



LEEDS
BECKETT
UNIVERSITY

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CARBON MANAGEMENT STRATEGY

2016-2021



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1. Introduction

This Carbon Management Strategy commits Leeds Beckett University to reduce its Scope 1 and 2 carbon emissions¹ by 34% against a 2005 baseline by July 2021. This is in-line with current government targets and guidance from the Higher Education Funding Council for England (HEFCE).

Over the reporting period 2012-2015 we achieved a 22% reduction in carbon emissions compared to a 25% target. These reductions were achieved through an investment of £2.4 million in energy projects over the last 3 years².

This strategy builds on the previous editions and supports the wider Estates Strategy for the university by;

- Procuring renewable energy sources
- Maximising opportunities for on-site electrical generation,
- Setting energy targets above that of building regulations for all new builds and refurbishments,
- Supporting maintenance improvements and building controls,
- Supporting city wide carbon reduction schemes,
- Behaviour change through the NUS Green Impact Scheme³,
- Ensuring the relevant finance is in place to support energy efficiency projects

The key sections of this strategy provide a performance update against the 2016-2021 targets, set new targets for the academic period 2016-2021 and details our plans to achieve these targets.

¹ Scope 1 emissions relate to carbon emissions that are produced or controlled by Leeds Beckett University. This includes all combustion on site from gas boilers and university owned vehicles. Scope 2 emissions relate to the generation of purchased electricity consumed by the university.

² Figures calculated using the Salix Finance methodology

³ National Union of Student Green Impact Scheme (<http://sustainability.nus.org.uk/green-impact>)

2. Performance 2010-2015

Our previous Carbon Management Strategies for the periods 2010 – 2012 and 2012 - 2015 set combined targets (table 1) to reduce our scope 1 and 2 carbon emissions by 25% by July 2015. Scope 3 emissions relating to travel and transport have not been included in this strategy as they are dealt with in our bespoke Transport Strategy.

Table 1 below amalgamates the targets set in the two strategies to give our performance over a five year period. Over this period, we achieved a 22% reduction in absolute carbon emissions.

This is still in-line with the Governments and HEFCE's recommendation of a 34% reduction by 2020.

TABLE 1 Interim targets and actual performance for scope 1 and 2 emissions 2010 to 2015

Year	2005 (baseline)	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Percentage reduction target (%)	0	5	10	15	20	25
Target emissions scope 1 & 2 (tCO2)	17,675	16,791	15,907	15,023	14,140	13,256
Actual scope 1 & 2 emissions (tCO2)	17,675	14,999	14,416	14,853	14,469	13,786

During this five year period we achieved significant emissions reductions due to enhanced monitoring of our data, improvements to our Building and Energy Management System (BEMS) and significant investment in energy efficiency measures. These investments over the last five years include, but are not limited to:

- A £30 million refurbishment project for our Portland and Calverley Buildings which improved the insulation and air tightness of the buildings from 1950 standards to modern building standards. This included the installation of LED lighting and LiGO lighting controls through all 20 floors.
- A £166,731 investment on the installation of Photovoltaic Arrays at our Headingley Campus
- A £250,000 investment in new highly efficiency boilers at our Headingley campus
- A £483,000 investment in an LED retrofit project at our Headingley Campus and Rose Bowl building
- A £1 million investment in a Combined Heat and Power (CHP) unit which produces electrical power as a by-product of heat generation for our Portland, Calverley, Woodhouse and Lesley Silver buildings.
- A £350,000 investment in upgrading the BEMS controls of our buildings ensuring air-conditioning operates when it is needed.
- A £20,000 investment to install evaporative cooling for our Uninterruptable Power Systems (UPS) room, reducing the electrical consumption of that room by 800,000 kWh per annum.
- Increase in the number of buildings included in the scheme.

3. Opportunities for savings

Energy Savings Opportunities Scheme (ESOS)

ESOS requires that 90% of a qualifying organisations energy use in buildings and transport has to be audited and a report submitted to the Environment Agency by the 5th December 2015.

We achieved this as over 90% of our estate is audited on an annual basis through the Display Energy Certificate (DEC) scheme. Our final report was submitted to the Environment Agency in October 2015, ahead of the required deadline.

The key findings of our ESOS report were:

- To conduct more in-depth energy audits for our top ten most energy intensive buildings
- To increase the number of buildings on half hourly meters to aid analysis of performance and to identify new energy projects
- To review current metering arrangements and identify areas that will benefit from further sub-metering

We are now preparing for the second phase of ESOS and will submit our second report to the Environment Agency in Dec 2019

Energy Audits

In December 2015 we instructed Arup to conduct full energy audits on our top ten most energy intensive buildings. A report was produced for each building covering the following headings:

- Data Analysis.
Including the production of monthly heating and power profiles over a 12 month period
- System and Document Review.

- c. Visual inspections.
To assess the condition of plant and systems.
- d. Findings and Recommendations

The recommendations for each of the buildings can be broadly summarised into the following three actions:

- a. Review and improve controls for heating and lighting through the management and improvement of the existing BEMS system
- b. Replace old lighting with LED
- c. Improve insulation to existing pipework

The energy efficiency opportunities identified through these audits are listed in the implementation plan in section 5 below.

On-site electrical and heat generation opportunities

In January 2016 Arup submitted a report which analysed the opportunities for heat and power generation at our Headingley Campus. The report assessed all available options using an Integrated Risk Matrix which prioritised options using the following criteria and weighting:

- a. Capital Cost 10%
- b. Simple Payback 100%
- c. CO₂ Reduction 100%
- d. Renewable Energy Contribution (% of campus energy) 40%
- e. Spatial Requirements 60%
- f. Technology/Fuel Availability 100%
- g. Ease of System Integration 70%
- h. Innovation/Demonstration Potential 25%

From the analysis the following options came out as the most preferable:

- a. Gas Combined Heat and Power (CHP)
- b. Solar Photovoltaic Arrays
- c. Solar Thermal Hot Water
- d. Air Source Heat Pumps (ASHP)

However, due to the listed building status for most of our buildings at Headingley and our recent investment in new gas boilers for each building, the report concluded that on-site generation opportunities are limited to solar photovoltaic arrays.

As a result, this puts significant emphasis on our maintenance, refurbishment and new build programmes to make our buildings as energy efficient as possible and to reduce or eliminate energy consumption at source.

New build and refurbishment projects

The Estates Strategy for the next five to ten years will increase the size of the estate by 20%, making further reductions in carbon emissions challenging. As a result, all new builds and refurbishments will have to achieve the highest energy efficiency ratings possible and include on-site generation where appropriate.

Our aim for the first buildings to go through the Estates Strategy is for them to be 10% more energy efficient (as a minimum) than current building regulations stipulate. This will make our buildings at least 35% more efficient than the same building built in 2010.

We will review this target on a project-by-project basis over the next five years to see if it can be increased. This review will form part of our commitment to the Government Soft Landings process which we aim to implement across all major projects.

4. Key Performance Indicators 2015-2021

KPI 1

Table 2 below details our targets for the next 5 years. Each target is set for the end of our financial year, which runs August-July.

TABLE 2 Interim targets and actual performance for scope 1 and 2 emissions 2015 to 2021

Year	2005 (baseline)	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Percentage reduction target (%)	0	27	29	31	33	34	35
Target emissions scope 1 & 2 (tCO ₂)	17,675	12,903	12,549	12,196	11,842	11,666	11,489
Actual scope 1 & 2 emissions (tCO ₂)	17,675	11,534	9,837	9,909	TBC	TBC	TBC

Note: Carbon figures revised from previous versions of the Carbon Management Strategy to reflect changes in DEFRA conversion factors for the periods 2005 – 2006 and 2010 - 2014

KPI 2

Each new build will reduce total predicted carbon emissions to 20% less than the Building Regulation Target Emission Rate.

This shall be evidenced at design work stages 3 and 4, through the production of a Building Regulation Part L accredited assessment and draft Energy Performance Certificate (EPC) at both stages. Further evidenced at construction work stages 5 and 6 with an "as-built" accredited assessment and final EPC.

KPI 3

Each new build will provide a minimum of 10% of the predicted energy needs of the development from decentralised, renewable or low carbon energy.

This shall be evidenced at design work stages 3 and 4, through production of a CIBSE TM54 calculation in order to predict the total energy needs of the building, which shall include both regulated and unregulated energy types. Note that this requirement cannot be satisfied by accounting for existing arrangements such as the city campus Combined Heat and Power unit or Half Hourly electricity supplies from renewable sources, the University requires new and additional initiatives as part of a new development.

This shall be validated at construction work stages 5 and 6 based upon "as-built" information.

5. Implementation Plan

The Estate Strategy for the next five to ten years looks to increase the size of the estate by 20%. This strategy looks to decouple carbon emissions from building works by focusing on seven key areas:

- a. Procurement of renewable energy
- b. Maximising opportunities for on-site electrical and heat generation,
- c. Setting energy targets above that of building regulations for all new builds and refurbishments,
- d. Supporting maintenance improvements and building controls,
- e. Supporting city wide schemes such as the Leeds City District Heating Scheme,
- f. Behaviour change through the NUS Green Impact Scheme,
- g. Ensuring the relevant finance is in place to support all energy efficiency schemes

Table 3 details the key initiatives to be implemented to reduce our carbon emission as per the targets set in KPI 1 above.

TABLE 3: Carbon Management Strategy - Implementation Plan

Initiative	Owner	Target Date
ENERGY PROCUREMENT		
To continue to procure 97% of all electrical energy from renewable sources	Sustainability Team, Procurement	Ongoing annual commitment
Investigate the credentials behind Green Gas and establish if it is feasible to procure as part of the current contract	Sustainability Team, Procurement with support from our current utility broker.	Complete. At this moment in time a certified green gas scheme does not exist.
ON-SITE ELECTRICAL AND HEAT GENERATION		
Install a photovoltaic array on the Carnegie Research Institute (CRI)	Sustainability Team and Projects	Achieved. The array is due to be installed in the first quarter of 2019
Conduct feasibility studies to install photovoltaic arrays on all new builds detailed in the Estate Strategy	Projects and Sustainability Team,	Achieved. Photovoltaic Arrays will be installed on both the Creative Arts and Carnegie Research and Teaching Facilities.
ENERGY PERFORMANCE OF BUILDINGS		
For all major building projects to be 10% more energy efficient, as a minimum, than current Building Regulations (Part L 2A and 2B) stipulate.	Projects, Sustainability Team and Maintenance with support from relevant design teams.	July 2021
Review actual energy performance of new and refurbished buildings against the design as part of the Government Soft Landings process	Sustainability Team, Projects and Maintenance	July 2021 (Project-by-project review).
MAINTENANCE AND BUILDING CONTROLS		
Support the development of the Metering Strategy to prioritise the replacement and installation of sub-meters for all utilities.	Maintenance and Sustainability Teams	July 2021
Provide analytical support to amend building controls and set points within the BEMS	Maintenance and Sustainability Teams	On-going with five year review in July 2021
Install movement and daylight dimming in all lighting circuits across the estate. Prioritise using energy data per building.	Maintenance and Sustainability Teams	On-going with five year review in July 2021
Revise heating system and controls and zones in Bronte, Headingley Campus	Sustainability Team and WSP (our Framework Electrical and Mechanical Engineers)	Complete. Due to the structure of this building we have not been able to support these changes.
Feasibility into increasing heating zone control in Carnegie Hall, Leighton, Macaulay, Caedmon and Priestley buildings.	Sustainability Team and WSP (our Framework Electrical and Mechanical Engineers)	Complete. Due to the structure of the buildings we have not been able to support these changes.
CITY WIDE SCHEMES		
Connect the proposed Creative Arts Centre to the Leeds City Council District Heating Scheme	Projects, Sustainability and Procurement with support from Leeds City Council	May 2020
Connect the existing Portland Combined Heat and Power (CHP) unit to the District Heating Scheme to increase operating times and maximise on-site electrical generation.	Projects, Sustainability and Procurement with support from Leeds City Council	Achieved. The CHP and six support boilers will be the primary heat source for the Creative Arts Building.
BEHAVIOUR CHANGE INITIATIVES		
Roll out the Green Impact Scheme across the university by increasing the number of green teas year-on-year.	Sustainability Team	Achieved. We have 11 Green Impacts teams. More teams to be recruited between now and July 2021.
FINANCIAL SUPPORT		
Whole Life Costing and investment appraisals for refurbishment and new builds	Projects, Sustainability, Maintenance and relevant Design Teams	July 2021
Continue to roll out heating and hot water controls for Halls of Residence inline with the UPP Sinking Fund. All projects to meet the Salix Recycling Fund ⁵ criteria.	Projects, Sustainability, Maintenance and relevant Design Teams	To be reviewed project-by-project
Identify projects listed in the Estates Strategy and Maintenance Investment Programme (MIP) that will qualify for the Revolving Green Fund (RGF) ⁶	Projects, Sustainability, Maintenance and relevant Design Teams	To be reviewed project-by-project
Identify projects listed in the Estates Strategy and Maintenance Investment Programme (MIP) that will qualify for the Salix Energy Efficiency Loans Scheme (SEELS) ⁷ .	Projects, Sustainability, Maintenance and relevant Design Teams	To be reviewed project-by-project

⁵ The Salix Recycling Fund aims to increase capital investment in energy efficient technologies across the public sector. It is a ring-fenced fund with capital provided by Salix, and matched by the partner organisation, to be spent on energy saving projects with paybacks of less than 5 years. The financial savings delivered by the projects are returned to the fund allowing further spending on front line services, hence the term 'Recycling Fund'.

⁶ The Revolving Green Fund is administered by Salix Finance Ltd on behalf of the Higher Education Funding Council for England (HEFCE). It is intended to accelerate investment in energy efficiency technologies, including on-site generation, which will reduce carbon emissions and create financial savings. The fund is an interest free loan paid back through the HEFCE grant over a period of 4 years.

⁷ The Salix Energy Efficiency Loans Scheme (SEELS) is an interest free loan paid back through savings generated through the investment in energy efficient technologies. This is different to the Recycling Fund as savings are not ring fenced for further projects and there is no requirement for match funding.

6. Governance and Reporting

The Director of Estates will be responsible for setting the strategic direction for the Carbon Management Strategy, agreeing the resources to be devoted to the Implementation Plan with members of the Senior Management Team and Estate Services Leadership Team (ESLT), reviewing progress against the Key Performance Indicators and reporting to the relevant group(s).

This strategy will be reviewed when there is any major change in government targets or policy change or a change in sector requirements.

Reports on progress towards the Key Performance Indicators and the Implementation Plan will be made to the university's Senior Management Team as and when relevant.

The Sustainability Manager will be responsible for developing and implementing the Carbon Management Strategy and producing interim reports.

Progress towards the energy targets will be reviewed monthly by the Estate Services Leadership Team to discuss trends and take immediate action where increases have been identified.

A performance report on the Carbon Management Strategy will be included in the Estate Services annual report which is a public document that is distributed to key stakeholders and interested parties.

7. Financing

Small projects – each project will be costed in terms of the total capital expenditure required (CAPEX), as well as the ongoing operating expenditure (OPEX) and a life-cycle perspective applied.

Larger projects – further assessment will be required where inflation and equipment amortisations are taken into account.

Projects will be prioritised on the basis of cost/affordability, energy and carbon reductions.

Projects will also be prioritised against the Estates Strategy, energy data and the university's condition survey.

A dedicated energy budget will be included in the yearly financial planning cycle. This will be supplemented by in year loan repayments from existing energy projects funded through Salix. Loan repayments are the savings from previous energy efficiency projects which are reinvested into new projects.

Refurbishment projects, implemented as a result of the condition survey, will include the cost of energy efficiency initiatives.

Energy efficiency will be built into maintenance budgets where relevant.

8. Related Documents

Estates Strategy

Leeds Beckett University Design Guide

Estates Financial Plan

ISO 14001 certification

Sustainability Policy

Estate Services Request and Project Definition process

Space Planning Policy

Transport Strategy

Space Temperature Policy

Maintenance Strategy