Carbon Management Strategy 2014/5-2018/19

Executive Summary

The Carbon Management Strategy (CMS) has been developed to support the University's aim of improving sustainability and reducing its carbon footprint. It has also an important document to support the University strategic plan 2013-2018 which includes a commitment to make an outstanding contribution to economic, social and environmental sustainability. Therefore it is important that the university demonstrates a commitment and support for a reduction in carbon dioxide emissions to both students and the community.

This Carbon Management Plan outlines:

- Drivers for reducing carbon emissions
- Details of the current carbon footprint
- Target reductions
- Strategies for reducing emissions

In 2014/15, the University produced 4,400 tonnes of carbon dioxide through scope 1 and 2 direct emissions and approximately 16,600 tonnes of carbon dioxide through scope 3 indirect emissions. The University aims to reduce these emissions by 40% by 2020 and this document outlines the strategies that will be adopted to achieve this.

Assessing performance the trend in direct emissions compared to the stated target of a 40% reduction against a baseline of 3,757 tCO2 is set out in figures 1 & 2. It is clear emission reductions are not on target and this is due to estate and university activity expansion. We must deliver a reduction in scope 1 and 2 emissions from 2013/4 of 2,400 tCO2 (a 64% reduction against baseline) to achieve the 2020 target. **It is evident that a significant improvement in building energy efficiency and low carbon generation capacity will be required.** This CMS quantifies the impact of planned measures – annex 1 & 2, but with reductions totalling 1,523 t CO2 more work is required if it's to be sufficient to meet 2020 targets.
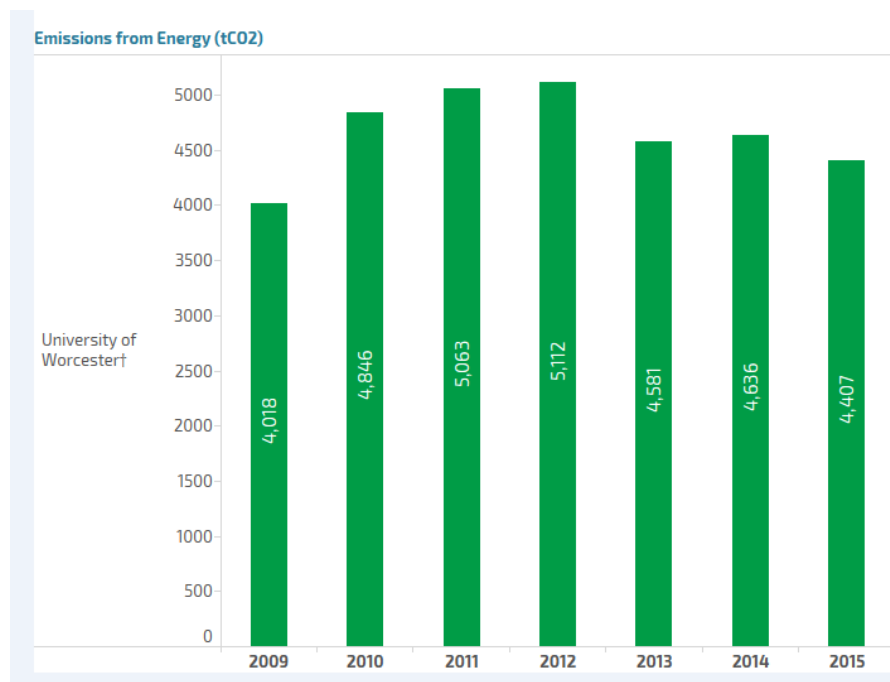

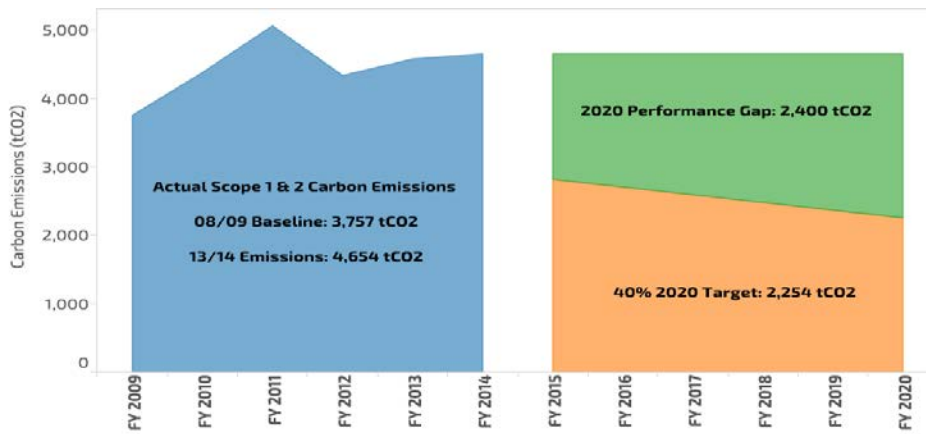Figure 1: Carbon emissions from energy from baseline year to 2015.

Figure 2: performance gap for direct carbon emissions

Recognising the scale of this challenge the Executive Group identified additional performance objectives in the Energy Management Strategy 2013-2018 that relate to Display Energy Certificates (DECs) ratings. By September 2017 the university seeks to ensure all relevant buildings will achieve a DEC rating of C or above. 83% have a DEC rating of D many very close to a C rating so this may be achievable. Work continues on a building by building approach to energy consumption reduction and the new energy manager who takes up post in September 2016, and major infrastructure investment should see a greater impact in this area.

When indirect carbon emissions are added in figure 3 below shows a representative 2020 target defined against a 2013/14 baseline. This also shows a wide performance gap due to significant increase in reported scope 3 emissions. This representative target consist of 40% reduction for scope 1 and 2 emissions in the earlier graph and a 3% per annum decrease in scope 3 emissions. **Whilst some success over the years has been noted, how best to tackle these indirect emissions sources and the impact this will have on the 2020 performance gap is a key objective of the next full revision of this CMS.** Clear targets have been identified within this strategy and review on progress will inform future SMART targets.
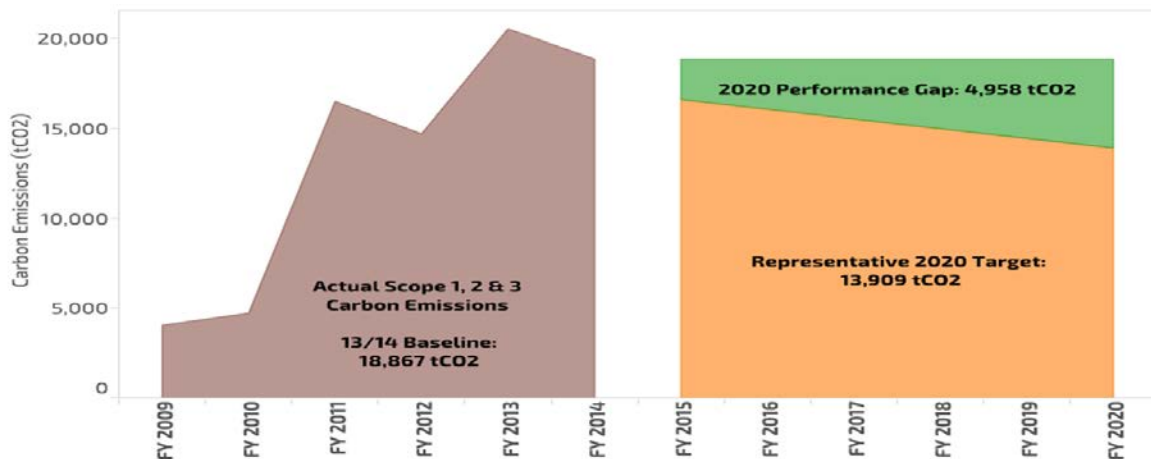

Figure three: performance gap for all direct and indirect carbon emissions

However it is important to view this figure when set against the universities significant growth over this period. Due to 51.46% increase in the size of the university estate we see a reduction in kg CO_2 from the baseline year of 77.9 kg CO_2 to 56.4Kg CO_2, a reduction of 21.5 kg CO_2 **or 27.6% reduction**. A set of actions is set out in the conclusion on page 13 below which will be undertaken as part a full review of the CMS due when the new university strategic plan is published. Annex 1 and 2 detail projects in the short, medium and long term. Annex 3 shows current quantified targets set in order to achieve carbon reductions for all direct and indirect emissions.

Introduction

1. The following document is a continuation of the July 2010 Carbon Management Strategy which detailed the University's strategy for managing, reducing and reporting on carbon emissions across the University's estate, fleet and population. This was reviewed by in April 2014 and again in July 2016. The University of Worcester has developed this carbon management strategy in order to support the long term ambition of becoming a flagship institution with regards to sustainability both locally and internationally.

2. The Carbon Management Strategy (CMS) is an overarching document which provides;
   - Clearly defined short, medium and long term targets
   - A strategic framework of both behavioural and technical measures
   - Methodology for reporting on progress
   - Signposts to supporting documentation

The CMS should be read in conjunction with other key university documents such as the Energy Management Strategy, Water Management Strategy, Sustainable Waste and Travel Plan, annual quantitative and qualitative targets all of which provide detailed 'road maps' of how the university aims to meet the carbon reduction targets.

Drivers for Change

3. The Fourth Assessment Report on Climate Change published by the UN Intergovernmental Panel on Climate Change (IPCC) concluded that climate change was unequivocal. It is believed the anthropogenic (human) impact from emissions of greenhouse gases, particularly carbon dioxide, are increasing the rate of global warming. The University is concerned about this issue and is working towards reducing carbon dioxide emissions to minimise further impact on the environment.

4. As the threat from climate change has increased, the government has introduced legislation to ensure a reduction in the UK's emissions. The 2008 Climate Change Act committed the UK to a reduction, in carbon dioxide emissions, of at least 80% by 2050 compared to a 1990 baseline. This has led to a number of legislative measures to enforce the reduction of energy consumption and a number of policies have been put in place to assess this. For example, the University is required to obtain a Display Energy Certificate (DEC) for all buildings. The DEC gives an indication of the energy efficiency of the building based on size, energy consumption and the function of each building.

5. A significant driver for the reduction of energy use is the financial gain primarily from reduced energy bills. The energy market is becoming increasingly volatile because of dwindling resources; a reduction in energy use would reduce the University's exposure to this market. The Higher Education Funding Council for England (HEFCE) has published a number of policies and strategies for reducing carbon emissions. In 2011 HEFCE linked their capital allocations to carbon reduction through the Capital Investment Framework. HEFCE require Higher Education Institutes to develop carbon reduction strategies, targets and a carbon management plan. They made £60m available to Institutions through the Revolving Green Fund to help HEI's meet their carbon targets and are reviewing its effectiveness with the intention of continuing to fund institutions to help them make the physical retrofit changes to their estate.

6. Sustainability has become an increasingly important factor for students when choosing a university. A Higher Education Academy and NUS report shows that, consistently over the last 5 years, c60% of HE students want to learn about sustainability, and c80% want their institutions to embed it in their operations. External environmental groups have been using data from the Estate Management Record to investigate the environmental performance of universities and publish the results. For example, People and Planet have published the University 'Green' League Table which ranks the universities based on their environmental

performance for the benefit of prospective students. If the university can maintain a consistently high ranking, it shows a commitment to sustainability and could potentially have an impact on student recruitment.

7. The University strategic plan 2013-2018 includes a commitment to make an outstanding contribution to economic, social and environmental sustainability. Therefore it is important that the university demonstrates a commitment and support for a reduction in carbon dioxide emissions to both students and the community to maintain their reputation within the sustainability field.

8. Research on progress in meeting sector carbon targets is published. The university sits within the bottom quartile of these tables which are based on Scopes 1 & 2 (see para 9 below) carbon. When reviewed against our institutional targets to meet the sector target of a 43 per cent reduction in carbon emissions by 2020 against a 2005 baseline, so far the University due to its continued growth is failing to meet them.

The "Scope" of emissions

9. Carbon emissions are classified according to World Resources Institute system into three 'Scopes'. These are:
- 'Scope 1' emissions are direct emissions that occur from sources owned or controlled by the organisation, for example emissions from combustion in owned or controlled boilers/furnaces/vehicles;

- 'Scope 2' accounts for emissions from the generation of purchased electricity consumed by the organisation;

- 'Scope 3' covers all other indirect emissions that are a consequence of the activities of the organisation, but occur from sources not owned or controlled by the organisation – for example, commuting and procurement.

10. Throughout each reporting year relevant data such as utility consumption, student numbers, fleet vehicle mileage and staff/student commuting distances are gathered. Each 'fuel source' has a carbon factor – the amount of carbon per unit utilised. Carbon factors are updated regularly and issued by the Department for Environment and Rural Affairs (Defra). The university updates both its baselines and emissions factors in line with the Defra protocols.

Carbon reduction targets

11. The University intends to achieve:

- 5% p.a. reduction in carbon emissions in Scopes 1, 2 & 3, against a 2008-09 baseline, from 2010 to 2015;
- a 3% reduction p.a. against the 2008-09 baseline from 2015 to 2020;
- Scope 3 emissions baseline year varies as the envelop has increased;
- The profile of reductions reflects the fact that it will become incrementally harder to achieve reductions as improvements take place.

These targets will secure a 40% reduction in emissions by 2020 compared to 2008-09 levels.

The baseline year

The tables and diagrams in this report detail the scope 1, 2 & 3 (direct and indirect) emissions for the baseline year and the annual targets going forward. Actual carbon emissions are also shown for comparison. As data and methodologies varies across emitter types for scope 3 the baseline year does vary.

Scope 1 and 2 total direct emissions CO$_2$te

Annual CO$_2$te	2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Target				**3,756.9**	*3,569.1*	*3,381.2*	*3,193.4*	*3,005.5*	*2,817.7*	*2,498.3*
Actual	3,513.9	2,976.3	3,277.3	**3,756.9**	4,383.4	5,065.8	4,339.3	4,581.4	4,657.1	4,407.8

Scope 3 Total emissions CO$_2$te

2005-06	2006-07	2007-08	Baseline 2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
211.5	169.5	199.7	**289.6**	333.1	11,438.5	10,359.5	15,965	14,212	16,605

Scope 1, 2 & 3 total direct and indirect emissions CO$_2$te

Annual CO$_2$te	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
Target								**20,546.8**	*19,519.5*	*18,492.1*
Actual	3,725.4	3,145.7	3,477.0	**4,046.5**	4,716.5	16,504.2	14,698.8	**20,545.4**	18,869.1	21,013.3

Table showing Scope 1, 2 and 3 Carbon emissions baseline (various yrs) and current 2014 – 2015 per emission type

Source of GHGe baseline 2005/6 unless stated	Baseline GHGe tonnes	2014/15 GHGe tonnes
Electric - Generation	1,864	2,675
Gas	1,856	1,660
Fleet	36.90	70.99
F gas Emission- baseline 2013/14	18.25	1.54
Scope 1 & 2 - direct		**4,407.8**
Electric - Distribution	148	220.9
Water	9.20	15.67
Wastewater	27.96	32.25
Waste & Recycling	73.4	26.1
Hire Car	15.5	40.1
Taxi – baseline 2011/12	3.5	2.8
Rail	15.5	16.1
Air -baseline 2010/11	6,843.1	168.1
Mileage Expense Claims- baseline 2010/11	45.0	111.3
Commute- baseline 2010/11	6843.1	5,683.3

Coach – baseline 2011/12	8.8	14.8
Procurement - baseline 2011/12	3,541.4	10,274.0
Scope 3 indirect		**16,605.5**
Scope 1, 2 & 3 all carbon emissions		**21,013.3**

Reporting on Emissions

12. The University measures and reports publically on carbon emissions in three ways:

- In absolute terms
- In relation to the number of students and staff at the University
- In relation to the size of the University's estate (Gross Internal Area of buildings)

Reporting is completed annually with documents submitted via the Sustainability Committee for review and approval before full publication on the university website. http://www.worcester.ac.uk/discover/carbon-management-and-targets%20.html

14. Carbon reporting continues to evolve and the university will build and maintain links with other universities, the Carbon Trust, Defra and other external organisations to develop and evaluate carbon reporting best practice. The methodologies used to calculate Scope 1, 2 & 3 emissions may change during the target period, full details of the methodology used and assumptions made are detailed in the annual Carbon Targets, Quantitative and Qualitative progress documents. See web site link above for full details.

Assessing Carbon Performance

15. Quantitative and qualitative targets for scopes 1, 2 and 3 (direct and indirect) emissions are set annually by the sustainability committee, and quantitative targets for 15/16 are shown in annex 3. Progress against these targets in full can be found http://www.worcester.ac.uk/discover/carbon-management-and-targets%20.html Targets have been set for energy, water, waste, emissions and discharges, procurement, transport, construction and refurbishment, education for sustainable development, and community involvement.

16. The trend in scope 1 and 2 emissions compared to the stated 2020 target of a 40% reduction against the baseline of 3,757 tCO2 is shown in the following figures 4, 5 and 6. In absolute terms UW scope 1 & 2 direct carbon emissions have increased from 4,018 in 2008/9 to 4,407 in 2014/5 an increase of 389 t CO2 9.7% increase. – see figure 4 below. However it is important to view this figure when set against the universities significant growth over this period. Figure 5 below shows the carbon emissions from energy set against size of the university estate. When viewed by this metric we see a reduction in kg CO2 from the baseline year of 77.9 kg CO2 to 56.4Kg CO2, a reduction of 21.5 kg CO2 or 27.6% reduction. This demonstrates that the university has made reasonable progress towards energy consumption reduction over the period. However due to 51.46% increase in the size of the university, (gross internal area) this is not reflected in an absolute reduction.
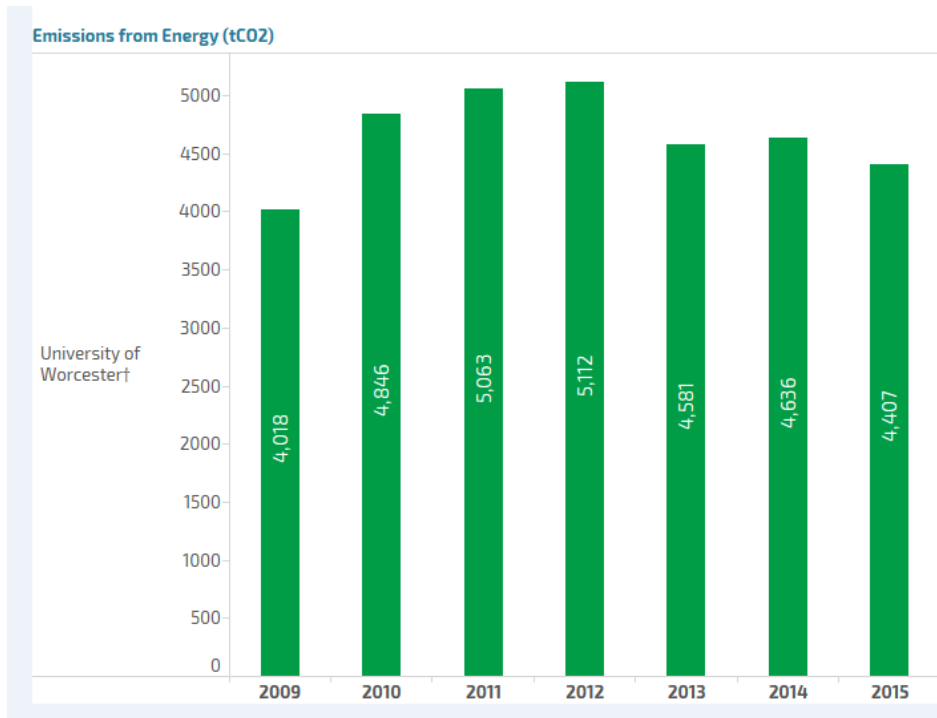
Figure 4: Carbon emissions from energy from baseline year to 2015.
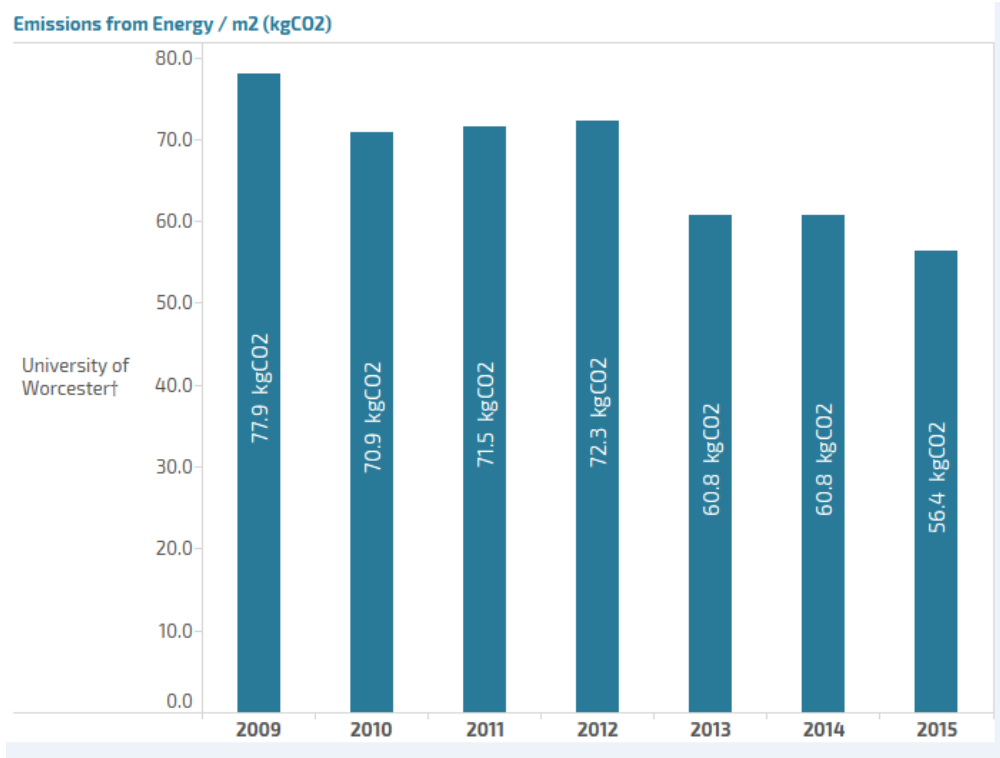

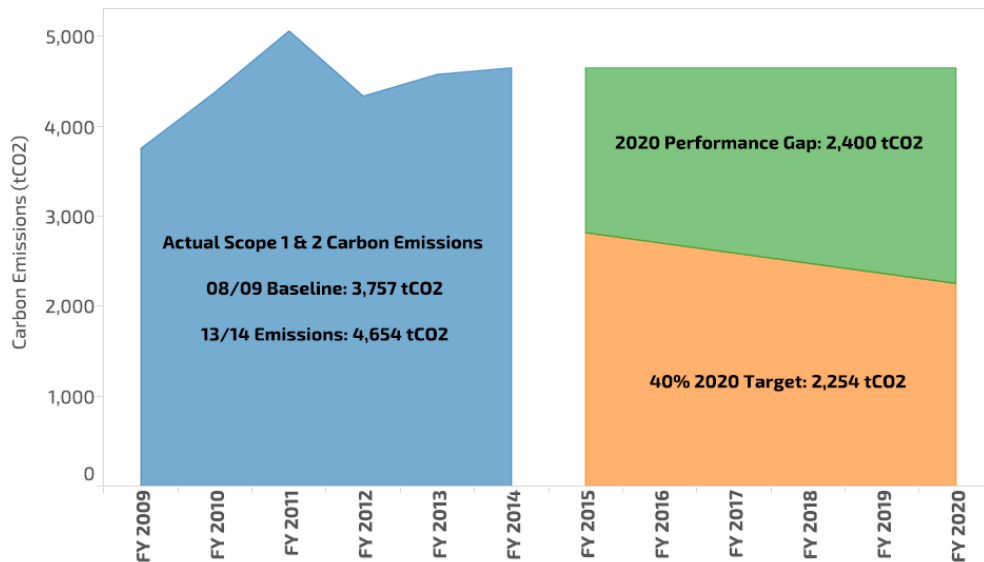Figure 5: – Emissions from Energy / m2(kgCO2)

Figure 6: Performance gap in direct scope 1 and 2 carbon emissions

17. It is pleasing to report that scope 1 & 2 total GHG emissions decreased 5.35% between 2013/14 and 2014/15 but it should be noted there was no change in the size of the estate and staff and student numbers decreased by 3%. When we compare to the baseline and look at absolute carbon emissions changes we have increased our direct carbon emissions by 17.3%. In the latest sector data i.e. the previous year the university is in the bottom quartile for the sector, 124 out of 127 universities, where our carbon has increased by 31.9% from sector 2005 baseline. This increase is against sector where 91 universities have managed to reduce their scope 1 & 2 emissions from 2005, the highest reduction being 51%. However if we factor in our growth again using last year's sector figures we have reduced our direct carbon emissions from 2005 by 22% which is just below the top quartile for the sector.
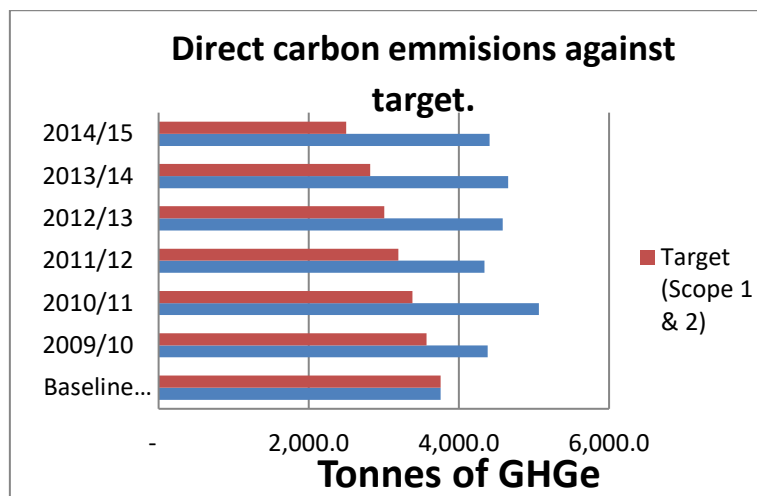
Scope 3 in direct carbon emissions

13. Scope 3 indirect carbon emissions are produced through the University's activities such as: water, travel, procurement and waste disposal. Indirect carbon emissions account for the majority of the University's carbon footprint. The University has been reporting on Scope 3 emissions since 2005/6. It has increased both the accuracy and availability of data and developed reasonable methodologies for calculating emissions using a variety of tools including annual, staff and student travel surveys. The university has also widened the envelop of areas included, for example staff travel expense claims for business miles, student home to term-time travel and procurement. Individual reduction targets are set for each area once we have gathered data for a couple of years and we have an understanding of what would be stretching but achievable. The

absolute reduction targets in scope 3 emissions a 5% reduction by 2015, and 3% reductions per year by 2020. Full details see annex 3.

Scopes 3 indirect carbon emissions against targets
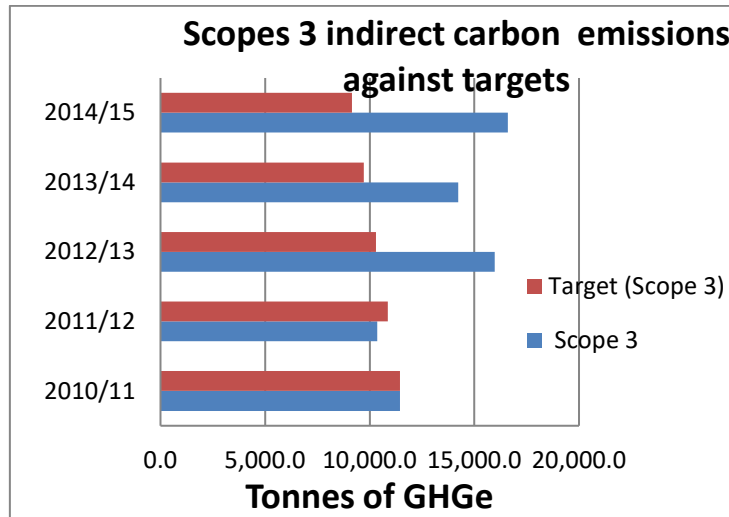
14. Scope 3 emissions increased 16.84% between 2013/14 and 2014/15. Data gathering for a number of these categories is still in its infancy, especially with regard to procurement and grey fleet, our two highest increasing areas, by 31.43% and 344% respectively. Year on year comparisons may not give a true picture. Emissions resulting from commuting have decreased by 2.4%.

15. Procurement currently accounts for approximately 63% of the University's carbon footprint therefore the University has established a Procurement Working Group of the Sustainability Committee and reports are a standard agenda item at Sustainability Committee meetings, a student has been working with Procurement team to improve this area and work on this project is planned to continue. This will produce more accurate information and allow the University to identify carbon reduction projects and set targets.

18. The figure seven below shows a representative 2020 target defined against a 2013/14 baseline due to significant increase in reported scope 3 emissions. This representative target consist of 40% reduction for scope 1 and 2 emissions in the earlier graph and a 3% per annum decrease in scope 3 emissions. Whilst some success over the years has been noted, how best to tackle these indirect emissions sources and the impact this will have on the 2020 performance gap is a key objective of the next full revision of this CMS. Clear targets have been identified within this strategy and review on progress will inform future SMART targets.
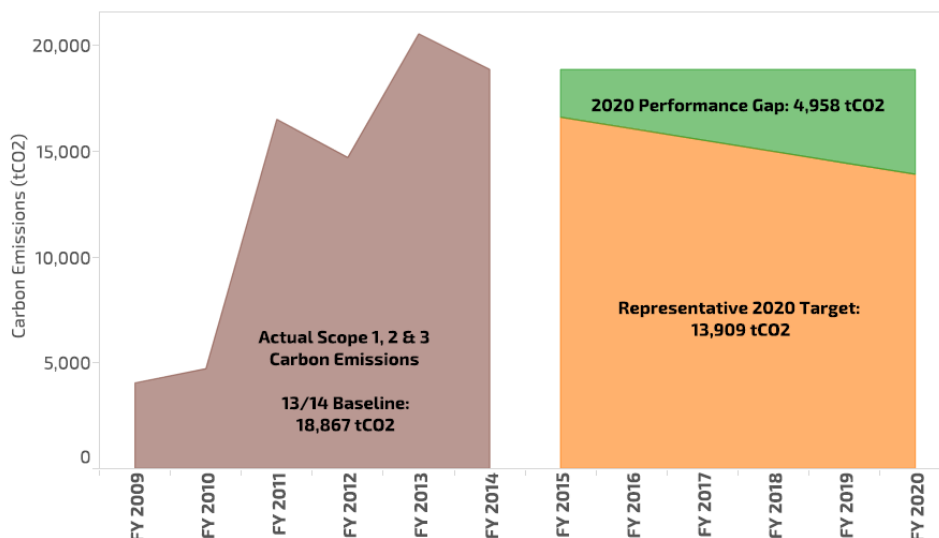
Figure 7: performance gap in all carbon emissions

19. It is clear that the University is failing to meet the carbon targets due primarily to its growth. As noted above detailed explanations are given in the progress against target documents published as are additional metrics, showing progress against size of the estate, gross internal area (GIA) and student and staff population, full time equivalents (FTE). Full explanation of these are found in our annual sustainability report. http://www.worcester.ac.uk/discover/sustainability-priorities.html

20. The introduction of complete sub metering for electricity, gas and water, and software to be able to monitor consumption in real time is a significant step change for the University. This investment along with the technical expertise of a new energy manager post will enable detailed analysis of high energy consuming areas of the estate and guide University Executive to prioritise projects.

Benchmarking

21. An effective method of gaining perspective of the University's carbon emissions is through direct comparison with other universities. The diagrams below show the annual energy carbon emissions per m^2 of the GIA. The graphs show the maximum, minimum and average consumption of all Higher Education Institutions in the UK and how the University's consumption compares.

Carbon emissions per m² of GIA
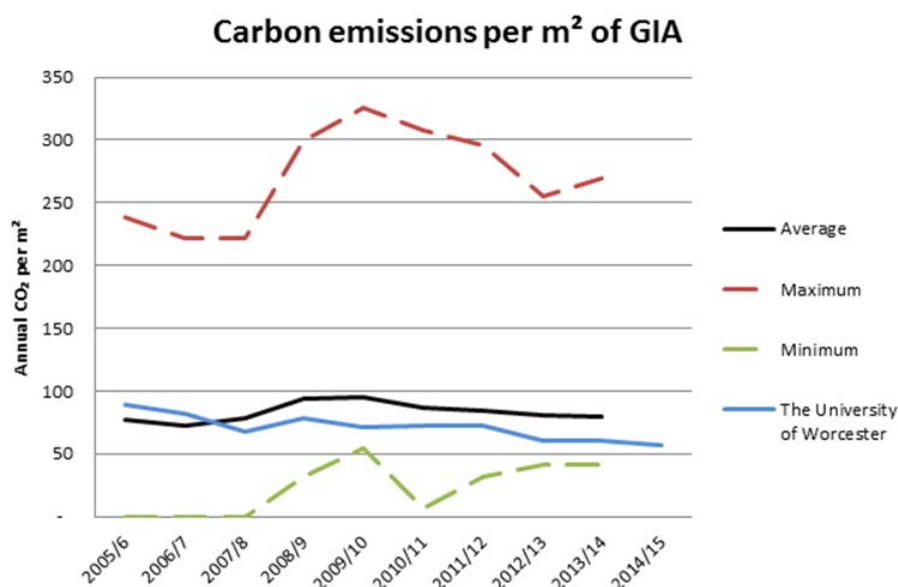
22. This graph shows that the carbon emissions of the University are similar to the national average when compared to institutions across the UK. Of the 146 institutions which have submitted data for the 2014/15 year, the University of Worcester is ranked in the top 41 universities total scope 1 & 2 carbon emissions and as the graph above shows below average annual CO2 per square metre of space.

23. The table below shows a 61% increase in total in income, a 51% increase in gross internal area and a 32% increase in the full time equivalent staff and students, demonstrating university growth over the past period. When carbon emissions from energy are compared against these metrics it is clear that energy intensity decreased significantly across the university from 2008/9 to 2014/15. Given the growth the university has experienced since 2008/9 the trend in carbon emissions is to be expected, and the absolute targets will be challenging to meet. **Ensuring the CMS establishes robust approach to measuring and verifying carbon performance must be a key aim.**

	2009	2012	2014	2015	
Emissions from Energy (tCO2e)	4,018	5,112	4,636	4,407	9.68%
Gross internal area Total HEI (m2)	51,557	70,702	76,280	78,087	51.46%
Total Income (Millions)	51	71	79	82	61.22%
FTE Staff + Students	6,069	7,948	8,313	8,000	31.83%
Emissions from Energy / m2 (kgCO2e)	77.9	72.3	60.8	56.4	-27.59%
Emissions from Energy / £1m (tCO2e)	78.9	72.1	58.8	53.7	-31.97%
Emissions from Energy / FTE Staff + Students (t..	0.66	0.64	0.56	0.55	-16.80%

Table 1: carbon emission performance and metrics

Behavioural Change

24. The University has implemented a number of student and staff behaviour change initiatives including, Student Switch Off, Green Impact, Liftshare, and a bike loan scheme. It is known that you can achieve over 15% reduction in emissions by changing people's habits and behaviours. Qualitative measures alongside quantitative targets are developed annually and these are also reported on publically. These measures may be part of established campaigns such as Student Switch Off and Green Impact or local initiatives such as Worcestershire Wellness and Around the World in 80 Days.

25. The University gained Responsible Futures Accreditation from the NUS in 2015 as one of the first pilot cohorts. Responsible Futures a whole-institution approach to embedding social responsibility and sustainability across the formal and informal curriculum. It is a supported change programme and accreditation mark that works to put sustainability at the heart of education. It creates an enabling environment in which staff and students can work together to embed social reasonability and sustainability into teaching and learning helping to ensure students leave education with the knowledge and attributes needed to lead society to a more just and sustainable future.

Technical measures

14. Annex 1 and 2 is an implementation plan to achieve the SMART carbon emission reduction target including estimated carbon savings, time scales and resources. Short term projects are shown in Annex 1. Projects are identified as scope 1, 2 or 3 and include behavioural change measures as well as technical solutions. Annex 2 shows potential medium and longer term projects and further work in identifying projects is being undertaken. This covers capital projects and actions to embed carbon management within the institution, through our strategic plan, communication and training. An annual budget of £150k is ring-fenced for sustainability projects including behaviour change initiatives. A ring fenced revolving fund of £125k is set aside for energy reduction measures and major investment in capital projects and infrastructure improvements are reviewed annually.

15. It has already been identified that there are significant issues with the electrical infrastructure of Edward Elgar, and potential for significant heating and hot water savings in these buildings. The installation of the new Energy Centre for Edward Elgar should show reductions going forward. By the introduction of the consumption monitoring software, it has been identified these buildings consume significantly more energy. This is not surprising as it houses the main data centre. Whilst some work to virtualise servers and improve server room cooling have taken place there is much more to be done. 38 servers were virtualised last year saving between 166,000 and 832,000 kWh/year. Detailed reports have been commissioned and proposals for medium and long term technical measures will be further developed over the next 12 months, and annexed to this strategy in due course.

Energy procurement and security

16. The University's main electricity meters are supplied from 100% renewable sources and the University aims to expand this so that all electricity is supplied from renewable sources.

17. The energy market is becoming increasing volatile due to dwindling resources and the University would like to reduce its exposure to this. The installation of solar PV panels on the Woodbury and Arena buildings and solar thermal panels on the St John's halls will reduce the University's dependence on external sources for energy. The University will continue to take measures to become less dependent on this market which will reduce the variability of energy bills.

Key strategies

18. Under the overarching Carbon Management Strategy there sits a suite of more detailed strategies in the following areas;

Energy: **http://www.worcester.ac.uk/discover/energy.html**

Waste: http://www.worcester.ac.uk/discover/waste-management.html

Travel: http://www.worcester.ac.uk/discover/transport-and-travel.html

Water: http://www.worcester.ac.uk/discover/water.html

Roles and responsibilities

19. The University Executive has given the day to day oversight of the Carbon Management Strategy to the Sustainability Committee (SC) which is chaired by the Pro Vice Chancellor (Students) the committee has student representation on it and staff are elected representing academic and support departments.

20. The Sustainability Management Team headed by the Director of Sustainability acts as the focal point for all aspects of sustainability and carbon management within the university. This group includes the senior staff operational staff from SC and includes Head of ILS, Purchasing Manager, Director of Estates and Facilities, Head of Estates Services and the Energy Manager. An annual sustainability report is produced and published and aims to follow Global Reporting Initiatives guidelines for publically reporting carbon emissions. Staff are named in annual actions plans as leads in ensuring identified projects are delivered timely and on budget.

Conclusion

21. The University has improved its data collection methodology for all scopes and now reports on many more modes of travel, procurement emissions are also given. Despite investment in resources and technologies the university carbon footprint in scopes 1 & 2 has increased.   However the figures must be placed in a context in which UW expanded. Student and staff numbers have increased since our first baseline was calculated in 2005/6 and have grown steadily each year just recently plateauing.

22. A set of actions is set out below which will be undertaken as part a full review of the CMS due when the new university strategic plan is published.

Area	Actions to Optimise the University of Worcester's Carbon Management Strategy
Detailed Assessment of Reductions Required to Meet Targets	• Assess carbon impact of known interventions (such as £1.7m investment in infrastructure projects) and compare against performance gap in figures 1 and 3 • Confirm the quantity of carbon reduction projects that still need to be identified to meet stated 2020 carbon reduction targets • Confirm likelihood of meeting stated reduction targets for scope 1, 2 and 3 emissions
Carbon Emissions Projects (Scope 1, 2 & 3)	• Full review of project lists to understand status and challenges • Portfolio wide assessment of energy performance projects that will help to meet targets for DEC ratings and contribute to carbon targets • Review projects for scope 3 emissions and assess confidence in savings • Develop new project list and forecast impact on 2020 target
Scope and Boundary of the CMP & Reduction Targets	• Review the carbon emitting activities that fall within the scope of the target, assessing the risks and benefits of incorporating relevant Scope 3 activities • Clearly state the scope and boundary of the Carbon Management Strategy • Confirm how this scope and boundary relates to the baseline year (the existing plan was imprecise with the baseline year for scope 3 emissions) • Confirm how this scope and boundary relates to 2020 carbon reduction targets
Implementation Management	• Review membership and terms of reference for the Environment Committee, ensuring they still meet the needs of the Carbon Management Strategy and can be practically achieved by this group • Clearly define responsibility for emitting activities and how they will be managed • Ensure that the Carbon Management Strategy reflects and plans for resource limitations
Funding the CMP	• Qualify the risks, opportunities and benefits associated with various funding routes • Build a funding plan that defines the optimal route for implementing carbon projects and is appropriate for the scale of the Carbon Management Strategy
Measuring & Verifying Performance	• Ensure value is obtained from sub-meter data through regular analysis and reporting • Given the impact of estate growth, it is important that a robust approach is taken to the assessment and communication of performance • Define approach to measuring and verifying savings delivered by specific projects • Develop a suite of key performance indicators for all emitting activities in scope
Drivers and Aligning with Wider Strategy	• Review and redefine drivers for carbon reduction • Full consideration of core values and stakeholder interests and priorities • Ensure alignment with the university's strategy
Communicate the Updated CMP	• Once the steps above have been completed the University of Worcester will be in a position to communicate the updated Carbon Management Strategy • Carefully consider the format of the document and how best to communicate it in order to raise awareness and engage stakeholders

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Approved: Approved University Executive 23 April 2014, Approved Board Governors 19th May 2014, reviewed University Executive 22 June 2016, Review date 2018/19

Annual carbon reduction projects 2015 -2016 Full details of annual plans see
http://www.worcester.ac.uk/discover/carbon-management-and-targets%20.html

	predicted carbon savings (CO2e tonnes /yr)	payback period (yrs)	budget
Energy – scopes 1 & 2			
occupancy sensors - phased	7.1	1.10	£5,000
external LED lighting - phased	13.51	18.00	£10,000
compressed air hand driers - phased	30.1	2.2	£2,000
loft insulation	8.05	3.7	£32,000
sports centre LED lighting	tbc	15	£7,500
Building Management System upgrade	277	5.00	£220,000
Solar thermal SJC Halls	83	6.5	£65,000
various smaller projects e.g. remove TRV's from circulation spaces			
Water – scope 3			
Water leak monitoring	40.4		
manual flush on urinals	0.1	< 1	£1,600
reduce shower flow rates	0.6	3	£4,000
reduce hand basin tap flow rates	0.3	3	£4,800
retrofit dual flush	0.3	4	£6,000
reduce cistern volumes	0.5	<1	£2,000
Waste – scope 3			

re-use, recycling awareness campaign	enabling		£6,000
cup for life	enabling		£3,500
Travel – scope 3			
Additional bikes for loan scheme	enabling		£5,000
Liftshare	17.8		£1,235
Cycle parking	enabling		£1,200
promotional events/campaigns	enabling		£4,089
car share dedicated spaces	enabling		£4,000
Skype project	enabling		£1,000
Bus real time	enabling		£12,000
Communications and community engagement scopes 1 2 & 3			
Green Impact, Student switch off	162.24		£7,000
sustainability 'earn as you learn' mentors	enabling		£10,000
Go Green Week	enabling		£220
FairTrade			£400
EcoCampus			£8,280

Annex 2

Measure	Description	Estimated carbon savings (tonnes)	Medium /Long term
Double glazing	Replace all single glazing windows in Edward Elgar with double glazing.	3	Medium
Boiler replacement	Replace boilers with new efficient boiler plant	100	Medium
Review new technology solutions	Incorrect technology installed in Peirson, Bredon, Teme, Woodbury, Student Union	6 - 8	Medium
Data rooms	Investigation of cooling system in server room to improve conditions and efficiency. The University of Cambridge have achieved a 10% reduction in electricity use.	10	Medium
Lighting	Continue upgrade of lighting to LED fittings and installation of occupancy and daylight sensors where required.	10	Medium
Plant and service contract Monitoring	Use the energy monitoring software to generate regular reports on each building to monitor plant performance and identify energy saving measures.	200	Medium
Behaviour change	Using the energy monitoring software to incentivise staff and students to reduce energy consumption. Bradford University have achieved a 30% reduction using this method. Savings are based on a 15% reduction.	600	Medium
Demolition	Demolition of buildings which are nearing the end of their life and are no longer required including Bredon and Binyon North.	300	Long
BMS expansion	Further expansion of the BMS so that City campus, Severn Campus can all be viewed using the same head end.	100	Long
Room Utilisation	Investigation into the utilisation of space throughout the university and rearrangement of staff to make best use of space available.	200	Long
Total		**1,523**	

Annex 3

	Quantitative Targets -
ENERGY	**GHGe targets** 5% p.a. reduction GHGe emissions in energy against a 2008/9 baseline from 2010 to 2015-16. **Consumption targets** 6% reduction in kWh gas consumption from 14-15 6% reduction in total kWh electricity consumption from 14-15 - Increase renewable energy generation to 2% of total consumption by 2020.
WATER	2.5% p.a. reduction in water GHGe emissions from consumption against a 2012/13 baseline from 2014 to 2019. Establish an increase in grey water usage target by August 2016
WASTE MANAGEMENT	Reduce GHG emissions from waste/recycling per FTE by 5% annually from 2008/9 0.0125 CO2e t baseline Reduce weight of landfill waste (including construction) 40% by 2017-18 against a baseline data collected in 2015/16; Increase weight of charity donations by 25% annually against a baseline data from 2012/13.
EMISSIONS AND DISCHARGES	Reduce fugitive F Gas emission by 25% annually from a baseline 2013-14 of 18.25 CO2e t Establish a leakage minimum target for F gas emissions by July 2016
SUSTAINABLE PROCUREMENT	Reduce the carbon emissions attributed to contracts the university is able to influence by 5% from 2011-12 baseline by 2018
TRANSPORT	Staff and student commuting reduction of 5% per annum from 2010/11 baseline 6,843 by 2018 • 20% reduction in the percentage of staff travelling by car alone to work by 2018 - i.e. a reduction from 55% in 2012 to 44% by 2018; • 20% reduction in the percentage of students travelling alone by car to the University by 2018 - i.e. a reduction from 24% in 2011 to 19% by 2018; • 10% reduction in the percentage of students travelling alone by car between their home address to term time address by 2018. **Fleet and Business Travel targets** • 5% reduction in the GHGe emissions from fleet vehicles by 2018 from a baseline 2008/9 of 36.9 tonnes CO2e; • 5% reduction in the GHGe emissions from business travel by 2018 from a baseline 2011/12 of 225.3 tonnes CO2e.
CONSTRUCTION AND REFURBISHMENT	All new build projects should be designed to achieve a DEC B rating or above. Design Jenny Lind second phase refurbishment to achieve a DEC rating of C as a minimum, but aim for B. The improvements to Edward Elgar building and plant should result in a DEC rating of C by 2020 All other university owned buildings to achieve a C rating or above by September 2017. 60% of the university's estate to achieve at least a B rating by September 2020.
EDUCATION FOR S DEVELOPMENT	Retain Responsible Futures accreditation, and increase score from 234 to 250 at next reaccreditation.
COMMUNITY INVOLVEMENT	Increase student sign-up to participation in SSO by 10% per annum on 2011/12 levels Increase number of Green Impact teams to 20 in 2015-16 across all sites Increase the student awareness of the University's sustainability activities from (baseline year 2015 51.8%) to 65% in the 3 yrs