PROGRESS AGAINST CARBON EMISSIONS TARGETS 2017-2018

The following tables show our performance against our overarching carbon emissions targets and year on year comparison. The University measures and reports on carbon emissions in three ways:

1. **Absolute emissions**

Scope 1 & 2 absolute emissions* (tCO2e) decreased 10% between 2016-17 and 2017-18, and 3.6 % from the baseline year (2008/9) and therefore significantly missing our target of 5% reduction per annum from 2010-2015 and 3% per annum from 2015-2020. *See figure one.* Despite decreasing our tCO2e we consumed very similar amounts of gas and electricity last year; 16.1 MWh compared to 16.09 MWh.

Electricity emissions reduced 20% against 2016-17. Total electricity used decreased by 0.11 MWh across the university. Emissions reductions are due to a change in the conversion factor because in the UK we now have more renewable energy sources providing our electricity.

Gas emissions increased 3% last year, following a small decrease in the previous year when the gas consumption decreased because of an investment in newer boiler plant. Note we've had mild winters* for the proceeding last four years but we had early snows in October and widespread cold weather coming right at the end of the season. This meant an increased consumption of 0.3 MWh from the previous year because of extending the heating season. Our total gas usage for the year was 10.1 MWh.

Fleet emissions decreased 9.5% last year and up by 39% from the baseline year. The increase from the baseline is due to University growth and our increased requirement for more vehicles. The fleet is slowly converting to be fully electric as we renew vehicles.

2. **In relation to the number of students and staff at the University (tCO2e/FTE)**

Emissions intensity has decreased by 17% compared to 2016-17 and by 41% since our 2008-09 baseline year. This measure indicates that whilst we have more people using our buildings, the carbon reduction initiatives on electricity and gas are making a difference, albeit slowly. Our recruitment success means that student and staff numbers continue to increase. We now have 9,541 full time equivalent students and staff on campus compared to 5,868 in our baseline year, increasing 397 last year.

3. **In relation to university buildings – floor space (tCO2e/sqm)**

Emissions intensity – floor space has decreased by 9% compared to 2016-17 and by 44% since our 2008-9 baseline year, we are using less energy per square metre, due to the number of carbon savings initiatives we have introduced across campus. No new buildings were added to the estate last year the minor change in square meterage is due to more accurate measuring.

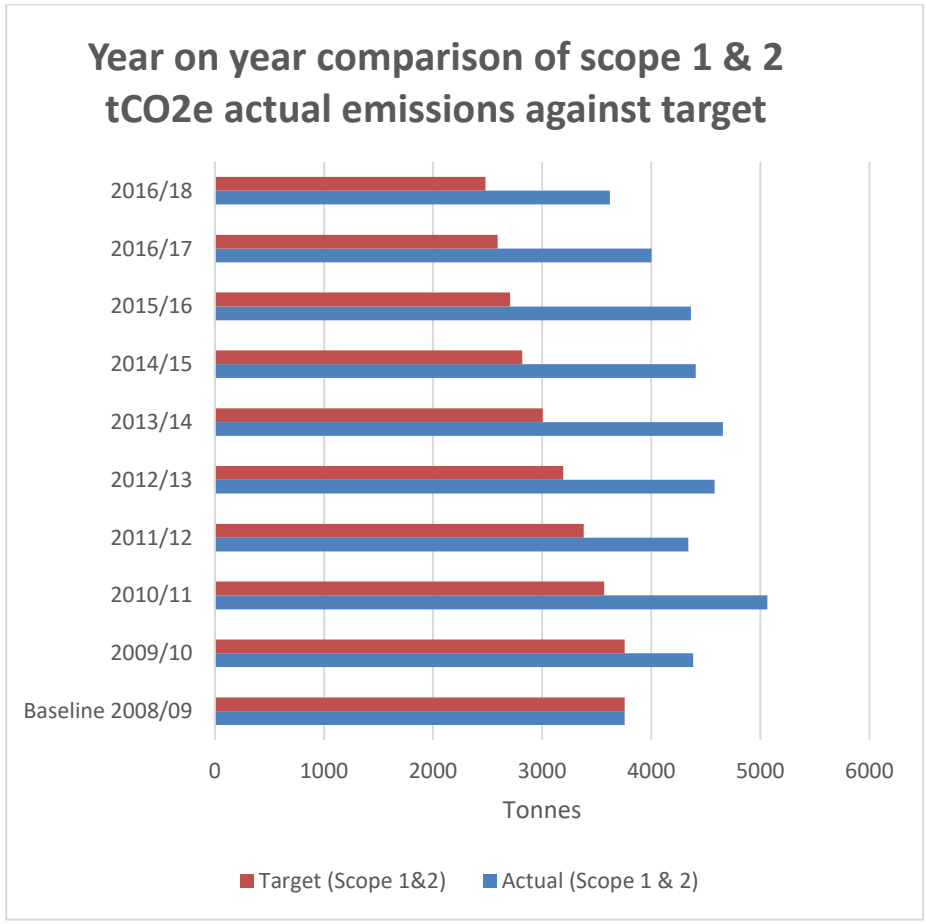
Scope 3 indirect carbon emissions

Scope 3 emissions* have decreased 12% last year, this is predominantly due to changes in our commute travel emissions for both staff and students and decreased 5% from the base year. Therefore we are beginning to make inroads into tackling these indirect emissions, but are not yet on track to meet our absolute targets. *See figure one*.

Methodologies for data gathering for a number of these categories is more robust and has been applied consistently since 2012-13. However it is important to note one of the two primary contributors to these indirect emissions, procurement, does depend on spend each year. Therefore if we spend more emissions go up. Scope 3 emissions have decreased by 5% since setting our baseline in 2012-13. A factor arguably the university has more influence over is staff and student commuting to campus. Happily these emissions have decreased by 26% in the past year; fewer people are driving on their own to campus. There was a greater use

of coach and rail travel, and 50% fewer taxi journeys compared to last year. As both rail and coach are more sustainable modes of transport these changes are seen as positive. Air travel did reduce last year by 10% but from the base year 2012/13 it is still 78% higher.
Year on year comparisons may not give a true picture. Full details are shown in the tables below; highlights include:

- There was slightly higher spend in procurement but as most of this was in business services (lower carbon factor) compared to previous year which was from construction projects which have a higher carbon emissions factor.
- Staff and student commuting decreased 26%, equivalent to 5,748 tCO2e due to fewer proportion of staff and students choosing to drive to campus.
- Waste and recycling emissions decreased 35%, partly due to more waste being used to create energy.
- Water usage decreased 26%. Leak detection work and a continuation of small water saving projects throughout the estate is bearing fruit.



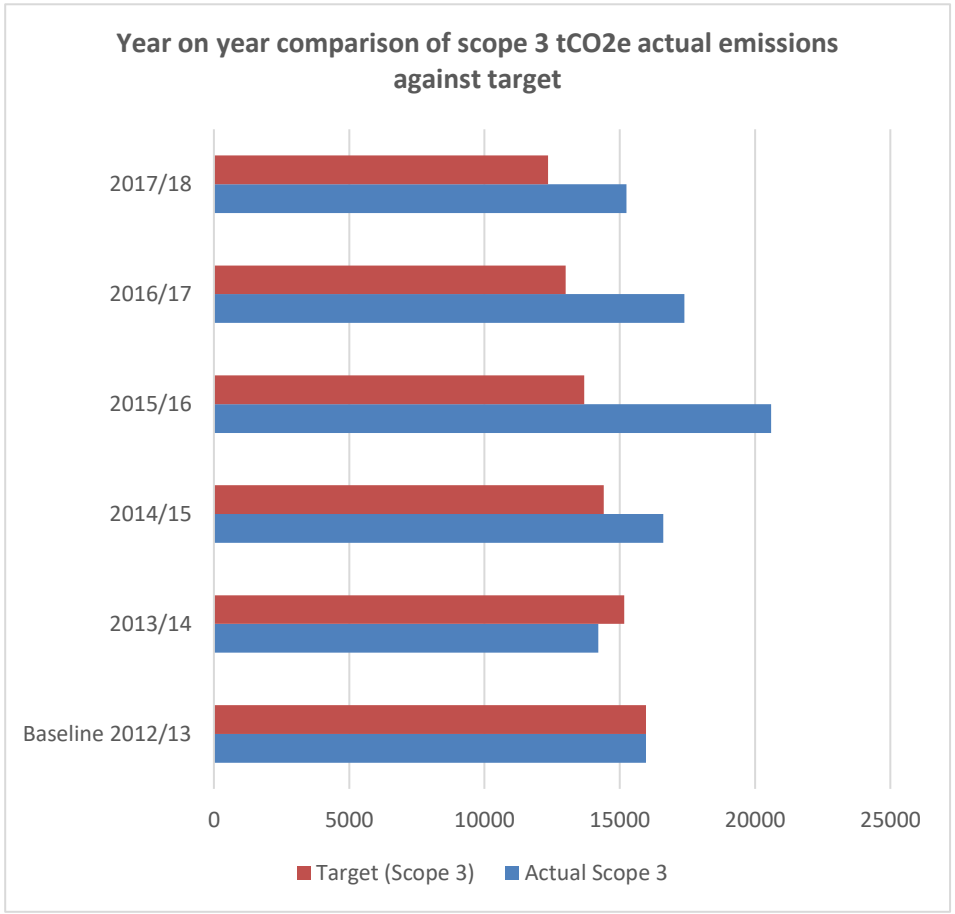


Figure 1: The graphs above show the university total carbon footprint broken down between direct (scope 1 & 2) and indirect (scope 3) carbon emissions. Year on year comparison of carbon emission targets against our actual absolute emissions.

PROGRESS AGAINST CARBON EMISSIONS TARGETS 2017-2018

In summary

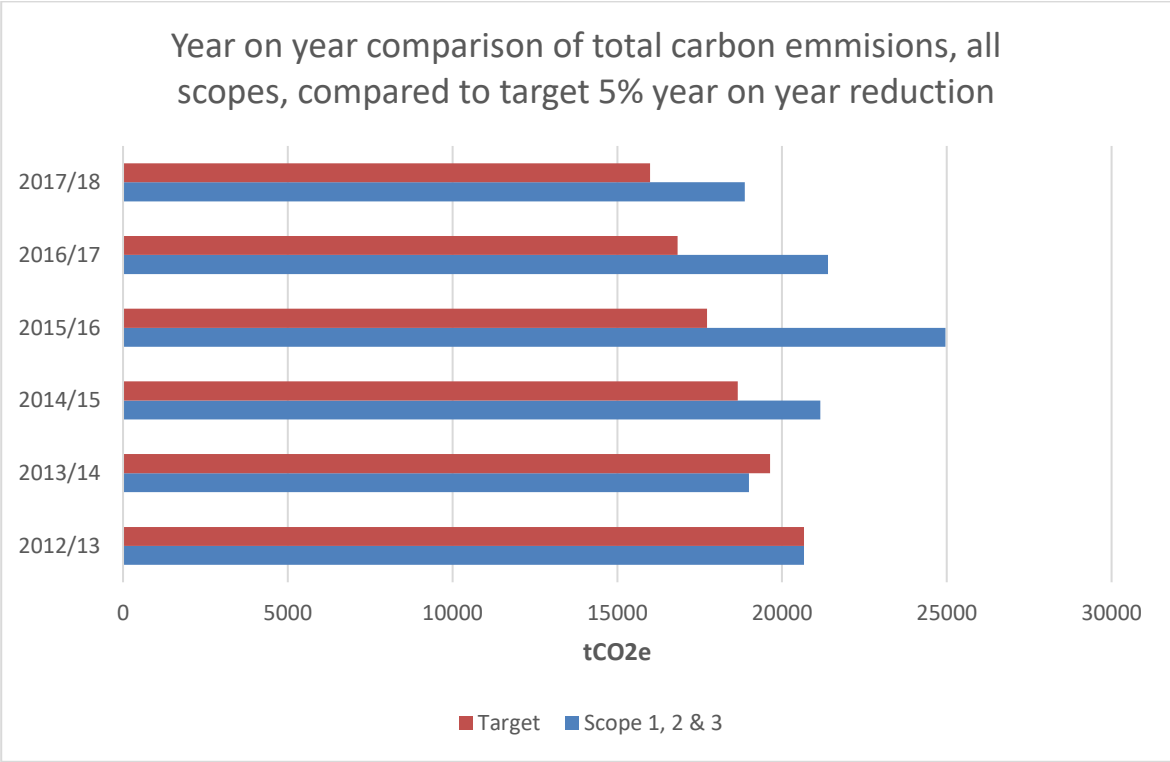


Figure 2: The graphs above show the university total carbon footprint for all scopes direct (scope 1 & 2) and indirect (Scope 3) carbon emissions. Year on year comparison of carbon emission targets against our actual absolute emissions.

Our total carbon footprint for 2017-18 was 18,865 tCO2e against a target of 15,911 tCO2e. We are clearly not achieving the absolute carbon targets we set. The majority of our carbon comes from scope 3 indirect emissions that is 15,245 tCO2e, of which most are from procurement and commuter travel. If we look solely at direct carbon emissions (scope 1 & 2) these have also decreased by 4% from the baseline going from 3,757 tCO2e to 3,620 tCO2e and a -10% annual change.

In 2008/9 our energy intensity was 0.08. Floor space has decreased by 9% compared to 2016-17 and by 44% since our 2008-9 baseline year, we are using less energy per square metre, due to the number of carbon savings initiatives we have introduced across campus. Our energy intensity in kgCO2e/m2 was 77.94 in 2008/9 and has reduced to 50.53 in 2017/8 a reduction of 35.2%.

PROGRESS AGAINST CARBON EMISSIONS TARGETS 2017-2018

Key: **RED** - does not meet target **AMBER** - needs monitoring **GREEN** - meets the target **GREEN★** - exceeds the target. FTE = staff and students, GIA = Gross Internal Area.

Scope 1, 2 & 3 total emissions tCO2e

	2005-06	2006-07	2007-08	Baseline 1&2, and some 3 2008-09	2009-10	2010-11	2011-12	Increased scope 3 envelope 2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Progress against target 5% reduction in tCO2e from 2012/13 baseline	
Actual	3,725	3,146	3,477	**9,450**	10,771	16,554	14,836	**20,666**	18,997	21,163	24,955	21,392	**18,865**	**8.7% decrease from baseline**	**RED**
Target								**20,666**	19,633	18,651	17,719	16,833	**15,991**	**12% decrease from last year**	**AMBER**

Scope 1 and 2 total emissions tCO2e

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	Progress against 2020 target of a 40% reduction in tCO2e from 2008/09 baseline	
Actual	3,514	2,976	3,277	**3,757**	4,383	5,066	4,339	4,581	4,657	4,407	4,362	4,003	**3,620**	**3.6% decrease from baseline**	**RED**
Target				3757	3757	3569	3381	3193	3006	2818	2705	2592	2480	**10% decrease from last year**	**AMBER**

Electricity Generation emissions tCO2e. Conversion factor = 0.28307

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	
Annual	1,596	1,509	1,797	**1,864**	2,280	2,365	2,415	2,619	2,907	2,675	2,449	2,129	**1,706**	**Decreased by 19.89% from 2016-17**	**AMBER**
Per FTE	0.304	0.277	0.321	**0.318**	0.354	0.313	0.311	0.336	0.337	0.320	0.279	0.232	**0.1788**	**Decreased by 23.21% from 2016-17**	**AMBER**
Per GIA	0.0362	0.0342	0.0397	**0.0394**	0.0365	0.0348	0.0347	0.0346	0.0382	0.0351	0.0302	0.0262	**0.0210**	**Decreased by 19.76% from 2016-17**	**AMBER**

PROGRESS AGAINST CARBON EMISSIONS TARGETS 2017-2018

Gas emissions tCO2e. Conversion factor = 0.18396

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual	1,911	1,453	1,467	**1,856**	2,078	2,675	1,899	1,931	1,700	1,660	1,844	1,802	**1,853**	**Increased by 2.81% from 2016-17**	**RED**
Per FTE	0.364	0.267	0.262	**0.316**	0.323	0.354	0.244	0.248	0.197	0.199	0.210	0.197	**0.194**	**Decreased by 1.47% from 2016-17**	**AMBER**
Per GIA	0.0433	0.0329	0.0324	**0.0392**	0.0332	0.0393	0.0273	0.0255	0.0223	0.0218	0.0228	0.0222	**0.0228**	**Increased by 2.96% from 2016-17**	**RED**

Fleet emissions tCO2e. Conversion factor = Diesel 2.627, Petrol 2.203

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual	6.94	14.26	13.28	**36.90**	25.70	26.28	25.38	31.53	32.22	70.99	50.65	56.51	51.15	**Decreased by 9.49% from 2016-7**	**GREEN**

F Gas emissions tCO2e 2088

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual									18.25	1.54	18.16	6.47	10.23	**Increase by 58.08% from 2016-17**	**RED**

Scope 3 Emissions

Scope 3 Total emissions tCO2e

PROGRESS AGAINST CARBON EMISSIONS TARGETS 2017-2018

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Baseline 2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Annual	211.5	169.5	199.7	289.6	333.1	11,438.5	10,359.5	**15,965**	14,212	16,605	20,594	17,389	**15,245**

Electricity Distribution Transport & Distribution emissions tCO2e. Conversion factor = 0.02413

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual	152.0	118.0	140.0	**148.0**	184.0	202.1	190.8	224.0	254.2	220.9	221.0	199.1	145.0	**Decreased by 27.16% from 2016-17**	**GREEN**
Per FTE	0.0290	0.0217	0.0250	**0.0252**	0.0286	0.0268	0.0245	0.0288	0.0295	0.0264	0.0252	0.0218	0.0152	**Decreased by 30.18% from 2016-17**	**GREEN**

Water emissions tCO2e. Conversion factor = 0.344

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual	12.90	8.70	8.70	**9.20**	12.16	15.33	14.70	12.92	13.06	15.67	17.56	22.91	16.91	**Decreased by 26.19% from 2016-17**	**GREEN**
Per FTE	0.00246	0.00160	0.00155	**0.00157**	0.00189	0.00203	0.00189	0.00166	0.00152	0.0019	0.0020	0.0025	0.0018	**Decreased by 29.26% from 2016-17**	**GREEN**

Wastewater emissions tCO2e. Conversion factor= 0.70800

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual	30.81	20.81	20.64	27.96	27.96	30.04	28.27	25.27	26.88	32.25	36.14	47.14	34.80	**Decreased by % from 2016-17**	**GREEN**
Per FTE	0.0059	0.0038	0.0037	0.0048	0.0043	0.0040	0.0036	0.0032	0.0031	0.0039	0.0041	0.0052	0.0036	**Decreased by % from 2016-17**	**GREEN**

Waste & Recycling emissions tCO2e – too many to list

PROGRESS AGAINST CARBON EMISSIONS TARGETS 2017-2018

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual				**73.4**	63.3	73.4	35.2	22.4	48.0	26.1	17.3	18.8	12.2	**Decreased by 34.96% from 2016-17**	**GREEN**
Per FTE				**0.0125**	0.0098	0.0097	0.0045	0.0029	0.0056	0.0031	0.0020	0.0020	0.0013	**Decreased by 36.56% from 2016-17**	**GREEN**

Hire Car emissions tCO2e. Conversion factor = 0.17753

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual	7.4	11.1	17.1	**15.5**	41.1	41.1	35.0	35.3	27.57	40.1	20.1	32.9	23.1	**Decreased by 29.78% from 2016-17**	**GREEN**
Per FTE	0.00140	0.00204	0.00305	**0.00264**	0.00638	0.00544	0.00450	0.00453	0.00320	0.00479	0.0023	0.0036	0.00242	**Decreased by 32.70% from 2016-17**	**GREEN**

Taxi emissions tCO2e. Conversion factor = 0.21482

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual							**3.5**	2.6	4.5	2.8	4.2	3.5	1.8	**Decreased by 49.57% from 2016-17**	**GREEN**
Per FTE							**0.00045**	0.00033	0.00053	0.00034	0.00047	0.00039	0.00019	**Decreases by 51.67% from 2016-17**	**GREEN**

Rail travel emissions tCO2e . Conversion factor = 0.04424

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual	8.4	10.9	13.2	**15.5**	4.7	11.7	13.6	24.3	13.1	16.1	15.1	18.4	19.9	**Increased by 8.02% from 2016-17**	**GREEN**
Per FTE	0.0016	0.0020	0.0024	**0.0026**	0.0007	0.0016	0.0018	0.0031	0.0015	0.0019	0.0017	0.0020	0.0472	**Decreased by 0.73% from 2016-17**	**AMBER**

PROGRESS AGAINST CARBON EMISSIONS TARGETS 2017-2018

Air travel emissions tCO2e . Conversion factor = Domestic 0.30, Short-haul, 0.16 and Long-haul 0.21

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual						118.2	264.9	252.9	271.2	318.0	577.0	499.6	450.7	**Decreased by 9.78% from 2016-17**	**RED**
Per FTE						0.0157	0.0341	0.0325	0.0315	0.0380	0.0657	0.0546	0.0472	**Decreased by 13.60% from 2016-17**	**RED**

Commuter travel emissions tCO2e. Distance calculated by modal spilt and Defra conversion factors by vehicle.

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual						**6,843.1**	6,315.0	6,142.4	5,823	5,683.3	5,978.6	7,817.0	5747.6	**Decreased by 26.47% from 2016-17**	**GREEN**
Per FTE						**0.906**	0.813	0.788	0.676	0.680	0.680	0.855	0.602	**Decreases by 29.53% from 2016-17**	**GREEN**

Grey Fleet emissions tCO2e. Conversion factor = 0.18064

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual							**45.0**	77.6	25.1	111.3	68.1	86.1	78.4	**Decreased by 8.95% from 2016-17**	**GREEN**
Per FTE							**0.0058**	0.0100	0.0029	0.0133	0.0078	0.0094	0.0082	**Decreases by 12.73% from 2016-17**	**GREEN**

Coach travel emissions tCO2e. Conversion factor = 0.47897

PROGRESS AGAINST CARBON EMISSIONS TARGETS 2017-2018

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual							**8.8**	14.9	16.6	14.8	16.0	13.7	24.2	**Increased by 76.28% from 2016-17**	**GREEN**
Per FTE							**0.00114**	0.00191	0.00193	0.00177	0.00183	0.00150	0.00253	**Increased by 68.95% from 2016-17**	**GREEN**

Procurement emissions tCO2e = Spend data converted by HEFCE procurement methodology

	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	change from last year	Key
Annual							4,153.2	**3,541.4**	9,248.7	7,816.9	10,274	8,629	8,690	**Increased by 0.7% from 2016-17**	**RED**
Per FTE							0.550	**0.456**	1.187	0.908	1.229	0.944	0.911	**Decreased by 4.17% from 2016-17**	**AMBER**

Full Time Equivalent student and staff numbers

	2005-06	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
FTE Stu/Staff	5,444	5,602	**5,868**	6,435	7,549	7,772	7,790	8,613	8,358	8,781	9,144	9,541
Floor space GIA m2	44,126	45,224	**47,362**	62,515	68,038	69,669	75,647	76,140	76,140	80,978	81,328	81,212

Source: http://www.ukconversionfactorscarbonsmart.co.uk/

*Notes:
The World Resource Institute developed a classification of emissions sources around 3 scopes. Scope 1 emissions are direct emissions from the combustion in owned boilers and vehicles, scope 2 accounts for emissions from the generation of purchased electricity consumed by an organisation, and scope 3 is all other indirect emissions which are a consequence of the activity of the organisation - for example procurement and commuting. Degree Days account for the effect of weather on measuring energy management. Last year it was another mild winter with total degree days of 1975, against five year average of 2150 degree days. Targets were initially drawn up in December 2007 were set for the five-year period 2007 – 2012, this was reviewed in October 2011 following the adoption of a revised more stringent carbon management strategy in July 2010. This new strategy also changed the baseline year from 2005/6 to 2008/9. A further review of the Carbon Management Strategy in April 2014 increased the scope 3 envelope. Our performance against each target is shown above; in areas with no target there is now sufficient data to set meaningful targets, which have been adopted for 2014-15. The emissions factors are for all greenhouse gases and follow Defra reporting guidelines.

**Wastewater figure is based on fascial consumption and does not include grey water which is not metered.