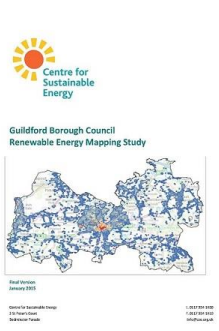
GUILDFORD BOROUGH

Greenhouse Gas (GHG) Emissions Report 2015-16



Chris Reynolds, Energy Management and Sustainability Officer

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Purpose of the report

This report presents a summary of the greenhouse gas emissions (GHG) resulting from the operational activities of Guildford Borough Council during 2015-16. It fulfils the previously specified requirements of the Department of Communities and Local Government (DCLG) and Department of Energy and Climate Change (DECC) for local authorities to report on greenhouse gas emissions.

Background

Guildford Borough Council is a second tier authority in the county of Surrey. The area of the borough is 27,093 hectares with a population of approximately 137,183 residents[1]. The borough is relatively prosperous but includes two of the poorest areas in Surrey. The population is equally split between urban and countryside areas. Guildford Borough Council's main areas of responsibility include council tax, housing, parks, sports, arts, planning, environmental health, waste and recycling collection and street cleaning.

This report uses the 2016 GHG conversion factors provided by the Department for Environment, Food and Rural Affairs (DEFRA)[2]. Data was re-baselined in our 2013-14 report to take account of new emission conversion methodologies, as requested in the Government's Environmental Reporting Guidelines. Since 2013-14 each year's current emissions factors are applied.

Guildford Borough Council committed to an ambitious Carbon Management Programme in 2009 with a 43% carbon dioxide emissions reduction target by 2020 and with an interim target of 34% by 2015. Both targets are measured against the 2008-09 financial year as a baseline. The Carbon Management Programme has driven significant energy saving and energy generation activity since its development, but at the same time the Council has undertaken new initiatives, services and building uses, all of which have led to increased energy consumption.

Reporting period and scope

The reporting period is 1 April 2015 to 31 March 2016. The scope of the emissions reported here are those generated by the operations of Guildford Borough Council. It includes all scope 1 and 2 emissions and a proportion of our scope 3 emissions. We aim to include as many scope 3 emissions as possible.

Approach and methodology

Guildford Borough Council is subject to the Carbon Reduction Commitment Energy Efficiency Scheme (CRC) and in 2015-16 we will be surrendering 7,719 carbon allowances to cover our CRC emissions.

The GHG data in this report is reported in conjunction with CRC emissions, but this report includes the fuel types, domestic emissions and transport emissions which are excluded from CRC. The methodology used here is in accordance with the "Environmental Reporting Guidelines" June 2013[3]. All factors have come from Government conversion factors[2]. The monitoring and reporting of energy consumption allows us to manage our resources more effectively and reduce both cost and carbon emissions.

The main types of emissions sources in three categories known as ‘scopes’. These are defined as:

Scope 1 (Direct emissions): Emissions from activities owned or controlled by your organisation that release emissions into the atmosphere. They are direct emissions. Examples of scope 1 emissions include emissions from combustion in owned or controlled boilers, furnaces, vehicles; emissions from chemical production in owned or controlled process equipment.

Scope 2 (Energy indirect): Emissions released into the atmosphere associated with your consumption of purchased electricity, heat, steam and cooling. These are indirect emissions that are a consequence of your organisation’s activities but which occur at sources you do not own or control.

Scope 3 (Other indirect): Emissions that are a consequence of your actions, which occur at sources which you do not own or control and which are not classed as scope 2 emissions. Examples of scope 3 emissions are business travel by means not owned or controlled by your organisation, waste disposal which is not owned or controlled, or purchased materials or fuels.

This report covers all scope 1 and scope 2 emissions. As part of our ongoing improvement in energy monitoring and reduction, we are constantly attempting to update our Scope 3 emissions and improving the information on the soures we include.

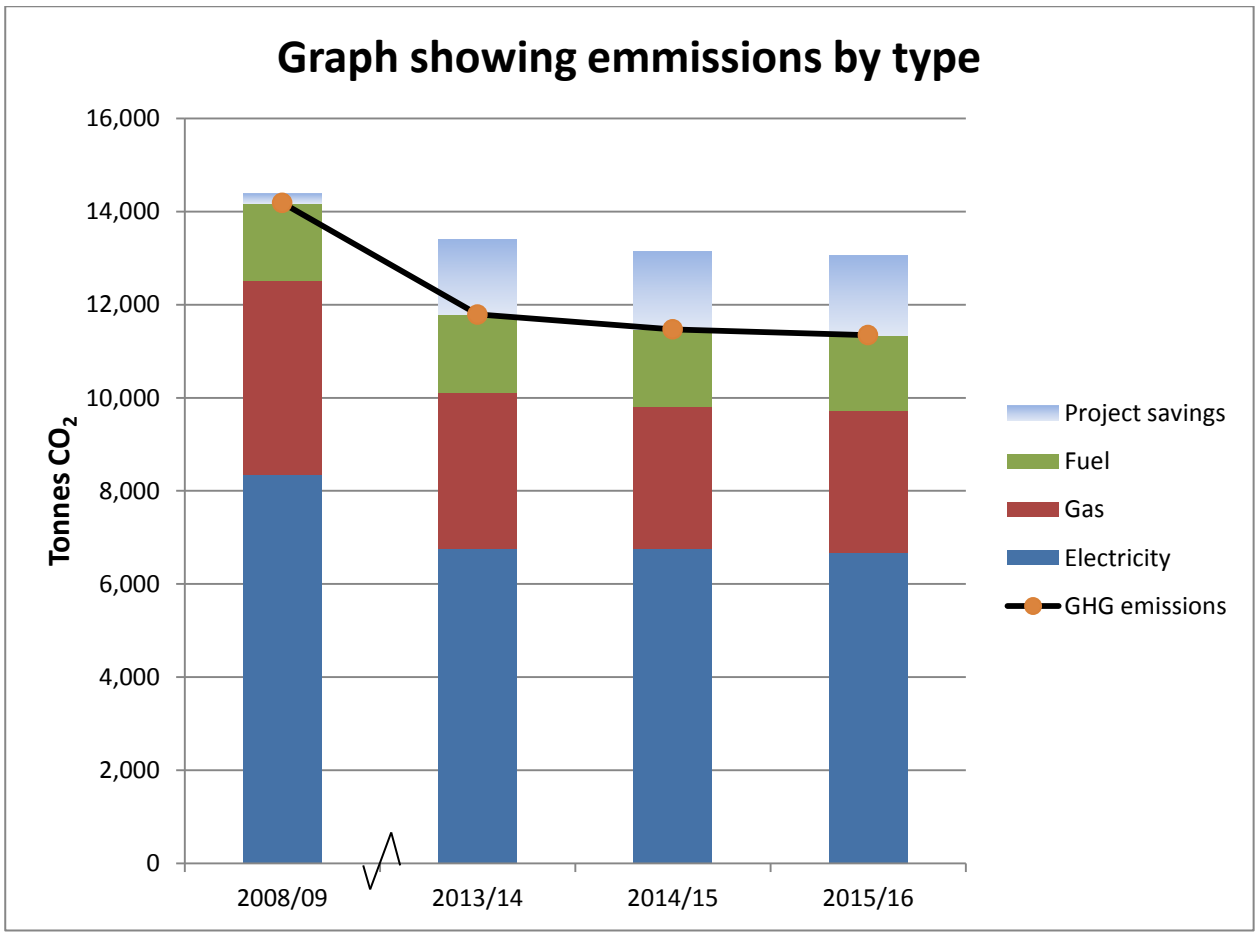
Summary of Greenhouse gas emissions for Guildford Borough Council

During 2015-16 our direct operational emissions (scope 1 and 2) are 11,345 tonnes CO_2. This compares with 11,471 tonnes CO_2 in 2014-15 and 14,184 tonnes CO_2 in the baseline year. Consequently we have saved 1.1% over the last year and 20% since the basleine year 2008-9.

The total of scope 1 and 2 emissions is the best comparison possible to measure our progress in reducing our greenhouse gas emissions. This 20% reduction doesn’t take into account the growth and changes in activities of the Council since the baseline period, nor does it adjust for weather factors. Analysis in the next section of this report takes these additional activities into account and presents the overall reduction in the light of a reasonable estimation of the growth in the baseline.

Our Scope 3 emissions are not directly comparable year on year because data was not previously available. However, for transparency, the Scope 3 data that is available is reported in the data table at the end of this report.

The following graph shows the downward trend of our greenhouse gas emissions. It also highlights in light blue, the proportion of savings resulting from energy efficiency projects.



Analysis and trends in 2015-16 greenhouse gas emissions

The focus of energy efficiency projects during 2015-16 has been LED lighting, the most notable installation being the large Arena at the Spectrum Sports and Leisure Centre. Further progress has been made on solar PV installtions which should come to fruition during 2016-17. A detailed feasibility study on water source heat pumps undertaken during 2015-16 has not yet resulted in an installation, due to a change of use for the proposed site, but is expected to be useful to inform future energy efficiency projects. At the same time the anticipated replacement of the Spectrum combined heat and power plant with an optimally sized CHP and associated energy efficiency equipment has been delayed. Once this installation is completed we expect to see a step change reduction in our GHG emissions, saving up to 1,434 tonnes CO_2 per annum.

Guildford Borough Council is increasing its generation of electricity from renewable sources, some of which we consume ourselves, and some of which we export to the grid. We have accounted for the power exported to the grid by showing it as an offset in the data table at the end of this report. Power that is both generated and consumed by us is reflected in a reduced CO_{2e} figure associated with electricity in the data table and the diagram above. The calculations for the carbon offsets have been generated from the factors relating to the energy they replace, quoted in the conversion factors for the corresponding year.

Guildford Borough Council has a carbon management programme which enables us to manage our emissions and drive energy saving initiatives.

This report shows that our scope 1 and 2 emissions have reduced by 20% since the 2008-9 baseline period. Analysis shows that our baseline would have grown by 6% as a result of

significant new activities undertaken since 2008-9. These include:-

1. More intensive use of our Council offices with the introduction of external tenants.
2. More Intensive leisure uses of Spectrum Leisure Centre including switching off a CHP.
3. Winter use of the Lido.

Against this new baseline our energy efficiency measures have effectively resulted in a 24.5% reduction in our greenhouse gas emissions. Our analysis shows the following technologies and initiatives have contributed to this saving:-

7.5% from the introduction of variable speed motor drives
2.1% from the introduction of energy efficient lighting (mainly LED) & electrical controls
1.1% from more efficient gas boilers and heating controls
Our renewable installations include a hydro generation plant, Biomass boilers, solar photovoltaic and solar thermal panels.

Notes on emissions

Scope 1 emissions include 100 per cent of our gas, diesel, unleaded petrol, kerosene and gas oil consumption, for heating and transport vehicles operated by the Council. Refrigerant is included in our data collection but no equipment requiring refrigerant has required topping up in this reporting period. Due to replacement of the waste and cleansing fleet, our Diesel emissions have reduced by 4.5%. We have improved the reporting methodology too, rather than deliveries we now measure pump use in all but the small quantity of kerosene. The starting and ending volumes are comparable, for all fuels, therefore no adjustment is necessary to take into account the change in reporting methodology.

Scope 2 emissions consist of 100 per cent of our electricity consumption. This is mainly used for lighting, equipment, heating, pumps, but also includes a growing component for the re-charging of electric vehicles. Emissions from electricity are broadly the same as the last reporting year.

Scope 1 and 2 data includes emissions from the Spectrum leisure centre and the public Lido, both significant users of electricty and gas.

Scope 3 emissions include all metered water supplies, business travel by public transport and car, fuels, gas and transmission emissions from the supply of electricity gas, transport fuels and biomass. Water use excludes Spectrum, Lido and Ash Manor Fitness Centre all of which are contracted out to be run by Freedom Leisure who arrange water supply directly. It also excludes those sites charged on a rateable value basis which are small, have little impact and for which data is not available.

Full Data table for Greenhouse gas emissions for Guildford Borough Council 2015-16

	Tonnes CO_2e			
Emissions	Reporting Year	Previous Year		Baseline Year
	Apr 2015 – Mar 2016	**Apr 2014 – Mar 2015**	**Apr 2013 – Mar 2014**	**Apr 2008 – Mar 2009**
Scope 1 - Direct Emissions	**4673.1**	**4707.3**	**5022.0**	**5829.0**
Natural Gas	*3051.7*	*3052.8*	*3340.3*	*4161.1*
Transport Fuels (operational)	*1499.1*	*1535.3*	*1549.9*	*1595.3*
Biomass (CO_2 outside of scope)	*2.3*	*1.7*	4.5	0
Other Fuels	*120.0*	*117.5*	127.3	72.6
Refrigerant	*Not Available*	*0.0*	*0.0*	*Not Available*
Scope 2 – Electricity Emissions	**6671.6**	**6763.4**	**6771.5**	**8354.9**
Total Scope 1 & 2 Emissions	**11,345**	**11,471**	**11,793**	**14,184**
Scope 3 – Indirect Emissions	**1345.9**	**1489.4**	**1556.9**	**1510.6**
Gas – transmission emissions	*414.3*	*409.8*	*448.4*	*363.4*
Fuels – transmission emissions	*313.5*	*364.8*	*369.9*	*319.6*
Electricity – transmission	*500.9*	*591.4*	*592.1*	*601.6*
Biomass – transmission	*1.4*	*2.3*	*6.1*	*Not Installed*
Water	*57.0*	*60.6*	*58.1*	*115.0*
Business Travel by car	*45.0*	*47.0*	*67.0*	*111.0*
Business Travel by Train	*2.1*	*1.9*	*1.8*	*Not Available*
Business Travel by Undergound	*0.3*	*0.3*	*0.2*	*Not Available*
Waste from Council operations	*8.5*	*8.5*	*recycling &waste 13.3*	*Not Available*
Recycling from Council operations	*2.9*	2.8	*As above*	*Not Available*
Total Gross Emissions	**12,691**	**12,960**	**13,350**	**15,694**
Carbon offset				
Hydro generated and exported	95.7	55.8	86.7	118.5
Total Net Emissions	**12,595**	**12,904**	**13,264**	**15,576**
Out of Scope				
Biomass (outside of scope)	*62.9*	*51.0*	133.9	*Not Installed*
Renewable/CHP CO_2 avoided				
Generated & consumed (CHP)	0.0	101	531	486
Biomass CO_2 offset	27.4	21.7	56.9	0.0
Generated & consumed (PV)	35	37	40	*Not Installed*
Degree Days at 15.5 ^{O}C	1792.7	1885.7	1941.9	2016.8
(an indicator of heat demand)				
Conversion Factors used above				
Electricity kWh to kg CO_2	0.49636	0.49426	0.49426	0.5430
Gas kWh to kg CO_2	0.18407	0.184973	0.184973	0.2060
Diesel litres to kg CO_2	2.661163	2.6024	2.6024	2.63
Refrigerant kyoto protocol R410A	2088	1725	1725	*Not Available*
Gas transmission factor	0.02499	0.02483	0.02483	0.1799
Electricity transmission factor	0.03727	0.04322	0.04322	0.0390982

Notes on the data table:-

Business travel is the use of trains and private cars for business activities. It does not include commuting from home to work by employees. Factors used have relied on the fuel type and engine size for cars. For fuels, gas, biomass and electricity, standard factors have been used. Rail travel has relied on a distance calculator and an average 7 mile tube journey. We have been unable to obtain waste analysis this year.

All conversion factors used have been sourced through official 2016 carbon factors[3] except the gas and electricity factors used for CRC and GHG reporting. Carbon offsets relate to electricity produced on site and exported to the grid rather than consumed on site, most notably our hydro-electric plant at Millmead.

Degree days are reported in the table for reference purposes, and to allow normalisation, but none of the data in the table has actually been adjusted for weather factors.

All our main sites are half-hourly metered using HH (Half Hourly) or AMR (Automated Meter Reading) meters. They were installed between 2011 and 2013. This has improved the quality of the data collected over the last two years. The remainder is primarily energy used for communal areas in social housing for which we rely on invoice data.

The principle adopted in our calculations of CO_2 avoided from renewable energy generation is that;

- where power is generated and consumed on site e.g. solar PV, we have calculated the avoided CO_2 based on an aggregate of the generation emissions factor plus the transmission factor, as we have avoided grid electricity by using our own generated renewable energy;
- where power is spilled to the grid and not used on site e.g. the hydro electric power, then we have calculated the avoided CO_2 only on the basis of the generation emissions factor since the transmission will be required to get from our generation plant to the power's end use;
- where heat is provided by biomass the CO_2 offset is calculated using the gas equivalent required to provide the same amount of heat. The heat generated from the biomass is assumed to be 80% of the embodied heat in the fuel input (47.2 tonnes of biomass in 2015-16) and assuming a gas boiler which is 88.8% efficient would have replaced the biomass boiler.

References

[1] http://www.neighbourhood.statistics.gov.uk/dissemination/LeadTableView.do?a=3&b=6275113&c=guildford&d=13&e=61&g=6468425&i=1001x1003x1032x1004&m=0&r=1&s=1405085328409&enc=1&dsFamilyId=2491&nsjs=true&nsck=false&nssvg=false&nswid=1676

[2] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2016

[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/206392/pb13944-env-reporting-guidance.pdf

For energy efficiency in the community please see our Home Energy conservation (HECA) report at http://www.guildford.gov.uk/article/11199/Home-Energy-Conservation-HECA-reports