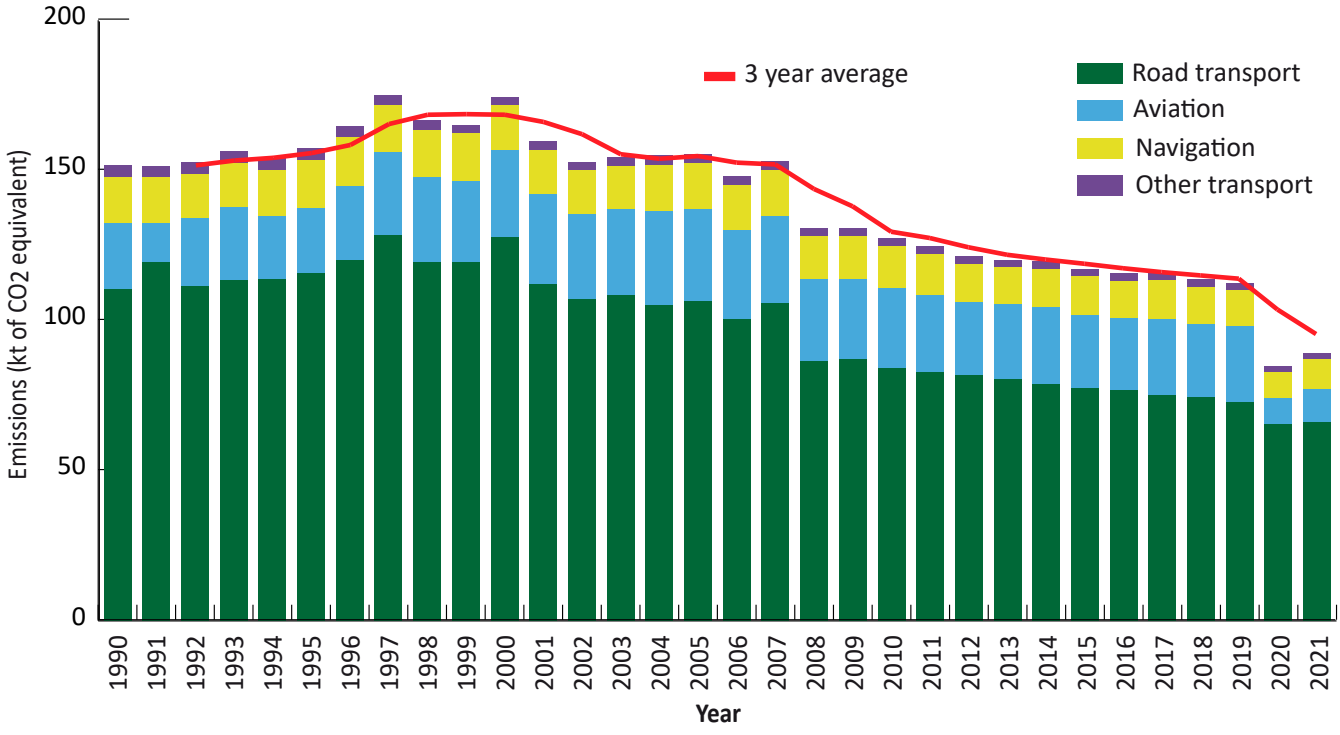
Emissions from transport decreased between 1990 and 2021 by 41.2% (62.5kt of CO_2 equivalent) and increased between 2020 and 2021 by 5.0% to 89.1kt of CO_2 equivalent (see **Figure 4.1.3** and **Tables 6.1.1 to 6.1.4**). Travel within the Islands of Guernsey and between Guernsey and the other Crown Dependencies and the UK are included in these calculations. Travel to Europe is classed as "International Bunkering" and is not included. The air and sea travel restrictions in place throughout most of 2020 and 2021 to reduce spread of COVID-19 had a significant effect on the number of flights and ferry voyages. There were also decreases in the amounts of petrol and diesel used for road transport and the number of bus journeys taken on-island. More detailed air, sea and bus passenger numbers can be found in the Facts & Figures booklet at **www.gov.gg/ff**.

Energy from transport was the biggest contributor of emissions in 2021, when it contributed 30.4% of total emissions.

Levels of greenhouse gases emitted as a result of transport have generally been trending downwards since a peak in 2000 (see **Figure 4.1.3**), due to decreasing emissions from road transport. The majority of greenhouse gas emissions resulting from transport are carbon dioxide. Other non-greenhouse gas air pollutants, such as nitrogen dioxide and sulphur dioxide are also present in vehicle exhaust emissions.

74% of transport emissions resulted from on-island road transport in 2021, with a further 12% from aviation and 11% from navigation. In 2019, before COVID-19 restrictions were in place, road transport emissions amounted to 65% of transport emissions, aviation was 22% and navigation, 11%. All travel restrictions were removed during 2022, so it is expected that the emissions from this source will increase in 2022.

Figure 4.1.3 Energy emissions - transport



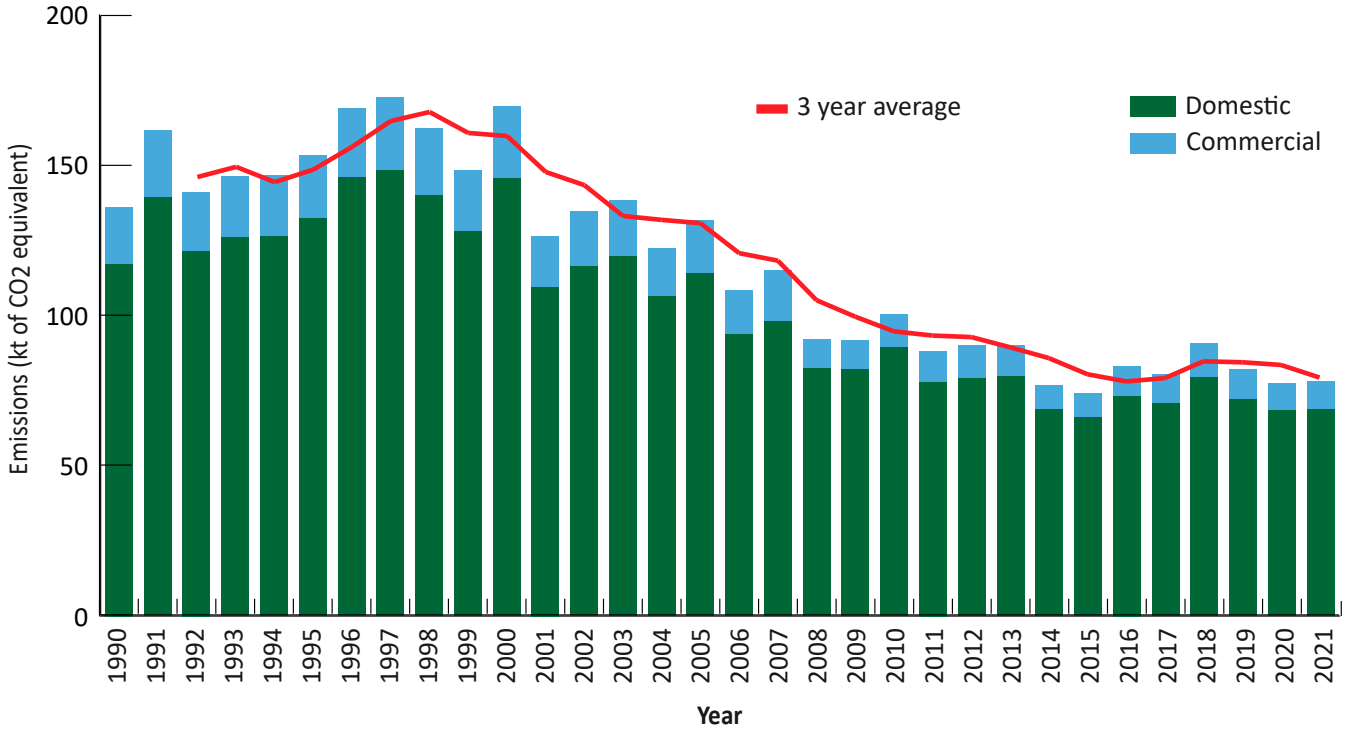
4.1 Emissions by source - energy - commercial and domestic combustion

Commercial and domestic combustion of fuels for heating and hot water in homes and offices, etc also contribute a substantial amount of the island's emissions (26.6% of the 2021 total). In 2021, 88% were from domestic sources.

The emissions from commercial and domestic combustion were 78.0kt of CO_2 equivalent in 2021, which was 42.6% lower than in 1990 and 0.7% higher than in 2019 (see **Figure 4.1.4** and **Tables 6.1.1 to 6.1.4**).

The red line on the chart shows the historical three-year average.

Figure 4.1.4 Energy emissions - commercial and domestic combustion



4.2 Emissions by source - agriculture, land use, land use change and forestry

Emissions from agriculture, land use, land use change and forestry (shown in **Figure 4.2.1**) contributed 4.8% of the total emissions in 2021 (14.0kt of CO_2 equivalent). The red line on the chart shows the historical three-year average.

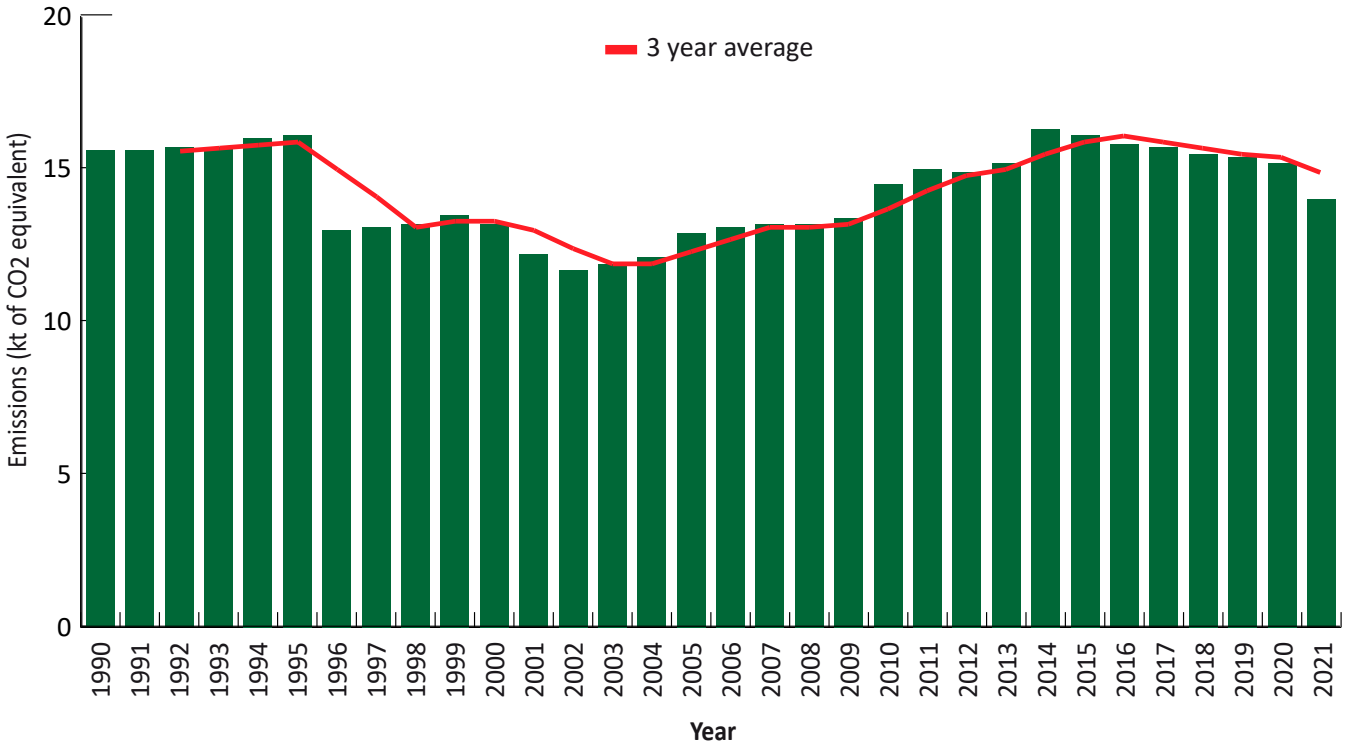
Emissions of methane released by the digestive processes of animals amounted to 12.4kt of CO_2 equivalent. In 2021, emissions from dairy cattle accounted for 88% of total animal emissions. Other cattle accounted for 6%, horses accounted for 5% and other animals accounted for 1%.

Livestock-related emissions are strongly linked to the numbers of animals on the Island. For example, there was a decrease in the number of cattle in the island in 2001, when the milk quota was reduced, resulting in a reduction in emissions from cattle. There has been an increase in emissions from other agricultural activities, such as slurry spreading, since 2002.

Changes in land use in 2021 led to a decrease in emissions of 0.1kt of CO_2 equivalent. Undeveloped land that remained unchanged in use sequestered 1.8kt of CO_2 equivalent, giving a total sequestration of 1.9kt of CO_2 equivalent in 2021.

The total level of emissions was 7.8% (1.6kt of CO_2 equivalent) lower in 2021 than it was in 1990.

Figure 4.2.1 Energy emissions - agriculture, land use, land use change and forestry



4.3 Emissions by source - waste

Waste was the third largest contributor to Guernsey's total emissions in 2021. It contributed 14.5% (42.6kt of CO_2 equivalent) of the total emissions in 2021. This was 37.8% lower than in 1990 and 7.8% lower than in 2020.

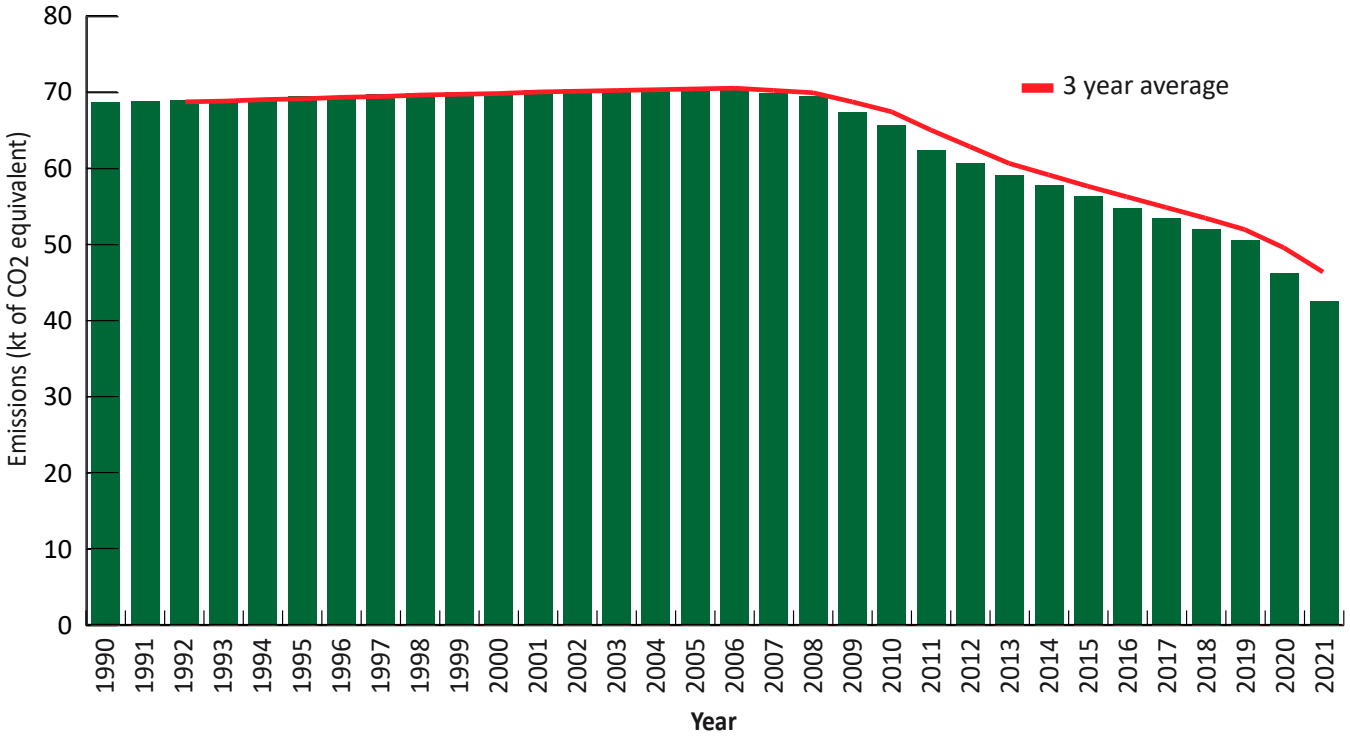
The emissions are mostly in the form of methane gas from landfill (90% in 2021), which is released as landfilled putrescible matter decomposes. In a weight for weight comparison, methane has a global warming potential twenty eight times higher than carbon dioxide, i.e. one kt of methane is equivalent to 28kt of carbon dioxide.

As a result, relatively small changes in the amount of methane emitted equate to considerably larger changes to emissions in terms of CO_2 equivalents.

There have been decreases in the emissions from this source since 2006 (see **Figure 4.3.1** and **Tables 6.1.1 to 6.1.4**) as less waste has been going to landfill since then. There was a large decrease in 2019 in the amount of waste going to landfill when the Waste Transfer Station started operating. This will be reflected in further decreasing emissions from this source, although previously landfilled matter will continue to decompose and emit greenhouse gases. The emissions of any Guernsey waste now exported for processing are counted within the country where the processing occurs, For example, any emissions from the anaerobic digestion facility in the UK which processes Guernsey's food waste will be counted in the UK.

Other sources of waste emissions are wastewater and composted waste. In 2021, 5% of emissions were from composting and 5% from wastewater processing.

Figure 4.3.1 Energy emissions - waste



5.1 Emissions - F-gases

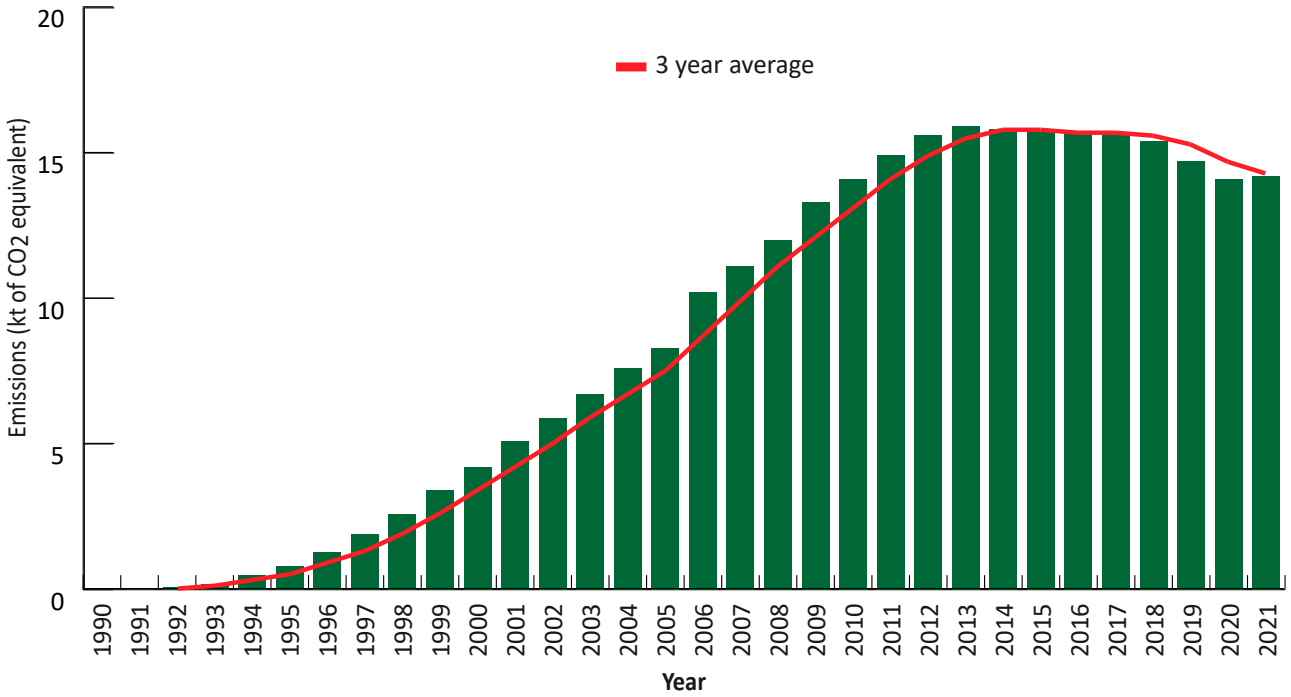
Fluorinated gases ("F-gases") are not estimated by source in the same way as the other three gases mentioned, but are included in the total greenhouse gas emissions.

F-gases can be released by refrigeration, air-conditioning and heat pump systems if they leak or are disposed of improperly.

In 2021, they were estimated to have contributed 4.8% of the total, compared to less than 0.001% in 1990; an increase of 14.1kt of CO_2 equivalent from a starting point near 0kt of CO_2 equivalent. As a result, the percentage increase from 1990 to 2021 is very high. Between 2020 and 2021 there was an increase of 0.3%. The red line on the chart shows the historical three-year average.

F-gases have very high global warming potentials compared to carbon dioxide. As such, amounts in the region of one gram in weight could have the same effect as one tonne of carbon dioxide being released into the atmosphere. The result of this is a highly volatile trend in terms of percentage changes (see **Tables 6.1.3 to 6.1.4**).

Figure 5.1.1 F-gas emissions



6.1 Appendix: Emissions inventory - mass contributed by source

Table 6.1.1 Mass of emissions contributed by source

	Energy - Power generation (CO2e)	Energy - Industrial combustion (CO2e)	Energy - Transport (CO2e))	Energy - Commercial and domestic combustion (CO2e)	Agriculture, land use, land use change and forestry (CO2e)	Waste (CO2e)	F-gases (CO2e)
1990	145.2	50.1	151.6	135.9	15.6	68.6	0.0
1991	174.0	59.9	151.3	161.6	15.6	68.8	0.0
1992	148.8	51.4	152.6	140.8	15.7	68.9	0.1
1993	155.1	53.6	156.4	146.1	15.7	69.1	0.2
1994	156.2	53.9	154.1	146.4	16.0	69.2	0.5
1995	162.6	56.2	157.5	153.2	16.1	69.4	0.8
1996	167.8	61.6	164.6	168.9	13.0	69.5	1.3
1997	169.6	64.1	175.0	172.3	13.1	69.7	1.9
1998	177.5	59.3	166.7	162.0	13.2	69.8	2.6
1999	181.9	53.7	165.3	148.1	13.5	69.9	3.4
2000	170.3	63.2	174.3	169.3	13.2	70.0	4.2
2001	41.1	44.3	159.6	126.2	12.2	70.2	5.1
2002	36.1	48.7	152.9	134.7	11.7	70.3	5.9
2003	42.4	49.9	154.5	138.4	11.9	70.4	6.7
2004	35.5	42.1	155.0	122.2	12.1	70.5	7.6
2005	52.0	46.0	155.5	131.6	12.9	70.6	8.3
2006	105.1	32.3	148.0	108.3	13.1	70.6	10.2
2007	75.4	31.6	153.0	114.9	13.2	69.8	11.1
2008	117.9	42.8	130.8	91.9	13.2	69.4	12.0
2009	103.2	42.7	130.7	91.6	13.4	67.3	13.3
2010	57.4	46.1	127.5	100.3	14.5	65.6	14.1
2011	68.4	38.8	124.6	87.9	15.0	62.4	14.9
2012	159.3	39.0	121.3	90.1	14.9	60.7	15.6
2013	143.7	41.4	120.1	90.1	15.2	59.1	15.9
2014	119.6	38.5	119.8	76.9	16.3	57.8	15.8
2015	58.8	36.4	117.1	73.9	16.1	56.3	15.7
2016	67.4	40.4	115.7	82.8	15.8	54.8	15.7
2017	32.2	38.6	115.9	80.3	15.7	53.5	15.7
2018	67.9	41.0	113.7	90.7	15.5	52.0	15.4
2019	134.0	37.9	112.5	82.0	15.4	50.5	14.7
2020	15.5	39.1	84.9	77.5	15.2	46.2	14.1
2021	15.8	39.4	89.1	78.0	14.0	42.6	14.2

6.1 Appendix: Emissions inventory - percentage contributed to total by source

Table 6.1.2 Percentage contribution to total emissions by source

	Energy - Power generation (%)	Energy - Industrial combustion (%)	Energy - Transport (%)	Energy - Commercial and domestic combustion (%)	Agriculture, land use, land use change and forestry (%)	Waste (%)	F-gases (%)
1990	25.6%	8.8%	26.7%	24.0%	2.8%	12.1%	0.0%
1991	27.6%	9.5%	24.0%	25.6%	2.5%	10.9%	0.0%
1992	25.7%	8.9%	26.4%	24.3%	2.7%	11.9%	0.0%
1993	26.0%	9.0%	26.2%	24.5%	2.6%	11.6%	0.0%
1994	26.2%	9.0%	25.8%	24.5%	2.7%	11.6%	0.1%
1995	26.4%	9.1%	25.6%	24.9%	2.6%	11.3%	0.1%
1996	25.9%	9.5%	25.5%	26.1%	2.0%	10.7%	0.2%
1997	25.5%	9.6%	26.3%	25.9%	2.0%	10.5%	0.3%
1998	27.3%	9.1%	25.6%	24.9%	2.0%	10.7%	0.4%
1999	28.6%	8.5%	26.0%	23.3%	2.1%	11.0%	0.5%
2000	25.6%	9.5%	26.2%	25.5%	2.0%	10.5%	0.6%
2001	9.0%	9.7%	34.8%	27.5%	2.7%	15.3%	1.1%
2002	7.9%	10.6%	33.2%	29.3%	2.5%	15.3%	1.3%
2003	8.9%	10.5%	32.6%	29.2%	2.5%	14.8%	1.4%
2004	8.0%	9.5%	34.8%	27.5%	2.7%	15.8%	1.7%
2005	10.9%	9.6%	32.6%	27.6%	2.7%	14.8%	1.7%
2006	21.6%	6.6%	30.3%	22.2%	2.7%	14.5%	2.1%
2007	16.1%	6.7%	32.6%	24.5%	2.8%	14.9%	2.4%
2008	24.7%	9.0%	27.4%	19.2%	2.8%	14.5%	2.5%
2009	22.3%	9.2%	28.3%	19.8%	2.9%	14.6%	2.9%
2010	13.5%	10.8%	30.0%	23.6%	3.4%	15.4%	3.3%
2011	16.6%	9.4%	30.2%	21.3%	3.6%	15.1%	3.6%
2012	31.8%	7.8%	24.2%	18.0%	3.0%	12.1%	3.1%
2013	29.6%	8.5%	24.7%	18.5%	3.1%	12.2%	3.3%
2014	26.9%	8.7%	26.9%	17.3%	3.7%	13.0%	3.5%
2015	15.7%	9.7%	31.3%	19.7%	4.3%	15.0%	4.2%
2016	17.2%	10.3%	29.5%	21.1%	4.0%	14.0%	4.0%
2017	9.1%	11.0%	32.9%	22.8%	4.5%	15.2%	4.5%
2018	17.1%	10.3%	28.7%	22.9%	3.9%	13.1%	3.9%
2019	30.0%	8.5%	25.2%	18.3%	3.4%	11.3%	3.3%
2020	5.3%	13.4%	29.0%	26.5%	5.2%	15.8%	4.8%
2021	5.4%	13.4%	30.4%	26.6%	4.8%	14.5%	4.8%

6.1 Appendix: Emissions inventory - annual percentage change by source

Table 6.1.3 Annual percentage change in emissions by source

	Energy - Power generation (%)	Energy - Industrial combustion (%)	Energy - Transport (%)	Energy - Commercial and domestic combustion (%)	Agriculture, land use, land use change and forestry (%)	Waste (%)	F-gases (%)
1991	19.8%	19.7%	-0.2%	18.9%	0.0%	0.2%	430.2%
1992	-14.5%	-14.2%	0.9%	-12.9%	0.4%	0.2%	154.7%
1993	4.2%	4.2%	2.5%	3.8%	0.5%	0.2%	329.8%
1994	0.7%	0.7%	-1.5%	0.2%	1.4%	0.2%	108.3%
1995	4.1%	4.1%	2.2%	4.7%	0.9%	0.2%	69.1%
1996	3.2%	9.7%	4.5%	10.2%	-19.3%	0.2%	57.2%
1997	1.1%	4.0%	6.3%	2.0%	1.1%	0.2%	41.6%
1998	4.6%	-7.5%	-4.7%	-6.0%	0.2%	0.2%	38.3%
1999	2.5%	-9.4%	-0.9%	-8.6%	2.5%	0.2%	31.6%
2000	-6.4%	17.6%	5.5%	14.3%	-2.0%	0.2%	23.0%
2001	-75.9%	-30.0%	-8.5%	-25.5%	-8.0%	0.2%	21.5%
2002	-12.0%	10.2%	-4.2%	6.8%	-3.8%	0.2%	15.6%
2003	17.3%	2.4%	1.1%	2.7%	1.9%	0.1%	14.8%
2004	-16.2%	-15.7%	0.3%	-11.7%	1.0%	0.1%	12.8%
2005	46.4%	9.2%	0.3%	7.7%	7.3%	0.1%	9.8%
2006	102.1%	-29.7%	-4.8%	-17.7%	1.2%	0.1%	22.3%
2007	-28.3%	-2.3%	3.4%	6.1%	0.7%	-1.2%	9.0%
2008	56.4%	35.6%	-14.5%	-19.9%	-0.3%	-0.5%	7.7%
2009	-12.5%	-0.3%	-0.1%	-0.4%	1.6%	-3.1%	11.1%
2010	-44.4%	8.0%	-2.5%	9.5%	8.2%	-2.5%	5.8%
2011	19.3%	-15.8%	-2.3%	-12.4%	3.8%	-4.9%	6.0%
2012	132.8%	0.6%	-2.7%	2.5%	-0.8%	-2.7%	4.7%
2013	-9.8%	6.1%	-1.0%	-0.1%	2.3%	-2.7%	2.1%
2014	-16.7%	-6.8%	-0.3%	-14.6%	7.2%	-2.2%	-0.9%
2015	-50.8%	-5.5%	-2.2%	-3.9%	-1.5%	-2.6%	-0.6%
2016	14.6%	10.9%	-1.2%	12.0%	-2.1%	-2.6%	0.2%
2017	-52.2%	-4.4%	0.1%	-3.1%	-0.5%	-2.4%	0.2%
2018	110.9%	6.2%	-1.9%	13.0%	-1.0%	-2.8%	-2.4%
2019	97.3%	-7.4%	-1.1%	-9.6%	-0.9%	-3.0%	-4.4%
2020	-88.4%	3.1%	-24.6%	-5.5%	-1.1%	-8.4%	-3.9%
2021	2.1%	0.9%	5.0%	0.7%	-7.8%	-7.8%	0.3%

6.1 Appendix: Emissions inventory - cumulative percentage change by source

Table 6.1.4 Cumulative percentage change in emissions since 1990 by source

	Energy - Power generation (%)	Energy - Industrial combustion (%)	Energy - Transport (%)	Energy - Commercial and domestic combustion (%)	Agriculture, land use, land use change and forestry (%)	Waste (%)	F-gases (%)
1991	19.8%	19.7%	-0.2%	18.9%	0.0%	0.2%	430.2%
1992	2.5%	2.7%	0.7%	3.6%	0.4%	0.5%	1250.3%
1993	6.8%	7.1%	3.2%	7.5%	0.9%	0.7%	5703.5%
1994	7.5%	7.8%	1.7%	7.7%	2.3%	1.0%	11989.2%
1995	12.0%	12.2%	3.9%	12.7%	3.2%	1.2%	20348.4%
1996	15.5%	23.1%	8.6%	24.3%	-16.7%	1.4%	32040.4%
1997	16.8%	28.0%	15.5%	26.8%	-15.7%	1.6%	45421.7%
1998	22.2%	18.4%	10.0%	19.2%	-15.5%	1.8%	62839.1%
1999	25.3%	7.3%	9.0%	9.0%	-13.5%	2.0%	82749.4%
2000	17.3%	26.2%	15.0%	24.6%	-15.2%	2.1%	101794.9%
2001	-71.7%	-11.6%	5.3%	-7.2%	-22.0%	2.3%	123709.2%
2002	-75.1%	-2.6%	0.8%	-0.9%	-24.9%	2.4%	143075.9%
2003	-70.8%	-0.2%	1.9%	1.8%	-23.5%	2.6%	164321.8%
2004	-75.5%	-15.9%	2.2%	-10.1%	-22.7%	2.7%	185358.3%
2005	-64.2%	-8.2%	2.6%	-3.2%	-17.0%	2.9%	203464.6%
2006	-27.6%	-35.4%	-2.4%	-20.3%	-16.0%	3.0%	248948.4%
2007	-48.1%	-36.9%	0.9%	-15.5%	-15.4%	1.7%	271480.9%
2008	-18.8%	-14.5%	-13.7%	-32.4%	-15.7%	1.2%	292350.1%
2009	-28.9%	-14.8%	-13.8%	-32.6%	-14.3%	-1.9%	324867.2%
2010	-60.5%	-8.0%	-15.9%	-26.2%	-7.3%	-4.3%	343752.6%
2011	-52.9%	-22.5%	-17.8%	-35.3%	-3.8%	-9.0%	364236.3%
2012	9.7%	-22.1%	-20.0%	-33.7%	-4.5%	-11.5%	381181.7%
2013	-1.0%	-17.4%	-20.8%	-33.7%	-2.3%	-13.8%	389011.8%
2014	-17.6%	-23.0%	-21.0%	-43.4%	4.8%	-15.8%	385615.6%
2015	-59.5%	-27.3%	-22.7%	-45.6%	3.2%	-17.9%	383373.9%
2016	-53.6%	-19.4%	-23.7%	-39.1%	1.1%	-20.1%	383953.7%
2017	-77.8%	-22.9%	-23.6%	-41.0%	0.6%	-21.9%	384802.1%
2018	-53.2%	-18.2%	-25.0%	-33.3%	-0.4%	-24.1%	375508.7%
2019	-7.7%	-24.2%	-25.8%	-39.7%	-1.3%	-26.4%	359032.7%
2020	-89.3%	-21.9%	-44.0%	-43.0%	-2.4%	-32.6%	344878.3%
2021	-89.1%	-21.2%	-41.2%	-42.6%	-10.0%	-37.8%	345819.3%

7.1 Further information

This bulletin has been produced by the States of Guernsey Data and Analysis team. The Guernsey emissions inventory is compiled by Aether, who lead the compilation of the inventories for UK crown dependencies and applicable overseas territories as part of the UK National Atmospheric Emissions Inventory (NAEI), which is developed and maintained by Ricardo Energy & Environment, in collaboration with Aether, CEH, Forest Research, Rothamsted Research, ADAS and Gluckman Consulting. The NAEI is funded by the Department for Business, Energy & Industrial Strategy (BEIS), Department for Environment, Food and Rural Affairs (Defra), the Scottish Government, the Welsh Government and the Northern Ireland Department of Agriculture, Environment and Rural Affairs.

7.2 Contact details

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