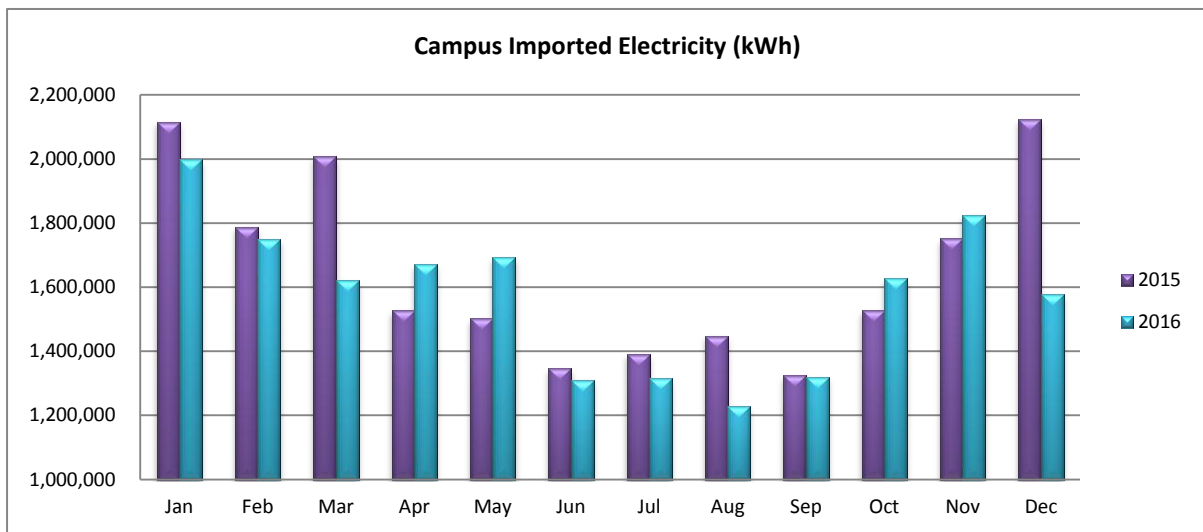


## 5. Energy and Environmental Management

### 5.1 Utility Usage Review.

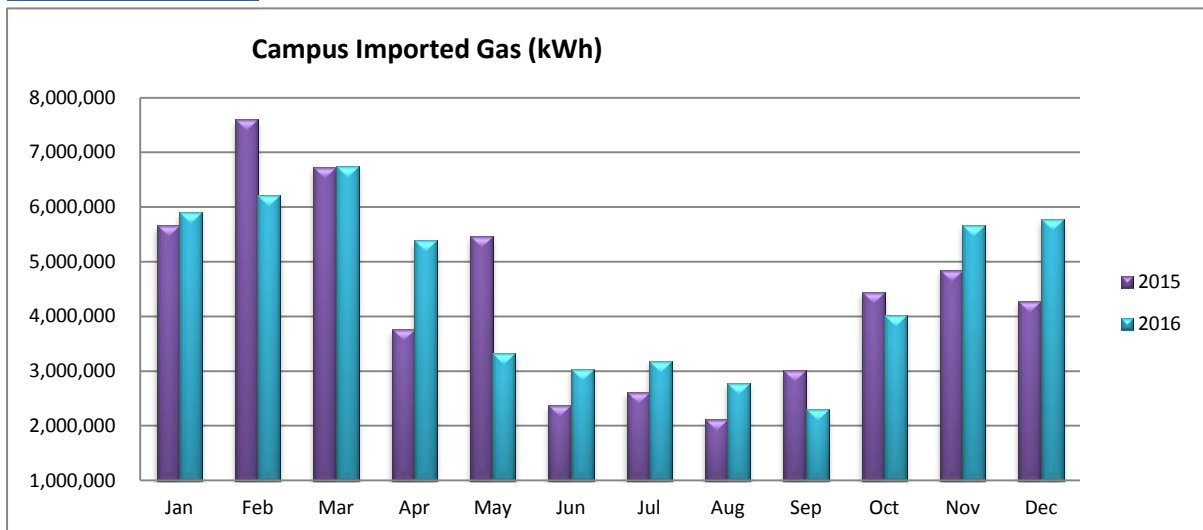
Comparison of Utility Consumption				
Utility	2015 (kWh)	2016 (kWh)	Trend	%
Imported Electricity	19,852,251 kWh	18,934,541 kWh	↓	4.62%
Gas Usage	52,872,907 kWh	54,298,647 kWh	↑	2.70%
Carbon Emission	20,008.23 tCO <sub>2</sub>	18,810.31 tCO <sub>2</sub>	↓	5.99%
Water Usage	599,225 m <sup>3</sup>	748,478 m <sup>3</sup>	↑	24.91%

#### 5.1.1 Electricity Comparisons



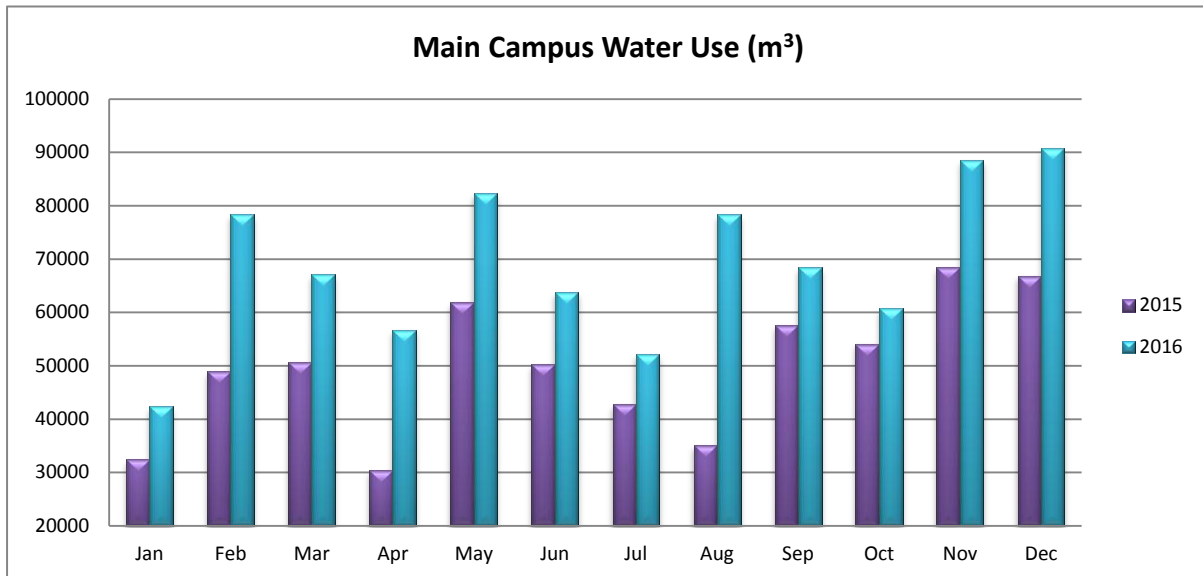
We can report that the Campus used less imported electricity over 2016 than in the previous year. This is due to improvements to the operation and performance of the Combined Heat and Power (CHP) plant. There have been some months that don't follow this trend, but are attributed to the CHP (maintenance and under performance). In December 2015 the CHP had planned maintenance works, which explains the variance between these months. April and May highlight great performance in 2015 against intermittent faults and power supply issues the following year.

#### 5.1.2 Gas Comparisons



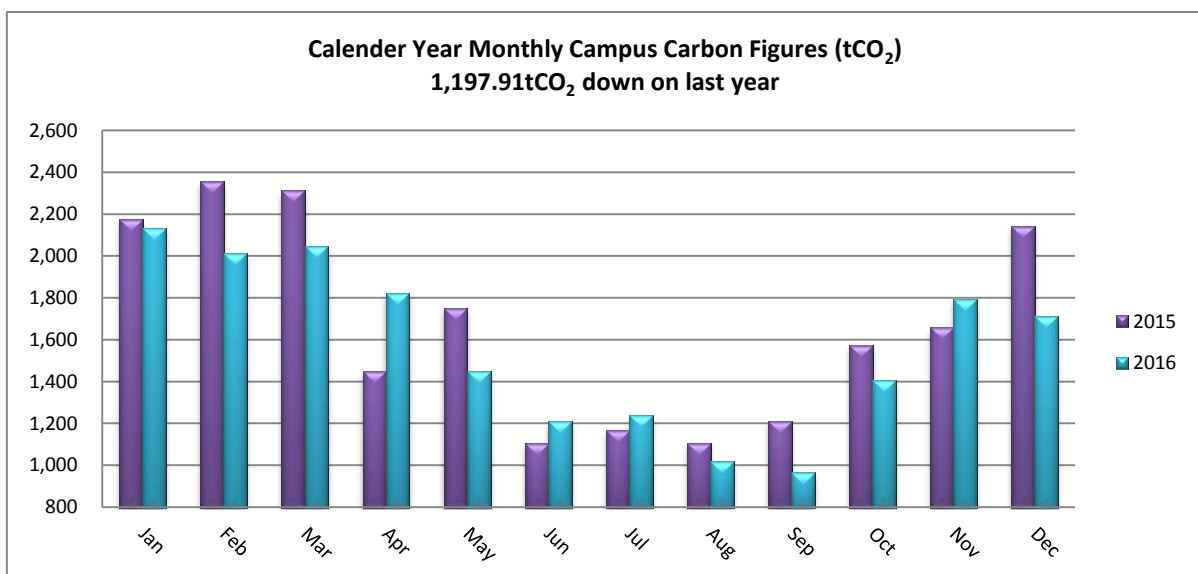
We can report that the Campus used more gas over 2016 than in the previous year. This is due to the increases in gas required to fuel the CHP, onsite electricity generation plant. There have been some improvements across campus that have assisted in the reduction of gas usage, through improvements to time and set points on the Building Energy Management Systems controls (BEMS) that control some of the campus's boilers.

### 5.1.3 Water Comparisons



We reported a sizable increase in water use and leaks this year against last year. The general trend shows a closing of the consumption gap, followed by assumed leaks, until the end of the 2016. We can see that consumption is now excessively high against last year's usage and as such we will increase leak detection efforts in the first few months of 2017, appointing a preferred water leak detection specialists to locate all campus leaks. The results of these future repairs will be noticeable in the January-February 2017 data.

### 5.1.4 Carbon Review



The annual trends show a continually steady reduction year on year since SEF engagement. The reported reductions between last year and this are 1,197tCO<sub>2</sub>. We can report for the first 5 months of the academic year (August to December) a 793tCO<sub>2</sub> reduction against last year and is ahead of where we are forecasting for the expected academic years performance (reduction of 1,095tCO<sub>2</sub>).

## 5.2 Carbon Forecast.

### 5.2.1 Carbon Tracker

Year	2005-06	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	20 <sup>th</sup> Nov 2020
Projects	<i>Carbon Saving (tCO<sub>2</sub>)</i>	<i>Carbon Saving (tCO<sub>2</sub>)</i>	<i>Carbon Saving (tCO<sub>2</sub>)</i>	<i>Carbon Saving (tCO<sub>2</sub>)</i>	<i>Carbon Saving (tCO<sub>2</sub>)</i>	<i>Carbon Saving (tCO<sub>2</sub>)</i>	<i>Carbon Saving (tCO<sub>2</sub>)</i>	<i>Carbon Saving (tCO<sub>2</sub>)</i>	<i>Carbon Saving (tCO<sub>2</sub>)</i>
Improvements to operation and running of CHP	0	0	572	228					
HFCE Revolving Green Fund Round 3 (Streetlighting)	0	0	20						
Solar Panels on Campus (Based on desktop survey).	0	0	0	0	0				
Fiscal and Sub-metering data collection	0	0	0	600	550	100	100	100	
Fume Cupboard supply air and extract alterations.	0	0	0	0	245				
Projects resulting from Energy Audit (See section 2.2)	0	0	0	0	100	3,493	967	504.6	84.1
Campus Changes				418	200	1,150	66	0	0
Annual Reduction	0	0	592	1246.0	1095.0	4743.0	1133.0	604.6	84.1
<b>Current and Projected Footprints</b>	<b>22,174</b>	<b>21,441</b>	<b>20,849</b>	<b>19,603</b>	<b>18,508</b>	<b>13,765</b>	<b>12,632</b>	<b>12,027</b>	<b>11,943</b>
Percentage Reduction		<b>3.31%</b>	<b>5.98%</b>	<b>11.59%</b>	<b>16.53%</b>	<b>37.92%</b>	<b>43.03%</b>	<b>45.76%</b>	<b>46.14%</b>
Historic Forecast		<b>18,282</b>	<b>17,734</b>	<b>17,202</b>	<b>16,685</b>	<b>16,185</b>	<b>15,700</b>	<b>15,229</b>	<b>15,229</b>

## 5.3 Carbon Management Strategy

### 5.3.1 Phase 1 of the University of Sussex Carbon Management Strategy (Delivered in 2017)

A “Carbon Management Strategy” Gateway document was presented to the University in December 2016. The University will now decide if they want to progress with a two phased energy savings project strategy to deliver the remaining HEFCE targeted carbon savings by 2020.

Phase one projects have been valued at approximately £4.4m ex VAT, following campus surveys and audits. The projects tabled are the improvement of both internal and external lighting to LED, the addition and improvement to the campus Building Energy Management System (BEMS) controls and the addition of 750kWp solar electric panels. With these projects in place we forecast a £575k pa saving from the utility bill, therefore achieving a simple payback in 7.6 years. This will deliver approximately half of the remaining carbon reductions target.

### 5.3.2 Phase 2 of the University of Sussex Carbon Management Strategy (Delivered in 2018)

Phase two projects, which are yet to be determined, are estimated to cost in the order of £6.6m ex VAT with £575k pa savings (11.5 years simple payback). Options include, but are not limited to the addition of an Anaerobic Digester (generating electricity/heat from waste food) and a Biofuel CHP which will form part of a raft of projects that will deliver the remaining carbon savings for the 2020 target year. Once the University are happy to proceed with phase one, focus will be put into developing a robust business case for this phase of works.

### 5.3.3 Campus Metering

We are working to complete the first phase of the sub-metering AMR project with the remaining budget before the end of February, with the second and last phase commencing and completing over the nearest University vacation period post February. We have planned for the next 8 Transformer Electricity meters to be installed week commencing 9th/10th January, with the remaining works dependent upon the required maintenance works within the Arts and York House Substations.

Utility	Phase 1 Total	Completed	% Complete
Billing Electricity	2	3	150
Billing Gas	16	16	100
Billing Water	1	1	100
Transformer Electricity	13	3	23
Sub Gas	3	3	100
Sub Electricity	3	3	100
Sub Water	0	0	n/a
Heat	37	37	100
Sussex Food Cafés Elec	9	0	0
Sussex Food Cafés Water	2 (from 9)	0	0
Total	75	66	88

Note: there is a requirement for an additional survey of the 7 water meters in the cafés. The costs to install the remaining water meters aren't included within this phase. The inclusion of the café metering was at the request of the University and will proceed over two evenings 8th/9th February).

The Second phase to complete the sub metering data collection across campus has been quoted and is awaiting budget approval. An additional report will be submitted to the University in January to reignite the requirement to complete this project. This will complete the campus wide utility meter logging, at building level and at zonal level on the water main (to assist in assisting in campus water leak detection). Once we have completed phase one, we will look to commence the remaining works during the near est University vacation period post February.

### 5.3.4 Student Engagement Program

The New East Slope development, which will be managed and operated by Balfour Beatty, will be utilising Amber Energy and their student awareness program called “The Student Energy Project” to engage with student living within the new halls of residence. The program has three distinct strategies to improve student engagement into environmental and energy usage:

- Financial incentives to reduce energy waste,
- Certified environmental training programs, and
- A gateway to environmental volunteering programs.

We aim to have a campus wide solution ready for the start of the 2017-18 academic year, which is suitable for all University of Sussex students living on and off campus, which will take into account the variety of residential building type the University has.

## 5.4 League Table Review

### 5.4.1. People and Planet University League Table Review

Year	League Position	Grading
2009	50 <sup>th</sup>	2:2
2010	57 <sup>th</sup>	2:2
2011	89 <sup>th</sup>	2:2
2012	45 <sup>th</sup>	1 <sup>st</sup>
2013	65 <sup>th</sup>	2:2
2014	43 <sup>rd</sup>	2:1
2015	No League Result this Year	
2016	81 <sup>st</sup>	2:2

Following the best result that the University has ever achieved in the People and Planet University League in 2014, it was disappointing to have slipped down to 81st in the subsequent league table. Whilst we showed areas of maintained high and improved scores in the following sections:

- Environmental Policy (Maintained 100%),
- Ethical Investment (Improved by 20%),
- Workers Rights (Improved by 2.5%),
- Staff and Student Engagement (Improved by 5%),
- Waste and Recycling (Maintained 26%), and
- Water Reduction (Improved by 11%).

We underperformed in the follow key sections:

- Human Resources for Sustainability (Dropped by 20%),
- Environmental Auditing and Management Systems (Dropped by 70%),
- Carbon Management (Dropped by 21%),
- Sustainable Food (Dropped by 10%), and
- Education for Sustainable Development (Dropped by 20%).

To tackle the poor performance we will be employing an additional environmental member of staff and an environmental student intern in 2017. We are reviewing whether we to re-adopt EcoCampus for 2017 and looking to engage with Sussex Food and the University Schools through the reignited Environmental Forum, which started in October. The Environmental Forum reports into the Health, Safety and Environmental Committee and shows the University's commitment to engage with all staff and students across the campus. The University has made great inroads into improving its forward focus on future investment, with the newly approved Socially Responsible Investment policy in April of this year. We have, just this week issued recycle bags across all halls of residence kitchens to make further improvements on our waste and recycling figures and are looking into supplying a composting scheme for all halls of residence kitchens, starting next academic year. We are tackling water wastage and leakages, through ongoing water leak detection and repair to continually reduce our water usage and will be looking at technology for further improvements.

### 5.4.2. UI Green Metric League Table Review

Year	League Position	Participants
2010	12 <sup>th</sup>	95
2011	24 <sup>th</sup>	178
2012	13 <sup>th</sup>	215
2013	21 <sup>st</sup>	301
2014	21 <sup>st</sup>	361
2015	11 <sup>th</sup>	407
2016	66 <sup>th</sup>	516

Once again, following the best result that the University has ever achieved in the UI Green Metric League in 2015, it was disappointing to have slipped down to 66th in the subsequent league table.

We are chasing information to explain the drop in the league table, considering that we have either maintained or improved performances from last year to this. Early indications would indicate that performance has dropped as a direct result of the increase to participating Universities.

Once we have a detailed outline of poor performances, we will initiate a programme of works to correct this.