UNIVERSITY OF LEICESTER

Carbon Management Plan (2016 – 2025)

Reporting Committee:	**Sustainability Steering Group**
Produced and Monitored by:	Estates and Campus Services

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A	Chrispal Anand	Sandra Lee	03/17	Final

Executive Summary

This Carbon Management Plan demonstrates the University of Leicester's continued commitment towards reducing carbon emissions impact against its 2004/05 baseline. By taking actions as set out in the Carbon Management Action Plan, the University continues in its aim to reduce emissions from its activities. The carbon target is specifically for Scope 1 and 2 carbon emissions. The University continues to develop its Scope 3 baseline and targets.

The University's Scope 1 & 2 carbon emission performance against 2004/05 is shown in Figure 1.

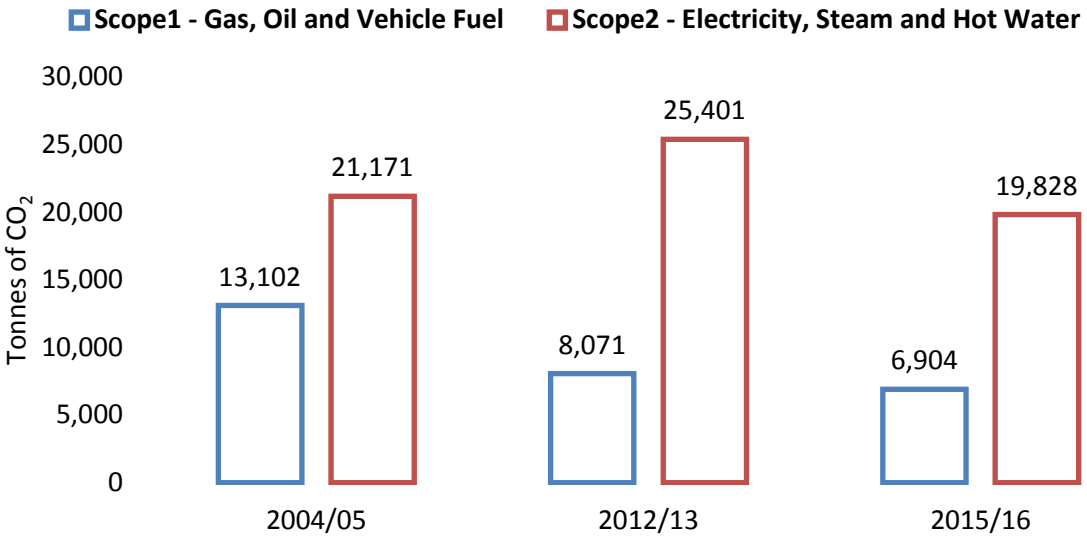

Figure 1 : Scope 1 and 2 Carbon Emissions Performance

The University's carbon reduction strategy is based on the following strategic themes:

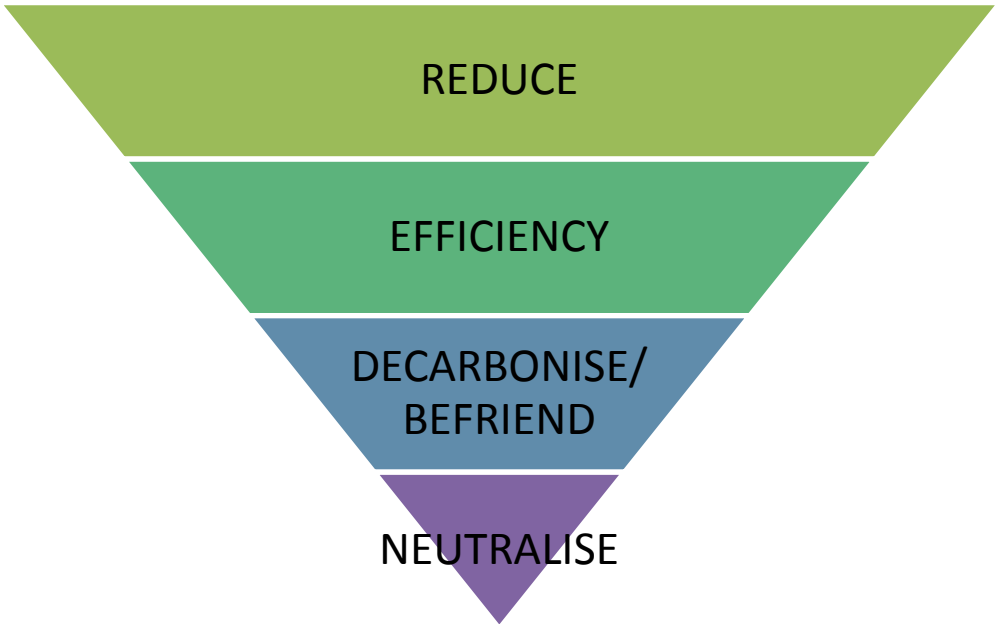

Figure 2: Carbon Reduction Strategy for the University of Leicester

The University recognises that there is no one single solution to achieve carbon reduction based on the University's business operations. Figure 3 identifies a mixture of opportunities for emissions reduction and utility cost savings. The Carbon Management Action Plan will identify the carbon saving projects and this plan will be reviewed and reported periodically in order to demonstrate continuous improvements on emissions reduction.

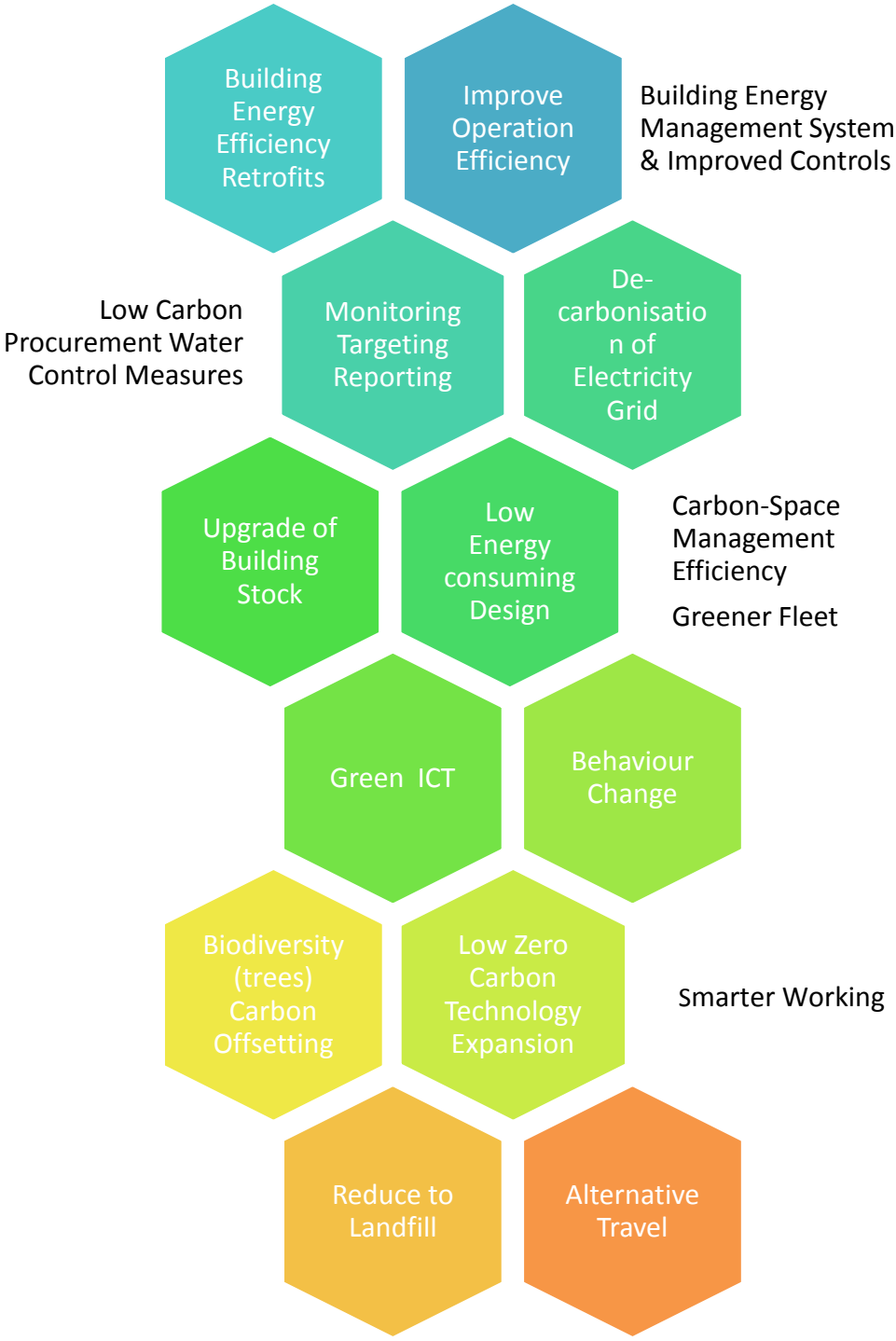

Figure 3: Carbon Reduction Opportunities at the University of Leicester

Electricity, gas, heat, steam, diesel, water, etc. at the University are generally consumed in electrical and mechanical plant rooms, research, teaching & support activities, student accommodation and leisure and recreation. Therefore, the responsibility of carbon emissions reduction at the University lies with all stakeholders. The Carbon Management Teams identified in Section 10 will work with the stakeholders to identify emissions reduction opportunities within *unregulated* energy controlled by building users such as scientific lab equipment, PC and peripherals. Estates & Campus Services will

mainly focus on *regulated* energy i.e. that which is under Estates & Campus Services control through building operational and infrastructural, such as heating, ventilation, lighting, building façade and fabric, etc.

The University has committed approximately £205K using Revolving Green Funds each year to re-invest in buildings energy efficiency projects. The Capital Plan will upgrade 15% of the building stock that contributes 7% of the current carbon footprint. Any other funds required will be based on a business case approach. The University will continue to explore local and national partnership working to implement large and medium scale low or zero carbon projects. Teams have been identified to help manage and implement the action plan.

The Carbon Management Teams mainly sit within the Estates & Campus Services Division & the Division of External Relations and provide regular reports to the Sustainability Steering Group, which informs and advises the University Leadership Team and University Executive Board on Sustainability matters.

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Acronyms and Abbreviations

AMR	Automated Meter Reading
ARD	Annual Return Database
AUDE	Association of University Director of Estates
BAU	Business as Usual
BEMS	Building Energy Management System
BMS	Building Management System
BREEAM	Building Research Establishment Environmental Assessment Method
CHP	Combined Heat and Power
CIF	Capital Investment Fund
CMP	Carbon Management Plan
CO_2	Carbon dioxide
CRCEES	Carbon Reduction Commitment Energy Efficiency Scheme
DEC	Display Energy Certificate
EMR	Estates Management Reporting
EISC	Estates and Infrastructure Strategy Committee
EPC	Energy Performance Certificate
ESS	Environmental Sustainability Strategy
FOI	Freedom of Information
GHG	Greenhouse Gas
GIA	Gross Internal Area
HECM	Higher Education Carbon Management Programme
HEFCE	Higher Education Funding Council for England
HEI	Higher Education Institution
HESA	Higher Education Statistics Authority
ICT	Information and Communication Technology
$KgCO_2$	Kilogram of Carbon dioxide
$KgCO_2e$	Kilogram of Carbon dioxide equivalent
kWh	Kilowatt-hour
LZC	Low or Zero Carbon
PIN	Positive Impact Network
P&P	People & Planet
RGF	Revolving Green Fund
SEED	Sustainable Environment Enterprise Development
Suste IT	Sustainable IT in Tertiary Education
SSG	Sustainability Steering Group
SSWG	Sustainability Student Working Group
ULT	University Leadership Team

1. Introduction

The University of Leicester is a leading UK University committed to international excellence through the creation of world changing research and high quality, inspirational teaching. To support this, the University has an extensive estate within the City of Leicester, Oadby and Glenfield comprising of five main sites, 291 buildings occupying an area of 337,321 m2 and 95 hectares of grounds. The area is split between non-residential and residential; it is roughly a 2:1 ratio, with the Central Campus dominating the former and Oadby the latter. A full schematic of the estate is included in Appendix 1. The University employs 3,605 substantive staff and a further 4,659 'atypical' staff (2016/17) with 20,150 (2016/17) registered students (30% online).
In order to support the HE sector to reduce its carbon emissions, one of the objectives of the Higher Education Funding Council for England's (HEFCE) Sustainable Development Strategy and Action Plan is "*to facilitate a carbon reduction culture to significantly reduce carbon emissions across the sector*"[1]. HEFCE has set sector carbon reduction targets for the sector of 34% by 2020 and 80% by 2050 against 1990 levels in order to comply with UK government targets.

Leicester developed its first Carbon Management Plan (CMP) through the Carbon Trust's Higher Education Carbon Management Programme (HECM) in 2006/07. Appendix 2 depicts the carbon management status at Leicester before the existing CMP was written (2007) and the levels of performance since the CMP's implementation. The success of the previous CMP is listed in Appendix 2. A graphical form of the carbon emissions trend of the University since 2004/05 (baseline year) is also shown in Appendix 2. There have been various developments nationally, locally and within the University over climate change that were not reflected in the first CMP.

This Carbon Management Plan was shaped by reflecting on the implementation of the 2006/07 CMP and has incorporated lessons learnt from that process (see Appendix 3).

To achieve the carbon targets, the University's carbon reduction road map includes challenges as varied as behaviour change, energy efficiency in buildings, integration of large scale low or zero carbon (LZC) technologies, monitoring and measuring scope 3 emissions, etc.

2. Carbon Management Reduction Context and drivers

There are a number of drivers for the Carbon Management Strategy and Plan:

The 2020 Carbon Emissions Reduction Targets:
The University of Leicester is endeavouring to achieve an absolute carbon emissions reduction (for Scope 1 and 2) by 2020 against its 2004/05 carbon footprint baseline.

Recent DEFRA's revised emission factors for electricity has instigated correction to all historic emissions for electricity. The University is a place of learning and has an innovative vision for its future and for this to happen it would need to expand its physical space.
To provide top class research and teaching facilities, the Estate Strategy has identified a price tag of £400M up to 2022/23. A proportion of this investment will assist in improving the fabric and services of existing buildings, thereby reducing carbon emissions. However, the remaining proportion of this investment will contribute to an increase in the University's carbon footprint.

[1] Sustainable development in higher education: 2008 update to strategic statement and action plan – February 2009/03

Taking into account the University's growth, implementation of the 10 year capital plan and current annual financial commitment for energy efficiency projects, the University's absolute emissions targets is 25% by 2020 and against its 2004/05 base year.
As the University activities are linked to use of buildings, income from research and teaching and number of staff & students, it is important to measure carbon emissions impact against Gross Internal Area (GIA), turn over and Full Time Equivalent (FTE) staff & student. The University's relative emissions target for 2020 is 60% for TCO_2/£ and 40% for TCO_2/FTE and GIA against its 2004/05 base year.

Further information on the absolute carbon emission target can be found in Appendix 3.

University's Commitment to Build Energy Efficient Buildings:
Estates & Campus Services has adopted the principle of striving to achieve Energy Performance Certificate (EPC) ratings of 'A' for new builds and 'B' for building refurbishments, Building Research Establishment Environmental Assessment Method (BREEAM) 'Very Good' aspiring to 'Excellent' for new builds and 'Good' aspiring to 'Very Good' for refurbishments and incorporate Passivhaus designs wherever possible[2].

Energy User Loads:
Energy loads in buildings is generally split between user loads and essential energy loads required to keep a building in operation. Estates and Campus Services do not have any influence over the energy user loads, as this is largely related to the academic, teaching and support activities. The user loads varies dependant on the type of activities taking place in buildings. Whilst Estates continue to improve on the essential energy, the building Users will also need to take responsibility towards minimising energy use in buildings. The bar chart below shows the user loads in sample buildings on the University's estate and potential opportunity for improvement in user loads through behavioural change programmes and upgrade of technologies and procedures.

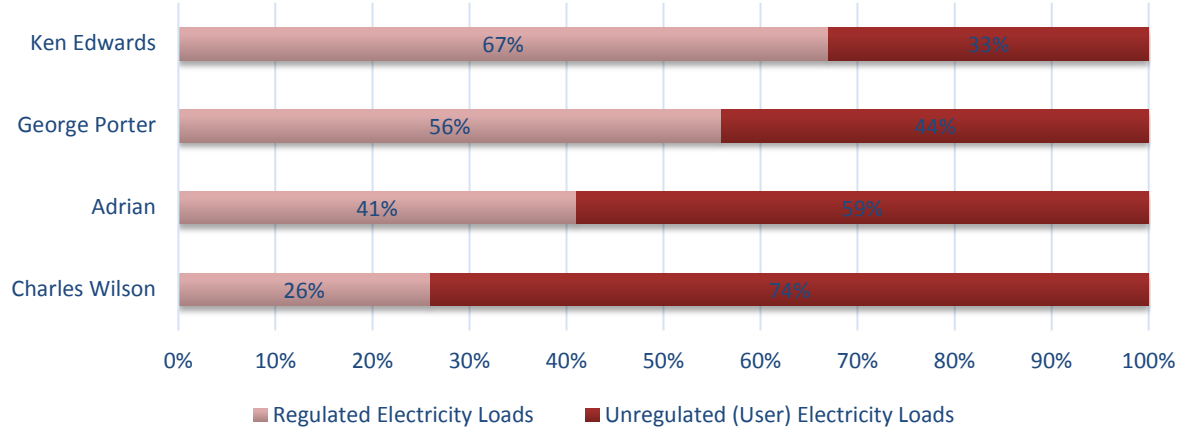


Figure 4: Regulated and Unregulated Loads in Buildings

Legislation:
The University is required to produce Display Energy Certification (DEC) labelling with an energy rating of "A" to "G" for all buildings over 250sq. m. Other energy legislation has been introduced including Energy Performance Certificates (EPC) and Air-Conditioning Inspection Certificates. Two cap and trade carbon emissions schemes were introduced in 2005 and 2010.[3] Due to the scale of the University's emissions it is a full participant in the CRCEES scheme.
More recent legislation which the University may be affected by in the future includes greenhouse gas reporting, Heat and Billing Regulation, ESOS and the EU Energy Efficiency Directive.

[2] See University of Leicester M&E Design Guide and Sustainable Construction Principles
[3] Carbon Reduction Commitment Energy Efficiency Scheme (CRCEES)

Fuel Prices:
Since 2006/07, the University's fuel cost has risen by 30 - 40% and this trend is expected to continue. However, by combining energy efficiency, low and zero carbon technologies and building/refurbished existing buildings, the University can mitigate some of the increase in energy prices and manage the budgetary impact of the volatile energy market.

Reputation:
Since 2007 People & Planet (P&P) - the UK's largest student network to protect the environment - have been ranking UK universities based on their environmental performance in the 'People & Planet Green League'. This league table is now printed in the Guardian newspaper annually and draws attention to the relative sustainability performance of HEIs; carbon management and reduction were worth 22% of the total score in 2016. Reducing carbon will improve the university's reputation under this scheme. It should be noted the University achieved 1st in P&P during 2016 and now this needs to be maintained.

AUDE has set up its own sustainability approach due to concerns regarding P&P criteria (such as type of VC's car). UoL will make use of the AUDE Green Scorecard metric to monitor its sustainability performance against the sector benchmarks set by AUDE.

Energy Cost:
The University would see substantial financial savings by achieving carbon reduction targets. Figure 5 show energy costs since 2004/05 (the University's carbon reduction baseline year).

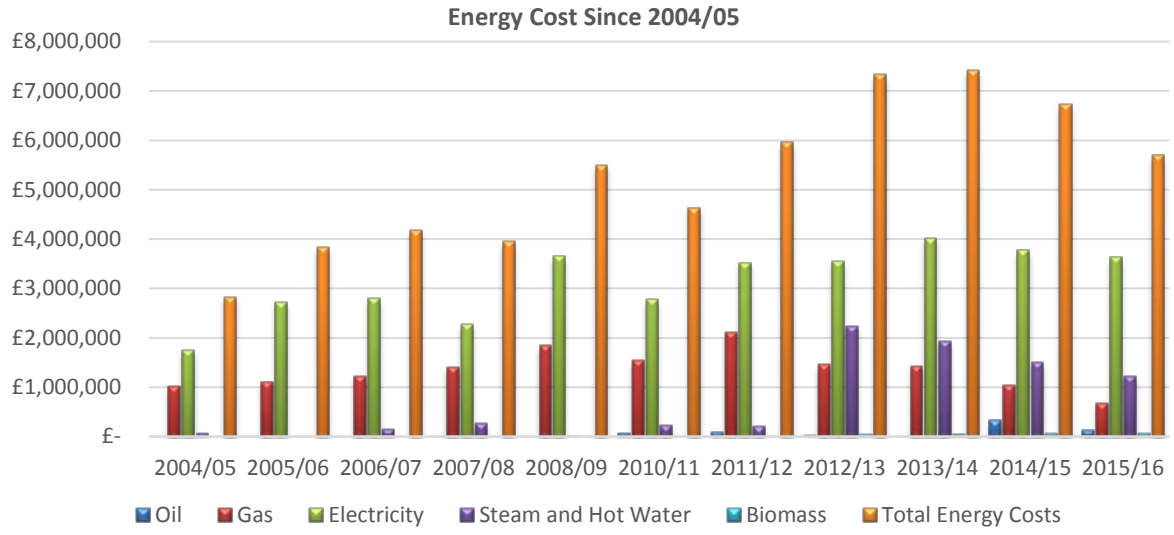


Figure 5: Total Energy Cost for the University of Leicester

HEFCE Capital Funding and Carbon Reduction Performance:

Within higher education, in January 2010, HEFCE published a good practice guide for the development of carbon management strategies and plans. This guide indicates that the University's future HEFCE Capital Investment Fund (CIF) allocations will be linked to its carbon reduction performance[4]. Therefore, it is imperative for the University to revise the existing Carbon Management Plan to reflect its carbon emissions reduction target and how it intends to achieve it. Even under a significant reduction in capital allocations, HEFCE expects universities to continue their commitment to reduce carbon emissions and prove value for money is being achieved.

[4] Carbon management strategies and plans: A guide to good practice – January 2010/02

3. Carbon Emissions Baseline and Projections

3.1 Classifying Carbon Emissions

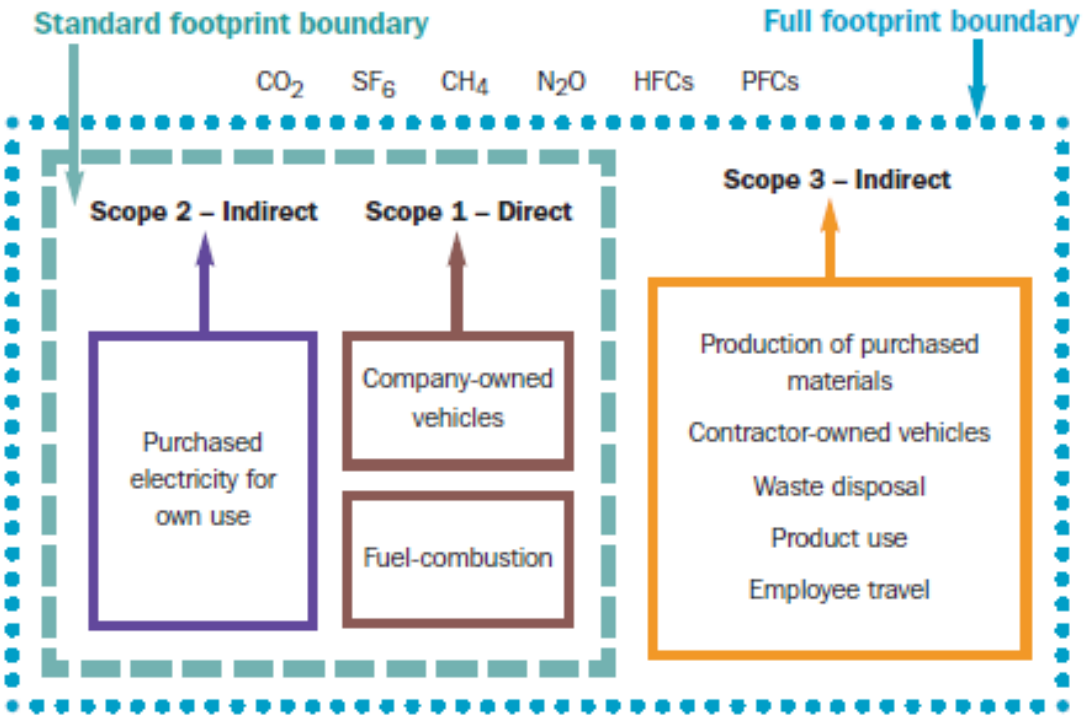
This section provides an understanding of where the University's carbon emissions come from and their possible effects over time. Emissions could stem from a number of University related activities such as energy used in buildings, maintenance, refurbishment, new building programmes, and infrastructure projects; energy procurement; specification and procurement of capital equipment; transport policy & planning and waste management.

The Greenhouse Gas (GHG) Protocol[5] defines three 'scopes' of emissions:

I) **Scope 1** - Direct GHG emissions are emissions from sources that are owned or controlled by the organisation. For example, emissions from ***combustion in owned or controlled boilers, furnaces and vehicles***.

II) **Scope 2** - This accounts for GHG emissions from the ***generation of purchased electricity*** by the company.

III) **Scope 3** - Indirect emissions that organisations produce through their activities, but occur from sources not owned or controlled by the organisation. Examples of such activities include ***business travel, commuting, supply chain (procurement), waste and water***.



Source: Clean Air-Cool Planet and Forum for the Future (2008)[15]

Figure 6: The boundaries of different carbon footprint 'scopes'

3.2 Emission Baseline and Recent Trends

In 2006/07[6], the University's carbon emissions baseline was established based upon 2004/05 data. The total carbon identified was 34,273[7] tonnes. The activities considered for calculation of these emissions were energy (gas, oil, owned vehicle fuel, electricity and steam & hot water – scope 1 and 2) and water

[5] http://www.defra.gov.uk/publications/files/pb13309-ghg-guidance-0909011.pdf
[6] The University took part in the Higher Education Carbon Management Programme ran by the Carbon Trust.
[7] Figure based on re-baseline.

(scope 3) consumed in residential and non-residential buildings, (scope 1) transport and (scope 3) waste generated.

Figure 7 shows the percentage of CO_2 emitted by different sources at the University of Leicester in the baseline year. The University's main source of CO_2 emissions is from the buildings at the academic sites followed by the buildings at the residential sites. Reducing the CO_2 emissions in buildings will also create a reduction in utility costs.

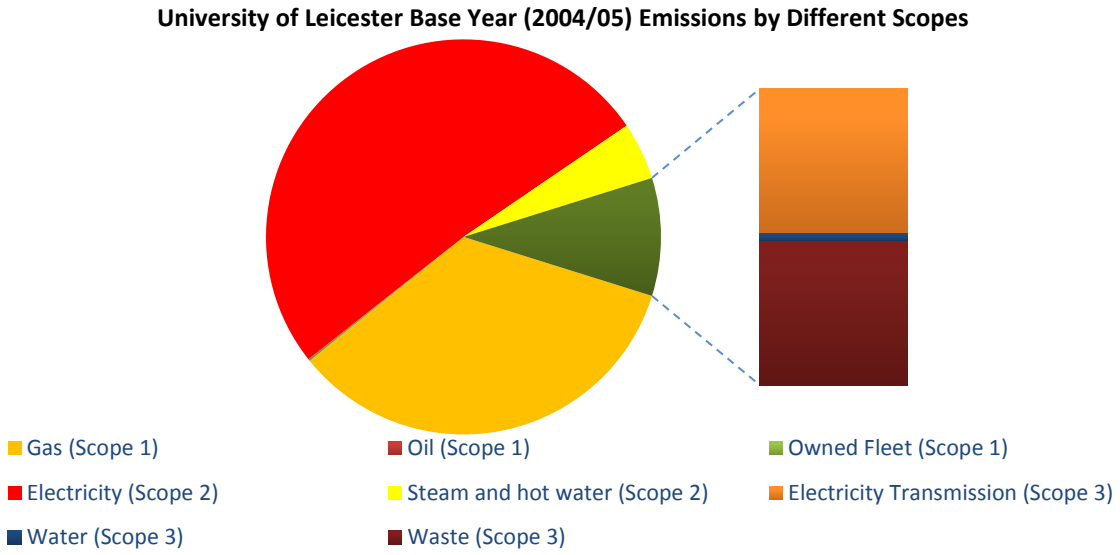


Figure 7: Base Year (2004/05) Emissions by Scopes

Table 1 describes the baseline year University emissions, what is included in the 2020 target and how recent emissions compare against 2004/05 (baseline).

Emissions in tonnes of CO_2		Emissions Source	2020 Target	2004/05	2006/07	2009/10	2012/13	2013/14	2014/15	2015/16
	Scope 1	Gas	25%	13,039	10,982	11,963	8,071	6,727	6,582	6,311
		Oil	25%	0	0	203	0	0	734	512
		Owned fleet travel	25%	64	-	-	0	0	0	82
	Scope 1 Total			13,102	10,982	12,166	8,071	6,727	7,316	6,904
	Scope 2	Electricity	25%	19,389	20,383	18,939	18,799	20,010	18,702	16,259
		Steam/hot water	25%	1,782	3,261	1,216	6,603	4,783	4,087	3,569
	Scope 2 Total			21,171	23,645	20,155	25,401	24,793	22,789	19,828
	Total Scope 1 and 2 Emissions			34,273	34,627	32,321	33,472	31,521	30,106	26,733
	Outside of Scopes	Biomass	25%	0	0					12
	Scope 3	Electricity Transmission and Distribution	N/A	1,794	1,592	1,525	1,607	1,750	1,544	1,471
		Water	2%	91	-	272	256	289	279	312
		Waste	See note 6	1,779	-	-	-	85	94	39
		Procurement	See 4.2	-	-	-	51,579	42,333	47,293	31,032
		Other travel	See 4.2	-	-	-				
		Biomass	N/A	0	0					35
	Scope 3 Total			3,664	1,592	1,797	53,442	44,457	49,210	32,853
	Total Emissions			51,039	47,201	46,285	94,985	82,705	86,632	66,490

Table 1: Emissions Base year, Targets and Recent Emissions

Note 1: Oil emissions normally occur only when there is a gas interruption by the supplier.
Note 2: Water and waste emissions have been corrected in accordance to HEFCE Scope 3 guidelines and DEFRA's emissions Factors.
Note 3: The cells that do not have any figures indicate no data are available.
Note 4: The University is currently working towards setting up monitoring protocols for emissions related to other travel.
Note 5: Appendix 4 provides further information on the University's carbon emissions.
Note 6: 50% on-site segregation, 95% diversion from landfill and Annual 1% decrease in waste figure per m^2.

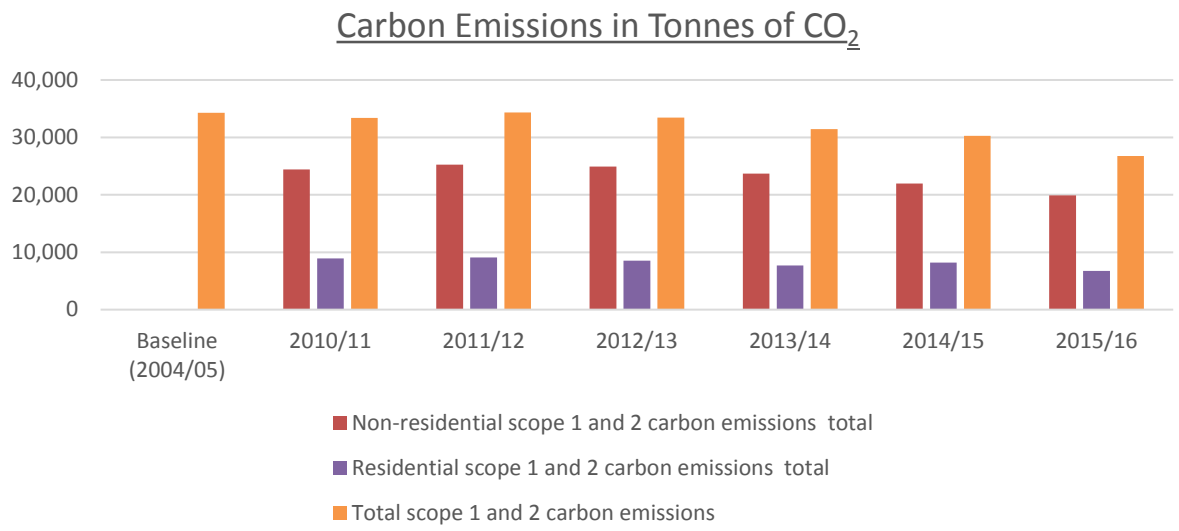


Figure 8: Carbon Emissions Scope 1 and 2 by Non-Residential and Residential Buildings

4. Carbon Management Targets

The University has set targets to control its carbon emissions associated with the University's core business activities. Targets associated with the different carbon management scopes are listed below.

4.1 Scope 1 & 2 Targets

- The University aims to reduce its Scope 1 and 2 carbon emissions by an **absolute figure** of 25% by 2020 against 2004/05 base line. The University also has a **relative target** of 60% by 2020 against turnover and 40% by 2020 against GIA and FTE (staff & students).
- These targets apply to emissions related to gas, heat and steam usage, fuel used in the University owned fleet and electricity purchased from the grid.

4.2 Scope 3 Targets

- The University has not set all of its Scope 3 targets to date. This is due to the complexity in collecting some of the Scope 3 data and actually being able to make any difference as the emissions cannot be controlled directly by the University. The HEFCE guidelines published in January 2012 will be used to collect this data. Data to be collected are summarised in Appendix 6. Where the scope 3 emissions have been calculated, suitable targets have been set.
    - Water – 2% reduction annually to 2020
    - Waste – Targets have been set to improve recycling and to divert waste from landfill:
        - Achieve 50% on-site segregation of waste for recycling (by weight) by 2020
        - Achieve 95% diversion from landfill (by weight) by 2020
        - Annual 1% decrease in waste figure per m^2
    - Travel
        - Improving air quality and emissions associated with University-related travel.
        - Capture commuter and business travel data for carbon foot printing purposes.
    - Procurement
        - Create a Social Value order of priorities
        - Achieve Flexible Framework level 4
        - Include sustainable catering within the Sustainable Procurement

5. Carbon Management Vision and Strategy

5.1 Low Carbon Vision

The University of Leicester recognises that climate change is taking a toll on the environment and is committed to playing a leading role through minimising our negative environmental impact.
The Sustainability Strategy has one main aim: to enhance our social, economic and physical environments by embedding sustainability into University core business.
This involves two core streams:

i. Developing the environmental management of our estate to be as efficient and environmentally responsible as possible,
ii. Embedding the wider sustainability-related values through the University through our curriculum, research practice, community outreach and day to day behaviours.

This vision shall partly be achieved through carbon emissions reduction opportunities, through operation of the carbon reduction hierarchy (Reduce – Efficiency – Decarbonise – Befriend – Neutralise)[8] and strategic themes.

5.2 Carbon Reduction Hierarchy

For a systematic and structured carbon management strategy, the carbon hierarchy[9] is adopted. This hierarchy will help to manage and reduce emissions in a socially responsible and cost-effective way.

REDUCE energy/fuel demand	Avoid unnecessary use	MONITOR ▪ Learn from existing projects and practice ▪ Apply control measures ▪ Evaluate impacts
	Passive features (for example insulation, daylight, solar gain/shading, thermal mass)	
	Encourage energy-conscious behaviours	
EFFICIENCY of equipment and energy/fuel sources	Use energy-efficient equipment	
	Provide simple and effective controls	
	Recover useful heat	
	Use clean fossil fuel technology	
DECARBONISE energy/fuel supplies	On-site or near-site renewable energy sources, including community schemes	
BEFRIEND	Seek partnerships to increase your capacity to do the above	
NEUTRALISE energy/fuel supplies	Consider responsible carbon offsetting schemes	
	Procure green electricity supplies	

Table 2: Carbon Reduction Hierarchy

[8] Carbon reduction target and strategy for higher education in England- January 2010/01
[9] Carbon reduction target and strategy for higher education in England – January 2010/01

5.3 Carbon Reduction Strategy

To achieve the carbon emissions reduction targets, the University has adopted the following strategic themes:

REDUCE

Sustainable Design

- All major and minor building projects will follow sustainable design principles as instructed in the University's Design Guide.

Behaviour change

- For an effective energy awareness programme, it is important to get the fundamentals right such as support and resources, an appreciation of the current situation, as well as understanding and targeting specific audiences, setting achievable goals and having the appropriate messages and communication strategies.
- Appendix 7 shows the regulated and unregulated energy loads for selected academic buildings. The consumption of unregulated load responsibility largely rests with the building users. A recent energy audit has revealed in some buildings the building users' energy load is as high as 59%.

Carbon-space management efficiency

- Energy and cost savings can be achieved through efficient use of space in buildings. This could be through efficient timetabling, use of zoning in buildings, making use of the most energy efficient buildings out of hours and purchasing and renting highly efficient buildings.
- The University's approach to the efficient use of space is embedded into the Space Allocation Principles Document[10].

Monitoring, targeting, reporting, policy and procedures

- The University has over 1,000 meters monitoring building utility consumption. The half-hourly data is imported into two aM&T systems for utility analysis, reporting and bill validation. There are numerous minor, major and capital work programmes taking place each year to develop the University's facilities. It is important that existing policies and procedures that are used for these works programmes have a low carbon focus embedded into them.

A model for a *Virtual* Devolved budget

- Utility budgets at the University of Leicester have been devolved to Residential and Commercial Services, Sport and Garden and to commercial businesses trading at the University but not to academic departments.
- Developing a model for a virtual devolved budget for Colleges/Departments would give more responsibility for energy use to the consumer.
- The main benefits of such a scheme for the University are: senior management buy in for energy savings, departmental discussions of energy use at budget setting, carbon/energy cost considerations when producing business cases and promoting energy efficiency within departments.

[10] http://www2.le.ac.uk/offices/estates/services/property/space/docs/Space%20Principles.pdf

EFFICIENCY

Understand energy use and Building energy efficiency projects

- 99.7% of the University's scope 1 and 2 emissions are from energy used in buildings. 39% of the emissions are related to heating and the remaining is related to power.
- Determining the regulated and unregulated loads in buildings to understand what proportion of energy the building users are responsible for and what is related to space heating and other core power requirements can influence energy savings. Regulated and unregulated loads for selected academic buildings are listed in Appendix 7.
- The existing building stock (approx. 291) requires in-depth energy audits of the following: efficiency of cooling, heating and ventilation systems, building fabric, lighting and small power (PC, office equipment, laboratory equipment, etc.). It is important that the University aims to bring all of its existing building stock up to acceptable energy performance levels.

Building management systems and controls

- The University has a well-established Building Management System (BMS). BMS is an excellent tool for remote and real-time maintenance. The BMS can also be used as a Building Energy Management System (BEMS).
- The University has BMS installed in 95% of the non-residential buildings and across 60% of the residential buildings.
- A BEMS action plan has been developed for all centrally timetabled spaces, departmental meeting rooms, department seminar rooms and common rooms. The action plan as part of the BMS strategy will need to be developed to include upgrading the controls to a building, by zones, etc.

Upgrade inefficient buildings

- Poor energy performing buildings increase operational running costs and produce excessive carbon emissions. It is important to strategically identify the worst performing buildings and target energy efficiency improvements as part of the Condition 'C' Plan.

Green ICT

- ICT is at the heart of the University's business activity. Inefficient management of ICT consumes additional energy, which costs money and contributes to the University's carbon footprint.

Owned travel fleet

- 0.3% of the University's scope 1 and 2 emissions are related to fuel consumed by owned travel fleet. Although the emissions from travel fleet are very small in comparison to buildings emissions, it is important to green the University's fleet and make cost savings.

DECARBONISE

BEFRIEND

Decarbonisation of electricity grid

- The UK government has legal 2020 and 2050 carbon emissions reduction targets. The University purchases a large volume (40% of total energy consumed) of electricity from the grid. The electricity from the grid is generated by a combination of fuel sources including fossil fuel and renewables.
- Decarbonisation of the electricity grid means increasing the energy generated using low carbon and renewable sources and reducing the dependence on carbon-intensive fossil fuels.

Leicester District Heating Partnership

- The University is in a Partnership with Leicester City Council and the third party energy provider. The scheme provides carbon emissions savings on the heat supplied to University buildings. The heat from this scheme was anticipated to account for 20% of the University's energy portfolio. Therefore, the emissions factor reduction for this heat is dependent on the efficiency of the scheme and low carbon fuel sources.

Large scale low or zero carbon technology expansion

- To decarbonise the fuel supplies used on the University sites, it is important to incorporate large low or zero carbon technologies such as CHP, Biomass, Ground/Air Source Heat Pump, etc. into existing non-residential and residential buildings and also to be considered as part of any new major refurbishment and development. These low carbon technologies would provide the University with a certain level of energy security and carbon savings.

Onsite renewable generation

- To reduce annual energy costs and mitigate fossil fuel dependence, it is important to explore the incorporation, where appropriate, of photovoltaic (PV) panels, Ground/Air Source Heat Pump, solar thermal, etc. into existing and new buildings.

NEUTRALISE

Procurement of Energy

- The University will aim to purchase a proportion of available green energy on all future energy contracts.

6. Carbon Management Action Plan

The Carbon Management Action Plan supports this Carbon Management Plan. The action plan will contain carbon reduction projects and will be reviewed periodically. Example of an action plan can be found in Appendix 9.

7. Monitoring, Reporting and Assessment

7.1 Monitoring

- The University monitors gas, electricity, steam, heat and water using the two automated meter reading systems on half-hourly intervals. The data shall be interrogated and analysed using the two software systems (Dynamat Plus for non-residential sites and eSight for residential sites).
- The University owned fleet data is collected through fuel card system.
- The University shall monitor waste data using data provided from contractors and internal waste audits.
- The University shall monitor travel data using the Cooperative travel management system and the travel expense claim system.
- The University shall work towards putting in place monitoring and reporting protocols for all Scope 3 emissions.

7.2 Reporting

Monitoring and reporting is an important aspect of any successful management system. In order to review the University's performance against its carbon targets and for compulsory energy legislation reporting, carbon and utility performance (electricity, gas and water) shall be provided to relevant internal and external stakeholders on an annual basis.

Under mandatory reporting, the University reports to the following schemes; CRCEES, DEC, EPC and Air Conditioning Inspection Certificate. Any Freedom of Information (FOI) request could also be classed as mandatory reporting such as the annual People & Planet Green League Table. The University also reports its emissions annually to its funding body HEFCE through the Estates Management Reporting.

7.3 External Verification of Emissions Data and Estimates

The University participates in CRCEES, which does not require mandatory external verification. However, the University has chosen to verify its emissions related to CRCEES using an external accredited body. The University has the majority of its Scope 1 & 2 emissions audited each year through CRCEES verification.

The University will periodically aim to report under voluntary carbon reporting such as the Carbon Saver Standard or similar to demonstrate its achievements on Carbon Management.

Due to the importance of emissions data, the University shall aspire to set-up emissions audits for all of its carbon emissions scopes by 2020.

7.4 Demonstrate Continuous Improvement

The University shall seek to maintain its Carbon Saver Standard or equivalent status. To embed energy and environmental continuous efficiency improvement across the University's estates operations, an appropriate energy and/or environmental management standard shall be considered for implementation.

8. Carbon Management Plan financing

Investment in carbon management projects is essential to achieving the carbon targets. The University of Leicester had no budget defined for energy management prior to joining the Higher Education Carbon Management Programme. Since then, the University was awarded an energy efficiency grant of £1.4 Million through the HEFCE-Salix RGF 1 and 2. The nature of the HEFCE-Salix RGF is to invest in energy efficiency measures in existing buildings. The savings from the invested projects are re-invested into other energy efficiency projects. Based on the savings, the amount of investment available each year is in the region of £200K.

8.1 Internal Funding

The types of projects include 'quick win ', 'medium term' and 'long term' projects. The quick win projects are of top priority to the University as they are quick energy & cost savers and contribute to the reduction of carbon emissions.

Quick wins

These are projects that require no or little investment with a quick payback. Examples of project include change of process and policies, timer controls for office equipment, awareness campaigns with an investment between £0 - 10k.

Medium term

The medium term investment projects result in a 5- 10 year payback period. Funds invested in these type of energy projects save 1 tonne of carbon per £50-100 spent. The HEFCE-Salix RGF funds these types of projects. These projects require quantified business cases that need to be sanctioned by the Fund Manager (Carbon and Energy Manager).

Long term

The long term projects require higher investment. They result in a longer payback period and are often linked to capital projects, which are integral to the growth of the core business – research and teaching. These projects require quantified business cases and need to be sanctioned by University Leadership Team (ULT). An example of this type of project is the David Wilson Library, which achieved BREEAM "Excellent", and the Centre for Medicine Building, which the largest Passivhaus Build in the UK.

The non-financial resources required to support this programme are the internal staff involved in implementing projects such as from Estates and Facilities Management Division, Media and Communication Office and Positive Impact Network (PIN) Coordinators.

8.2 External Funding

The University shall continue to consider external funding sources to finance energy efficiency programmes and low or zero carbon technologies that will support carbon management activities.

The University shall also continue to seek opportunities to work effectively in partnership with local businesses and other local public sector organisations to enable solutions that share learning and would not be possible by working alone.

9. Stakeholder Management and Communication

9.1 Stakeholder management

The behavioural culture and activities of staff and students at the University will influence how well carbon can be reduced. Universities have reported energy reductions from 11% (University of Cambridge, 2012[11]) to 33% (University of Bradford, 2011) using behaviour change initiatives, thus stakeholder participation in CO_2 reduction activities will determine the success of the plan. University stakeholders have been identified as:

- Staff
  a. Academic staff
  b. Administrative staff
  c. Non-academic and non-administrative staff
- Students
  a. Local students
  b. Students at Halls of Residence
- Visitors
- Leicester general public and especially local residents

Recent research emphasises that, in terms of energy use, people are most influenced by what those around them are doing (social norms) and are more likely to be influenced by information which is novel, accessible and of relevance to the individual in question[12]. In order to achieve behaviour change, a comprehensive strategy needs to be implemented with a thorough understanding of each stakeholder and their potential and actual impact on the plan.

The University is developing a research programme to develop that understanding along with colleagues in the Departments of Management and Psychology that will inform a Positive Behaviours Strategy to complement this Carbon Management Strategy. The purpose of this research is to investigate the sustainable and unsustainable behaviours, motivations and values of our staff and students in order to inform future University policy and practice and also as part of some potential collaborative work with other Universities.

The Environment Team is developing a behaviour change and associated communications plan to complement Carbon Management Strategy and Plan. This will be based on communicating the issues of unregulated energy use and will largely focus on encouraging staff to come up with innovative energy reduction solutions. It will mainly be concerned with scope 1 and 2 reductions, but not exclusively. This will be available by November 2017.

[11] http://www.buildingsustainability.net/blog/category/behaviour-change/
[12] Behaviour Change and Energy Use, Cabinet Office, 7 June 2011.

10. Carbon Management Ownership and Management

10.1 Main roles and responsibilities

In order for the Carbon Management programme to be successful and continuous, there is a need to demonstrate who takes responsibility for what and at what level of management from within the University. This section explains the roles and responsibilities of the teams that have been established to run the Carbon Management Programme.

10.2 Project Team

Project Sponsor - Pro-Vice-Chancellor

The Project Sponsor chairs the Sustainability Steering Group (SSG), which advises and informs ULT on all sustainability matters including carbon and energy.

Co-Sponsor - Director of Estates and Campus Services

The Co-Sponsor provides appropriate support to the Carbon and Energy Manager to implement the carbon management plan. The Co-Sponsor is also a member of the SSG and communicates to the ULT on carbon, energy and environmental matters.

The Project Sponsor and Co-Sponsor will steer the programme to achieve the aims and give approval to the steps taken by the Carbon and Energy Manager who is tasked with delivering the programme.

Project Manager - Carbon and Energy Manager

Project Funding Officers – Director of Finance, Director of Estates and Campus Services and the Head of Customer Services and Office Support (Estates)

The Project Funding Officers are the key individuals tasked with obtaining internal and external funding for implementing the projects along with the Project Manager.

Sustainability Steering Group

The SSG's role is to formulate and review annually the Sustainability Strategy, which includes carbon reduction commitment; to review environmental practices to ensure consistency with the Environmental Sustainability Policy and Strategy; to consider and recommend changes to environmental and carbon policy and practice; to consider and promote environmental improvements to the University's operations, including carbon & energy saving measures; and to set and monitor appropriate targets for carbon and environmental performance.

Positive Impact Network Coordinators

The role of the PIN Co-ordinators within the Carbon Management Programme is to assist the Project Manager and Project Support Officer to deliver identified projects at their respective building level.

Student Sustainability Steering Group

The student-led SSWG consists of representatives from a large number of student societies and focuses on sustainability-related issues. It also administers the Sustainable Environment Enterprise Development (SEED) Fund where students can bid for money to run sustainability (including energy-saving) projects.

Carbon Management Team

The Carbon Management Team assists in identifying and delivering the carbon saving projects identified at the University of Leicester. Their main role is to support the Project Manager by delivering projects that are identified under the criteria in an agreed timescale.

Area for CMP Support	Carbon Management Team Members
Building energy management	Building Controls Engineers Building Services Engineers Electrical and Mechanical Design Engineers
Estates maintenance and major refurbishment programmes	Director of Planning & Projects Head of PPM and Head of Operations
Estates strategy	Director of Estates and Campus Services Director of Campus Services
Energy procurement	Head of Customer Services and Office Support Head of Procurement
Procurement of new buildings and infrastructure	Director of Planning & Projects Head of Procurement
Procurement, use and recycling of water, paper and all other consumables **Scope 3 – Procurement**	Head of Customer Services and Office Support Head of Procurement Waste Manager Sustainability Manager
Specification and procurement of capital equipment, including IT and fit-out of laboratories, workshops etc.	Director of Estates and Campus Services Building Services and Control Engineers Head of Customer Services and Office Support Director of Planning & Projects Director of Campus Services Director of IT Services Head of Operations Head of Procurement
Transport policy and planning **Scope 1 and 3 – Travel**	Head of Operations Sustainability Manager
Waste management **Scope 3 – Waste**	Head of Operations Waste Manager

Table 3: Carbon Management Team and Areas of Expertise

Day-to-Day Carbon Management Team

The Energy and Environment Team tackles the day-to-day elements of the carbon management programme.

Specific Carbon Management Area	Team Members
Carbon and Energy Management	Carbon and Energy Manager Utilities Technician Finance and Utilities Assistant
Environmental Management	Sustainability Manager
Sustainable Procurement	Head of Procurement
Travel Management	Sustainability Manager
Waste Management	Waste Manager
Water Management	Carbon and Energy Manager
Behaviour Change	Sustainability Manager Sustainability Project Officer Sustainable Projects Intern

Table 4: Day-to-Day Carbon Management Team

Wider Supporting Team

Role in the Project	Team Members
Press releases, etc.	Director of Press and Publications Office
Assistance with organising events, seminars, workshops, clerical support and assistance etc.	Estates Admin Team
Internal communication	Environment Team – Marketing Office

Table 5: Wider Supporting Team and their Roles

10.3 Expected Constraints

Maintaining Support

Whilst implementing projects, it is likely that there will be a certain number of successes that will motivate the teams and University stakeholders. It is very important to publicise these successes in order for continuous momentum of the programme and it will help build and maintain the support for the programme. Reporting to stakeholders at the University will be a key element in maintaining support for the programme.

Time Management

Project plans are one of the most important tools in completing projects and meeting targets set for carbon reduction. It is essential that annual scheduling should be used when implementing projects, which will assist delivering the projects in good time.

Possible Risk

In order for the successful implementation and continuity of the carbon management plan, risks need to be evaluated. Evaluation of risks for the programme will be undertaken annually along with the review of the programme. Outcomes will be addressed with the help of senior management.

The possible risks to the project are:

I) Strategic decision-making that contributes carbon to the University's footprint
II) Lack of resources for the Project Manager and Project Support Officer affecting delivery of targets.
III) Lack of continuous support towards the carbon management plan affecting delivery of future milestones.
IV) Lack of quality data affecting identifying energy saving opportunities.
V) Lack of continuous support from the teams will affect the implementation of the plan.
VI) Allocating and obtaining budgets may delay implementation of the identified opportunities.

10.4 Reporting and evaluation

Procedures for reviewing performance

This section covers the procedures for reviewing how well the carbon management programme is delivering its aims and targets. Figure 9 shows the committee reporting line for carbon management at Leicester.

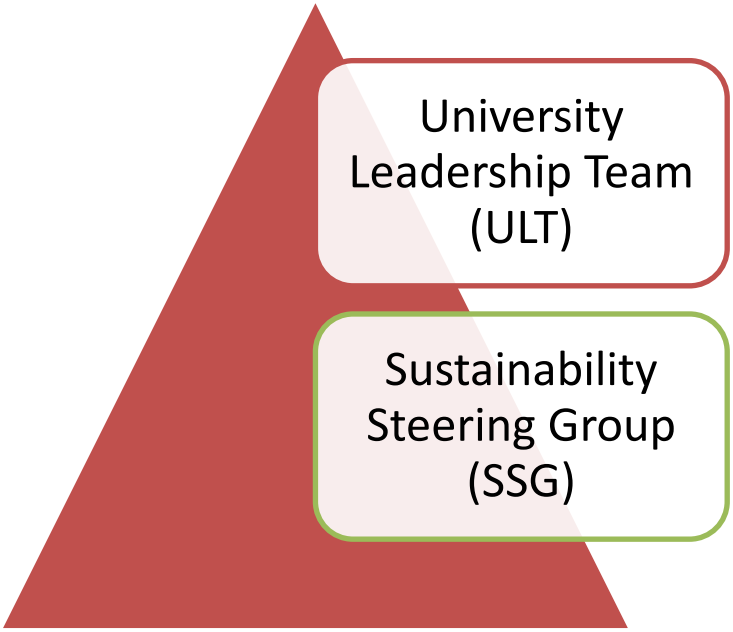


Figure 9: Committee Hierarchy for Carbon Management Reporting at the University

Sustainability Steering Group – The plan status will be reported to the Working Group three times a year in line with committee reporting structures, where project performance and outcomes shall be reviewed. This will then be passed to ULT for information and/or approval as required.

Carbon Management Team Meeting – The plan status will be presented to the Carbon Management Team and Pin Coordinators and Sustainability Student Working Group (SSWG) on an annual basis. Meetings shall be used to obtain feedback on current projects and provide an opportunity for them to instigate new ones.

Stakeholder interaction – The programme status shall be published to the stakeholders of the University on a quarterly basis via the Environment Team and Estates and Facilities Management web pages, e-bulletins and other suitable medium. This is done so that everyone in the University has an opportunity to input to the projects.

Procedures for updating plans and targets

The Project Manager is responsible for co-ordinating with the project teams for monitoring and tracking the implementation plan, initially on a quarterly basis and providing final reviews annually. The final reviews will be presented to the SSG.

Towards the end of each academic year the Project Manager will assess how well carbon management processes have been incorporated within the strategy and action planning of the Environment Team more generally and will propose an updated plan to the SSG.

Procedures for reporting achievements

Formal reporting - Plan updates shall be reported to the SSG tri-annually. The Project Manager shall report to the Estates and Infrastructure Strategy Committee as and when required. The Project Manager and Project Support Officer shall update the Project Teams as necessary.

Social media – the Carbon Management Plan will have pages on the Environment Team website that shall be frequently updated and maintained. The Team also Tweets all relevant news items regularly and on an Environment Team newsblog.

Written media - Programme achievements and progress will be highlighted on the Insider, which is circulated to all staff once a week by the University Press Office and in press releases where appropriate. Information will also be circulated in the bi-monthly PIN newsletter.

Displays – the Carbon Management Plan information and achievements shall be publicised using exhibition stands during major University events, open days, staff inductions, within the University administration area, etc.

Awareness projects – to re-iterate the carbon management key messages to the University stakeholders, the Carbon Management Plan shall be looking to implement awareness-raising projects on an annual basis for which funding shall be allocated by the Estates and Facilities Management Division. These awareness-raising projects shall be used to draw attention to the achievements made by the Carbon Management Plan already and what it is aiming to do for future projects.

The Project Manager and Project Support Officer, together with the day-to-day Carbon Management Team, will be responsible for managing the above and all publications will be compiled according to the principles in the Environment Team Communication Strategy.

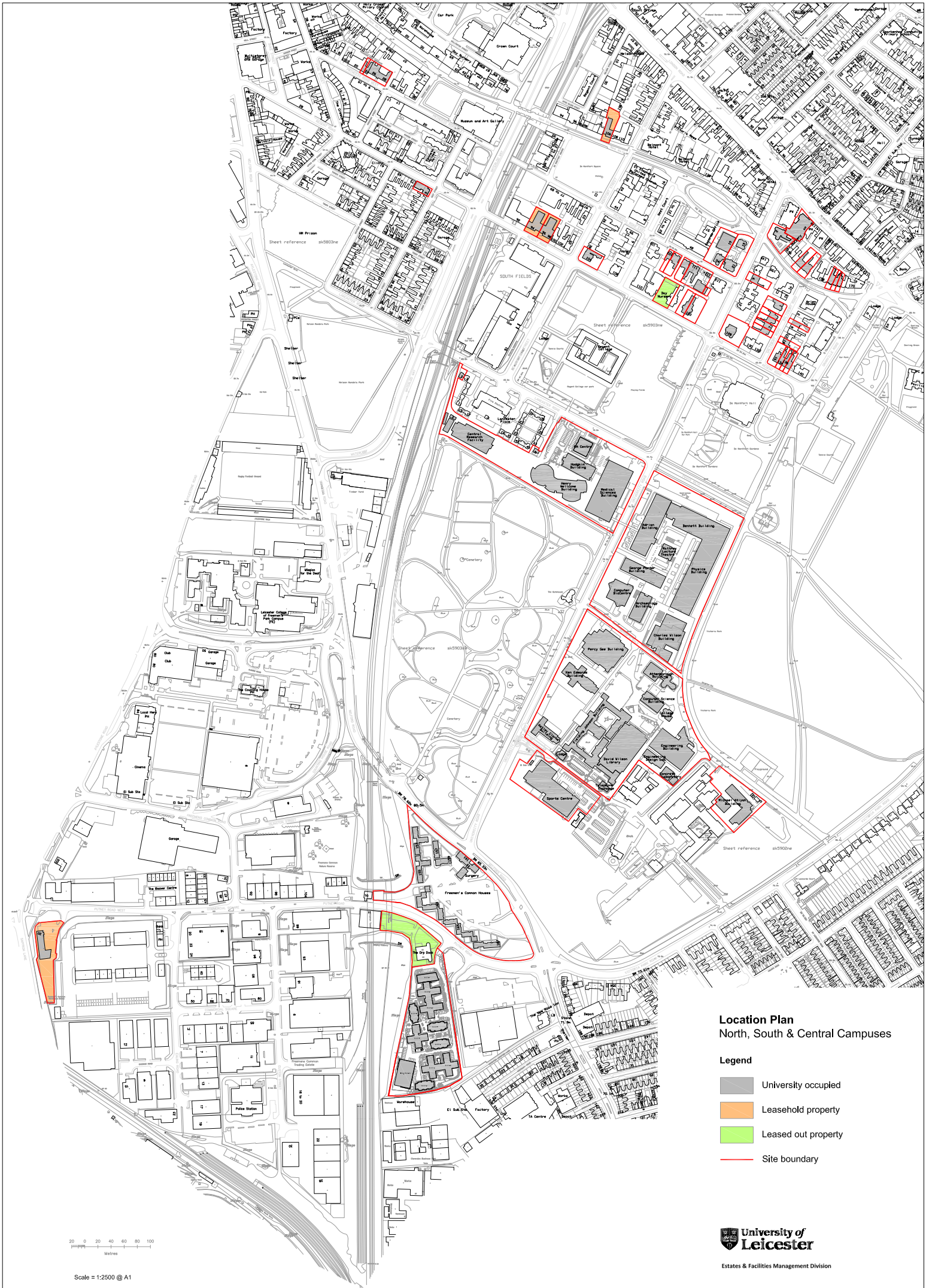
Appendix

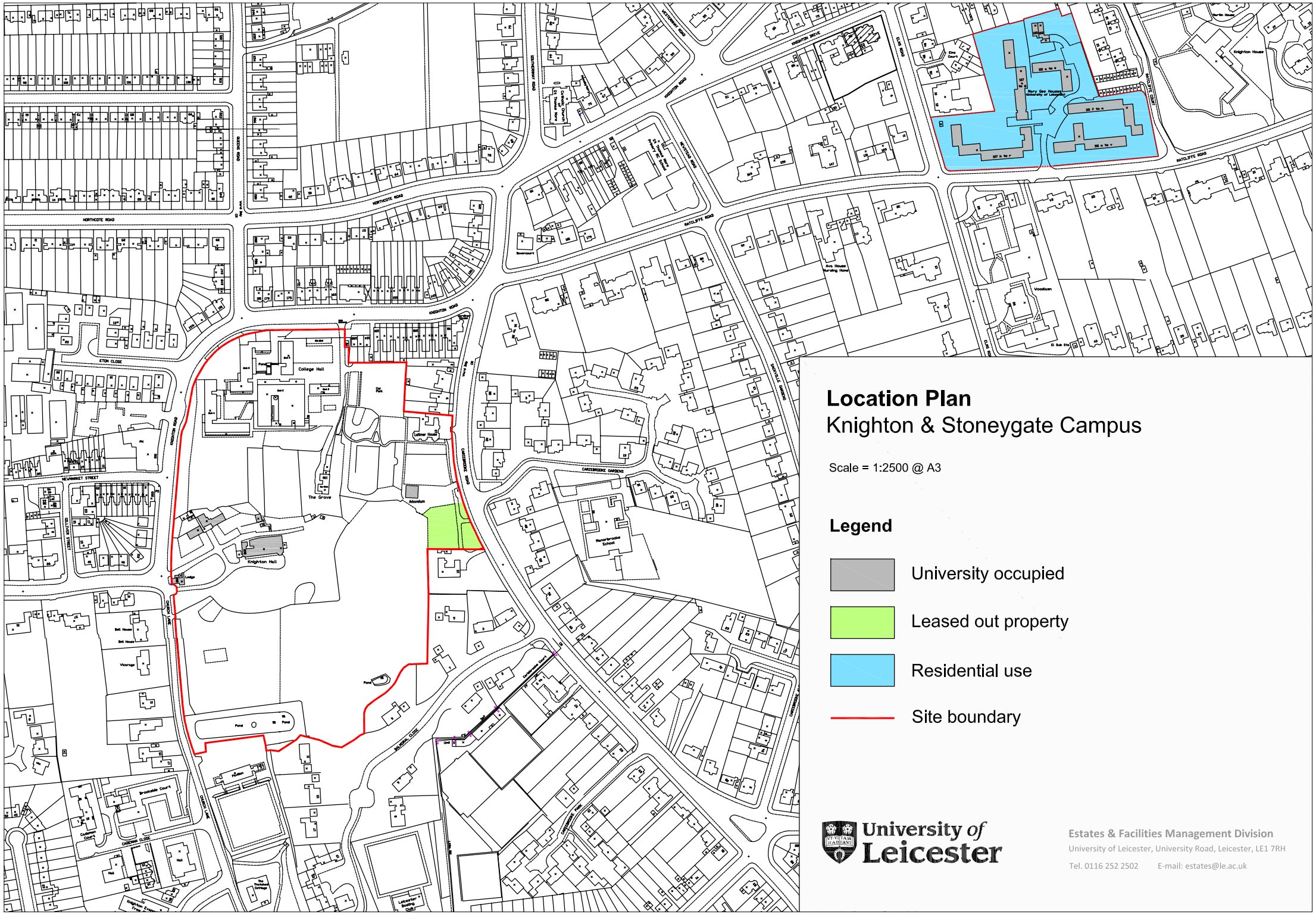
Appendix 1 – University of Leicester Estate

Figure A1.1 – Central, North and South Sites

Figure A1.2 – Knighton and Stoneygat Sites

Figure A1.3 – Oadby Sites


Location Plan
North, South & Central Campuses
Legend
University occupied
Leasehold property
Leased out property
Site boundary
University of Leicester
Estates & Facilities Management Division
Scale = 1:2500 @ A1
August 2012
20 0 20 40 60 80 100
Metres



Location Plan

Knighton & Stoneygate Campus

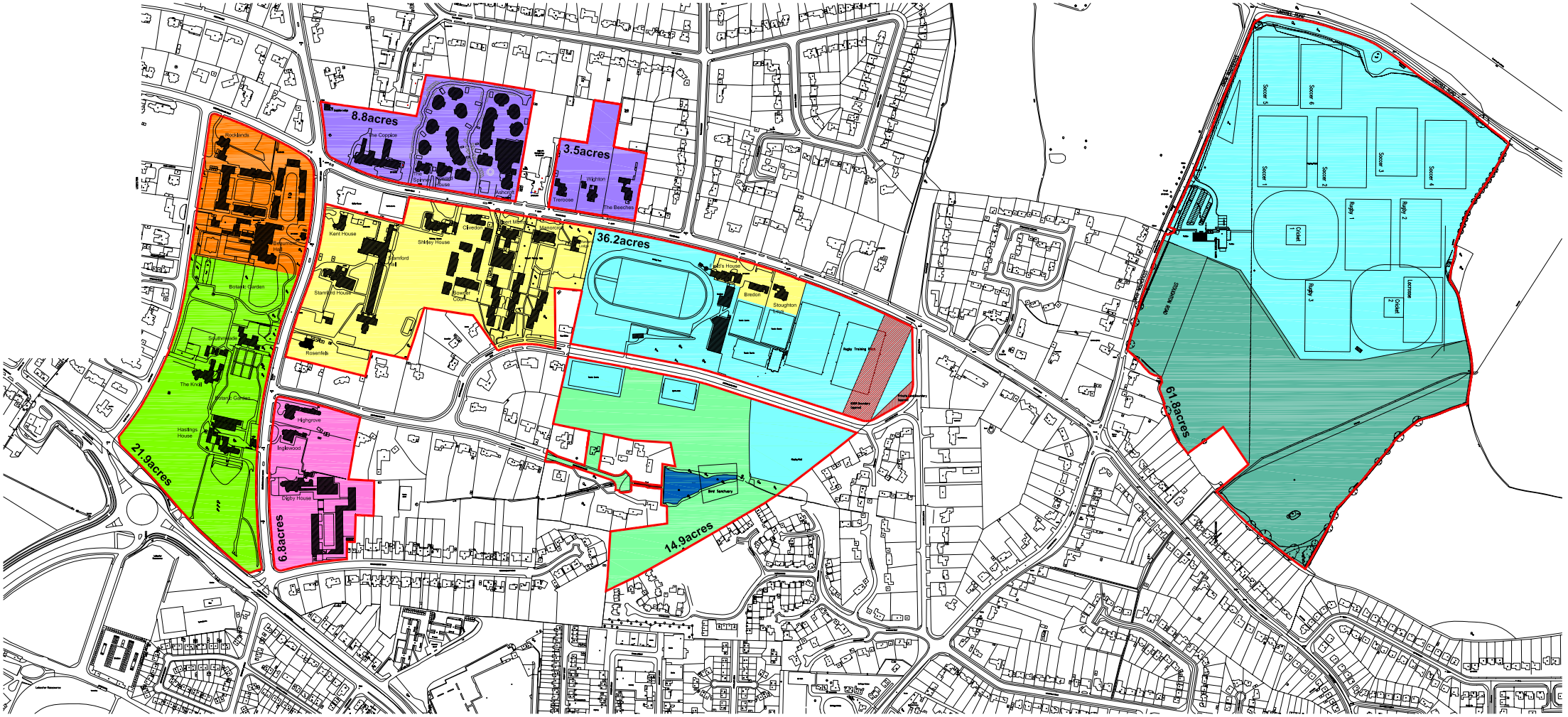
Scale = 1:2500 @ A3

Legend

- University occupied
- Leased out property
- Residential use
- Site boundary

University of Leicester

Estates & Facilities Management Division
University of Leicester, University Road, Leicester, LE1 7RH
Tel. 0116 252 2502 E-mail: estates@le.ac.uk



Oadby Campus - Land Holdings

Total area = 153.9acres

August 2012

Appendix 2 - Successes from the Previous Carbon Management Plan

The list below highlights the success that the University has had during the first CMP.

Overall

- The Plan has assisted the University to understand carbon management concepts and impacts based on University activities.
- There have been four Switch Off campaigns conducted since September 2007.
- Several building refurbishments have been completed between 2007/08 and 2010/11, which included urinal controls to reduce water consumption.
- Improvements have been made to the Building Management System as a result of appointing a dedicated Building Controls Engineer.
- A new waste management system has taken recycling levels from 3% in 2007 to over 80% in 2012.
- As part of the capital project for new build and major refurbishments, the University has invested in low and zero carbon technologies such as biomass boilers, solar thermal, air source heat pumps and small scale photovoltaic and has planning permission to build its first Passivhaus building.

2007/8

- The Attenborough Windows upgrade project was completed.
- The University's first Environmental Sustainability Policy was signed off by the Vice-Chancellor.

2008/9

- The University's Environmental Sustainability Strategy was developed.

2009/10

- The University Travel Plan was completed.
- Water saving measures were identified and implemented as part of a large scale water audit.
- The installation of Automated Meter Reading System was completed in non-residential properties.
- The University secured £1 Million HEFCE-Salix Revolving Green Fund (RGF) for small-scale energy efficiency projects.

2010/11

- The University signed up to the Leicester City Council's District Energy Scheme.

2011/12

- The installation of Automated Meter Reading System in residential properties was completed.
- The University achieved the Carbon Trust Standard based on a 7.2% relative reduction in emissions.
- The University achieved Carbon Saver Gold Standard based on a 2% absolute footprint and 5.4% relative reduction.
- The University secured £492k HEFCE RGF2 funding for small scale energy efficiency projects.

2012/13

A full progress is detailed in the annual report. Below list provides a summary of highlights.

- 2% absolute carbon reduction.
- Heating and Cooling Policy approved.
- Leicester District Heating Scheme CHP was commissioned and in operation from 1st October 2012.
- £207K was invested in boilers and LED lighting.
- RGF 2 funds were spent before 31st Jan 2013 as per the funding requirement.
- Completed installation of automated meter reading system at residential buildings.
- Student projects were completed on calculation the University carbon footprint for IT and procurement.
- Go Green Week switch off campaign led by students saved 5% energy during the week at Percy Gee Building.

- 91% recycling rate achieved.
- 3% reduction in people driving to work alone and 60% increase in cycle parking on campus.
- University partners with Sainsbury's on the water saving offset scheme.

2013/14

A full progress is detailed in the annual report. Below list provides a summary of highlights.

- 367 tonnes of waste being recycled.
- Emissions from procurement reported for the first time.
- Absolute emissions decreased by 3%.
- 2% of energy is from low or zero carbon source.
- 13% reduction to total water consumption across the University.
- 7 electric vehicles with 2 charging points launched to measure air quality around Leicester.

2014/15

A full progress is detailed in the annual report. Below list provides a summary of highlights.

- 37% of the University heat is produced by renewables or low carbon energy.
- The University's Centre for Medicine building commence construction. This building is built to Passivhaus standard.
- CRC emissions down by 7.6% compared to 2013/14, which is approx. 2,319 tonnes savings.
- 750 tonnes of CO2e saved from re-use furniture scheme.
- Single occupancy cars to the University sites have been reduced to just 37%.
- 200 trees planted at Stoughton Road playing fields.

Carbon Emissions since the 2004/05 Baseline

The figure below shows the carbon map of the University since its baseline year, 2004/05.

Appendix 3 - Lessons Learnt from Previous Carbon Management Plan

On reflection regarding the development and implementation of the previous CMP, the following items were taken into consideration while writing the new CMP.

Carbon Reduction Road Map to Achieve Target:
A clear breakdown of the carbon baseline for buildings and activities etc. needs to be established as part of the carbon strategy. In the previous CMP, projects were well defined but less detail was given on the carbon impacts. To overcome this, opportunities and carbon impacts need to be the focus and a continuous structured audit system will need to be put in place to identify projects that will reduce and maintain the carbon impact. The project plan in the previous CMP was defined in terms of numbers of projects and delivery dates but not in terms of financial commitments – greater detail is necessary in the new CMP.

Previous 2020 Carbon Emissions Target:
A 60% carbon emission reduction was set under the published 2010 Environmental Sustainability Strategy. This target was one of the most ambitious amongst UK Higher Education Institutions (HEIs) to assist the UK and HEFCE's reduction target of 34% before 2020 in line with the Climate Change Act. The logic behind this ambitious target was, Leicester had access to its utilities data from 1990 and as such the 60% target is based on actual increases in carbon emissions as opposed to an extrapolation or guesswork.

The University's total scope 1 and 2 emissions in 1990 were approximately 21,754 tonnes of carbon dioxide (CO_2). Since then the University has grown and as a result emissions have increased by 25.8% against 2004/05 (29,233[13] tonnes of CO_2). In order to meets HEFCE's reduction target of 34% against 1990 levels by 2020, the University would need to reduce carbon emissions by 59.8% by 2020.

The University has gained a better understanding of its carbon emissions based on its activities. It would be therefore sensible to ensure the 2020 and future targets are set realistically to the University of Leicester.

Better Communication and Feedback Systems:
Over the life of the previous CMP, there was not enough detailed information fed back to the project board and sponsor. The communication process to the board and other stakeholders needs to be improved. The 'value at stake' will need to be re-visited through continuously re-assessing the business case over the life of the project.

Strategy and Ownership of the Plan:
There was buy-in from the senior management team regarding the CMP. However, the CMP did not fit in with the Higher Education (HE) strategy as there was no strategy at the time. The old CMP identified stakeholders but responsibilities were not delegated to help achieve carbon reduction. There was also no direct ownership of the carbon reduction target.

Financial and Personnel Resources:
There was less achieved in the previous CMP than should have been but this was mainly due to lack of financial and personnel resources. Funding was not in place, which will need to be reviewed and addressed under the new CMP.

[13] The University re-baselined emissions using DEFRA guidelines during 2016/17.

Appendix 4 – Further Information on the University of Leicester's Carbon Emissions

University Emissions Overview

Table A4.1 provides a description of carbon emissions:

Scope	Description	Data Source	Inclusion in baseline and target
Scope 1: Direct emissions	Emissions from energy use: fossil fuel (gas, coal, oil) combustion	Estates Management Reporting (EMR), invoices, manual and automated meter reads.	Mandatory
Scope 2: Electricity indirect emissions	Emissions from electricity use		Mandatory
Scope 3: Indirect unregulated emissions	• Business travel • Commuting • Supply chain (procurement) • Waste • Water	Estates Management Reporting (EMR), invoices, manual and automated meter readings. Cooperative Management data. Travel questionnaire. Purchasing Annual Returns Database (ARD) data.	Optional. Not included in 60% target. There are baselines set for water and waste.

Table A4.1: Scope 1 and 2 Carbon Emissions

Note: Appendix 4 shows the CO_2 conversion factors used to calculate CO_2 for the different sources. It is important to note that carbon conversion factors change from year to year.

Scope 1 and 2 emissions

Figure 6 shows an increasing trend in CO_2 emissions in non-residential and residential buildings. There are several reasons for this increasing trend such as the activity in each individual building varying from year to year, the addition of new buildings and increases in the number of staff and students, turnover, etc.

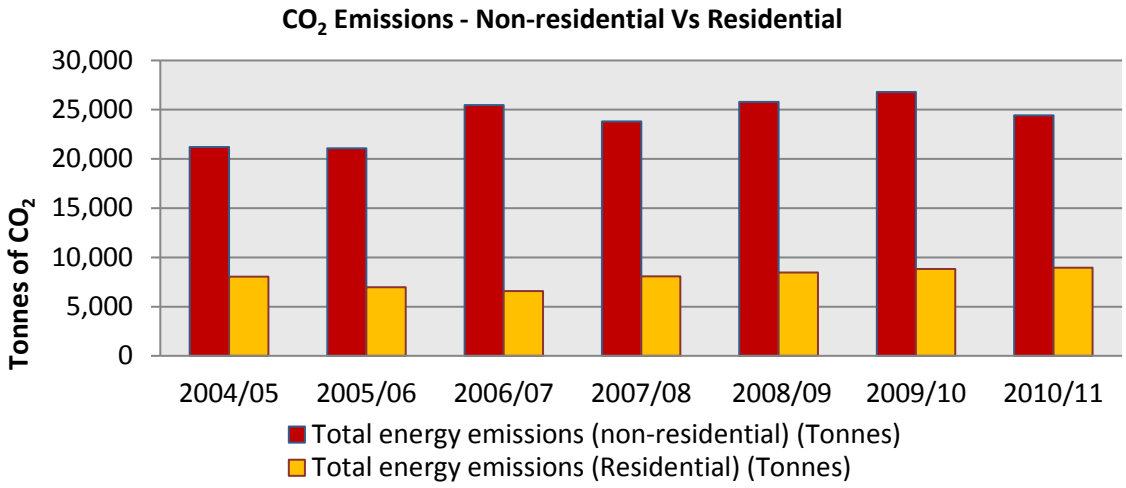


Figure A4.1: CO2 Emissions for Non-residential and Residential Buildings

Case study example – University-owned vehicles

The same trend is observed for CO_2 emissions from the University-owned vehicles due to the increased number of vehicles.

A detailed breakdown of the fleet and individual department fuel performance can be found in Appendix 5. The results show that between 2009 and 2011:

I) Fuel consumption from the fleet increased by 15% from 33,500 litres a year to 38,600 litres.
II) Annual carbon emissions rose by 15% from 89,637 $kgCO_2e$ to 103,203 $kgCO_2e$, amounting to an additional 13,556 $kgCO_2e$ emitted into the atmosphere.
III) Annual fuel expenditure rose by 28% from ca. £39,000 to ca. £49,700, amounting to an additional cost of £10,700 a year.
IV) Horticulture and VIP travel were the largest single consumers of fuel, accounting for 40% of total fuel consumption.
V) Six of the nine departments increased their fuel consumption, while three decreased.

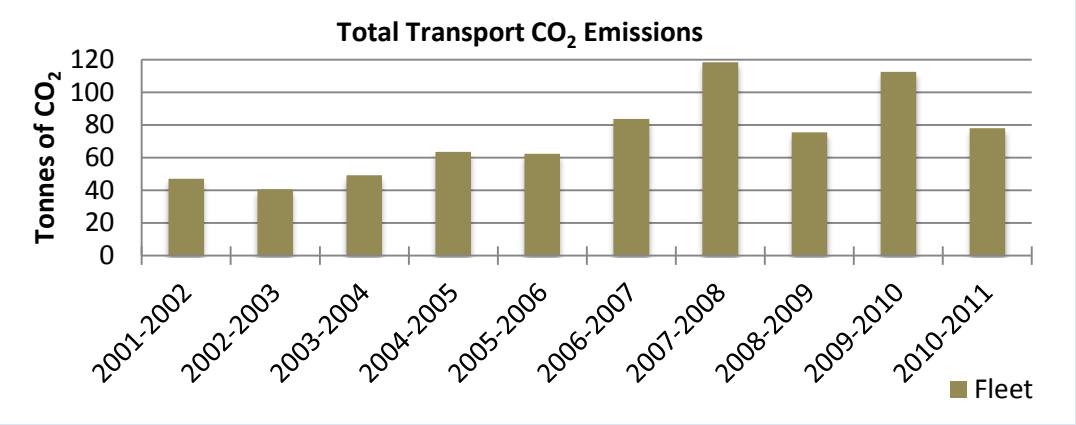


Figure A4.2: Total CO_2 Emissions from Transport

Scope 3 Emissions

HEFCE has recently published guidelines on how to monitor and measure Scope 3 emissions for waste, water, travel and procurement. Measures are currently being put in place to calculate more accurate Scope 3 emissions for the University. Data to be collected are summarised in Appendix 6. This will be produced as an addendum to this Carbon Management Strategy.

Case Study Example – Water use

Data collected on waste and water use show the same trends of increasing emissions and associated costs:

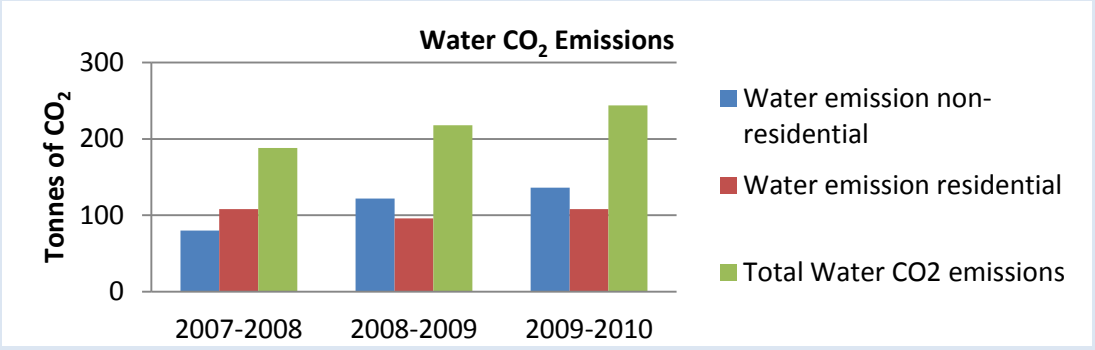


Figure A4.3: Total CO_2 Emissions from Water

Emissions per Activity

The University's day-to-day activities and its carbon emissions are inter-related. An understanding of activity-related emissions would help to monitor and manage the emissions and help the University to conserve energy and save on energy and carbon costs. Activities can be any number of things including: Information Communication Technology (ICT) (figure A4.4), Sports (figure A4.5), Gardens (figure A4.5), Library (figure A4.5) and Students' Union (figure A4.5).

Case Study Example – ITC equipment

A recent student led project[1] at the University identified the carbon impact associated with the University's ICT equipment. Figure A4.4 shows the energy consumption and carbon emissions associated with different types of ICT equipment at the University.

Category	Annual Energy Use (kWh)	%	Annual Energy Cost (£)	Carbon Emissions ($kgCO_2$)
HPC	**870,772**	9.0%	104,493	456,824
Servers	**4,326,836**	44.7%	519,220	2,269,945
PCs	**2,178,300**	22.5%	261,396	1,142,780
Networks	**2,008,572**	20.7%	241,029	1,053,737
Telephony	**65,788**	0.7%	7,895	34,513
Imaging	**182,872**	1.9%	21,945	95,938
AV	**49,576**	0.5%	5,949	26,008
TOTAL	**9,682,715**	100%	**1,161,926**	**5,079,746**

Figure A4.4: Carbon Footprint of ICT Equipment (SusteIT tool by thorough method)

It should be noted that the data used for this project were based on total cost of ownership (TCO)[1] study carried out in 2008 for the University's IT Services. Whilst it does not give current precise numbers, it gives a picture of emissions related to the University's ICT equipment controlled by IT Services. It was found that the carbon footprint for the University's ICT equipment is approximately 5,080 tonnes of CO_2 per year when estimated using the thorough method of the SusteIT tool[1]. These emissions correspond to approximately 22.1% of the total non-residential carbon emissions (Scope 1 & 2) reported under Estates Management Reporting for 2010/11.

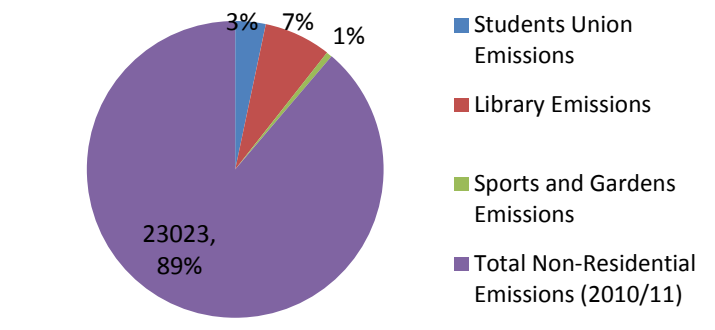


Figure A4.5: 2010/11 Carbon Emissions (Tonnes of CO_2) Related to Activities

[1] The University commissioned KPMG to carry out a study on the total amount of resource the University currently invests in its IT facilities and the support and delivery of its IT services. The study also looked at the costs of IT across all parts of the institution (Understanding the Total Cost of Information Technology at the University of Leicester - Briefing Note for Staff).

[2] SusteIT Tool is a toolbox produced by SusteIT project, which has tools to assist energy/carbon calculations for IT related energy consumption.

Appendix 5 – Further Information on Emission Baseline and Trends

Carbon Conversion Factor

Carbon Conversion Factors ($kgCO_2/kWh$)	2004 /05	2005 /06	2006 /07	2007 /08	2008 /09	2009 /10	2010 /11	2011 /12	2012 /13
Gas	0.190	0.190	0.185	0.185	0.185	0.207	0.205	0.204	0.205
Electricity	0.430	0.430	0.527	0.543	0.543	0.543	0.539	0.482	0.491
Steam/hot water	0.190	0.190	0.185	0.185	0.185	0.207	0.205	0.204	0.205
Oil	0.270	0.250	0.251	0.251	0.252	0.265	0.268	0.268	0.270

Table A5.1: CO_2 Conversion Factor

		kg CO_2e per unit		
Emission Source	**units**	**2007/08**	**2008/09**	**2009/10**
Water supply	cubic metres (m^3)	0.276	0.300	0.340
Wastewater treatment	cubic metres (m^3)	0.693	0.750	0.700

Table A5.2: CO_2 Conversion Factor

Source – University Fleet

A recent audit looked at the fuel consumption for the whole fleet and each of the departments for the period 2009/10 to 2010/11, which is shown in Figure A4.1 and Table A4.3. 98% of the fleet fuel is diesel.

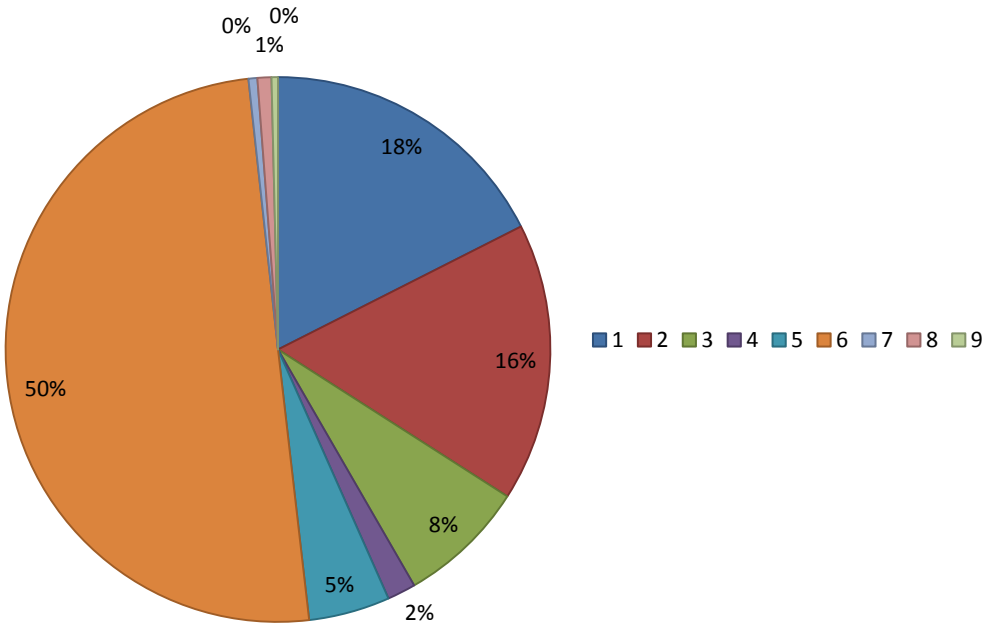


Figure A5.1: Fuel Consumption by Department (2009-2011)

		Fuel consumption (litres)			Carbon emissions $kgCO_2e$*		Fuel expenditure (incl VAT)		
Division/Dept	**Section**	**2009/10**	**2010/11**	**% change**	**2009/10**	**2010/11**	**2009/10**	**2010/11**	**% change**
Residential & Accommodation services (RACS)	Accommodation	2,339	1,835	-22	6,250	4,903	£2,742	£2,317	-15
	Catering	1,930	3,295	71	5,156	8,804	£2,188	£3,952	81
	Bookshop	1,920	1,411	-26	5,129	3,770	£2,243	£1,835	-18
	Total	**6,188**	**6,541**	**23**	**16,535**	**17,478**	**£7,173**	**£8,104**	**47**
Archaeology Department	Archaeology Department	1,774	930	-48	4,739	2,485	£2,028	£1,199	-41
	University of Leicester Archaeology Society (ULAS)	3,518	5,767	64	9,400	15,409	£4,264	£7,513	76
	Total	**5,292**	**6,697**	**16**	**14,139**	**17,894**	**£6,292**	**£8,712**	**35**
IT Services	AVS	2,167	3,347	54	5,789	8,943	£2,680	£4,264	59
	Total	**2,167**	**3,347**	**54**	**5,789**	**8,943**	**£2,680**	**£4,264**	**59**
Biology/Biomed Department		789	436	-45	2,109	1,165	£928	£568	-39
Estates (Property Services)	Electric	1,246	1,347	8	3,330	3,599	£1,409	£1,752	24
	Builder	0	498	na	0	1,331	£0	£644	na
	Plumber	65	340	423	174	908	£66	£419	535
	Total	**1,311**	**2,185**	**431**	**3,503**	**5,838**	**£1,475**	**£2,815**	**559**
Estates Facilities Services	Portering Total	2,566	2,385	-7	6,856	6,373	£2,997	£3,015	1
	Waste Total	459	608	32	1,226	1,625	£521	£787	51
	Post Total	1,518	2,376	57	4,056	6,349	£1,742	£3,061	76
	Security Total	3,362	2,795	-17	8,983	7,468	£3,799	£3,603	-5
	VIP Total	3,265	4,631	42	8,724	12,374	£3,710	£5,777	56
	Horticulture Total	5,299	5,098	-4	14,158	13,622	£6,018	£6,531	9
	Sports Total	782	1,201	54	2,090	3,209	£891	£1,523	71
	Total	**17,251**	**19,094**	**157**	**46,094**	**51,019**	**£19,678**	**£24,297**	**257**
Engineering Department		0	381	na	0	1,018	£0	£525	na
Library		**378**	**223**	**-41**	**1,010**	**596**	**£470**	**£294**	**-37**
Physics Department		**175**	**101**	**-42**	**468**	**270**	**£278**	**£120**	**-57**
TOTAL:		33,551	39,005	15%	89,647	103,203	£38,974	£49,699	28%

*conversion factor= 2.672 assuming a diesel fleet (diesel accounts for ca. 80% of fuel in 2011)

Table A5.3: Fuel consumption, carbon emissions and cost for University Fleet, August 2009-July 2011

Appendix 6 – Information on Scope 3 Data Collection

Travel Data Collection

Business Travel
Road vehicles

Information required	Data sources
*Fuel consumption *Fuel type Or Expenditure and, Fuel type / price Or Distance and Vehicle specification	Fuel card provider Fleet management software Lease, hire vehicle suppliers
Grey fleet:	
Vehicle specification details	driving licence checking procedures grey fleet business insurance checking procedures parking permit applications

* - preferred option

Air Travel

Information required	External data sources *(likely to be able to provide the most accessible and accurate sources of data)*
Flight distance Type of flight (short or long haul) Cabin class	Travel Management companies Self-booking tool Global distribution system Third party data analysts Expenses and subsistence systems
	Internal information systems
	Expenses claims Insurance records

Rail, taxi, bus and ferry travel

Information required	Data sources
Distance travelled Type of train /taxi/ bus (e.g. national rail, Eurostar, black cab, London bus)	Travel suppliers (see air travel) Expense claims (origin and destination)

Commuter Travel

Information required	Data sources
Home and term time residence postcodes Modes of travel by percentage Vehicle details	Travel surveys Car parking applications Student records Public transport operators

Supply-chain Data Collection

Data Categories:

- Business services
- Construction
- Food and catering
- Information and communication technologies
- Manufactured fuels, chemicals and glasses
- Medical and precision instruments
- Other manufactured products
- Other procurement
- Paper products
- Unclassified
- Waste and water

Data required:

- Expenditure data, which can be in two formats:
- ProcHE coded data from ARD supplier data
- The United Nations Standard Products and Services Code (UNSPSC) datasets.

Waste Data Collection

It has been proposed that a tiered approach is used for calculating carbon emissions from waste:
Basic approach: where waste data are very limited for both residential and non-residential properties.
Medium approach: where waste data and recycling data are available for non-residential and/or residential buildings.
Detailed approach: where good quality in-house waste data are available.

Information Required	Data Sources	Reporting Tier	Non-Residential	Residential	Construction
Recycled waste mass	Contractor	Detailed	✓	✓	✓
Food(biodegradable) waste mass (anaerobic digestion)	Contractor	Detailed	✓	✓	✓
Hazardous waste mass	Contractor	Detailed	✓	✓	✓
WEEE waste mass	Contractor	Detailed	✓	✓	✓
Radioactive waste mass	UoL Safety Services (in-house data collection)	Detailed	✓	✓	
Clinical waste mass	Contractor	Detailed	✓	✓	
Recycled waste mass composition	UoL Environment Team (in-house audits) and construction contractor	Detailed	✓	✓	✓

Water Data Collection

Automatic Meter Readings (AMR) provide more reliable data because they produce confirmed readings, rather than the estimates on which water utility company bills are often based. To improve the accuracy of water volume figures, manual meter readings should periodically be taken instead of only using estimates. It is not easy to calculate the sent for treatment unless it is monitored and metered. Utility companies often use estimates based on the volume of water supplied to calculate the volume of wastewater disposed of and treated. This varies, but is usually between 90 per cent and 95 per cent of the water use volume.

Information required	Data sources
Volume of water used Volume of wastewater produced	Utility company bill *Automatic meter readings (AMR)

* - preferred option

Appendix 7 – Regulated and Unregulated Energy Loads in Buildings

The table below shows the regulated and unregulated energy loads for selected buildings.

Regulated energy – energy consumption via fixed building services such as heating, cooling, hot water and internal lighting.
Unregulated energy – energy consumption via small power equipment/plug loads, servers, external lighting, etc.

		Electricity			Gas	
Building	**Electricity**	**Regulated Energy Loads (%)**	**Unregulated Energy Loads (%)**	**Gas**	**Regulated Energy Loads (%)**	**Unregulated Energy Loads (%)**
Archaeology and Ancient History	215,192	67%	33%	650,668	96%	4%
George Porter	1,943,847	56%	44%	2,279,567	81%	19%
Engineering	661,788	59%	41%	2,667,992	100%	0%
Maurice Shock Building	2,401,613	73%	27%	7,079,722	99%	1%
Ken Edwards	230,038	67%	33%	894,103	100%	0%
Attenborough	511,629	74%	26%	1,015,394	100%	0%
Bennett	847,738	55%	45%	3,271,171	96%	4%
Charles Wilson	1,369,128	26%	74%	2,090,974	94%	6%
Adrian	3,772,621	41%	59%	4,216,869	94%	6%
Total	11,953,594			24,166,460		

Table A7.1 Details of Regulated and Unregulated Loads in Buildings

Appendix 8 – Carbon Management Supporting Policies and Procedures

a) Sustainability Strategy and Plan
b) Vehicle Policy
c) Waste Management Policy
d) Water Management Policy
e) Heating and Cooling Policy
f) Travel Policy
g) Procurement Policy
h) Space Management Policy
i) University of Leicester Estates M&E Design Guide

Appendix 9 – Summary of the Carbon Emissions Reduction Plan

This is a live separate document. There are currently over 70 projects identified.

Actions	Predicted Annual Energy Savings (kWh)	Predicted Annual Energy Cost Savings (£)	Predicted Annual CO_2 Saving (tonnes)	Percentage of Predicted Carbon Savings against Identified
Capital Programme Refurb (MSB and CWB) (estimated savings 20%)	3,105,818	-	2,200	22.04%
Decarbonisation of electricity grid (Estimated 10%)	-	-	1,625	16.28%
Oadby - CHP/Biomass Scheme	-	£ 21,697.00	1,348	13.50%
Capital receipt of residential estate (based on 2015-16 carbon emissions)	2,990,829		663	6.64%
Building management systems and optimisation of controls (2.5%)			564	5.65%
David Wilson Library LED Upgrade	1,104,000	£ 112,000.00	496	4.97%
Behaviour change (Estimated 2.5%)			406	4.07%
Outsourcing of Catering	1,949,000	£ 78,978.00	397	3.98%
Revise Air Change Rates within all Areas in CRF based on agreed Scope of Works	97,243	£ 32,559.00	253	2.54%
Henry Wellcome – Fume cupboards set back and automatic sash closers	1,072,960	£ 40,343.00	232	2.32%
Henry Wellcome – LED lighting upgrade	385,840	£ 41,941.00	201	2.01%
Adrian -AS AN EXAMPLE: Isolate and Remove the Rooftop Greenhouses	581,298		152	1.52%
Henry Wellcome – Voltage Optimisation	287,467	£ 31,248.00	150	1.50%
Improve Loading on Steam Boiler and Install Stam to LPHW Plate Heat Exchanger - CRF	276,140	£ 7,010.00	137	1.37%
Adrian - Replace Windows	511,042	£ 26,789.00	94	0.94%
Residential Plant Room Insulation - 2017/18	478,001	£ 9,560.02	88	0.88%
Non-Residential Plant Room Insulation -2017	419,431	£ 13,270.73	70	0.70%
George Porter – Windows Upgrade	344,416	£ 18,000.00	63	0.63%
George Porter - Replace Existing Fume Cupboards with Variables Air Volume (VAV) System	292,664	£ 15,294.00	63	0.63%
Owned travel fleet			62	0.62%

Michael Atiyah Sub-station - Voltage Reduction		£	10,679.00	51	0.51%
Adrian - Replace Perimeter Heat Emitters	262,500	£	13,333.00	48	0.48%
CRF - PV	92,400	£	14,500.00	46	0.46%
Bennett - Replace Heat Emitters	221,729	£	11,299.00	41	0.41%
George Porter – Control Fume Cupboard Air-flow	174,678	£	9,375.00	39	0.39%
Beaumont Hall – TRVs	202,214	£	11,020.00	37	0.37%
Nixon Court Block J&K Pipe Insulation	187,773	£	4,994.76	35	0.35%
Ken Edwards - Insulate Exposed Radiator Pipework and Fit TRV's	179,250			33	0.33%
Calorifier and TRV Install - Fraser Noble Building	176,093	£	3,802.64	32	0.32%
MSB - Install 500m2 of Solar Photovoltaic (PV) Panels	60,000	£	9,722.00	27	0.27%
Adrian AS AN EXAMPLE: Reduce Temperature Set-point in Greenhouses	131,214			24	0.24%
Charles Wilson - Replace Perimeter Heat Emitters	130,054	£	6,750.00	24	0.24%
Bennett - Replace Existing Lecture Theatre Supply and Extract Ventilation Plant	113,669	£	5,725.00	21	0.21%
Rocklands – TRVs	109,328	£	5,958.00	20	0.20%
George Porter - Provide Individual Local Control to Fume Cupboards	87,407			20	0.20%
Archaeology – Windows Upgrade	100,491	£	5,250.00	19	0.19%
Bredon, Clivedon, Manor Croft, Hastings House and The Knoll - TRVs	98,253	£	5,406.00	18	0.18%
Archaeology - Upgrade Wall Insulation and Replace Heat Emitters	91,504	£	4,050.00	17	0.17%
Ken Edwards - Insulate Roof	85,000			16	0.16%
Attenborough - Fit TRV's to Finned-Tube Heaters	72,347	£	3,643.00	13	0.13%
Adrian - Fit Inverters to LTHW Distribution Pumps	29,484	£	1,641.00	13	0.13%
Attenborough Tower and Seminar Block - Fit TRV's to Finned-Tube Heaters	72,347	£	3,643.00	13	0.13%

Ken Edwards - Install Secondary Glazing	68,000	£	3,500.00	13	0.13%
Henry Wellcome - Lighting controls presence detection to corridors and lux level meters to stairs	22,502	£	2,446.00	12	0.12%
Ken Edwards - Cavity Wall Insulation	59,500	£	2,900.00	11	0.11%
				9,983	

Table A9.1: List of Energy Reduction Projects