

# **Greenhouse Gas Emissions from Local Authority own estate and operations**

**Reporting year 2017\_18**

Oxford City Council

**Date: 17 August 2018  
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Reviewer: Jo Colwell**



## **Greenhouse Gas Emissions (GHG) from Local Authority own estate and operations covering financial year 2017/18**

### **Foreword**

The public sector has been leading the way in tackling climate change in the UK, and Oxford City Council has been in the vanguard since 2008 when it started managing the carbon emissions from its own operations and estate. What you can't measure, you can't manage and Oxford has gone to a lot of effort to put automated metering of energy and water consumption in place to underpin its carbon management.

It gets harder to produce year on year carbon reductions – Oxford has an ambitious target of 5% per year by implemented measures. Short payback opportunities have been taken already. However we have been very successful in winning government Salix funding to increase the size of our revolving loan fund to £1m to meet investments costs for a range of energy efficiency measures such as installing new efficient boilers, LED lighting and controls upgrades, insulation, variable speed drives, and photovoltaic systems.

Greenhouse gas carbon equivalent emissions (tCO<sub>2</sub>e) have reduced this year by 4.3% – but this is due in part to the ongoing dramatic decarbonisation of the national electricity grid.

Our underlying energy consumption has gone up slightly - a 2.1% increase in electricity, a 0.8% increase in gas and a 5.4% increase in carbon from vehicle fuel. This is to be expected as unlike many other local authorities, Oxford City Council has been insourcing and offering commercial services to other organisations in the area, with the income protecting frontline priorities. Oxford City Council uses more gas, electricity, water and vehicle fuel to be able to do this - but we are doing it in a lower carbon way.

We will continue to work hard to deliver carbon, energy and cost efficiencies, whilst working city-wide to drive down carbon emissions and improve air quality.

**Councillor Tom Hayes**  
**Board Member for Safer, Greener Environment**

## 1. Introduction

Oxford City Council launched its first Carbon Management Strategy and Implementation Plan (“Getting Our House in Order”) in 2008/09, mapping out a route to implementing a range of measures to achieve a reduction in CO<sub>2</sub> emissions by 25% by 2011 (on a 2005 baseline) and 3% year on year thereafter. The Plan was refreshed and updated in August 2012 (Carbon Reduction at the Heart of Everything we Do) with a stretched target of a 5% year on year implementation of CO<sub>2</sub> reduction measures, and an expanded scope (including supplies of electricity and gas in communal areas of council housing stock) bringing in more emissions sources that are under the Council’s control.

A further refreshed and updated plan<sup>1</sup> covering the next 5 years (2017/18 to 2021/22) was published in March 2017 following City Executive Board approval and maps a path to continual improvement in carbon and energy management, driving down energy, fuel and water spend and their associated carbon dioxide emissions.

The areas that contribute to the bulk of the Council’s CO<sub>2</sub> emissions are from:

- Heating and electricity consumption in Council operational sites (e.g. office buildings, depots, leisure centres, car parks, sports pavilions, public conveniences and other miscellaneous sites)
- Fuels consumed in Council fleet vehicles (e.g. refuse trucks, vans and pool cars), non-road going vehicles and plant (e.g. lawnmowers, chippers, and portable heaters)
- Travel for business purposes (e.g. fuel consumed in staff-owned vehicles, pool cars and from the use of public transport to conduct Council business)
- Operational waste deposited in landfill sites (generated from Council operations)

This report provides GHG emissions data (in tCO<sub>2</sub>e and tCO<sub>2</sub>) for the reporting period 2017/18 (as well as including details of emissions from the previous 3 years 2014/15, 2015/16 and 2016/17). (CO<sub>2</sub>e gives the global warming effect of the mass of GHG in terms of what mass of carbon dioxide would produce the equivalent effect.)

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<sup>1</sup> [https://www.oxford.gov.uk/downloads/download/552/carbon\\_management\\_strategy](https://www.oxford.gov.uk/downloads/download/552/carbon_management_strategy)

A summary of 2017/18 GHG emissions included in this report are as follows (see Sections 5 and 6 below for scope of emissions coverage in this report):

<b>Total GHG emissions for period 1 April 2017 to 31 March 2018*</b>		
	<b>Tonnes of CO<sub>2</sub></b>	<b>Tonnes of CO<sub>2</sub>e</b>
<b>Year</b>	<b>2017/18</b>	<b>2017/18</b>
Scope 1	5,199	5,229
Scope 2	2,894	2,916
Scope 3	315	427
<b>Total GHG emissions</b>	<b>8,408</b>	<b>8,572</b>

\* see Sections 5 and 6 below for scope of emissions coverage in this report

Please see Section 6 onwards below for a discussion of carbon emissions trends over the past 5 reporting years (including the current reporting year 2017/18).

## **2. Organisation Information**

Oxford City Council is a non-metropolitan district council as defined by Section 1(4) and Schedule 1 Part II of the Local Government Act 1972. The Local Authority main contact details are: Oxford City Council, Town Hall, St Aldates, Oxford, OX1 1DS.

## **3. Reporting period**

1 April 2017 – 31 March 2018.

## **4. Approach**

We have based this report on the Government's Guidance on how to measure and report greenhouse gas emissions as outlined in communications from The Department for Food, Environment and Rural Affairs.

<https://www.gov.uk/measuring-and-reporting-environmental-impacts-guidance-for-businesses>

## **5. Organisational boundary**

The scope of this report covers all Council buildings and operations as well as water consumption and disposal.

The following emissions sources are covered:

- Electricity and gas consumed in all buildings and sites (e.g. emissions from our operational buildings and other sites office buildings, depots, leisure centres, car parks, sports pavilions, public conveniences and other miscellaneous sites).
- Fuel consumption from fleet vehicles, non-road going vehicles and plant.
- Miles or kilometres travelled in staff-owned vehicles and estimated to be travelled in public transport for business purposes.

- Water consumed in Council operational buildings and other miscellaneous sites within the scope of the Council's influence and operations.

In future years, as data quality and availability improves we propose to expand the scope to cover other emissions sources across the Council estate and operations that the Council has direct influence over (e.g. operational waste deposited in landfill sites, staff commuting and procurement).

## 6. Operational scopes

We have measured our total scope 1, 2 and significant scope 3 emissions covering the areas outlined in the organisational boundary (see above). Further details are outlined in Table 1 below.

**Table 1: Operational scopes**

Scope One	Scope Two	Scope Three	Not included
Fuel used to heat our buildings (e.g. natural gas, gas oil, kerosene and liquid petroleum gas)	Purchased electricity for our buildings and other electricity consuming sites (e.g. offices, leisure centres, depots, car park and public conveniences).	electricity (transmissions and distribution factors)	Perfluorocarbons (PFC), hydrofluorocarbons (HFC) and sulphur hexafluoride (SF <sub>6</sub> )
Fuel used in council vehicle fleet and also to power non-road going vehicles and plant such as lawn-mowers and, chippers.			Staff commuting
		Business mileage by car	Emissions from Council operational waste deposited in landfill sites
		Business mileage by public transport (bus and train)	Emissions from Leased commercial properties or housing stock where tenants are paying energy/water bills.
Fuel used in waste collection vehicle fleet		Water consumed (supply and treatment)	<b>Total indirect emissions:</b> e.g. due to upstream emissions from production and delivery of fuel to power stations or transport fuel stations.
	Half-hourly metered and non-half-hourly metered electricity supplies (ie Meter profile classes 01-08, HH and Unmetered Supplies)		Avoided emissions from on-site renewable energy have not been included to date

Where possible we will work towards including the excluded emissions in future years.

A summary of total GHG emissions for the current reporting year (2017/18) is outlined in Table 2 below. Headline figures over the last five years (including the current reporting year) are detailed in Table 3 and the stacked bar chart (Chart 1). A more detailed breakdown of Total GHG emissions and sources for the previous three years can be found in Appendix 1.

**Table 2:** Total GHG emissions for the period 1 April 2017 to 31 March 2018

2017/18	Total Units	tCO2	tCO2e
<b>Scope 1</b>			
Gas consumption (kWh)	17,050,077	3,134	3,140
Gas Oil (litres)	31,284	85	92
Kerosene (litres)	4,000	10	10
LPG (litres)	0	0	0
Diesel (litres) - average biodiesel blend	747,373	1,927	1,943
Petrol (litres) –(average biofuel blend)	19,571	43	43
<b>Total Scope 1</b>		<b>5,199</b>	<b>5,228</b>
<b>Scope 2</b>			
Purchased Electricity (kWh)	8,294,434	2,894	2,916
<b>Scope 3</b>			
Electricity - Transmission and distribution	8,294,434	270	273
Average petrol car (miles) - unknown fuel	141,074	41	41
Passenger travel – train, national rail (km)	62,049	3	3
Passenger travel – average local bus (km)	6,627	1	1
Water supply(m3)	104,266	0	36
Water treatment(m3)	104,266	0	74
<b>Total Scope 3</b>		<b>315</b>	<b>428</b>
<b>Totals</b>		<b>8,408</b>	<b>8,572</b>

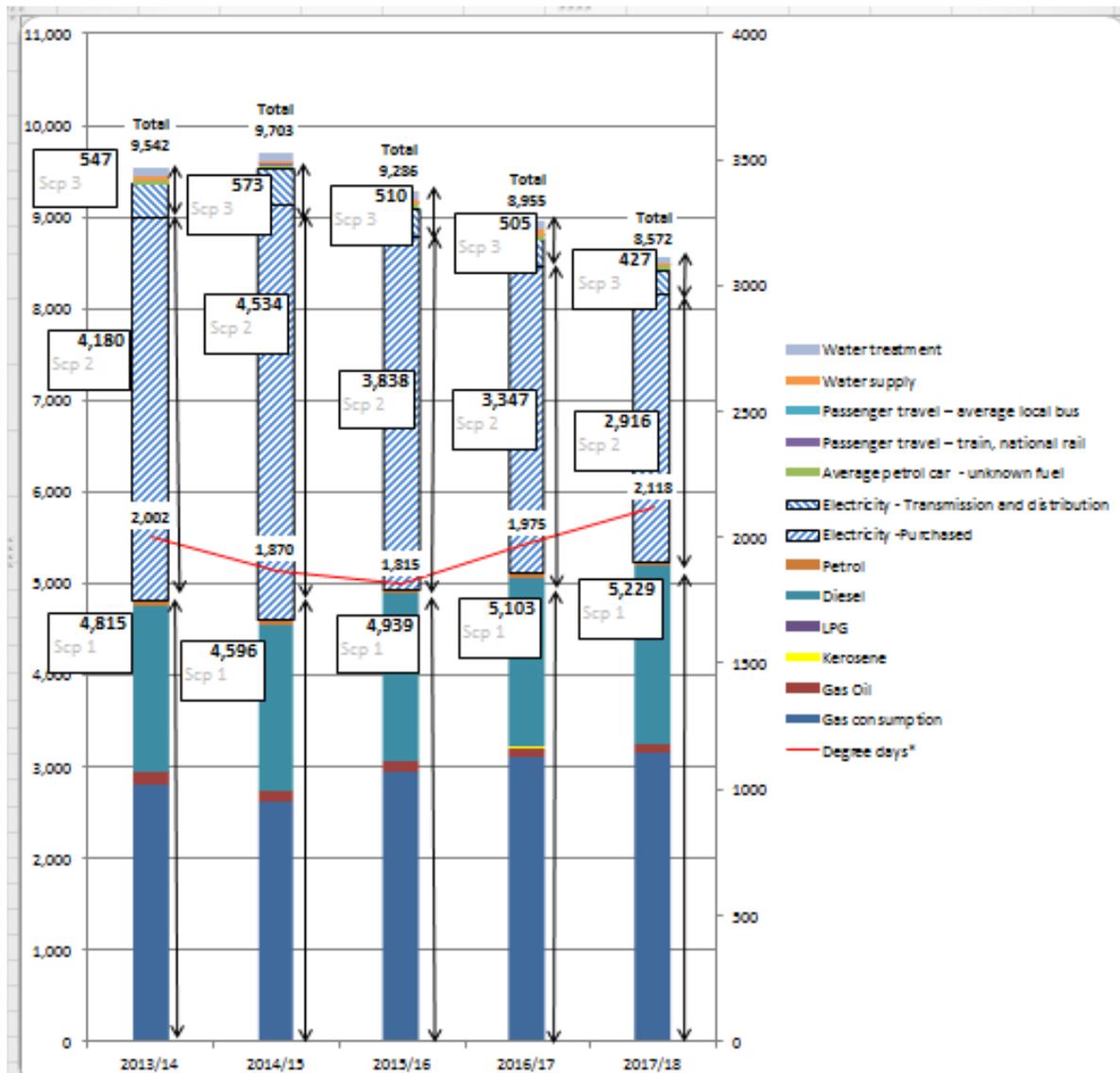
**Heating degree days** (to base 15.5°C) for the Thames Valley Region for the 2017/18 reporting period were 2118.

We have referenced heating degree day figures (to base 15.5°C) for each reporting year as a rough indication of the severity of the heating season. This is not a precise assessment on a building per building basis accounting for heating loads, building fabric and other factors that may influence heating related consumption but solely used as rough indicator of general heating demand. A lower degree day number indicates a less severe heating requirement and may have an influence on quantity of gas used.

**Table 3:** Summary of annual GHG emissions (tCO<sub>2</sub>e) for period 1 Apr 2013 to 31 March 2018

	13/14 tCO <sub>2</sub> e	14/15 tCO <sub>2</sub> e	15/16 tCO <sub>2</sub> e	16/17 tCO <sub>2</sub> e	17/18 tCO <sub>2</sub> e
Gas consumption (kWh)	2,804	2,619	2,946	3,112	3,140
Gas Oil (litres)	132	106	106	96	92
Kerosene (litres)	10	10	10	10	10
LPG (litres)	2	0	0	0	0
Diesel (litres) - average biodiesel blend	1,803	1,814	1,832	1838	1,943
Petrol (litres) – (average biofuel blend)	64	47	44	47	43
<b>Totals Scope 1</b>	<b>4,815</b>	<b>4,596</b>	<b>4,939</b>	<b>5,103</b>	<b>5,228</b>
Purchased, grid Electricity (kWh)	<b>4,180</b>	<b>4,534</b>	<b>3,838</b>	<b>3,347</b>	<b>2,916</b>
Electricity - Transmission and distribution	357	396	317	303	273
Average petrol car (miles) - unknown fuel	51	44	38	44	41
Passenger travel – train, national rail (km)	4	4	4	4	3
Passenger travel – average local bus (km)	1	1	1	1	1
Water supply(m <sup>3</sup> )	43	42	49	50	36
Water treatment(m <sup>3</sup> )	90	86	101	103	74
<b>Totals Scope 3</b>	<b>547</b>	<b>573</b>	<b>510</b>	<b>505</b>	<b>428</b>
<b>Totals</b>	<b>9,542</b>	<b>9,703</b>	<b>9,286</b>	<b>8,955</b>	<b>8,572</b>
Degree days	2002	1870	1815	1975	2118

The above data from Table 3 is further detailed in the stacked bar chart below to show the overall trends in absolute emissions at the appropriate annual conversion factors supplied:



**Chart 1: Stacked bar chart showing GHG emissions (tCO2e) from all three scopes for the past five reporting years (2013/14 to 2017/18).**

### 7. Base Year

Our base year for this GHG reporting process is 2016/17 (the previous reporting year) as this is aligned with our year on year target, outlined in our Carbon Management Plan 3 approved in February 2017 (“Continual improvement in carbon and cost reduction”).

### 8. Targets

In the Carbon Management Plan covering the reporting period for this report, the Council CO<sub>2</sub> reduction target for 2017/18 was to put measures in place calculated to reduce CO<sub>2</sub> emissions by a minimum of 5% compared with the previous year (equivalent to 452tCO<sub>2</sub>) which was exceeded. A range of energy conservation

measures were implemented and tracked during the reporting year delivering a total estimated reduction of 461tCO<sub>2</sub>/year. Measures implemented include:

- Façade mounted Solar PV on tower block 5tCO<sub>2</sub>
- Large depot buildings Solar PV installation (125kWp): 53tCO<sub>2</sub>
- Building disposals: 14tCO<sub>2</sub>
- Fleet fuel reduction measures (in-cab technology reducing the number of missed bin pick-ups plus improved MPG performance of vehicles): 208tCO<sub>2</sub>
- LED lighting upgrades at: Tower Blocks; Multi-use games areas floodlighting; community centres and other areas 39tCO<sub>2</sub>;
- Monitoring & targeting savings (targeting and correcting excess consumption issues arising): 15tCO<sub>2</sub>

The impact of measures implemented in 2017/18 are not expected to be fully represented in the carbon emissions data for the 2017/18 reporting year - as they were implemented at periods throughout the reporting year so would not have had a full year's impact.

**Governance and targets:** Tim Sadler, Executive Director, Community Services has overall accountability and Jo Colwell, Environmental Sustainability Manager is responsible for the achievement of the target. Councillor Tom Hayes City Executive Board Member for a Safer, Greener Environment is also responsible for this work area. Internal assurance and governance for the Carbon Management Programme and related work area is provided through engagement with the aforementioned officers.

In terms of progress in year on year reduction in absolute emissions our total GHG emissions in 2017/18 (scopes 1, 2, and 3 as outlined in Sections 5 and 6 above) were **3.9%**(CO<sub>2</sub>) and **4.3%**(CO<sub>2</sub>e) less than in the previous year 2016/17.

In terms of estate-wide electricity and gas consumption, **a 2.1% increase in electricity consumption** and **a 0.8% increase in gas consumption** have been observed. An 7.2% increase in degree days was observed in 2017/18 compared to the previous year which may have led to some increased demand on gas and heating related consumption in buildings. Further analysis of GHG reduction performance is outlined in the following section against significant intensity measurements.

## 9. Intensity measurements

This section provides more detail on underlying trends in GHG emission data against significant intensity measurements related to areas of activity at the Council.

### a. Leisure centre visits

Leisure centres account for over 40% of building related GHG emissions and therefore activity in these buildings can have an impact on overall energy and water consumption if not managed effectively.

Leisure centre related CO<sub>2</sub>e emissions decreased by 4.9% in 2017/18 compared to the previous year. Applying an intensity measurement against visitor numbers however shows a 26.3% increase in kgCO<sub>2</sub>e per visit compared to the previous year. This is due to a large drop (24.7%) in visits reflecting the very challenging leisure market at the moment.

The following table summarises these trends over the last three years.

	2015/16		2016/17		2017/18	
	Visits	kgCO2e/ visit	Visits	kgCO2e/ visit	Visits	kgCO2e/ visit
Barton Leisure Centre	126,012	2.78	113,966	2.98	96,476	3.34
Ferry Leisure Centre	619,562	1.01	498,469	1.38	306,570	1.88
Hinksey Outdoor Pool	62,357	10.43	56,830	7.99	58,987	9.68
Leys Pools and Leisure Centre	439,921	1.84	537,045	1.54	403,730	1.92
Oxford Ice Rink	193,441	3.61	161,661	4.09	164,004	3.52
<b>Totals</b>	<b>1,441,293</b>		<b>1,367,971</b>		<b>1,029,767</b>	
total kgCO2e per visit in Leisure Centres	0	<b>2.18</b>	0	<b>2.17</b>	0	<b>2.74</b>
Visits: % change on previous year	<b>-0.40%</b>	0.00%	<b>-5.09%</b>	0	<b>-24.72%</b>	0
kgCO2e/visit: % change	<b>0</b>	<b>-5.00%</b>	0	<b>-0.4%</b>	0	<b>26.3%</b>

Table 4: Leisure visits over 3 years and carbon emissions/visit comparison

#### **b. Commercial operations - increasing trading activity**

Oxford City Council's commercial operations have been showing a steady increase year on year as it transforms into a Local Authority Trading Company (LATCo). The kind of additional services being offered centre on commercial waste collection, private and HGV vehicle MOT testing and, servicing ground maintenance and building maintenance. All of this activity results in extra vehicle purchasing, movements and increased office and workshop energy and water use, producing an upward pressure on our carbon emissions.

Increases in GHG emissions related to this activity have been limited by gradual upgrading of fleet to modern lower emission (including electric), more fuel efficient vehicles as well as rolling out advanced driver training to educate drivers on techniques to conserve fuel consumed in vehicles. Regular eco-driver training and investment in vehicle telemetry, giving on-board engine management systems/alerts, are assisting this work.

Table 5 outlines changes in the make-up of the vehicle fleet in the last five years with a 5.3% increase in the number of vehicles used to conduct council operations compared to the previous year. Fourteen electric vehicles have been added to the fleet in recent times with plans to expand this base significantly in future years. As well as significantly reducing whole life costs of vehicle fleets this will also contribute towards assisting with the Council's aspirations for implementing a world first Zero Emission Zone in Oxford city centre.

	2014/15	2015/16	2016/17	2017/18
Vehicle Types	No of vehicles	No of vehicles	No of vehicles	No of vehicles
Car and Car derived vans	64	83	79	71
Electric vehicles				14
Misc light/heavy plant and ride on machinery	319	451	532	570
Trucks and tippers up to 3500kg GVW	66	73	72	65
Vans up to 3500kg GVW	80	99	92	111
Vans, trucks and tippers between 3501 and 7500kg GVW	18	13	20	10
Vans, trucks and tippers between 7501 and 18000kg GVW	9	8	11	8
Refuse Collection Vehicles	26	28	32	36
Sweepers	15	17	18	17
Tractors, shovels and light loaders	19	11	7	6
Trailers	46	51	46	50
<b>Totals</b>	<b>662</b>	<b>834</b>	<b>909</b>	<b>958</b>

Table 5: Increase in vehicle fleet numbers

### 10. Renewable energy installations

Oxford City Council has continued to implement renewable energy installations to generate on-site electricity and reduce its use of grid-sourced electricity. In 2017/18 the council's total installed Solar PV capacity exceeded 1MW.

This equates to solar providing the equivalent of 10% of the Council's total electricity from renewable energy installations. Further Solar PV installations are planned in 2018/19 and beyond.

### 11. Sustainable Buildings

The Council continues to invest in the upgrade of its estate with a programme of refurbishments and new build projects. Where possible energy efficiency solutions that go beyond minimum building regulation requirements (and other sustainability measures) are implemented. The Council's own planning requirement for the city for larger developments insists on a Natural Resource Impact Assessment and 20% on-site renewable - or very low carbon - energy generation. This requirement influences new Council buildings as well as those built by others in the city.

### 12. External Assurance Statement

Energy and water data is validated and managed via a market leading Energy bureau database package (Team Sigma) with the team developing expertise in this area in-house.

Team members managing the energy/carbon related programmes at the Council include a Certified Energy Manager and Certified Measurement & Verification

Professional, BREEAM Accredited Professionals, BREEAM-in-Use Assessor, Public Building Energy Assessor, professionals with Energy Institute qualifications and membership (eg TEMOL and MEI status) and membership of the Association of Energy Engineers (AEE) with one team member being a regular Board member for the UK Chapter of the AEE.

**Appendix 1: Total GHG emissions for the last three reporting years (2014/15, 2015/16 and 2016/17)**

**Table a:** Total GHG emissions for the period 1 April 2014 to 31 March 2015

2014/15	Total Units	tCO <sub>2</sub>	tCO <sub>2</sub> e
<b>Scope 1</b>			
Gas consumption (kWh)	14,160,656	2,613	2,619
Gas Oil (litres)	36,178	99	106
Kerosene (litres)	4,000	10	10
LPG (litres)	0	0	0
Diesel (litres) - average biodiesel blend	697,152	1,800	1,814
Petrol (litres) –(average biofuel blend)	21,243	46	47
<b>Total Scope 1</b>		<b>4,568</b>	<b>4,596</b>
<b>Scope 2</b>			
Purchased Electricity (kWh)	9,173,950	4,497	4,534
<b>Scope 3</b>			
Electricity - Transmission and distribution	9,173,950	393	396
Average petrol car (miles) - unknown fuel	144,121	44	44
Passenger travel – train, national rail (km)	88,186	4	4
Passenger travel – average local bus (km)	7,889	1	1
Water supply(m <sup>3</sup> )	120,984	n/a	42
Water treatment(m <sup>3</sup> )	120,984	n/a	86
<b>Total Scope 3</b>		<b>442</b>	<b>573</b>
<b>Totals</b>		<b>9,507</b>	<b>9,704</b>

\* Defra emissions factors guidance - dated June 2014 used

<https://www.gov.uk/measuring-and-reporting-environmental-impacts-guidance-for-businesses>

# estimated derived from financial data

a – Defra Emissions Conversion factor tool used (2014 data)

<http://www.ukconversionfactorscarbonsmart.co.uk/>

**Heating degree days** (to base 15.5°C) for the Thames Valley Region for the 2014/15 reporting period were **1870**.

**Table b:** Total GHG emissions for the period 1 April 2015 to 31 March 2016

2015/16	Total Units	tCO <sub>2</sub>	tCO <sub>2</sub> e
<b>Scope 1</b>			
Gas consumption (kWh)	15,971,143	2940	2946
Gas Oil (litres)	35,366	99	106
Kerosene (litres)	4,000	10	10
LPG (litres)	0	0	0
Diesel (litres) - average biodiesel blend	709,109	1,817	1,832
Petrol (litres) –(average biofuel blend)	20,148	44	44
<b>Total Scope 1</b>		<b>4,910</b>	<b>4,939</b>
<b>Scope 2</b>			
Purchased Electricity (kWh)	8,303,027	<b>3,807</b>	<b>3,838</b>
<b>Scope 3</b>			
Electricity - Transmission and distribution	8,303,027	314	317
Average petrol car (miles) - unknown fuel	127,785	38	38
Passenger travel – train, national rail (km) <sup>#</sup>	84,989	4	4
Passenger travel – average local bus (km) <sup>#</sup>	7,550	1	1
Water supply(m <sup>3</sup> )	143,015	n/a	49
Water treatment(m <sup>3</sup> )	143,015	n/a	101
<b>Total Scope 3</b>		<b>357</b>	<b>510</b>
<b>Totals</b>		<b>9,074</b>	<b>9,286</b>

\* Defra emissions factors guidance - dated June 2015 used

<https://www.gov.uk/measuring-and-reporting-environmental-impacts-guidance-for-businesses>

# estimated derived from financial data

a – Defra Emissions Conversion factor tool used (2015 data)

<http://www.ukconversionfactorscarbonsmart.co.uk/>

**Heating degree days** (to base 15.5°C) for the Thames Valley Region for the 2015/16 reporting period were **1815**.

**Table c:** Total GHG emissions for the period 1 April 2016 to 31 March 2017

2016/17	Total Units	tCO2	tCO2e
<b>Scope 1</b>			
Gas consumption (kWh)	16,915,814	3,107	3,112
Gas Oil (litres)	32,412	88	96
Kerosene (litres)	4,000	10	10
LPG (litres)	0	0	0
Diesel (litres) - average biodiesel blend	703,669	1,823	1,838
Petrol (litres) –(average biofuel blend)	21,345	47	47
<b>Total Scope 1</b>		<b>5,074</b>	<b>5,103</b>
<b>Scope 2</b>			
Purchased Electricity (kWh)	8,123,213	3,327	3,347
<b>Scope 3</b>			
Electricity - Transmission and distribution	8,123,213	301	303
Average petrol car (miles) - unknown fuel	147,119	44	44
Passenger travel – train, national rail (km)#	81,889	4	4
Passenger travel – average local bus (km)#	8,048	1	1
Water supply(m3)	145,136	0	50
Water treatment(m3)	145,136	0	103
<b>Total Scope 3</b>		<b>350</b>	<b>505</b>
<b>Totals</b>		<b>8,751</b>	<b>8,955</b>

\* Defra emissions factors guidance – last updated June 2016 used

<https://www.gov.uk/measuring-and-reporting-environmental-impacts-guidance-for-businesses>

# estimated derived from financial data

a – Defra Emissions Conversion factor tool used (2016 data)

<http://www.ukconversionfactorscarbonsmart.co.uk/>

**Heating degree days** (to base 15.5°C) for the Thames Valley Region for the 2016/17 reporting period were **1975**.