



UNIVERSITY OF PLYMOUTH

Interim Sustainability Report 2018-19

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1. Purpose of the report

The following acts as a summary report to track progress against University sustainability targets in 2018-19, highlight key issues relating to this performance, and compare our performance against the sector. The focus is upon carbon, energy, water and waste performance.

2. Targets and performance summary

The following table highlights performance against University targets for sustainability for the 2018-19 academic year.

Area	Target	Performance 2018-19
Carbon	<ul style="list-style-type: none"> 80% reduction in CO₂e (from scope 1 & 2) by 2050 from 1990 levels with interim target as UK Government budget years 	<ul style="list-style-type: none"> 48% reduction in CO₂e (from scope 1 & 2) in since base year
Water	<ul style="list-style-type: none"> Reduce annual water consumption to below 3.0m³/student by 2020. 	<ul style="list-style-type: none"> Current consumption is 4m³ per student 27% reduction in water since the base year
Waste	<ul style="list-style-type: none"> Recycle 70% of waste by 2020. Reduce waste generated to 20kg or less per student. 	<ul style="list-style-type: none"> 50% recycling rate 26kg waste generated per student
Travel	<ul style="list-style-type: none"> To reduce gCO₂e per mile of business travel to below 0.28gCO₂e per mile by 2020 Reduce the need for business travel through video conferencing Monitor student and staff commuting emissions (TCO₂e/staff and TCO₂e/student) 	<ul style="list-style-type: none"> Business travel as per baseline at 0.31gCO₂e per mile 609KgCO₂e per staff member and 192KgCO₂e per student
Supply Chain	<ul style="list-style-type: none"> Annually monitor supply chain emissions based on spend data, against the baseline year 2015-16 (56.1 kgCO₂e/m²) excluding construction, utilities and business travel. 	<ul style="list-style-type: none"> Emissions as per baseline at 56.1 kgCO₂e/m²
Sustainable Food	<ul style="list-style-type: none"> Maintain Status Quo - evidenced by Sustainable Food Standard in place. 	<ul style="list-style-type: none"> Sustainable Restaurant Association 3 star standard renewed.
Fairtrade	<ul style="list-style-type: none"> Maintain Status Quo - evidenced by Fairtrade University standard in place. 	<ul style="list-style-type: none"> Fairtrade needs renewing (decision to be made whether to continue with accreditation in light of increased costs).

3. Current projects

The following are current projects that are underway intending to contribute towards energy reduction.

Energy wide campus infrastructure project

Reviewing the future of the gas-led CHP district heat network in order to transition to 5th generation lower carbon electrical led system in the future combined with an ambient ground loop. Currently working on the proposal to develop NEDF as a lower carbon energy centre lead for the network.

CHP efficiency

Modelling our current gas CHP boiler in order to maximise the efficiency of the unit for the remainder of its life and extending the network to maximise heat and electrical output. Note that this will deliver financial savings, but not reduce carbon emissions, due to the decarbonisation of electricity as an alternative to gas fed CHP (as above).

LED lighting replacements

Continuing our LED lighting replacement programme in Rolle and Portland Square (completion planned by Nov 2020), completing remaining areas in Portland Villas, Davy and RLB. Smeaton, Fitzroy and Scott were completed earlier this year.

Energy metering upgrades

Upgrading the remaining metering as the second phase to the Campus Information Control System project, aimed at improving metering and access to energy data (Metering systems upgrade project under the small works team).

Building energy Management System (BeMS) upgrade

Developing a project proposal for upgrading the existing BeMS system including system controls and replacing obsolete controllers.

BeMS optimisation

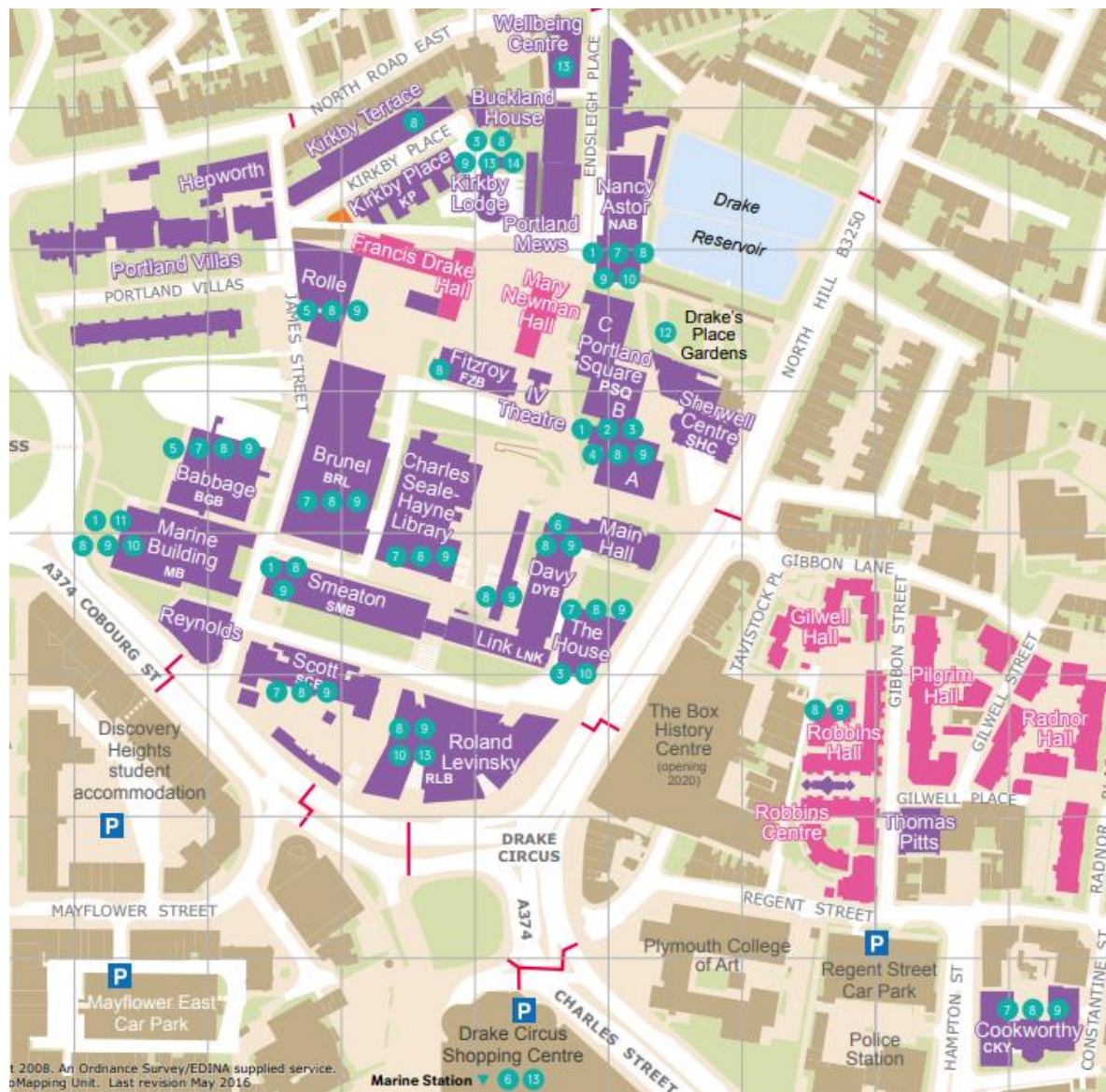
Ranges from installing localised BeMS controls to some of the smaller buildings, through to full controls optimisation of the more complex buildings, depending on the levels of controls currently in place.

Roof top PV

To install additional roof top PV on suitable roofs, to reduce our electricity demand from the grid through increasing onsite generation.

4. Existing location of renewable/low energy technology

For information the following map shows where existing renewable or low energy technology exists across main campus. It should be noted that it has been identified that not all the technology is operational due to lack of maintenance, this is being investigated currently with a view to be rectified going forward.



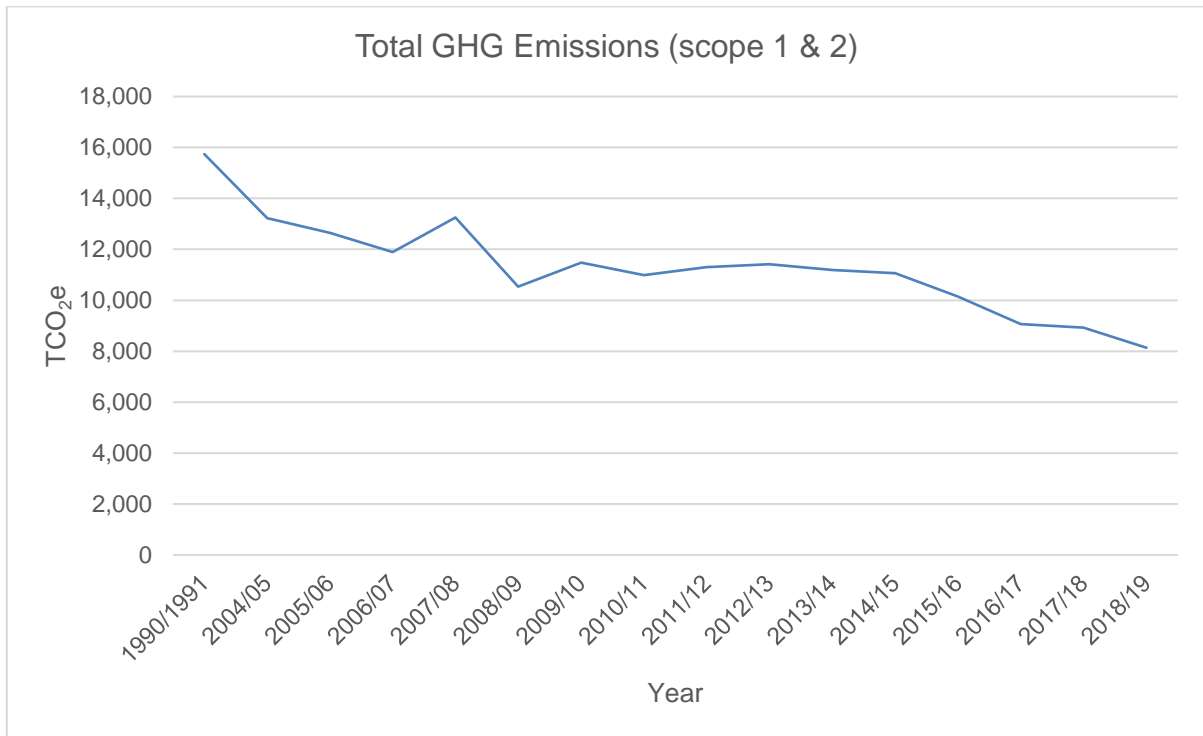
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1	Solar thermal hot water	9	Lighting sensors
2	Thermal decks	10	Rainwater harvesting
3	Passive ventilation	11	Low-loss transformer
4	Night-time cooling	12	Large gardens
5	Solar shading	13	Photo voltaics
6	CHP location	14	Green wall
7	Voltage optimisation		
8	High-efficiency LED lighting		Inverter controls across all campus

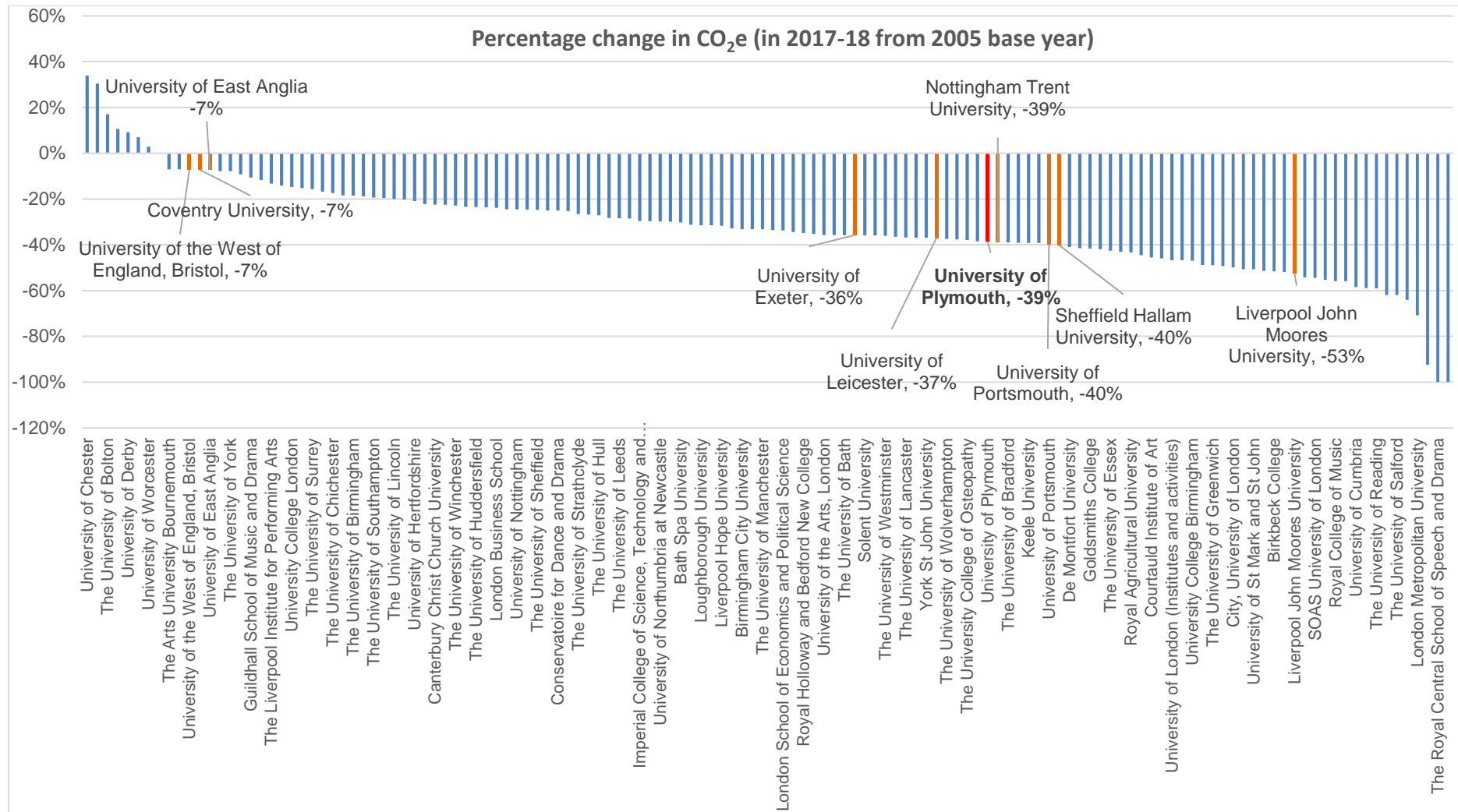
5. Carbon emissions

5.1 Percentage change in emissions

Carbon emissions are continuing to reduce, with a 9% reduction in 2018-19 from the previous year and a 48% reduction since our base year of 1990. This is delivered through reduced electricity use (as a result of targeting and monitoring and energy reduction projects) and also the gradual decarbonisation of the national grid.

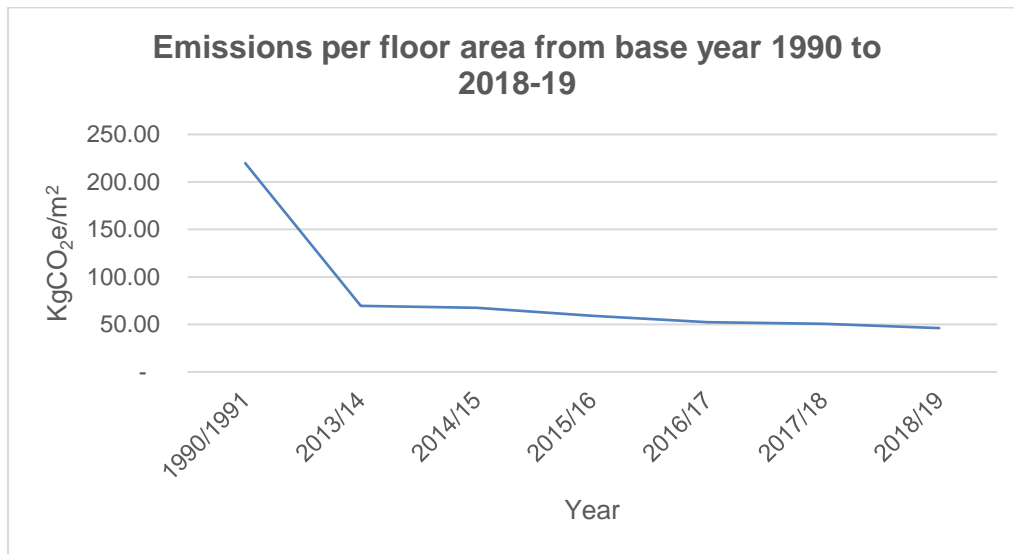


The University sector reports against a 2005 base year for carbon reduction. Comparing to this baseline, the University has reduced its emissions by 39% since 2005. Using HESA data from the latest year of 2017-18 we can compare our performance to the rest of the sector. Compared to the sector our reduction of 39% puts the University towards the higher end of the third quartile in terms of the best performing universities.

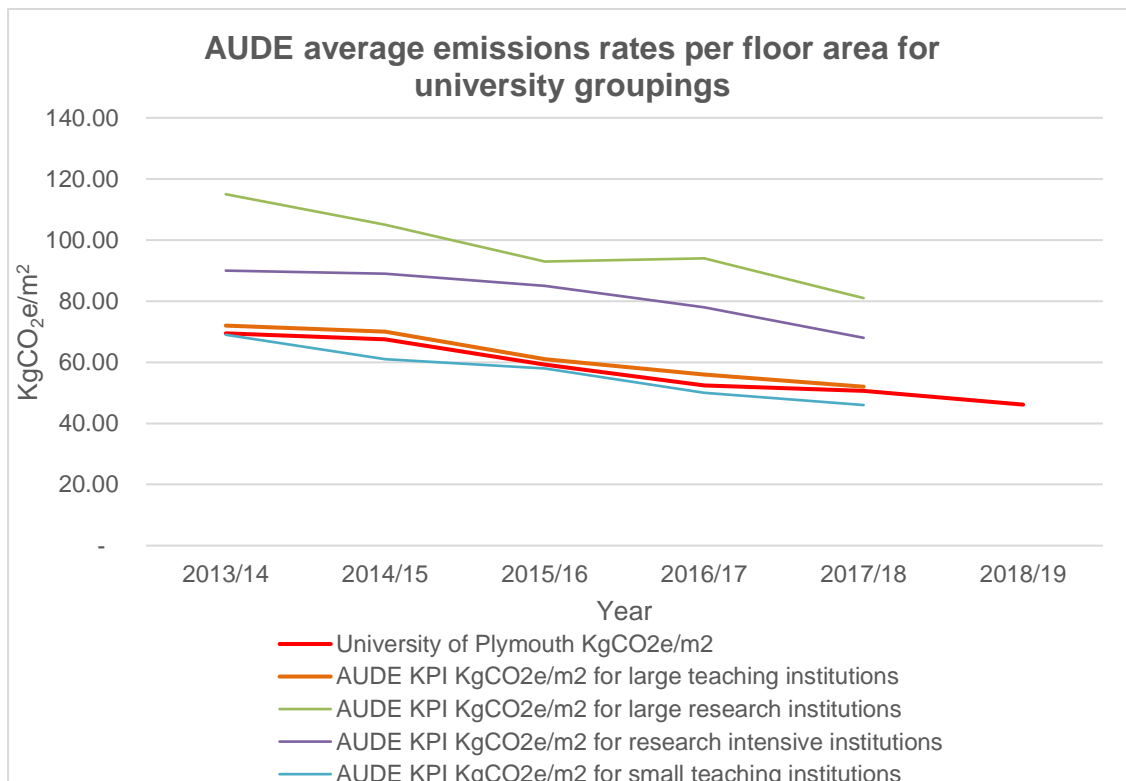


5.2 Emissions per floor area

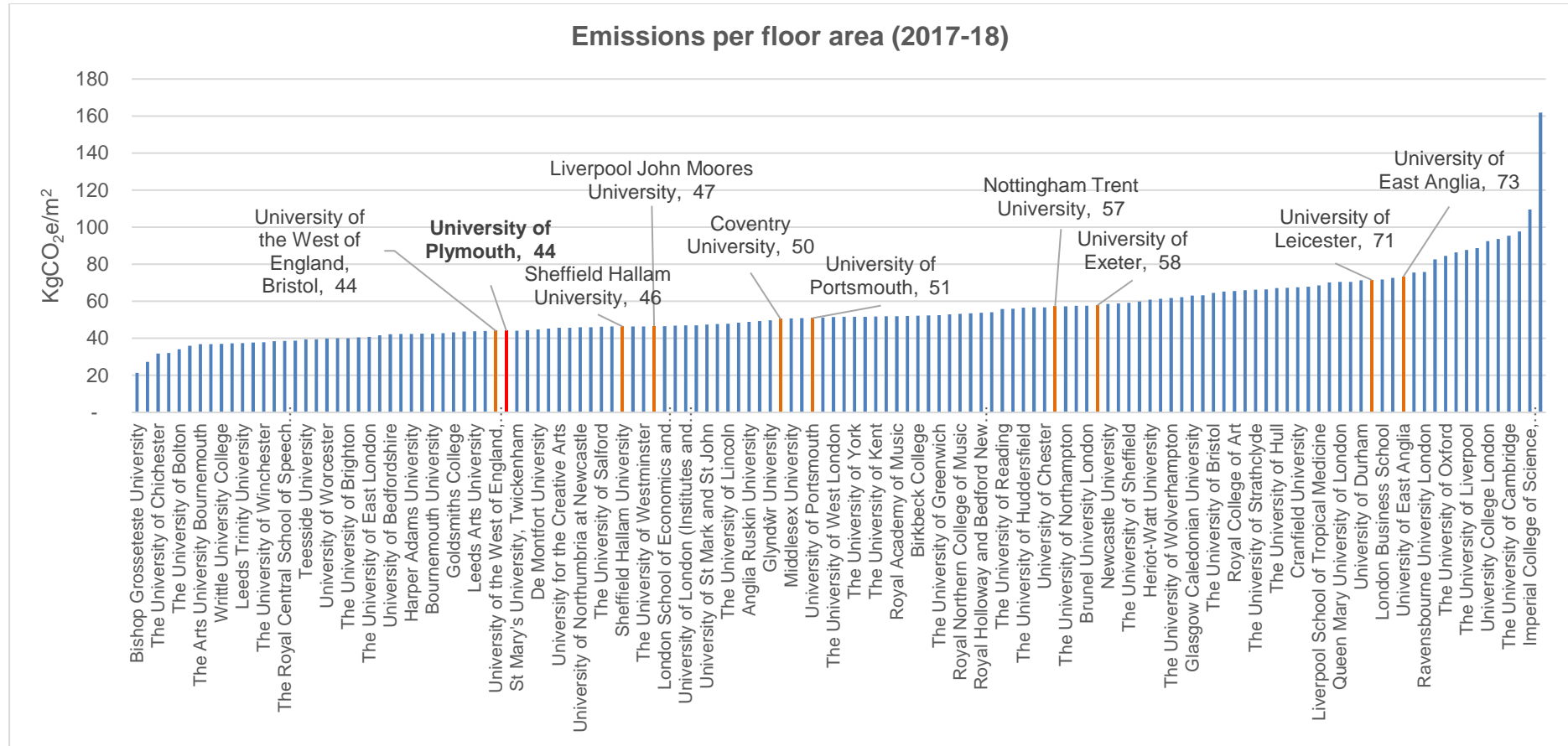
Over time the University of Plymouth estate size has changed, but emissions per floor area is continuing to reduce. Emissions in 2018-19 were 44 KgCO₂e/m² which has reduced steadily over the years from 69 KgCO₂e/m² in 2013-14, and 219 KgCO₂e/m² in the base year of 1990. The reduction from the base year is due to both an increase in the size of the campus (from 71,650m² in 1990 to 176,315m² now) and a 48% reduction in our emissions.



Our rate for emissions per floor area is reducing, but also consistently remaining slightly below the AUDE KPI average KgCO₂e/m² rate for large teaching institutions. Our emissions rate per floor area is significantly below the average rate for large research and research intensive institutions.



Looking across the emissions for the whole sector in 2017-18, they range from 21KgCO₂e/m² for Bishop Grosseteste University to 161KgCO₂e/m² for The Institute of Cancer Research, followed behind by Imperial College of Science, technology and Medicine and the University of Hertfordshire. Our rate of 44 KgCO₂e/m² puts the University just over the first quartile with the lowest rates.

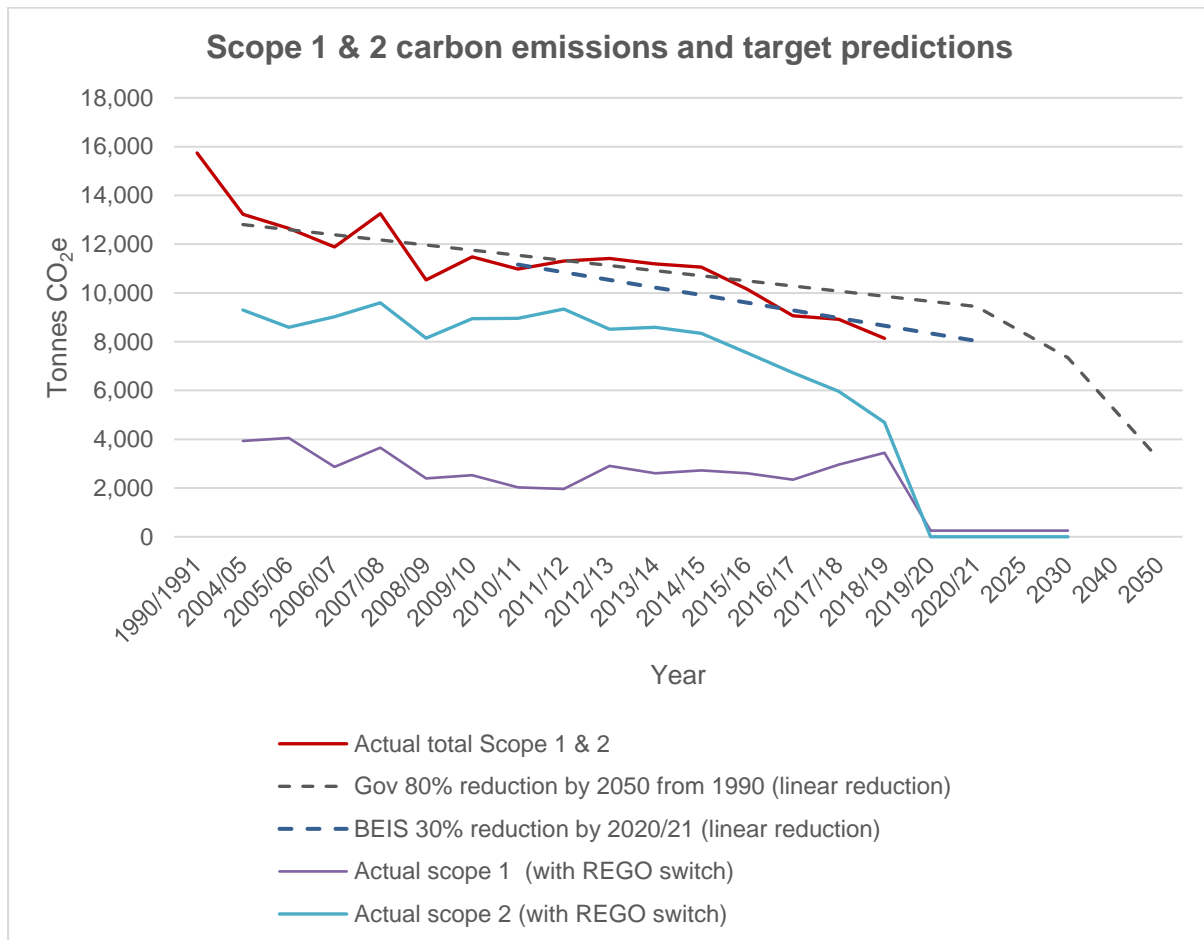


5.3 Reduction against targets

The University has recently declared a climate emergency, with a new target of net zero emissions for scope 1 and 2 by 2025. This will replace the University’s previous target of an 80% reduction by 2050 based on 1990 levels.

The following chart shows our historic scope 1 and scope 2 greenhouse gas emissions (GHG) against the different reduction target options. Specifically the chart shows the following:

- Our actual scope 1 and 2 GHG emissions from 1990/91.
- The linear reduction required for our previous target, which is 80% reduction in scope 1 and 2 GHG emissions by 2050 from 1990 levels.
- The linear reduction required for the Department for Business, Energy and industrial Strategy’s (BEIS) target of 30% reduction in scope 1 and 2 emissions by 2020/21 from 2009/10.
- Our scope 1 GHG emissions to date, and future scope 1 GHG emissions if a REGO (Renewable Energy Guarantees of Origin) contract was purchased.
- Our scope 2 GHG emissions to date, and future scope 2 GHG emissions if a REGO contract was purchased.



We are currently progressing well against our previous agreed long-term target of an 80% reduction in scope 1 and 2 GHG emissions by 2050 from 1990 levels. This target is translated into a linear reduction in the above chart and reduction levels are ahead of the

linear reduction required, but this will get increasingly difficult to maintain. Easier to deliver projects with quicker paybacks have typically been delivered across earlier years.

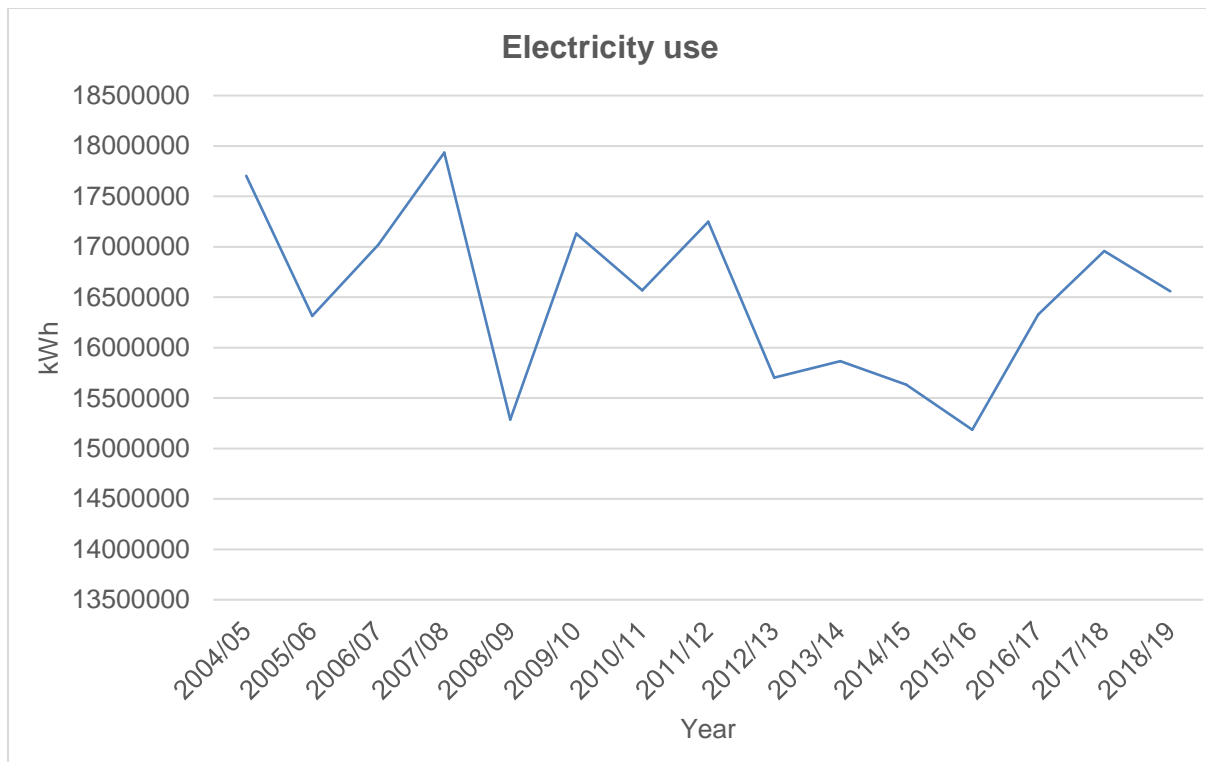
We have already achieved the BEIS target of a 30% reduction in scope 1 and 2 GHG emissions by 2020/21 from 2009/10 levels. However, this reduction level will need to be maintained for the next year.

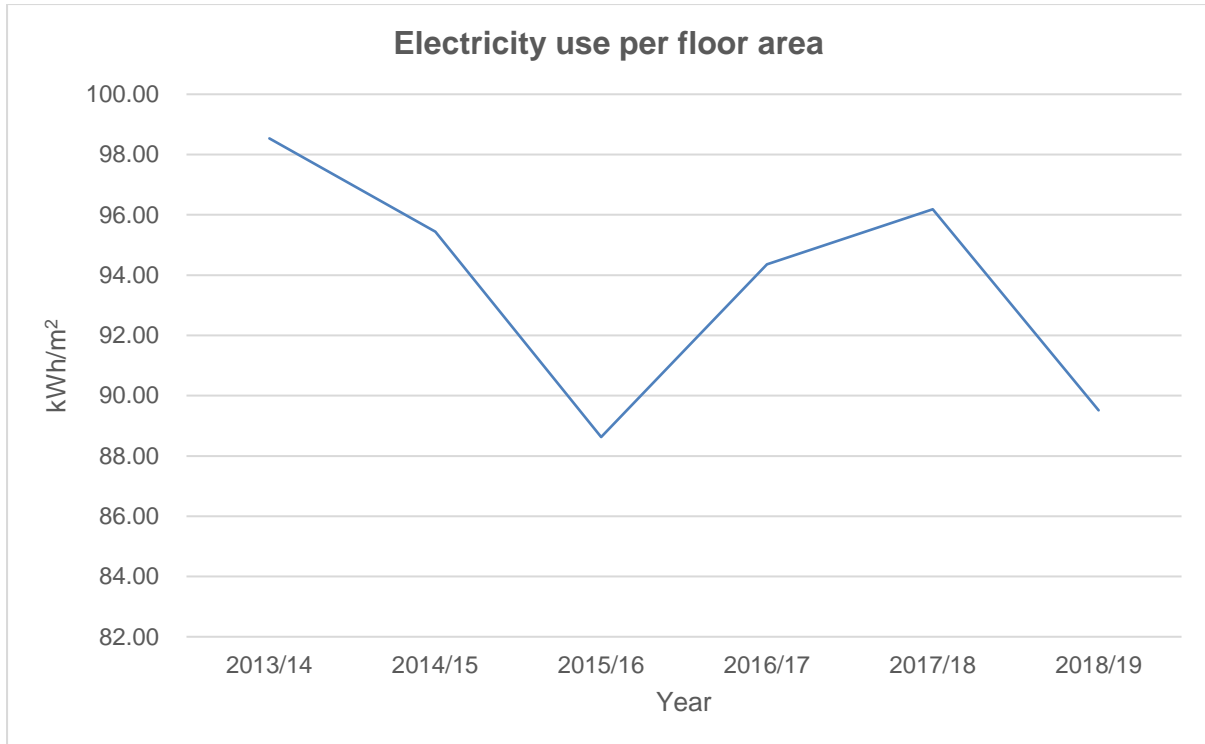
Our scope 1 and 2 GHG emissions mainly come from gas and electricity use (97%). Switching to a renewables tariff (REGO) for this enables us to report zero GHG emissions for gas and electricity use. This would then leave 3% remaining emissions that would need to be offset against if they cannot be reduced or switched to a renewable alternative, for example fleet vehicles that cannot be switched to electric vehicles. Work to reduce gas and electricity use would still need to be maintained.

To keep the chart simple, the blue and purple lines show the scenario that we purchase a REGO contract in 2019/20 for illustrative purposes.

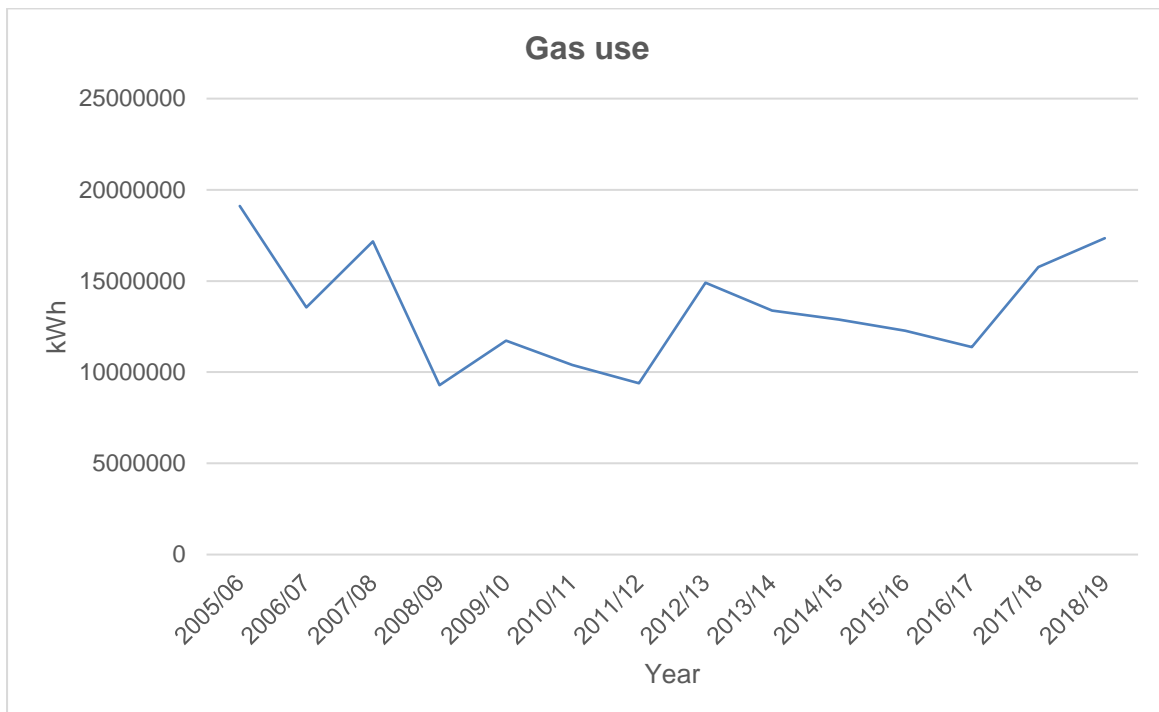
6. Energy Use

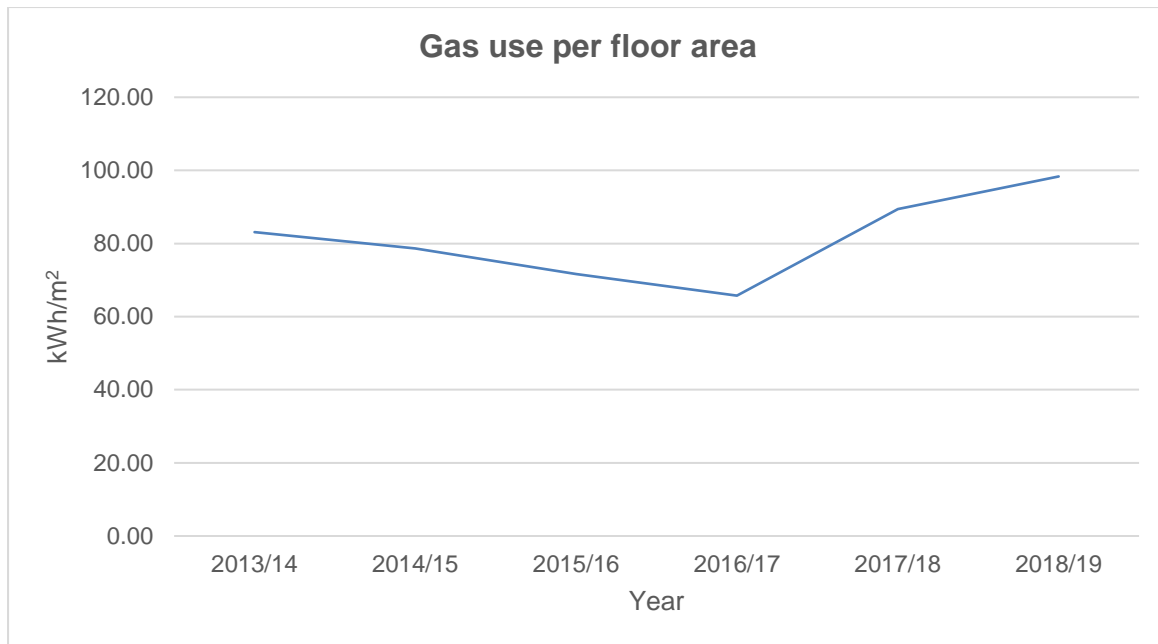
Electricity use has decreased by over 2% from the previous year, and overall there is a 2% decrease in electricity use from the base year 2005-06. Unfortunately electricity use increased over a period of two years previously. However, when comparing electricity use to the size of our campus, the kWh per m² has significantly reduced over the past year.



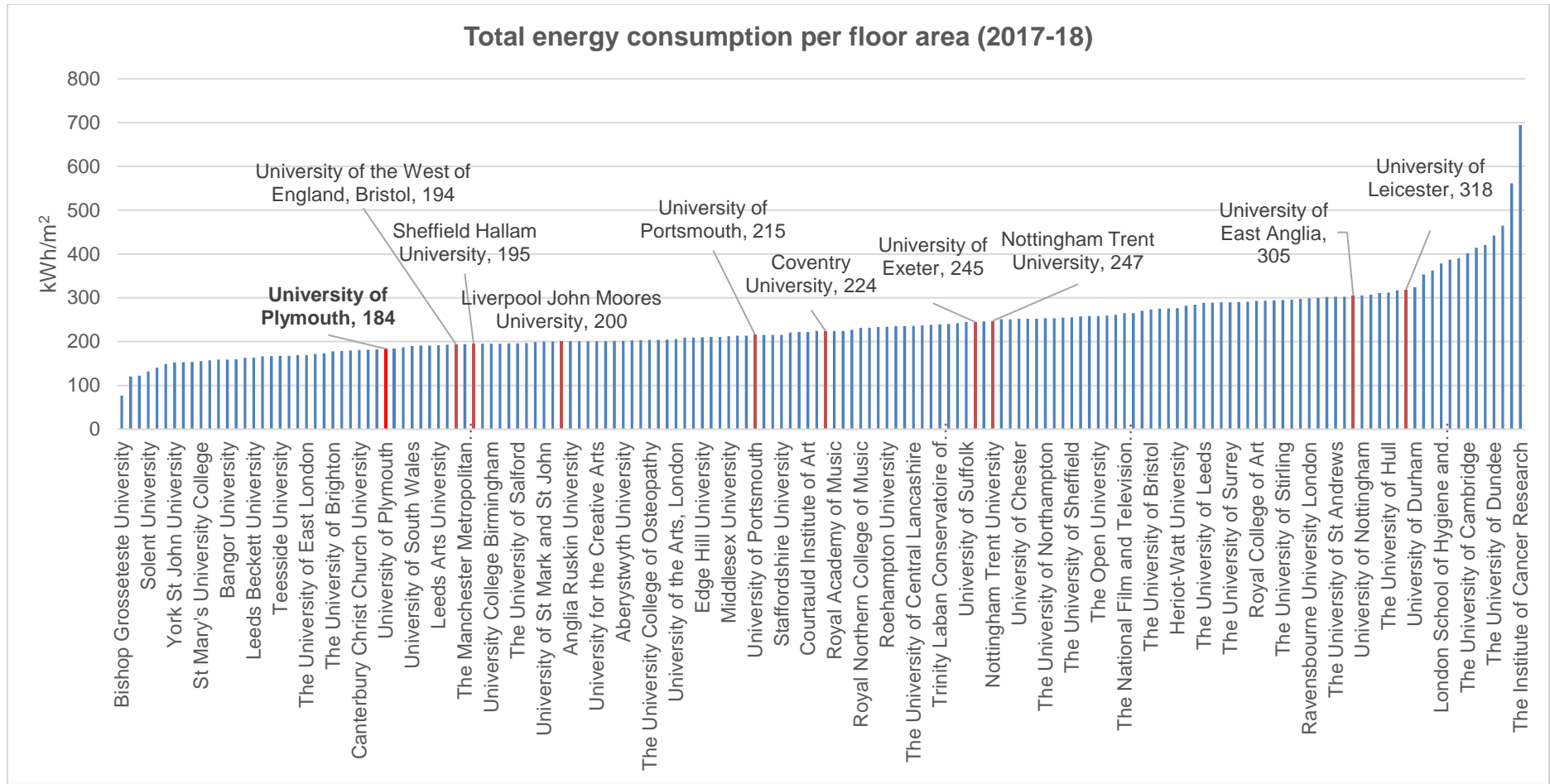


Gas use has increased over the past year by 10%, however, overall there has been a 9% decrease in gas use from the base year 2005-06. Using the degree day’s methodology, we would expect that 2018-19 would have seen an increase in heating load in the South West of around 10% and so the increase in gas use we experienced can be explained mostly by the cold winter.



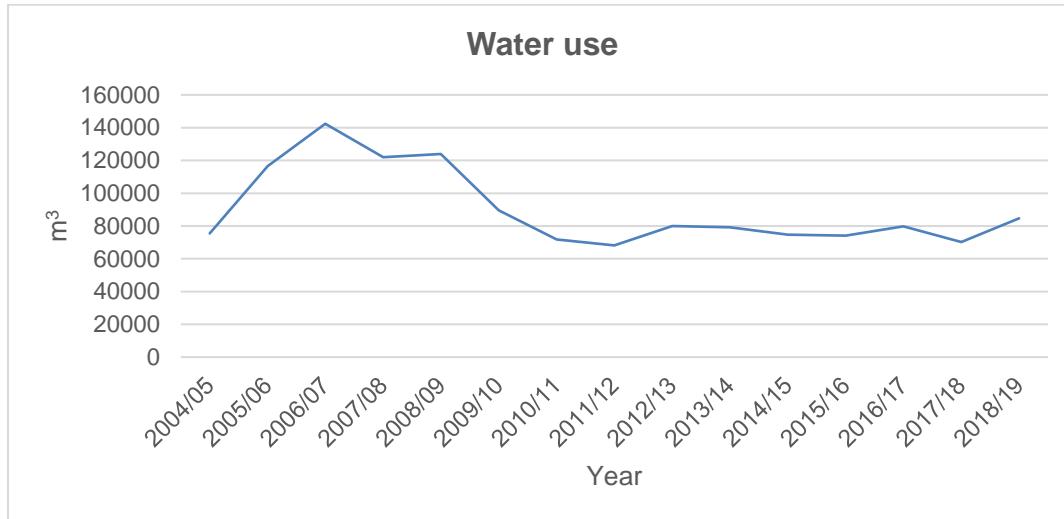


Looking across the whole sector, total energy consumption per floor area in 2017-18 ranges from 77kWh/m² for Guildhall School of Music to 694 kWh/m² for the Institute of Cancer Research, closely followed by the University of Aberdeen and Imperial College. Our rate of energy consumption per floor area puts us firmly in the first quartile for the lowest consumers.

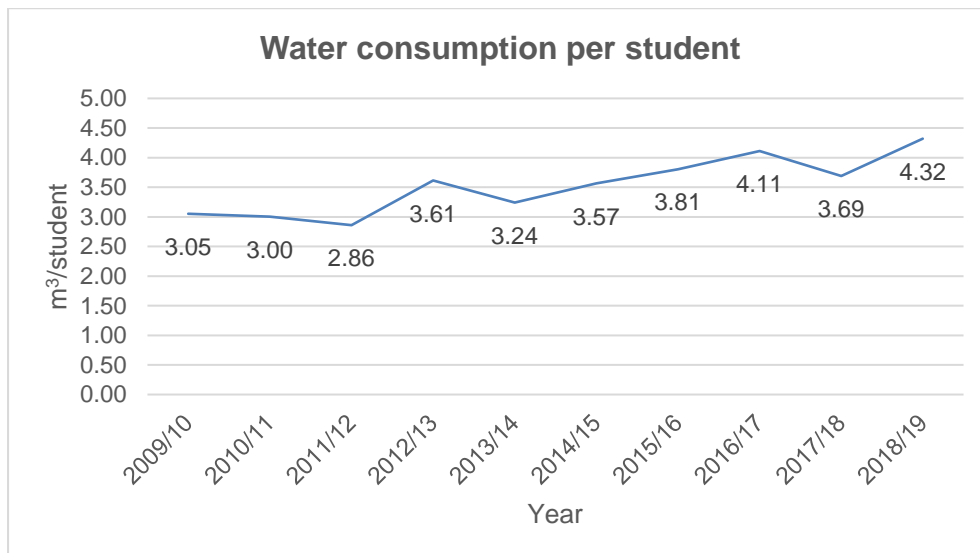


7. Water use

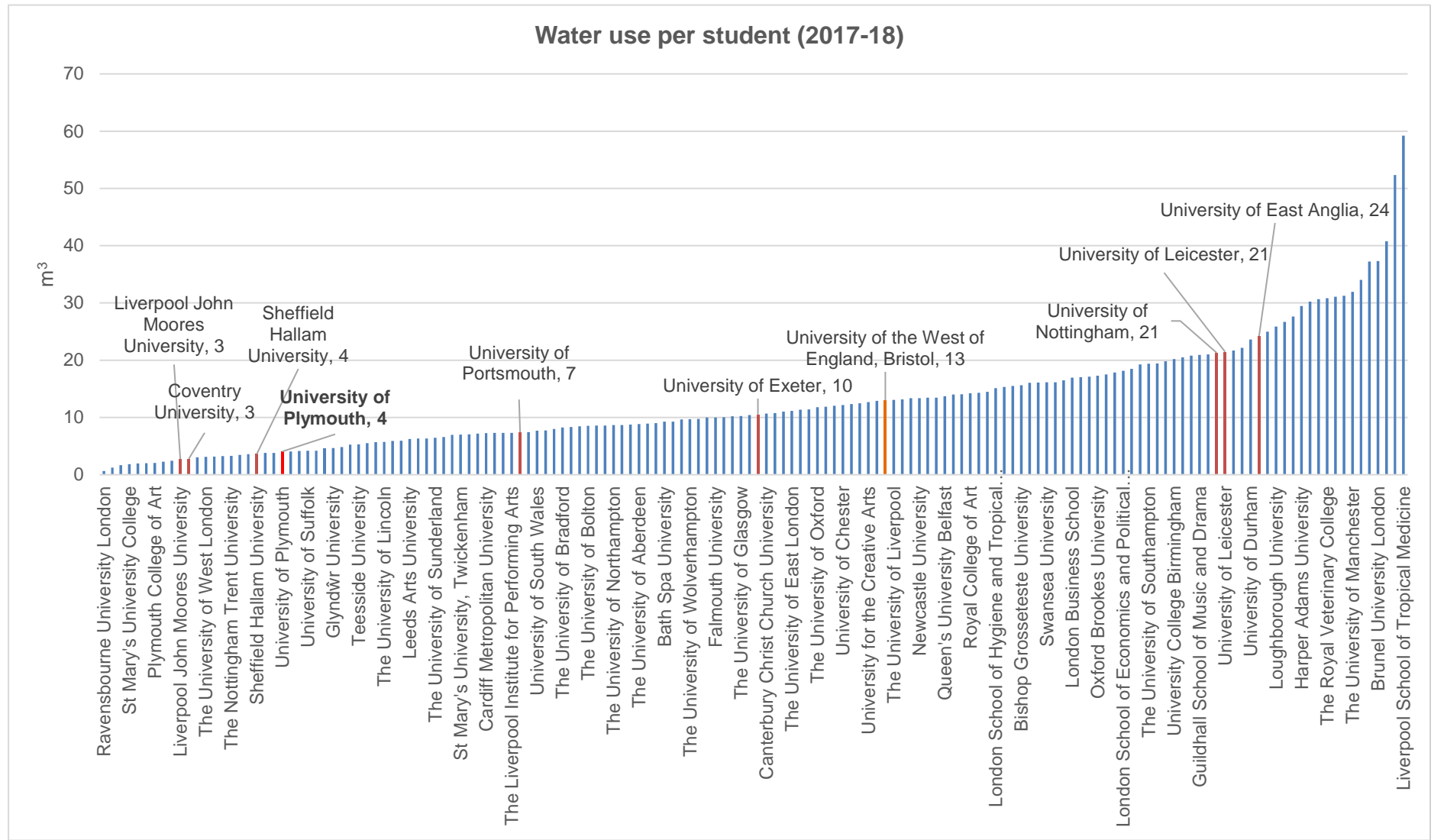
Water use has increased by 20% in 2018-19 from the previous year, although overall there has been a 27% reduction in water use from the base year 2005-06. Generally since 2011-12 water use has been relatively static until the increase seen in 2018-19.



As water consumption should be more impacted by the number of users rather than floor area, as for gas and electric, water use is monitored against student numbers. Water consumption per student is currently at 4m³, which is higher than the target of 3m³. And water consumption per student is increasing, even though student numbers are decreasing.



Looking across the whole sector, water use per student ranges from 1m³/student for Ravensbourne University London and Birkbeck College to 59m³/student for the Liverpool School of Tropical Medicine, closely followed by Courtauld Institute of Art and Keele University. Our rate of usage again puts us firmly in the first quarter for the lowest users.

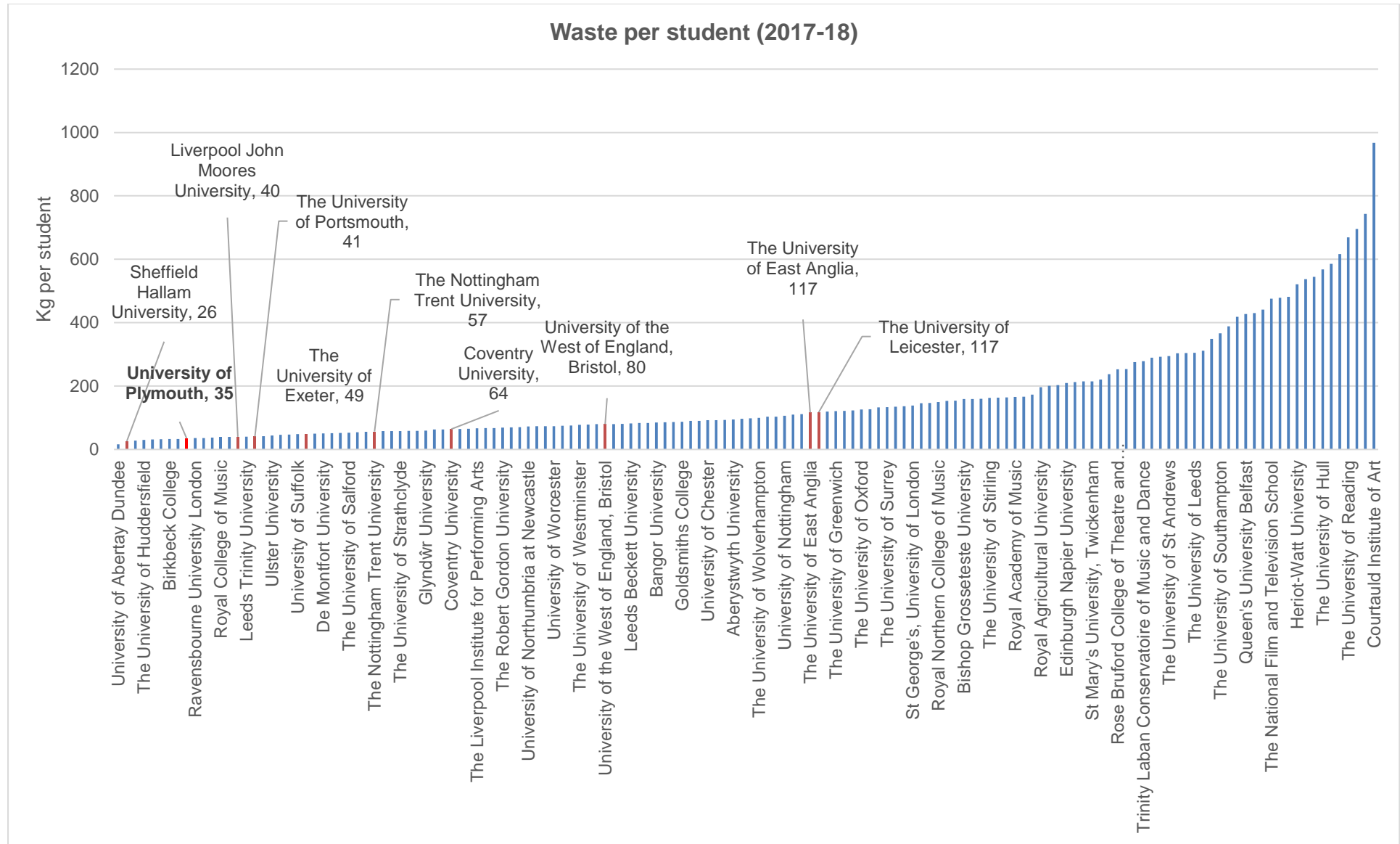


8. Waste

Since 2011, waste has decreased by 2% and we generate on average 26kg per student in 2018-19. In 2018-19 we recycled 50% of our waste. Although the figures are going in the right direction, it is going to be a significant challenge to achieve our recycling target of 70% and to generate 20kg or less of waste per student per year.



As waste consumption should be more impacted by the number of users rather than floor area, total waste generated is monitored against student numbers. Looking across the whole sector, waste use per student ranges from 16Kg/student for the University of Abertay Dundee, to 3,610Kg/student for the Institute of Cancer Research, closely followed by 1,975Kg/student for the University of Bournemouth (these higher outliers have been removed from the chart below to avoid distortion). Our rate of usage again puts the University firmly in the first quarter for the lowest users.



9. Conclusion

Overall, we are consistently amongst the best performing universities against all areas. This performance against the sector is reflective of the work done in this area to date. However, many of the easy to achieve initiatives have been completed over the earlier years and the targets are now become increasingly challenging to keep pace with. We are now at a time where we need to begin to target and implement more complex projects and changes in operations going forward to maintain performance. If we continue with the current level of performance we will fail to achieve our net zero carbon target, energy and water reduction and recycling targets.

The projects identified in section 3 will target reduction in electricity and gas use, and other projects are being identified for a continual spend to save programme. Additional resourcing beyond these measures is needed in order to maintain performance against targets and to deliver the climate emergency declaration.