

BIRMINGHAM'S GREEN COMMISSION

Report on Birmingham's Carbon Emissions Progress

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Introduction

Birmingham's Green Commission launched its Vision Statement in March 2013 with the aim of building a leading green city and reducing carbon dioxide (CO₂) emissions by 60% by 2027 against a 1990 baseline.

In order to measure the progress against this target the Green Commission decided to complete annual reviews using the data released by the Department of Energy and Climate Change (DECC). This data is published in the summer annually. However the data currently always has a lag of two years due to the complex process required to extract localised data.

DECC published the latest CO_2 emissions data relating to 2011 for local authorities on 11 July 2013.

The data can be downloaded from <u>https://www.gov.uk/government/publications/local-</u> authority-emissions-estimates

The data in this subset excludes emissions in the main dataset which are considered to fall outside the scope of influence of Local Authorities (e.g. emissions from motorways and emissions from some installations in the EU E missions Trading System). The data also excludes embedded carbon in goods consumed within local authority areas. The figures shown for per capita emissions are based on population estimates published by the Office for National Statistics at the Local Authority level. Since these statistics are a subset of the main dataset, revised figures for 2005 - 2010 have again been published alongside the new 2011 figures. For a full overview of what is included in the data set please see Appendices 2 and 3.

Data Revisions

The 2005 - 2010 estimates published previously have now been superseded by the revised figures. Any estimates published previously for all years back to 2005 are not comparable with the new data owing to improvements in the source data and methodology used.

In order to ensure that the data for 2005 - 2010 are consistent with the data now available for 2011, the estimates for these years have been revised to incorporate both new data and improvements in the underlying methodology.

Summary of Data for 2011

- 1. Birmingham's CO₂ emissions have <u>decreased</u> by 23.7% against a 1990 baseline.
- 2. Birmingham's total CO_2 emissions are at an all time low since 1990.
- 3. All sectors have <u>decreased</u> since 2010 and are at an all time low against the available data since 2005.
- 4. The data revisions made by DECC have <u>decreased</u> the previous recorded emissions across all years for Birmingham.
- 5. Birmingham's emissions continue to be dominated by industry and commercial (41.48%) and domestic CO₂ emissions (36.06%). Transport accounts for 22.45% of total emissions within the local authorities' scope and control.
- Birmingham's CO₂ emissions are <u>currently ahead</u> of the projected year-onyear reduction target set from 2005 - 2027.
- 7. The updated DECC data for 2005 2010 has implications for the previous year on year target projections for 2005 to 2027 set in Technical Paper 1 (March 2013)¹. The year-on-year target reduction has therefore been amended to reflect the updated data from DECC. These can be found in Appendix 1.
- The 1990 baseline has remained the same to ensure the 60% target and 2027 emissions total are consistent.

An analysis using the latest data is presented on the following pages.

Year	Industry and Commercial (ktCO ₂) Total	Domestic (ktCO2) Total	Transport (ktCO2) Total	Grand (ktCO2) Total	Population ('000s, mid-year estimate)	Per Capita Emissions (t)
2005	2,745.9	2,315.5	1,310.1	6371.5	1014.7	6.3
2006	2,679.2	2,323.1	1,284.0	6286.3	1020.8	6.2
2007	2,589.3	2,253.5	1,294.3	6137.1	1029.0	6.0
2008	2,705.9	2,248.1	1,255.0	6209.0	1039.0	6.0
2009	2,284.4	2,007.8	1,220.6	5512.8	1050.1	5.2
2010	2,390.5	2,139.2	1,189.8	5719.5	1061.1	5.4
2011	2,175.1	1,890.6	1,177.0	5242.8	1074.3	4.9

Table 1. Sector totals, grand total, populations and per capita emissions

¹ Can be downloaded from <u>http://www.birmingham.gov.uk/greencommission</u>

Graph 1. Birmingham's CO_2 emissions progress since 1990 (backcasted and projected with actual data for 2005 – 2011)



The 2005 – 2027 trajectory has been updated to account for the latest data from DECC released in 2011.

- To ensure consistency Birmingham's backcasted 1990 baseline, agreed by the Green Commission in 2012 has not been updated.
- The backcasted figures using the 2010 data and the updated 2005-2027 trajectory are represented by the dashed line in Graph 1.
- The solid line represents the 2013 data release for 2005-2011 and shows a 23.7% CO_2 emissions reduction from 1990 levels. This is a 17.7% CO_2 emissions reduction between 2005 2011.
- Birmingham's CO₂ emissions are currently ahead of the projected year-onyear reduction target set from 2005 – 2027.



Graph 2. Birmingham's CO₂ emissions by sector, 2005 - 2011

Birmingham's CO_2 emissions continue to be dominated by industry and commercial (41.48%) and domestic (36.06%). Transport accounts for 22.45% of total emissions within the local authorities' scope and control. As the local authority level data only started to be collected in 2005 it is not possible to provide data by sector to 1990.

Between 2005 - 2011 industry and commercial CO₂ emissions have reduced by 20.8%, domestic emissions have reduced by 18.4% and transport emissions have reduced by 10.2%.

Although it should be noted that transport emissions have increased their share of total emissions from 20.5% in 2005 to 22.45% in 2011.

Graph 3. Birmingham's CO_2 emissions reduction against 2005 baseline - % total CO_2 emissions & % CO_2 emissions per capita reduction



The Green Commission set a more stringent target to reduce total carbon emissions by 60% by 2027. As the city's population increases there is a potential knock on effect which would artificially inflate progress towards the 2027 target.

Graph 3 shows how the Commission's total carbon reductions between 2005 and 2011, compares with a per capita assessment. This demonstrates how per capita can inflate progress artificially, as Birmingham's population has steadily increased by almost 60,000 people between 2005 and 2011, a 5.5% increase.

Therefore, between 2005-2011 total CO_2 emissions have reduced by 17.7% whereas per capita emissions have reduced by 22.2%.

Graph 4. Exploring links between Birmingham's total CO₂ Emissions, Gross Value Added, total jobs and average annual degree days



In previous years the reduction in CO_2 emissions on a national level has been attributed by commentators to the economic recession from 2008.

To consider the wider factors which may influence Birmingham's CO₂ emissions, further analysis has factored in the city's Gross Value Added (GVA), total jobs and average annual degree days.

- GVA is a measure of the value of goods and services produced in an area, industry or sector of an economy. Birmingham's GVA has been relatively stable between 2005 and 2011 so it is difficult to find a direct correlation between this and total CO₂ emissions.
- Total jobs decreased between 2005 and 2009 but then increased for two consecutive years, whereas emissions increased dramatically in 2010 but decreased dramatically in 2011. Jobs may be a partial indicator, perhaps secondary to degree days.
- Degree days are often used as a measure for estimating the demand for energy required for heating and cooling buildings. For degree days the annual average has been used between 2005 and 2011. 2010 stands out as an anomaly between 2005 and 2011 as a colder than average year and

coincides with a rise in CO_2 emissions, possibly due to a rise in demand for gas and electricity to heat buildings. In an average degree day year when the temperature is more stable, it seems that total jobs may have an influence on CO_2 emissions.

Graph 4 therefore shows more clearly how there may be a relationship between (i) degree days, (ii) total jobs and (iii) total CO_2 emissions with degree days.

Since the 2008 recession, total CO_2 emissions have followed a similar pattern of reduction and growth compared to jobs, except in 2011.

2011 therefore represents an anomaly to this explanation which may be caused by the measures to reduce CO_2 emissions taking effect. Further analysis based on the 2012 data, which will be available in summer 2014, which includes a comprehensive understanding of all the different carbon reduction measures in Birmingham is required to test this hypothesis.

Appendix 1. Updated target projections & actual data using a 2005 baseline

This table provides an update on Birmingham's projected targets as produced in the Technical Paper 1 (March 2012). It provides detail on:

- a) Birmingham's estimated 1990 baseline produced in March 2012
- b) Actual data for 2005-2011 (using latest data from 2011)
- c) The required CO_2 emissions to achieve the 60% target from a 1990 baseline with an updated trajectory for 2005 2027 using 2011 data.

Year	Estimated tCO ₂ using 2005	Estimates %	Achieved tCO ₂	Achieved %
1990	6,874,000			
1991	6,843,929	0.44		
1992	6,813,859	0.87		
1993	6,783,788	1.31		
1994	6,753,717	1.75		
1995	6,723,647	2.19		
1996	6,693,576	2.62		
1997	6,663,505	3.06		
1998	6,633,435	3.5		
1999	6,603,364	3.94		
2000	6,573,293	4.37		
2001	6,543,223	4.81		
2002	6,513,152	5.25		
2003	6,483,081	5.69		
2004	6,453,011	6.12		
2005	6,371,460	7.31	6,371,460	7.31
2006	6,207,222	9.7	6,286,280	8.55
2007	6,042,246	12.1	6,137,090	10.72
2008	5,877,270	14.5	6,209,010	9.67
2009	5,712,294	16.9	5,512,790	19.8
2010	5,547,318	19.3	5,719,460	16.8
2011	5,382,342	21.7	5,242,760	23.73
2012	5,217,366	24.1		
2013	5,052,390	26.5		
2014	4,887,414	28.9		
2015	4,722,438	31.3		
2016	4,557,462	33.7		
2017	4,392,486	36.1		
2018	4,234,384	38.4		
2019	4,069,408	40.8		
2020	3,904,432	43.2		
2021	3,739,456	45.6		
2022	3,574,480	48.0		
2023	3,409,504	50.4		
2024	3,244,528	52.8		
2025	3,079,552	55.2		
2026	2,914,576	57.6		
2027	2,749,600	60.0		

Key:

Denotes actual data

Year	A. Industry and Commercial Electricity	B. Industry and Commercial Gas	C. Large Industrial Installations	D. Industrial and Commercial Other Fuels	E. Agricultural Combustion	Industry and Commercial Total	F. Domestic Electricity	G. Domestic Gas	H. Domestic 'Other Fuels'	Domestic Total	I. Road Transport (A roads)	K. Road Transport (Minor roads)	M. Transport Other	Transport Total	Grand Total	Population ('000s, mid-year estimate)	Per Capita Emissions (t)
2005	1,669.0	853.2	34.7	188.0	1.1	2,745.9	928.0	1,356.5	31.1	2,315.5	441.3	848.1	20.7	1,310.1	6371.5	1014.7	6.3
2006	1,711.4	756.3	31.8	178.7	1.1	2,679.2	993.2	1,298.8	31.2	2,323.1	429.8	833.0	21.2	1,284.0	6286.3	1020.8	6.2
2007	1,631.8	728.3	43.6	184.6	1.0	2,589.3	989.4	1,233.0	31.1	2,253.5	421.7	851.3	21.3	1,294.3	6137.1	1029.0	6.0
2008	1,691.6	710.7	64.6	237.9	1.1	2,705.9	952.5	1,263.2	32.3	2,248.1	397.4	835.8	21.8	1,255.0	6209.0	1039.0	6.0
2009	1.368.3	640.9	64.9	209.3	1.1	2.284.4	855.9	1.119.5	32.4	2.007.8	384.9	814.7	21.0	1.220.6	5512.8	1050.1	5.2
2010	1.404.7	706.5	64.9	213.3	1.1	2.390.5	878.0	1.228.4	32.7	2.139.2	377.2	791.3	21.2	1.189.8	5719.5	1061.1	5.4
2011	1,303.9	597.1	64.8	208.2	1.1	2,175.1	835.8	1,021.9	32.9	1,890.6	377.5	778.3	21.2	1,177.0	5242.8	1074.3	4.9

Appendix 2. Birmingham's detailed CO₂ emissions within scope and influence (ktCO₂)

Appendix 3. Carbon emissions datasets

1 1	NI186	LACO2	
Imports Exports	Domestic Commercial and Industrial Transport	European Union Emissions Trading Scheme Land Use and Land Use Change Motorways Diesel Rait	restic Aviation
	LACO2 Equivalents		Don

- The dotted box on the right contains all emissions that are covered by the Climate Change Acts 34% target for the third budget period. The figure shows that international shipping, international aviation, and embedded emissions (in the way of imports) are not covered under the 34% target. This figure shows NI186 as a sub set of the LACO₂ data set².
- Below the LACO₂ data set is the corresponding LACO₂ equivalents. The figure highlights the issue of embodied energy/CO₂ of imports and exports, the need for international cooperation in tackling emissions such as International shipping and Aviation, and Local Authorities responsibilities in the broader context. The diagram is not to scale.
- NI186 This dataset is a subset of the LACO₂ emissions which covers CO₂ emissions only. This set of emissions has been reduced to exclude emissions from sources which it is felt that LAs have minimal influence over. The omitted locally produced emissions are motorways, diesel rail, emissions covered under European Union Emissions Trading Scheme (EUETS) besides point source electricity, and Land Use and Land Use Change (LULUC). This set of data is used in local authorities carbon reduction baseline and to report progress. Since the end of NI186 this data set is referred to by DECC as "Carbon dioxide emissions within the scope of influence of local authorities (previously NI 186)".
- LACO₂ This data set covers all the emissions in the NI186 plus motorways, diesel rail, EUETS, and LULUC. It is a CO₂ only data set so does not contain any of the other six green house gasses (CO₂ equivalents) such as methane and nitrous oxide. Approximately 70% of the EUETS emissions are covered in the NI186 emissions under domestic, commercial and industrial point source electricity usage. The remaining 30% is included in LACO₂ and refers to other large emitters participating under the EUETS.

² <u>http://tools.decc.gov.uk/en/content/cms/statistics/climate_stats/gg_emissions/laco2/laco2.aspx</u>

- LACO₂ Equivalents This is the part of the local emissions which are not included in the above two datasets. There are a few reasons for this. Firstly the CO₂ component makes up a large majority of the emissions reported under the above two indicators, secondly, in general when CO₂ emissions are reduced through energy efficiency, energy conservation, or renewable energy generation, the equivalents are reduced, and finally, these emissions require more effort to measure than CO₂ alone.
- Aviation The UK national atmospheric emissions inventory shows that emissions from domestic and international aviation assigned to the UK (on the basis of bunker fuel sales) accounted for some 5.5% of UK CO₂ emissions in 2008. 90% of these emissions will now be covered under the EU ETS as of 2012.
- Domestic Aviation So far the EUETS has set a reduction commitment of 5% from 2013 onwards for both domestic and international aviation. The Low Carbon Transition Plan (LCTP) states 'the Government announced a target to reduce UK aviation carbon dioxide emissions to below 2005 levels by 2050, despite forecast growth in passenger demand'. This target is the only one of its kind anywhere in the world, and implies that aviation will be paying a lot for emissions to be abated elsewhere in the EUETS.
- International Aviation International aviation is not covered under the Carbon Budgets. Under the Kyoto Protocol, the International Civil Aviation Organization (ICAO) has been given the responsibility to tackle greenhouse gas emissions from aviation. In October 2010 an historic agreement was reached between the 190 contracting states (including UK) to cap international aviation emissions at 2020 levels. Along with this 2020 cap, it has been agreed that an improvement to fuel efficiency of 2% per year will be achieved. Europe has further committed both domestic and international aviation to the EUETS scheme. Under this scheme the cap to be applied to the aviation Sector within the EUETS in 2012 will be 97% of average annual aviation CO₂ emissions in 2004, 2005 and 2006, and from 2013 onwards the cap is set at 95% of average emissions over these years.
- International Shipping According to the LCTP, flights and journeys by sea that begin in the UK but end in a foreign country (and vice versa) are classed as 'international aviation' and 'international shipping' and are not counted in our carbon budgets and emissions reductions targets for the time being, due to the lack of a globally agreed methodology to allocate responsibility for these journeys to individual countries.
- Imports versus Exports The embodied carbon in imports to the UK should arguably be added to UK's official carbon footprint. Britain's footprint is 11 tons CO₂e per year per person. DEFRA reports that the embodied carbon in imports is approximately 6.2 tons CO₂e per year per person. Another estimate, by the science journal Nature, reported that in 2001 imported embodied emissions in the UK accounted for approximately 37% of UK emissions while the embodied CO₂e of exports was approximately 22%. This gap has definitely increased over the past 9 years through increased trade with China.³

³ Overview written by Carbon Descent, February 2011 - <u>http://www.carbondescent.org.uk/blog/?p=30</u>