South Gloucestershire Council
Local Greenhouse Gas Report (2016/17)

1. Introduction

Climate Change is recognised as being a significant global threat. The Paris Agreement (negotiated at the 21st Conference of the Parties of the United Nations Framework Convention on Climate Change) sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C. The UK Government ratified the agreement in November 2016. To help mitigate the potentially devastating effects of climate change, the UK Government has established a target to cut greenhouse gas (GHG) emissions by at least 80% by 2050 compared to 1990 levels.

South Gloucestershire Council remains committed to reducing its GHG emissions to contribute towards the national targets, and to play its part in limiting the extent of dangerous climate change.

The South Gloucestershire Climate Change Strategy includes a series of Action Plans to mitigate and adapt to the effects of climate change. One of the Action Plans includes the objective of reducing carbon emissions across the Council estate and operations.

Therefore, the Council monitors greenhouse gas emissions from its own estate and activities. The monitoring data collated covers:

- emissions from energy consumption in buildings,
- electricity consumption in street lighting,
- fuel use in fleet vehicles, and
- business mileage by staff.

[There are other GHG emissions that result from the Council delivering its functions, such as outsourced services and the procurement of products and services, but the emissions are not easily measured and are therefore not currently included in this report.]

The Council has an **overall target to reduce its own GHG emissions by 4% per annum**.

The purpose of this report is therefore to quantify GHG emissions from the Council's estate and activities listed in the bullet points above, and to analyse progress against the annual target. The relevant data is set out in Appendix 1.

Key points are highlighted in the Report and Appendix 2 lists some key achievements to date. However, the report does not detail the actions planned to be taken over the next few years to reduce GHG emissions as these are set out separately in the South Gloucestershire Council Carbon Management Plan (which forms part of the Council's Asset Management Plan).

This report also sets out the amount of energy the Council generates from renewable and low carbon sources as this is a positive and practical way that the Council can help to tackle climate change through the use of its own estate and activities.

2. Energy Consumption

Energy consumption across the Council estate derives from:

- Energy consumption in buildings (including local authority maintained schools, not academies);
- Electricity consumption in street lighting (including lighting for signs, bollards, traffic signals etc.);
- Fuel use in fleet vehicles (pool cars and Streetcare); and,
- Business mileage paid to staff for business use of their own vehicles (which excludes commuter mileage).

Table 1 (Appendix 1) shows a breakdown of the Council's total energy consumption. This has fallen year on year since monitoring began. **Energy consumption[1] in 2016/17 was 3% lower than in the previous year and 43% lower than in 2010/11**.

The key changes compared to the previous year are:

- **Energy consumption in our schools has fallen by 8%**. This has been driven by a reduction in electricity use (13%), and a reduction in gas use of 7%. However, the figures are also influenced by the former Grange School site being transferred from 'schools' to 'non schools' reporting of data.
- An overall increase of 16% in **energy consumption in non-school** buildings. This was mainly due to the change in reporting of the former Grange School site as referred to above. In non-school buildings there was a small reduction in electricity use (1%);
- A 10% reduction in electricity use in street lighting. This is a result of our streetlighting LED replacement programme which has, **in the previous year alone, saved (1039 MWh of electricity) the same amount of electricity as is used per year by 292 South Gloucestershire homes**;
- A **2% reduction in fleet fuel use** (which is the equivalent of 12,500 litres of fuel) shows relatively little change over the previous year. However, this is still a positive achievement and demonstrates that the Council's ongoing fleet

[1] Energy consumption is calculated in MWh and covers gas, oil and electricity use in schools and non-school buildings, plus electricity used for street lighting, and fuel used for fleet vehicles. It does not include business mileage as this is not calculated in MWh.

management programme and replacement of the fleet with 'greener' vehicles is having a positive impact on energy consumption; and,

- An **5% reduction in business mileage** (a reduction of over 81,000 miles compared to the previous year) is likely due to i) efficiencies through staff being based in fewer offices, and ii) continued implementation of the smarter working campaign to reduce business miles.

3. Green House Gas Emissions

We convert fuel use to Greenhouse Gas Emissions using conversion factors published by the Government each year. Emissions from different fuel types vary over time, especially for electricity where the various forms of generation (coal, wind, gas, solar, etc) affect the emissions per unit of electricity generated. We therefore need to see a decreasing trend in both energy consumption and GHG emissions if we are to hit our GHG emissions targets.

Table 2 (Appendix 1) sets out GHG emissions data for each year since the base year 2009/10. **Total GHG emissions in 2016/17 have decreased by 12% since the previous year and by 50% since the base year (2009/10)**.

A summary of our emissions is described below:

- Electricity consumption accounts for almost two thirds of the Council's emissions. Electricity is used in the Council's schools and non-school buildings as well as in street lighting. The Council's electricity consumption reduced this year (as detailed above), and therefore, once the emissions factor has been applied, this has meant that **the total emissions from electricity use have reduced by 19%.**

- Total emissions from the use of gas have increased slightly by 1.8% during the reporting period.

- Emissions from business mileage has decreased by 4% and emissions from fleet fuel have decreased slightly by 1% since the previous year.

4. Renewable Energy Generation

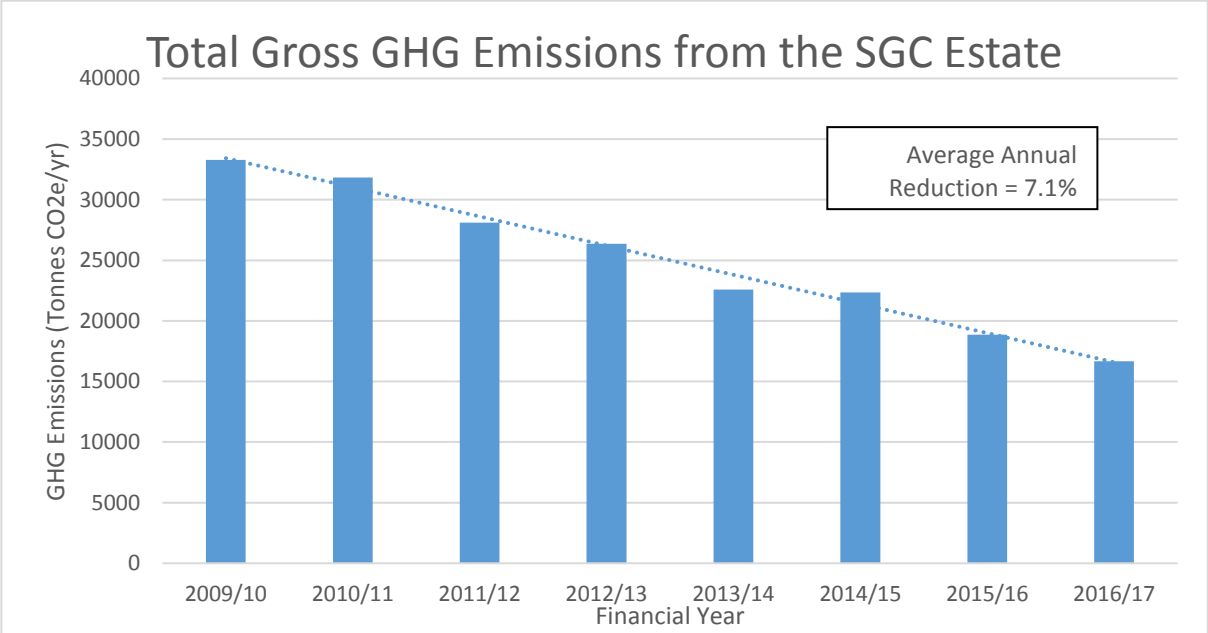
The Council generates renewable energy from a range of sources. The prime source of renewable electricity generation are the two ground mounted solar systems (at Badminton Road, and Moorend). This is the first full reporting year that they have been up and running. The Badminton Road scheme feeds renewable electricity directly into the Badminton Road office building, whilst the Moorend scheme generates electricity that is fed into the National Grid. In total, solar PV schemes from the Council estate have generated 978,193 KWh. An additional 7,879 KWh has been generated from the wind turbine at Marshfield Primary School. This amounts to a total increase of over 600% in the generation of renewable electricity from the previous year.

The Council has also generated a significant amount of renewable heat energy this year from Biomass sources, totalling 1,063,972 KWh. This is a 152% increase on the previous year. There are a total of six biomass boilers installed across the Council estate (in one office and five schools), as well as two ground source heat pumps, two air source heat pumps and four solar thermal arrays. Two mini combined heat and power units are also installed, which are generating low carbon heat and electricity (though this is not considered to be renewable electricity and is therefore not counted in Table 3 of Appendix 1, which sets out renewable energy generation for this year).

5. Conclusion

The Council has an overall target to reduce its GHG emissions by 4% per annum during the accounting period. Reductions in electricity use has been the key driver which has resulted in the Council's target being exceeded, in 2016/17, with an absolute reduction in GHG emissions of 12% since the previous year.

The graph below demonstrates an average annual reduction of over 7% since the baseline year of 2009/10.



Total GHG emissions are now 50% lower than in the baseline year, however, this has been skewed somewhat by the conversion of schools to academies (which are no longer included in the Council's emissions data). For example, during this year one secondary and two primary schools converted into academies.

Overall the data recorded still demonstrates that the Council has made significant progress in its efforts to reduce energy consumption.

In addition to reducing energy consumption, the Council has also been proactive in the generation of renewable energy from its Estate. There has been a massive

increase in generation from last year as the ground mounted solar PV schemes have come on board.

In summary, this report demonstrates that the Council is leading by example to mitigate and adapt to climate change. However we recognise that there is still more to be achieved and we are committed to implementing the actions identified in the Carbon Management Plan to achieve further reductions in energy consumption and carbon emissions, and to increase renewable energy generation.

Appendix 1 – Data tables

Table 1: Total energy consumption across the Council estate							
Energy Consumption (MWh/year)	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**
School Buildings	52,272	45,222	40,491	33,961	31,971	27,610	25,484
KWh gas Schools	32,342	27,405	25,603	19,981	19,509	16,880	15,640
KWh oil Schools	3,906	2,107	2,551	2,191	1,636	1,349	1,682
KWh electricity Schools	16,025	15,709	12,337	11,789	10,826	9,381	8,162
Non-School Buildings	18,288	15,798	15,197	12,724	10,080	9,915	11,536
KWh gas Non Schools	10,403	8,492	8,392	7,088	4,493	4,777	6,465
KWh oil Non Schools	932	323	256	0	0	0	0
KWh electricity Non Schools	6,952	6,983	6,549	5,636	5,587	5,138	5,071
Street Lighting	14,609	14,138	14,486	12,831	11,763	10,488	9,450
Fleet Vehicle Fuels	8,300	8,540	8,671	7,873	7,651	6,486	6,352
Total (MWh/year)	**93,469**	**83,698**	**78,844**	**67,389**	**61,466**	**54,500**	**52,822**
Business Mileage (miles per year)	2,890,460	2,442,864	2,347,587	1,874,482	1,802,028	1,648,889	1,567,171

Table 2: GHG emissions data for period 1st April 2009 to 31st March 2017 Tonnes CO2 (e)								
	2009/10 (base year)	**2010/ 11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**
Total GHG Emissions (t CO2e/yr)	33,284	31,819	28,096	26,352	22,597	22,359	18,870	**16,671**
School Buildings	15,261	14,732	12,653	11,047	9,467	9,363	7,782	6,656
Gas in Schools	6,073	5,991	5,032	4,742	3,677	3,609	3,114	2,878
Heating Oil in Schools	1,694	964	520	630	538	404	333	415
Electricity in Schools	7,494	7,777	7,101	5,675	5,252	5,351	4,336	3,363
Non-School buildings	6,018	5,531	4,795	4,630	3,815	3,593	3256	3279
Gas in all non-school buildings	2,177	1,927	1,559	1,554	1,305	831	881	1,189
Heating Oil in all non-school buildings	225	230	80	63	0	0	0	0
Electricity in all non-school buildings	3,615	3,374	3,157	3,013	2,511	2,762	2,375	2,090
Street Lighting	7,296	7,090	6,391	6,664	5,716	5,814	4,848	3,894
Fleet vehicle fuel	2,113	2,028	2,030	2,063	1,873	1,822	1,535	1,520
Business Mileage Paid	1,140	969	804	736	574	549	495	477
Electricity Transmission & Distribution losses	1,457	1,469	1,423	1,213	1,152	1,218	954	845

Table 3: Renewable Energy Generation from the Council Estate for 1st April 2016 to 31st March 2017 in KWh	
Type of Renewable Energy Installation	**2016/17**
TOTAL KWh GENERATED	**2,050,044**
Solar PV	978193
Wind Turbine	7879
Biomass Chip	394110
Biomass Pellet	669862

Appendix 2 – Key Interventions and Actions implemented to date

The tables below set out the key actions that have been implemented so far in terms of:

A. Improving the energy efficiency of assets and operations, and rationalising and sharing assets where appropriate; and

B. Developing renewable energy in council buildings and on council land where appropriate

Table A: Actions implemented to improve the energy efficiency of assets and operations, and rationalise and share assets where appropriate	
Description of Intervention	**Specific action completed or ongoing**
Buildings	
Consolidate and rationalise the council estate, close inefficient corporate buildings and make better use of space and share/lease surplus space	Accommodation strategy 2014-2019 implemented, including transfer of staff from Thornbury and Kingswood to Badminton Road, has led to energy savings due to reduced requirement for space-heating and lighting
Monitor and report on energy consumption to improve control and management of energy use and provide training for schools staff on energy monitoring and management	Display Energy Certificates produced for all buildings over 500m2 and Sub Meters and Automatic Meter Reading installed (where possible and cost effective) to enable effective monitoring and management. Also, schools are electronically issued with up to date user guide information to monitor energy usage and spend and have the ability to measure energy efficiency projects using a web based energy management system.
Deliver energy saving measures in school buildings	Implemented LED lighting / rewiring / tube lighting replacement schemes for 11 primary schools. The annual total of CO2 saved is now just over 100 tonnes per annum. It is expected that a further 2-3 schools will switch to LED next year.
Develop and implement projects to deliver energy improvements to the non-schools estate where a business case, which includes a satisfactory payback, is demonstrated.	Annual programme delivered.
Street lighting	
Implement LED street lighting replacement and lamping programme, and dimming of lights at night. The programme includes the policy decision to do like for like replacement (rather than achieve the British Standard) which produces a cost / carbon avoidance of 20% or 200 columns. Also the part-night lighting is no longer being carried out. Instead there will be savings from dimming during night time hours in the LED rollout.	10 year programme being delivered from 2014/15. As of July 2017 approximately 10,000 lanterns have been replaced. Since the first year of the programme (14/15), the LED project has saved 10,570 tonnes CO2 and is projected to save 13,862 tonnes CO2 and 31,527,543 KWh by the end of 17/18.

De - illumination of bollards and signage and replacement with highly reflective materials	Ongoing – only replaced as and when required therefore very long term project.
Use planning process to reduce extent of growth in external lighting.	Ongoing - Use of planning can be difficult to influence in some circumstances – for example where new developments are put next to existing. If the existing development has street lighting, the new development demands it (whereas a new development in a new area may not have required it). Some rationalisation has been achieved – for example external contractors on new developments tend to over-design the lighting by 10-20%. The Street Lighting team have managed to reduce this on some developments.
ICT	
Maintain and improve the energy efficiency of council ICT servers and equipment	Ongoing - Annual programme delivered.
Transport	
Review the potential to streamline and green the council's vehicle fleet and fleet operations	Ongoing – 'greening' the fleet replacement programme. The fleet currently has 2 electric bikes plus 15 further electric vehicles (12 pool cars, 1 electric van used by the road safety team, 1 electric car used by the cleansing services team and 1 electric car used by the integrated transport unit). The ULEV grant received for 2014-19. GPS tracking has been installed in every vehicle, however fuel consumption has not been greatly reduced as the mileage for each vehicle tends to be relatively low.
Reduce the number of car journeys to and between offices through the implementation of the green travel plan and smarter working policies enabling staff to work remotely	Good progress made in reducing business mileage due to consolidation of office accommodation, and smarter / flexible working policies introduced. Employee engagement events held, by the TravelWest roadshow team at council offices, aimed at encouraging sustainable travel by the council's employees.

Table B: Actions implemented to develop renewable energy in council buildings and on council land	
Action	**Measure:**
Use Invest-to-Save fund to meet the over and above costs of installing biomass boilers rather than gas boilers in schools whose boilers require replacement	Biomass boilers installed in 5 schools (plus 2 which have converted to academies)
Enable schools to install solar PV schemes using Invest to Save fund or other approved models	Roof mounted Solar PV installed on 2 schools
Develop solar energy on council land and buildings where there is a viable business case and support the development of community led renewable energy projects where viable	Searches on Council land undertaken and ground mounted Solar PV schemes installed at Badminton Road and Moorend. Roof mounted Solar PV schemes installed on all 5 leisure centres.
Review costs and incentives for renewable and low carbon energy solutions, assess viability for inclusion in refurbishment, building and maintenance programmes, and seek to access funding for viable projects	Ongoing – continually assess buildings suitable for solar PV to benefit from Government FIT scheme.
Investigate potential for use of waste wood from council owned land and operations for fuelling council owned biomass boilers	Review completed 2014/15 and no further action recommended.