BUILDING RELATIONSHIPS.

The Courtauld Institute of Art Carbon Management Plan

Version

4

Report Date

17 April 2015

sustain

Watts.

Contents

Foreword from The Courtauld Institute of Art's Director

The Courtauld Institute of Art's mission is to:

Advance an understanding of art through access to world leading expertise and collections, exhibitions and debate.

To achieve this mission, The Courtauld Institute of Art will:

1. Give all students an experience that is consistently regarded as excellent
2. Take advantage of the potential of new technologies to support our Mission
3. Develop our public offer at the highest level of quality that increases our reputation and builds and extends audiences
4. Play a leading role in developing art history and conservation in dialogue with other fields of enquiry
5. Secure the sustainability of The Courtauld
6. Ensure the infrastructure of the estate and its facilities are fit for The Courtauld's needs

Whilst:-

Optimising the skills and talents of our staff and promoting a collaborative culture

In delivering the mission, The Courtauld Institute of Art (The Courtauld) acknowledges that it has a responsibility to the environment and commits, as far as reasonably practical, to promote protection of the environment and thus, minimise the impact of its activities upon the local, regional and global environment.

The Courtauld has already demonstrated this commitment by reducing its Scope 1 and 2 carbon emissions by 7% since 2011/2012 and by committing to the measures outlined in this Carbon Management Plan, carbon emissions will be reduced further in-line with the targets conveyed within this Plan. The Courtauld acknowledges that it has a duty to act in a socially responsible manner and that its reputation will be increasingly linked to the progress made with meeting the targets outlined.

To achieve a reduction in Scope 1 and 2 carbon emissions will be a significant challenge for The Courtauld given its occupation of a Grade 1 listed building[1] and the necessity to maintain particular environmental conditions (with corresponding high associated energy usage and carbon footprint) with regards to safeguarding The Gallery's art collection that is of both national and international importance. Reducing our Scope 3 emissions will also

[1] See Appendix H for further details on the North Block's status and fabric

be challenging particularly in the context of expanding our outreach work including the loaning of artwork both nationally and internationally.

However, The Courtauld believes that reductions in energy use and the refinement of our business processes can be made without compromising operational requirements, by using both tried and tested approaches and innovative solutions, including partnership working and collaboration. This will not only support environmental improvements but improve our reputation and operational costs.

To achieve the reduction targets set out in this Plan will not only require continuing management and monitoring of our performance, but more importantly the ongoing commitment of our staff and students including the support of our key suppliers and service providers.

The Courtauld will continue to assess and implement energy saving initiatives that require minimal investment over the next two years (2015/2016 and 2016/2017) whilst ensuring those requiring more substantial investment and thus, longer payback periods are embedded and delivered through the *Courtauld Connects* project, due to complete in 2020.

The combination of delivering the energy saving measures, implementing changes to business processes and fostering a culture of behavioural change will collectively support The Courtauld to make a difference.

This Carbon Management Plan is approved by The Courtauld's Director and Senior Management Team with operational implementation of the Plan delegated to the Director of Operations and Facilities Manager. All our staff, students, key suppliers and service providers are required to support this Plan and thus, contribute to The Courtauld's future sustainability, both in terms of our mission and the targets set out in this Plan.

Professor Deborah Swallow
Märit Rausing Director

April 2015

Foreword from Watts Group and Sustain Limited

The Courtauld Institute of Art commissioned The Watts Group with its partner, Sustain Limited in November 2014 to work with The Courtauld's Facilities Manager to:

- Develop a new Carbon Management Plan (CMP) for energy (electricity and heating fuel) related carbon emissions to demonstrate progress against HEFCE's requirements;

- Identify through the development of the CMP implementable carbon reduction measures to 1) support a general reduction in energy usage and 2) embedding of appropriate environmental performance measures into the *Courtauld Connects* project and The Courtauld's wider business activities;

- Provide benchmark comparisons for The Courtauld's performance for electricity and heating fuel consumption against similar sized Higher Education institutions and Art Galleries;

- Provide an estimate of Scope 3 (supply chain) carbon emissions for The Courtauld to meet HEFCE's minimum requirements on Scope 3 reporting (i.e. water, waste, procurement and business travel) and identify material categories;

- Review and provide a gap analysis and recommendations on how to improve The Courtauld's Environmental policy and carbon reduction management maturity to support The Courtauld achieving progress in reducing carbon emissions in line with HEFCE's requirements;

The Watts Group and Sustain Limited have welcomed the opportunity to work with The Courtauld to develop this CMP which provides The Courtauld with a clear direction for carbon emissions reduction over the next five years to meet the reductions targets as set out in this Plan.

By taking a strategic approach to carbon reduction The Courtauld is able to put in place recommendations and set key objectives that enable The Courtauld's Senior Management Team to plan for the future.

The Watts Group and Sustain Limited are both supportive of The Courtauld in its ongoing implementation of carbon management and efforts to reduce carbon emissions.

Watts Group / Sustain Limited

April 2015

Executive Summary

The purpose of this Carbon Management Plan is to provide The Courtauld Institute of Art (The Courtauld) with a clear direction for managing carbon emissions over the short to medium term to meet the reduction targets as set out in this Plan. By taking a strategic approach to carbon reduction The Courtauld is able to put in place recommendations and, set key objectives enabling its Senior Management Team to plan for the future.

The Courtauld is also undertaking a master planning exercise, *Courtauld Connects*, which is specific to its occupation of the North Block of Somerset House to identify what needs to be done to support the transformation of this Grade 1 Listed Building over the next five years.

The Courtauld is facing an increasing need to proactively manage its energy usage and associated CO_2 emissions for the following reasons:

- National carbon reduction targets
- Sector carbon reduction targets
- Introduction of Carbon Tax, i.e. Carbon Reduction Commitment (CRC) scheme
- Introduction of Display Energy Certificates (DEC's)
- Building Regulations and local planning targets
- Construction industry targets

Working with The Courtauld's Facilities Manager, the Watts Group with its partner, Sustain Limited, were commissioned to:

- Develop a new Carbon Management Plan;
- Provide a benchmark comparison for The Courtauld's performance for electricity and heating fuel consumption;
- Provide an estimate of Scope 3 (supply chain) carbon emissions;
- Review and provide a gap analysis and recommendations on how to improve the existing Environmental policy;

Through a combination of several site surveys, discussions with key stakeholders[2] and desk based analysis it has been found that:

- The benchmark comparison of The Courtauld against Chartered Institute of Building Service Engineers (CIBSE) benchmarks show that the North Block uses more electricity but less gas than a typical museum or art gallery and Duchy House uses both less gas and electricity than a typical hall of residence.

- The current[3] annual energy (electricity and gas) cost and related carbon emissions at The Courtauld are approximately £160k and 734 tonnes of CO_2e respectively. Despite current energy price reductions, this cost is set to increase due to 1) the expected rises in gas and electricity costs and the general level of uncertainty that

[2] Stakeholders consulted were The Courtauld Facilities Manager; The Gallery Chief Conservator; Somerset House Trust Property Manager; BMS maintenance company;
[3] For the year 2013/2014

surrounds the availability of these resources; and 2) demands from students for 24/7 learning facilities.

- A range of operational and short payback energy efficiency measures have been identified[4] which could currently save around £50k per year and 229 tCO_2e for an estimated capital cost of around £171k[5] i.e. a pay-back period of three and a half years.

- Key energy efficiency measures identified include lighting, heating and ventilation improvements.

- The Courtauld has set the Scope 1 and 2 baseline year as 2011/2012 year, which is 792 tCO_2e. Thus the 43% reduction target emission as required by the Higher Education Funding Council for England (HEFCE) is to achieve a level of 451 tCO_2e by 2020.

- The implementation of the energy efficiency measures outlined in this Plan, will it is estimated reduce Scope 1 and 2 carbon emissions by 245 tCO_2e (31%) compared to the baseline year of 2011/2012.

- Implementation of the measures outlined combined with savings of 7% made in the two years since the baseline year will achieve an overall reduction of Scope 1 and 2 carbon emissions of 301 tCO_2e by 2020, approximately 40 tCO_2e short of the required HEFCE target.

- The assessment of the carbon reduction management maturity within The Courtauld, using an industry adopted maturity matrix, has suggested that despite a number of energy management activities, energy and carbon reduction is not integrated into the core business processes of The Courtauld.

- A review of The Courtauld's current Environmental Policy suggests that the policy compares well against peer policies reviewed. However in developing this Plan a refreshed and update Environmental Policy has been incorporated.

- The refreshed Environmental Policy now supports The Courtauld in achieving carbon reduction progress against HEFCE targets. It is also more clearly defines policy ownership, reduction targets definition, policy review cycle and the definition of a policy implementation mechanism and action plan.

- The Courtauld's total carbon emissions for the academic year 2013/2014, (August to July), were 3,808 tCO_2e for all business activities, including Scope 3.

- The dominant Scope is Scope 3 representing emissions from Procurement, Business travel (staff, students and goods in and out), Commuting, Water and

[4] See Tables 7, 8 and 9

[5] Of which £43,472 would be eligible for Salix Funding see Tables 7,8 and 9

Waste with 81% of the total footprint or 3,074 tCO_2e. This figure does not include the emissions associated with the products and services of The Shop (operated by the subsidiary Samuel Courtauld Trading Enterprises (SCTE)) and the products and services associated with the on-site catering facilities (provided by the catering company Leafi Food Development).

- Electricity consumption (Scope 2) is responsible for 15% of the total footprint or 558 tCO_2e. Heating fuel (Scope 1) is responsible for 4% of the total footprint or 176 tCO_2e.

- Procurement of goods and services is the dominant category with 2,261 tCO_2e or 73% of the total Scope 3 emissions.

- Business travel (staff and students) is responsible for the bulk of the remaining Scope 3 emissions with 670 tCO_2e or 22% of the total Scope 3 emissions.

- Commuting represents 123 tCO_2e or 4% of the total Scope 3 emissions.

- Waste and water are not significant sources of emissions for The Courtauld.

- Within the Procurement category of Scope 3 emissions, Goods Travel In and Out is the dominant category with 1,256 tCO_2e or 56% of the total Procurement category emissions. The travel of Goods In and Out represents primarily the loaning of artwork in and out The Gallery.

- The calculation of Scope 3 emissions data in this Plan represents an initial baseline for this Scope. The baseline calculation for Scope 3 will be reviewed in 2016/2017 following improvement and experience in data collection and management for the material categories i.e. Business travel and Goods Travel In and Out during the period 2014/2015 and 2015/2016.

- In the meantime, a target reduction of 10% by 2020 against the baseline will be aimed for. The Scope 3 category of Goods Travel In and Outs and Printing and Stationary will be targeted for improvements and reduction. The suppliers (e.g. Constantine) for these services will be engaged through The Courtauld's Environmental Policy to provide regular detailed records on activities/services provided to The Courtauld (e.g. detail of travel, destinations, transport modes…etc). Details of suppliers' commitments and actions to reduce their own environmental impact will also be obtained.

1.0 Management Summary

Sustainability is an important factor in everyday life and climate change is something that impacts everyone's lives, whether they realise it or not, from extreme weather events to changes within the work place. All levels of society are making big and small changes to reduce their carbon emissions and thus, reduce the release of greenhouse gases into the atmosphere. The need to reduce carbon emissions is one that must be met by all.

The 2008 Climate Change Act set legally binding carbon reduction targets for the United Kingdom (UK). The Act sets out a framework for an 80% reduction in green house gas emissions by 2050 from1990 levels, with interim targets of 35% by 2020 and 50% by 2025.

In response to the Act, the UK government made a commitment to reduce carbon emissions by 34% by 2020 and an 80% reduction by 2050 (measured against a 1999 baseline).

The then Department of Innovation, Universities and Skills identified the need for Higher Education Institutions (HEIs) in England to play a part in meeting the national emission reduction targets and implemented a reduction strategy for the sector in 2010/2011 which through the Higher Education Funding Council for England (HEFCE) requires all universities to:

- Reduce Scope 1 and 2 carbon emissions by 43% by 2020 and 83% by 2050, on a 2005 baseline rather than 1990.
- Set their own targets for 2020 and in doing so to develop Carbon Management Plans (CMP) and to report on progress and results

In addition from 2011, HEFCE has linked capital funding to performance against CMP's.

The Courtauld Institute of Art (The Courtauld) is committed to reducing its carbon emissions by making continual improvements to the premises it occupies which include the North Block of Somerset House, part of the first floor of the New Wing of Somerset House and Duchy House (a Hall of residence) including its' business processes to meet the carbon emission reduction targets outlined in this Plan.

1.1 Objective

The objective of this CMP is to set out how The Courtauld will monitor and manage the amount of carbon emissions generated from operating the premises it occupies and its business activities. In doing so, this Plan outlines measures The Courtauld intends to implement to support a reduction in Scope 1 and 2 carbon emissions (arising from electricity and heating fuels) by 2020 including setting targets against which reductions in Scope 3 carbon emissions will also be measured and reduced.

This Plan therefore confirms how The Courtauld manages and measures carbon emissions arising from operating its premises and all of its business activities in addition to highlighting projects to be implemented and targets against which performance will be measured and benchmarked. Both Government and HEFCE targets ensures continual

improvements are made to lowering the total amount of carbon emissions generated by The Courtauld.

1.2 Drivers

The necessity for this Plan is driven by the need for The Courtauld to proactively manage its energy usage and improve business processes associated with carbon emissions for the following reasons:

- *National Carbon Reduction targets*: The UK Government has committed to reduce the nation's carbon emissions by 80% by 2050. This has led to a cascade of carbon reduction targets across the public sector including The Higher Education Funding Council for England (HEFCE);

- *Sector carbon reduction targets*: The most immediate carbon reduction target set by the HEFCE is a reduction in energy related (electricity and heating fuel) carbon emissions of 12% by 2012, 29% by 2017 and 43% by 2020 against a 2005 baseline and all higher education institution are expected to show they are making efforts towards meeting these targets;

- *Carbon Tax*: The Carbon Reduction Commitment (CRC) Energy Efficiency Scheme has introduced costs averaging £12,000[6] per year for The Courtauld;

- *Display Energy Certificates*: a requirement for all building over 1,000 m^2 in floor area, The Courtauld is required to display this certificate confirming energy performance of a building based on actual energy consumption to be accompanied by a list of cost effective measures to improve the energy rating of the building;

- *Building Regulations and local planning targets:* The Courtauld must respond to tightening Building Regulations and local planning requirements that may affect major renovations of the North Block through delivery of the *Courtauld Connects* project.

- *Construction industry targets:* The government's 2025 Industrial Strategy for Construction challenges the industry to deliver a 50% reduction in greenhouse gas emissions and a 33% reduction in the initial cost of buildings.

1.3 Finance

- From May 2013 to February 2015, The Courtauld's tariff price for electricity has increased by 60%[7] and for gas has decreased by 12%[8]. This demonstrates energy

[6] Combination of CRC payments, audit fees and registration fees;
[7] May 2013 £0.524p/kWh / February 2015 average £0.842p/kWh
[8] April 2013 £2.625p/kWh / February £2.266p/kWh

costs are volatile. If this trend in tariff pricing were to continue, The Courtauld's energy bill in 2019/2020 could approach £204k per annum (an increase of 28% against 2013/2014) if no measures were implemented to reduce consumption.

- Funding from the HEFCE has reduced across the sector and is more profound in the absence of a carbon management strategy as part of Capital Infrastructure Funding (CIF).

- The Courtauld qualifies as a participant for the Carbon Reduction Commitment (CRC) Energy Efficiency Scheme under which it is required to annually purchase allowances for every tonne of CO_2 emitted[9]. The value of the first payment in 2012 was £9,509 and in 2014 the payment was £12,032.

- The higher education sector has experienced budget cuts from central government and this has seen a reduction in the Council funding grant received by The Courtauld of c£1.615 million over the period 2010/2011 to 2014/2015.

- The Courtauld (like other HEI's) continues to face pressures to cut the operating costs of the premises it occupies.

1.4 Reputation

The Courtauld needs to act in a socially responsible way to achieve its mission and attract both public and private funding.

1.5 Targets

The Courtauld has set itself the following carbon emission reduction targets:

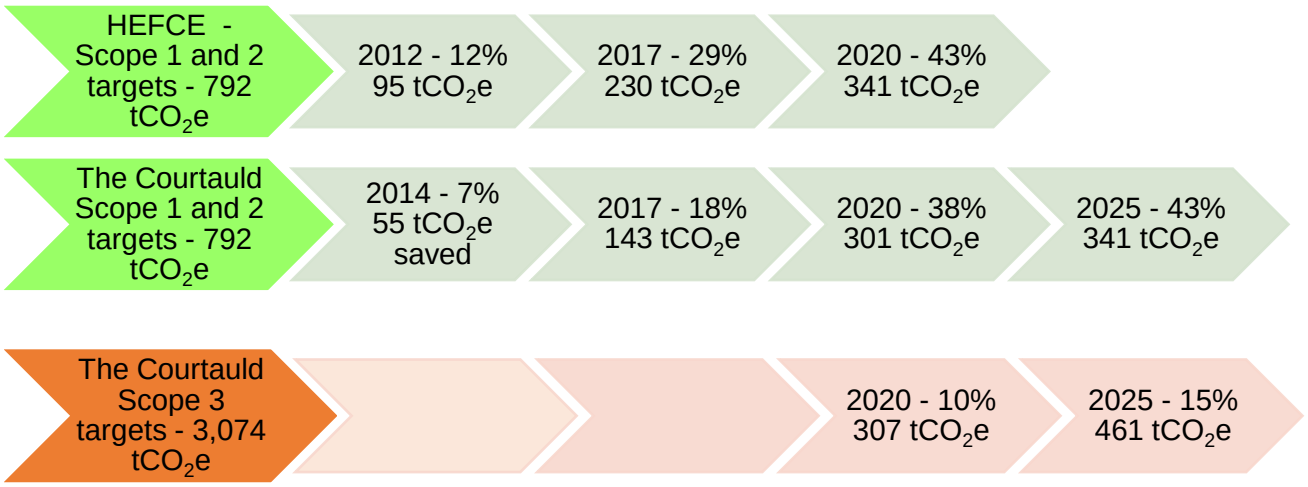
- *Short-term*: reduce Scope 1 and 2 emissions by 18% by 2017 from a baseline year of 2011/2012 and to reduce Scope 3 emissions by 5% by 2017 from a baseline year of 2013/2014.

- *Medium-term*: reduce Scope 1 and 2 carbon emissions by 38% by 2020 from a baseline year of 2011/2012 and to reduce Scope 3 emissions by 10% by 2020 from a baseline year of 2013/2014.

- *Long-term*: reduce Scope 1 and 2 carbon emissions by a further 5% from 2020 by 2025 to achieve and overall 43% reduction set by HEFCE and to reduce Scope 3 emissions by 15% by 2025 from a revised baseline year of 2016/2017.

The targets outlined above are illustrated overleaf.

[9] Associated with electricity and heating fuel (Scopes 1 and 2);



The Courtauld recognises that its medium term reduction target in regards to Scope 1 and 2 emissions is lower than the HEFCE sector wide target of 43% by 2020. However, The Courtauld is unique within the Higher Education sector in so far as part of its business is to operate a Gallery that is open 363 days of the year. In doing so The Courtauld is obliged to maintain particular environmental conditions[10] to safeguard The Gallery's art collection that is of both national and international importance and of exceptional value.

By extending the target date to 2025 to achieve a 43% reduction The Courtauld, envisages that it will have delivered the *Courtauld Connects* project thus, fully embedding all energy saving measures identified within this Plan that may on re-elevation achieve greater energy savings than those identified in this Plan. In addition over the next five year period, further technology advancements may provide new energy saving solutions that can be considered and implemented over the period 2020 to 2025 to support achieving the remaining 5% target.

1.6 Responsibilities

This Plan is supported by The Courtauld's Director and Senior Management Team with strategic responsibility assigned to the Director of Operations. Operational responsibility for implementation of the Plan is delegated to The Courtauld's Facilities Manager, who is also required to report annually to the Estates Committee on delivery of the targets as set out in this Plan.

1.7 Procedure

This Plan and any supporting documentation that underpins it will be reviewed and updated at least once annually normally in the Spring Term by the Facilities Manager with input from the Head of Finance and other relevant staff where appropriate. The review and

[10] Incurring a higher usage of electricity

any updates made will reflect any changes in legislation and industry good practice guidance issued.

Amendments to this Plan will be made by the Facilities Manager and a revised version of the Plan will be put to The Courtauld's Estates Committee normally in the Summer Term for formal approval.

1.8 Equality Implications

There are no known impacts on equality in relation to protected characteristic groups i.e. age, ethnicity, sex, disability, sexual orientation, religion, belief or non-belief, pregnancy or maternity, civil partnerships or marriage or gender identity for both staff and students in respect to this Plan.

2.0 Carbon Management Strategy

2.1 The Courtauld Institute of Art - Environmental Policy

The Courtauld Institute of Art (The Courtauld) acknowledges that it has a responsibility to the environment and commits, as far as reasonably practical, to promote the protection of the environment and thus, minimise the impact of its activities upon the local, regional and global environment. To this end The Courtauld endeavours to carry out all reasonably practical measures to meet its responsibilities to reduce its impact on the environment.

The Courtauld believes that environmental performance and associated refinement of business processes can be made without compromising operational requirements, by using both tried and tested approaches and innovative solutions, including partnership working and collaboration. This will not only support environmental improvements but improve our reputation and operational costs.

Through its Environmental Policy The Courtauld makes a commitment to:

- Ensure compliance with all relevant environmental legislation.
- Seek to identify forthcoming environmental legislation to ensure timely compliance with such new legislation as it applies to The Courtauld.
- Seek to improve its management of energy, emissions, use of resources and waste performance to prevent pollution and provide resources to support effective improvement opportunities without compromising operational requirements.
- Monitor and report annual energy usage and greenhouse gas emissions, as appropriate.
- Adopt sustainable procurement practices and work with key suppliers and service providers to improve energy performance throughout The Courtauld's supply chain.
- Review its Environmental Policy and other relevant environmental documentation at regular intervals.

Responsibilities

The Director of Operations has responsibility for delivery of The Courtauld's Environmental Policy through the Facilities Management function, which reports to the Director of Operations. The Facilities Management function is responsible for implementing the Courtauld's Environmental Action Plan to ensure the Environmental Policy commitments are met.

Review and Improvement

The Courtauld will continue to monitor the effectiveness of measures implemented under the Environmental Policy. In particular The Courtauld will:

1. Support the Facilities Management function in co-ordinating and monitoring the implementation of necessary good practice standards, including the Environmental Action Plan across The Courtauld's premises and operations, as appropriate.

2. Produce an accurate annual assessment of The Courtauld's energy and carbon emissions performance, in its core businesses, for the purposes of management review, voluntary reporting to stakeholders, sectorial and legislative compliance.

3. Produce an accurate annual assessment of The Courtauld's waste and natural resources use performance, in its core businesses, for the purposes of management review, voluntary reporting to stakeholders and legislative compliance.

4. Review actual energy and emissions performance and trends, in its core businesses, and consider amendments to the Environmental Policy and Environmental Action Plan as part of an annual environmental management review, and to implement amendments as necessary.

Communication

The Courtauld is committed to communicating its Environmental Policy to staff, students, contractors, key suppliers, service providers, visitors and other interested parties, through termly staff meetings, e-newsletters and other appropriate publications.

Robert Thorpe
Director of Operations

April 2015

2.2 The Courtauld Institute of Art Environmental Action Plan

Responsibilities

The Facilities Management function is responsible for implementing The Courtauld's Environmental Action Plan to ensure the Environmental Policy commitments are met.

Performance review

Through its Environmental Action Plan, The Courtauld makes a commitment to:

- Benchmark energy and emissions performance annually for each premises occupied[11].
- Produce a Display Energy Certificate (DEC) annually. The DEC will be displayed in a public area of each premises The Courtauld occupies[12].
- Review the progress with meeting carbon emissions (Scope 1 and 2) reductions against the Higher Education Funding Council (HEFCE) reduction targets annually and those set out in this Plan.
- Review its position on the carbon reduction management maturity matrix annually.
- Review the Scope 3 emissions baseline in 2016/2017 following improvement and experience in data collection and management for the material categories i.e. Business travel and Goods travel In and Out.

Baseline and Reduction targets

Through its Environmental Action Plan, The Courtauld makes a commitment to:

- Set the baseline year for HEFCE requirements as 2011/2012 year or 792 tCO2e (reference Scope 1 and 2 emissions).
- Seek to implement the energy efficiency measures identified in The Courtauld Carbon Management Plan (April 2015) to reduce carbon emissions by a total of 38% compared to the baseline year of 2011/2012 year by 2020.
- Reduce Scope 1 and Scope 2 carbon emissions by 18% by 2017 (short term); 38% by 2020 (medium term) and by 43% by 2025 (long term).

[11] New Wing of Somerset House excepted
[12] Ibid

- Improve the score on the carbon reduction management maturity matrix to 3 in all categories by 2020.

- Set the initial baseline year for Scope 3 emissions as 2013/2014 as described in The Courtauld Carbon Management Plan (April 2015), re-calculating in 2016/2017.

- Reduce Scope 3 emissions by 10% against the 2013/2014 baseline by 2020 and by 15% by 2025 against a revised baseline year of 2016/2017.

Reduction measures

- Scope 1, 2 and 3 emissions reduction measures are fully described in The Courtauld Carbon Management Plan (April 2015).

Reporting and communication

- Submit an annual return to HEFCE (via HESA[13]) for Scope 1, Scope 2 and relevant components of Scope 3 emissions via the annual Estate Management Record return.

- Include an environmental guidance note in all staff and student welcome packs including information on The Courtauld's Environmental Policy and carbon reduction targets.

- Post the Carbon Management Plan (incorporating the Environment Policy) on The Courtauld website.

- Via termly all staff meetings, e-newsletters and other appropriate publications, periodically remind and update staff, students, key suppliers, service providers visitors, etc. on the environmental targets set and the progress made in meeting these.

[13] Higher Education Statistics Agency

2.3 Carbon management maturity matrix

The carbon management maturity matrix is a useful tool to analyse and benchmark The Courtauld's approach to carbon management. Overleaf is a summary following the assessment of The Courtauld against this criteria. The shaded cells represent current achievement levels, thereby indicating key areas where improvement can be made.

In summary, whilst The Courtauld does carry out a number of energy management activities and have policies in place, this is not truly embedded within the organisation, so there is more that can be put in place by management to make improvements and to make energy reduction and carbon management a higher priority.

The matrix is useful as it clearly signposts for The Courtauld what steps need to be taken to make improvements across the categories to progress. This benchmark can then be used to review progress each year and to establish what next steps need to take place to make further improvements.

Key points:

- The current policy was reviewed against best practice examples. A suggested policy wording has been included in this report for adoption by The Courtauld.
- The policy needs to be fully adopted at all levels of the organisation, especially at the senior level of management[14];
- Responsibility and accountability for energy consumption and reduction needs to be formalised and written into role profiles;
- Appropriate staff should be provided with specific training to enable them to spot and make energy saving changes in the buildings;
- Current energy consumption performance is currently measured monthly, and this can be increased to weekly and incorporate degree day analysis to take into account external weather variation;
- Energy consumption should be regularly communicated to all building users, and energy conservation encouraged;
- A more strategic view of energy saving projects to be undertaken with a specific budget set aside for improvement works;

[14] Senior Management Team and Heads of Department

Level	Policy	Organising	Training	Performance Measurement	Communicating	Investment
4	Energy policy, Action Plan and regular review have active commitment of top management	Fully integrated into management structure with clear accountability for energy consumption	Appropriate and comprehensive staff training tailored to identified needs, with evaluation	Comprehensive performance measurement against targets with effective management reporting	Extensive communication of energy issues within and outside of organisation	Resources routinely committed to energy efficiency in support of business objectives
3 *	Formal policy but no active commitment from top management	Clear line management accountability for consumption and responsibility for improvement	Energy training targeted at major users following training needs analysis	Weekly performance measurement for each process, unit, or building	Regular staff briefings, performance reporting and energy promotion	Same appraisal criteria used as for other cost reduction projects
2	Un-adopted Policy	Some delegation of responsibility but line management and authority unclear	Ad-Hoc internal training for selected people as required	Monthly monitoring by fuel type	Some use of company communication mechanisms to promote energy efficiency	Low or medium cost measures considered if short payback period
1	An unwritten set of guidelines	Informal, mostly focused on energy supply	Technical staff occasionally attend specialist courses	Invoice checking only	Ad-Hoc informal contacts used to promote energy efficiency	Only low or no cost measures taken
0	No explicit energy Policy	No delegation of responsibility for managing energy	No energy related staff training provided	No measurement of energy costs or consumptions	No communication or promotion of energy issues	No investment in improving energy efficiency

Table 1: Carbon Management Maturity Matrix

*The Courtauld's aim is to achieve Level 3 across all six categories by 2020.

3.0 Carbon Emissions, Baselines and Reduction Targets

The scope of this CMP includes Scope 1, 2 and 3 emissions, aligning with the HEFCE guidelines for carbon reporting where applicable. In detail, this includes carbon emissions resulting from the use of heating fuel, electricity and those associated with procurement, business travel, commuting, water and waste. In addition the carbon emissions identified have been analysed to establish the baseline emissions to meet the HEFCE guidelines for Scope 1 and 2 as well as establishing an initial baseline for Scope 3. The total emissions have been reported, and then broken down into Scope 1, 2 and 3.

A Scope 1 and 2 baselines is established, so that all future consumption can be compared against it and performance fully measured in a systematic and standardised way. Likewise an initial Scope 3 baseline has been established, which will refined and enhanced as more experience is gained in accessing carbon emissions associated with all Scope 3 categories.

The different Scopes of carbon emissions are defined as per the definitions below:

- **Scope 1** emissions are direct emissions that occur from sources owned or controlled by the organisation
- **Scope 2** accounts for emissions from the generation of purchased electricity consumed by the organisation
- **Scope 3** covers all other indirect emissions which are a consequence of the activities of the organisation, but occur from sources not owned or controlled by the organisation

The baseline carbon emissions are separated into Scope 1, 2, and 3. HEFCE require the baseline to include Scope 1 and 2, and The Courtauld is assessing Scope 3 separately. Scope 3 will be reported alongside Scope 1 and 2 in all future up-dates.

A baseline is established, so that all future consumption can be compared against it and performance fully measured in a systematic and standardised way.

3.1 Total Scope 1, 2 and 3 carbon emissions

The current carbon emissions have been calculated for the most recent academic year 2013/2014 (August to July). The Courtauld's total carbon emission for the year 2013/2014 is 3,808 tCO2e. Figure 1 overleaf shows the breakdown of the emission between Scopes 1, 2 and 3. Figure 2 overleaf shows a breakdown of the total emissions by source.

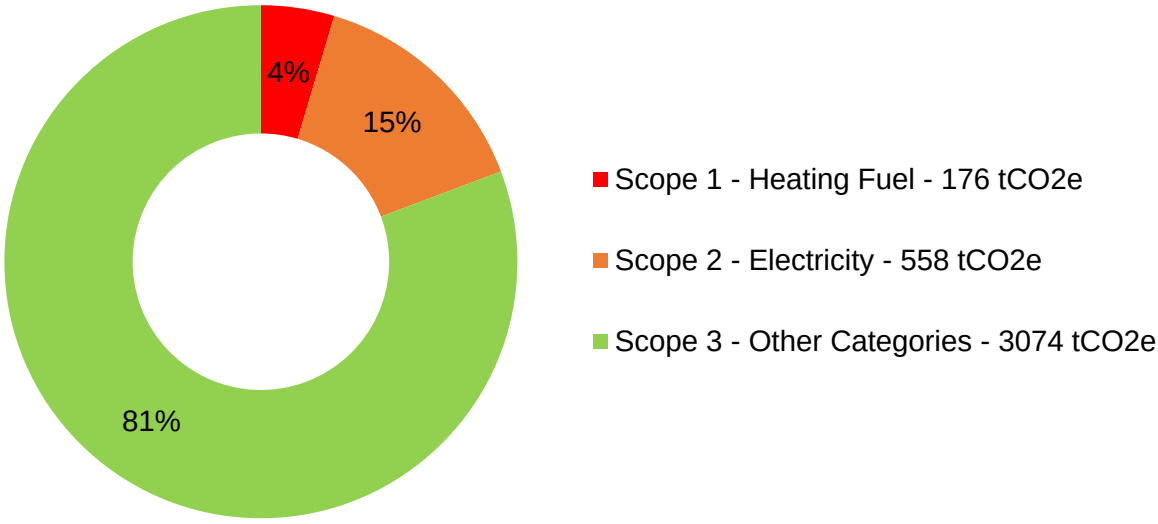


Figure 1: The Courtauld carbon emissions for 2013/2014 include Scopes 1, 2 and 3

Key points:

- The dominant Scope is Scope 3 representing emissions from Procurement, Business travel (staff, students and goods in and out), Commuting, Water and Waste with approximately 80% of the total footprint or 3,074 tCO_2e
- Electricity consumption is the second most impactful scope with 15% of the total footprint 558 tCO_2e.

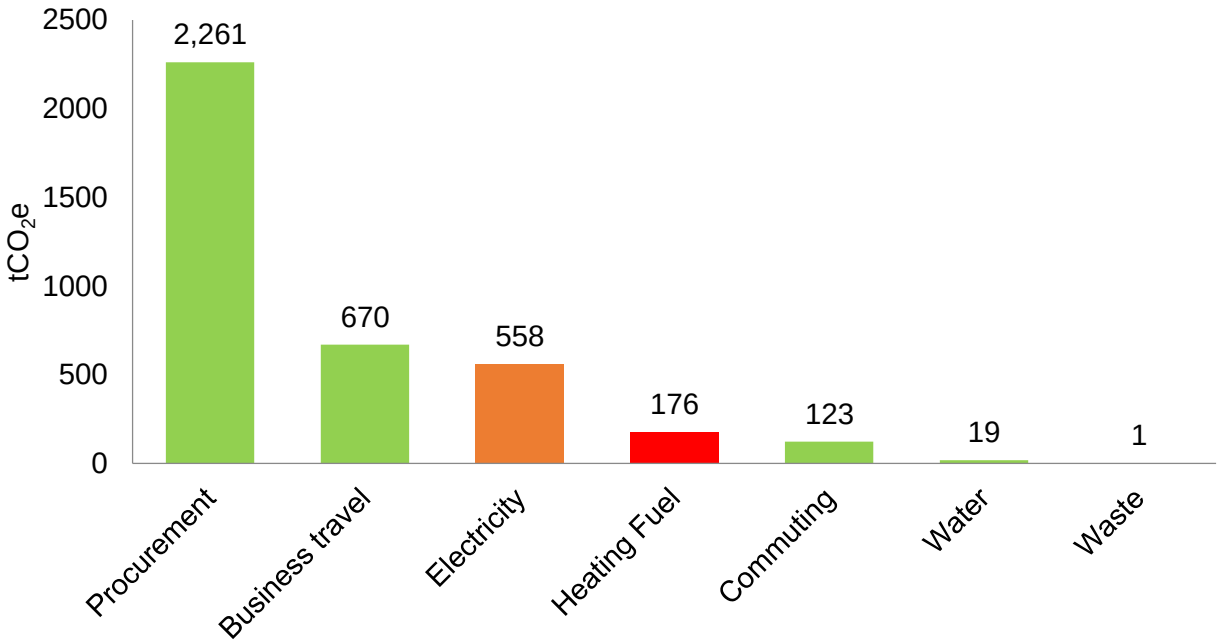


Figure 2: The Courtauld carbon emissions (tCO_2e) for 2013/2014 broken down by source

Key points:

- Procurement of goods and services is the dominant category with 2,261 tCO_2e or 55% of the total emissions.
- Business travel (staff and students only) is the next category with 670 tCO_2e or 16% of the total emissions
- Electricity consumption is the next category with 558 tCO_2e or 13% of the total emissions.

3.2 Scope 1 and 2 current emissions

A detailed breakdown on the carbon emissions from Scope 1 and 2, between the North Block and Duchy House has been accessed. The emissions have been calculated for the most recently completed year 2013/2014, (August to July), and the results are shown in Table 2 and Figure 3 below.

	North Block	Duchy House	Total
Electricity tCO_2e	513	45	558
Gas tCO_2e	131	45	176
Total	643	90	734
% of total	88%	12%	

Table 2: Scope 1 and 2 emissions for 2013/2014

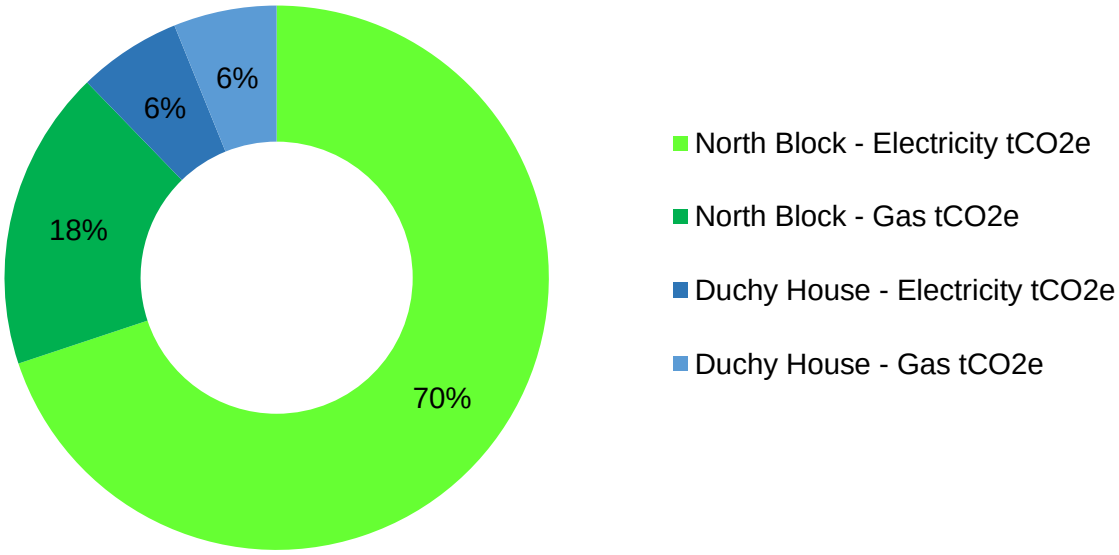


Figure 3: Scope 1 and 2 carbon emissions split by utility and building for 2013/2014

Key points:

- The North Block in Somerset House is responsible for almost 90% of the Scope 1 and 2 emissions.
- Carbon emissions from electrical use make up three quarters of the Scope 2 emissions from The Courtauld.
- The electrical emissions from the North Block are responsible for 70% of the total Scope 2 emissions, so concentrating on reducing electrical consumption within this building is key.

3.3 Scope 1 and Scope 2 baseline carbon emissions

The HEFCE requires a carbon baseline to be set for emissions associated with Scope 1 and 2. HEFCE desires the baseline to be based on 2005 levels to provide consistency between HEI's when reviewing and reporting on progress.

However in the case of The Courtauld, Duchy House, the student accommodation premises, was only occupied from October 2010, so using 2005 would not be a complete baseline for both buildings against which to compare.

The baseline year used by the University of London (UoL) is the academic year 2009/2010, and ideally The Courtauld (as a constituent college) would mirror this in its own baseline, however as per the above Duchy House was only occupied from October 2010 so there is incomplete data for 2009/2010 to facilitate this. As such the year 2011/2012 has been chosen as the baseline year against which targets will be set and progress with achieving reductions compared.

The baseline emissions, for the year 2011/2012 for The Courtauld is 792 tCO_2e. Figure 4 shows the breakdown of the emissions between the gas and electricity consumed. Electricity use makes up almost three quarters of the baseline carbon emissions from The Courtauld.

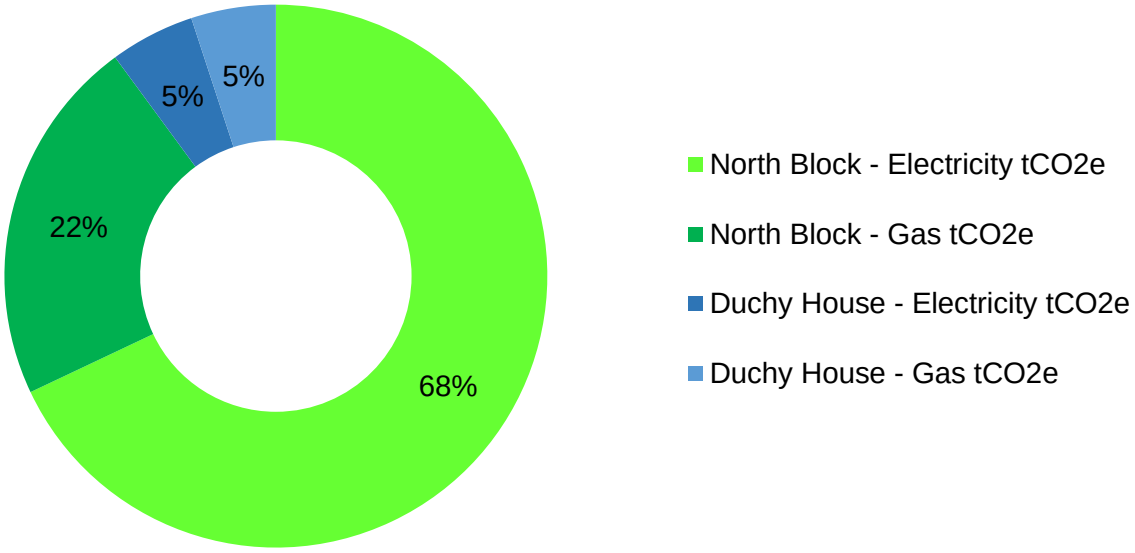


Figure 4: Scope 1 and 2 carbon emissions split by utility and building for 2011/2012

Figure 5, shows the breakdown of the baseline emissions between the, North Block and Duchy House.

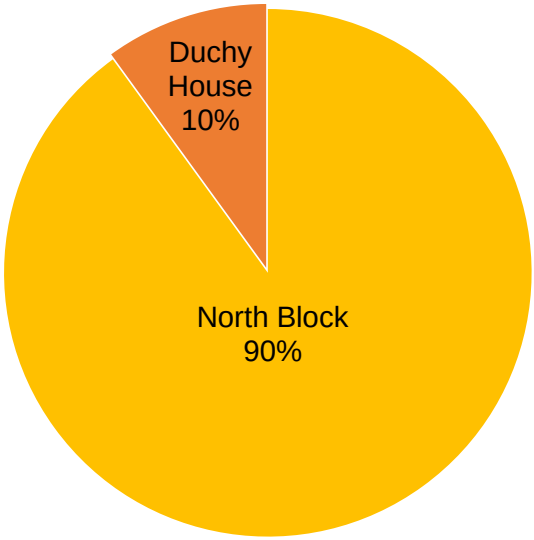


Figure 5: Carbon emission split by North Block and Duchy House for 2011/2012

Key points:

- North Block is a larger emitter of carbon.
- In terms of floor area, the approximate split is 80% of the total floor area is the North Block, and 20% Duchy House. Therefore in terms of carbon emissions, the North Block is emitting more than the proportional floor area. The graph below, Figure 6, shows the current consumption as compared to the baseline carbon emissions.

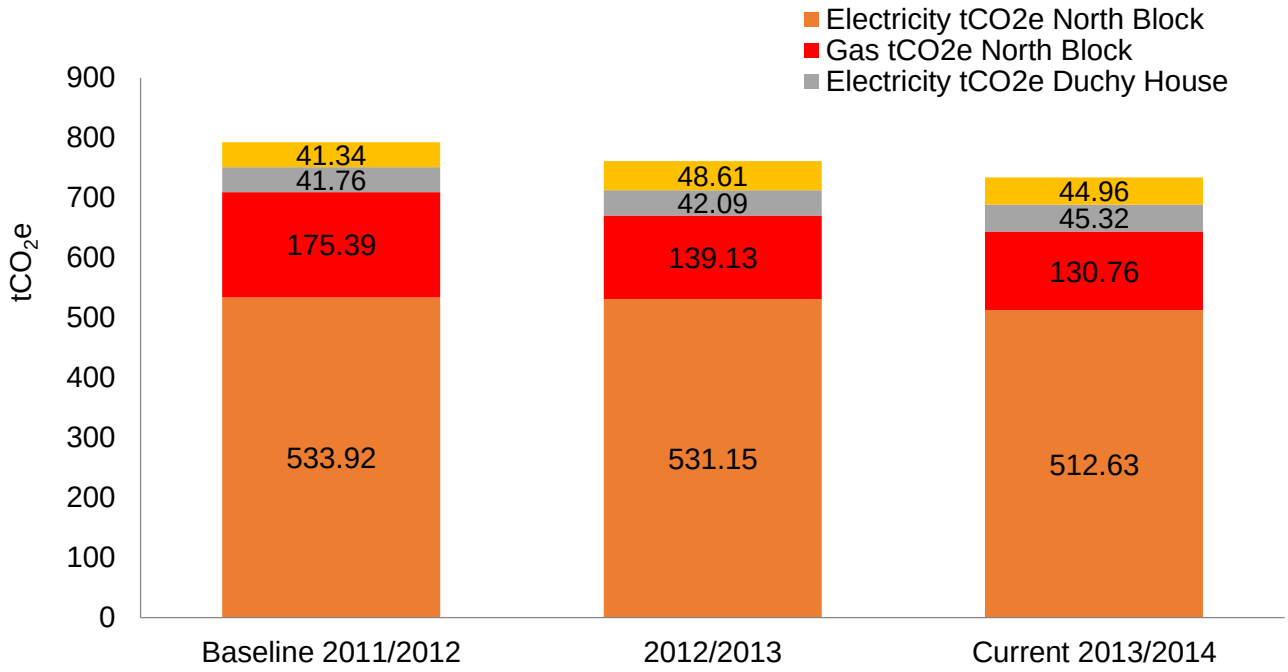


Figure 6: Current carbon emission as compared to baseline carbon emissions

Key points:

- There has been a 9% increase in the emissions from Duchy House, as compared to the baseline. However looking at the historical consumption date, as detailed in the appendices, the gas and electrical consumption at Duchy House has fluctuated over the past 3 years.

- The emissions from the North Block have reduced by 9%, with the greater saving from a reduction in emissions from gas consumption

3.4 Scope 1 and 2 Carbon Emissions Reduction Targets

The Courtauld's target is to reduce Scope 1 and 2 carbon emissions by 43% by 2025, from the baseline year 2011/2012.

The Courtauld is an independent college of the University of London (UoL), and as such, The Courtauld wishes to align itself with the carbon reduction targets set by UoL as closely as possible. The UoL baseline year is based on the year 2009/2010, and the target set is to achieve a 43% reduction in carbon emissions by 2020. As previously stated, due to Duchy House only being occupied from October 2010 onwards it is not possible for The Courtauld to align to the same baseline year as the UoL, but the same overall carbon reduction target has been chosen, albeit to be achieved 5 years later in 2025.

The Scope 1 and 2 carbon emissions in 2011/2012 were 792 tCO_2e, so the target emissions (as required by HEFCE) is 649 tCO_2e by 2017; 506 tCO_2e by 2020 and 451 tCO_2e by 2025. Figure 7 below shows the historical carbon emission for The Courtauld

with the projected emissions if all the recommendations as set out in Tables 7, 8 and 9 are implemented as compared to the target emissions.

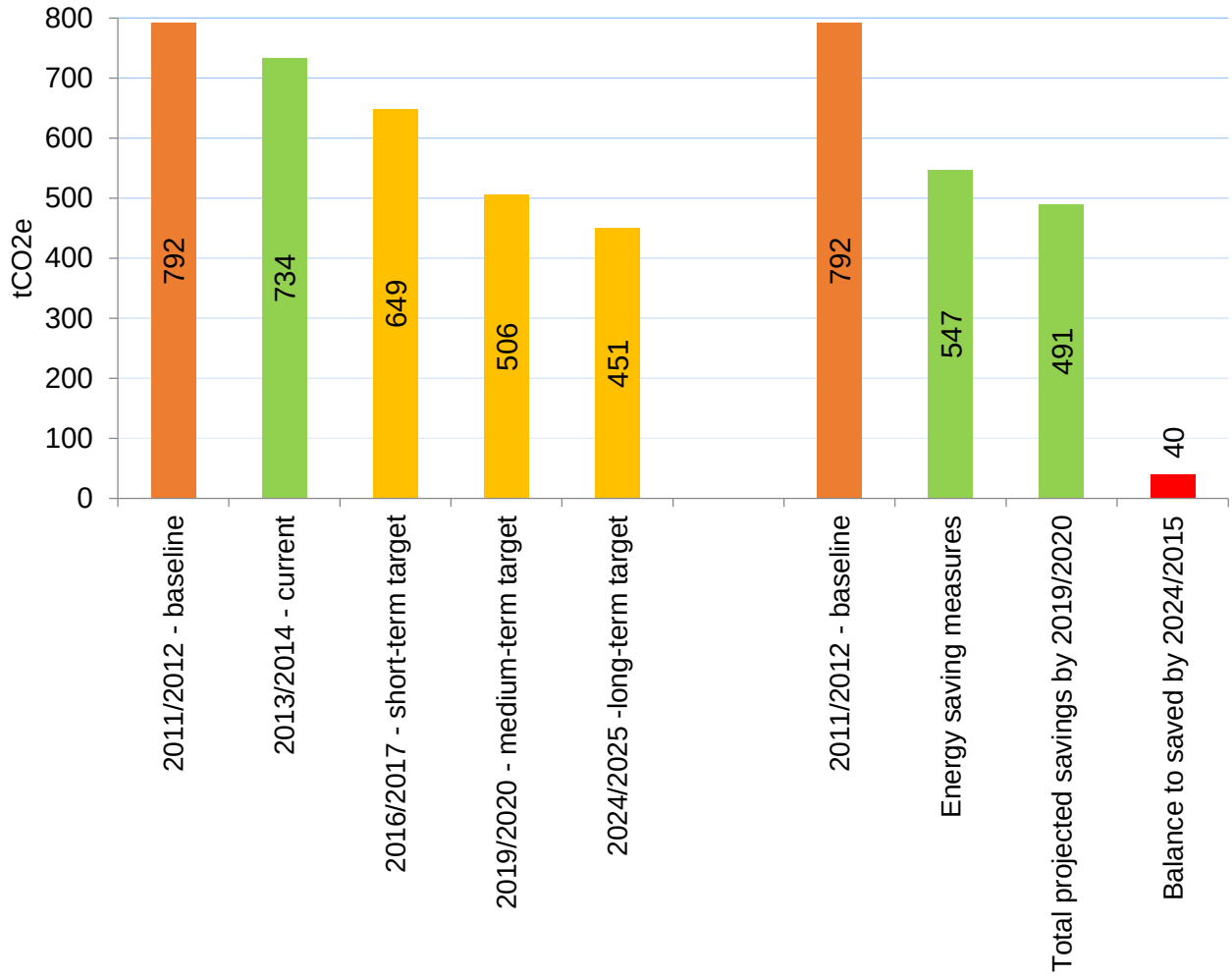


Figure 7: Carbon emission targets and impact of savings to date and measures

There is already a positive downward trend in carbon emissions, with an approximate 7% decrease in emissions in 2013/2014, as compared to the baseline year (2011/2012).

During the process of drafting this CMP, a number of energy saving opportunities have been identified within the North Block and Duchy House. The measures identified will lead to a saving of 31% over the 2011/2012 baseline. When this is combined with the 7% saving already achieved, this will deliver a total saving of 38% (301 tCO_2e), thus reducing emissions to 491 tCO_2e.

The HEFCE target is for a 43% reduction, and with a reduction of 38% projected there is a 5% (40 tCO_2e) saving gap remaining. The Courtauld is unique in its set up, especially when comparing against the wider sector. In addition to its teaching and research commitments, an important part of The Courtauld's, business is to operate a Gallery that is open 363 days of the year to the public. In addition and perhaps more importantly there are specific environmental conditions that have to be met in The Gallery and on-site stores

to safeguard both the permanent and temporary art collections that are of both national and international importance and of significant value. This makes cost effective energy saving recommendations for the HVAC of The Gallery limited.
In addition Somerset House is a Grade 1 listed property which also limits the opportunities for energy saving measures in terms of interventions that can be made to the buildings fabric and infrastructure. Given these limitations achieving a saving of 38% (301 tCO_2e) by 2020 is deemed realistic and achievable.

Care will need to be taken as The Courtauld embarks on and implements the *Courtauld Connects* project to ensure that the transformation of internal spaces (within the North Block) do not lose sight of the need for energy efficiency to be at the heart of those changes. The design team will be integral to supporting The Courtauld to operate the North Block efficiently thereby ensuring that emissions do not increase but actually decrease as a result of the transformation. To achieve this, the team will need to look carefully at whole-life-costings and how the building operates seasonally.

Figures 8 and 9 overleaf demonstrate the impact of rising energy costs. These shows the actual energy expenditure for The Courtauld from 2012/2013 and 2013/2014 and how the energy expenditure would increase until 2024/2025 if no energy saving measures were implemented. This does not include the Carbon Reduction Commitment Tax, which is currently[15] at £16.40/tonnesCO_2, which is also expected to continue to increase.

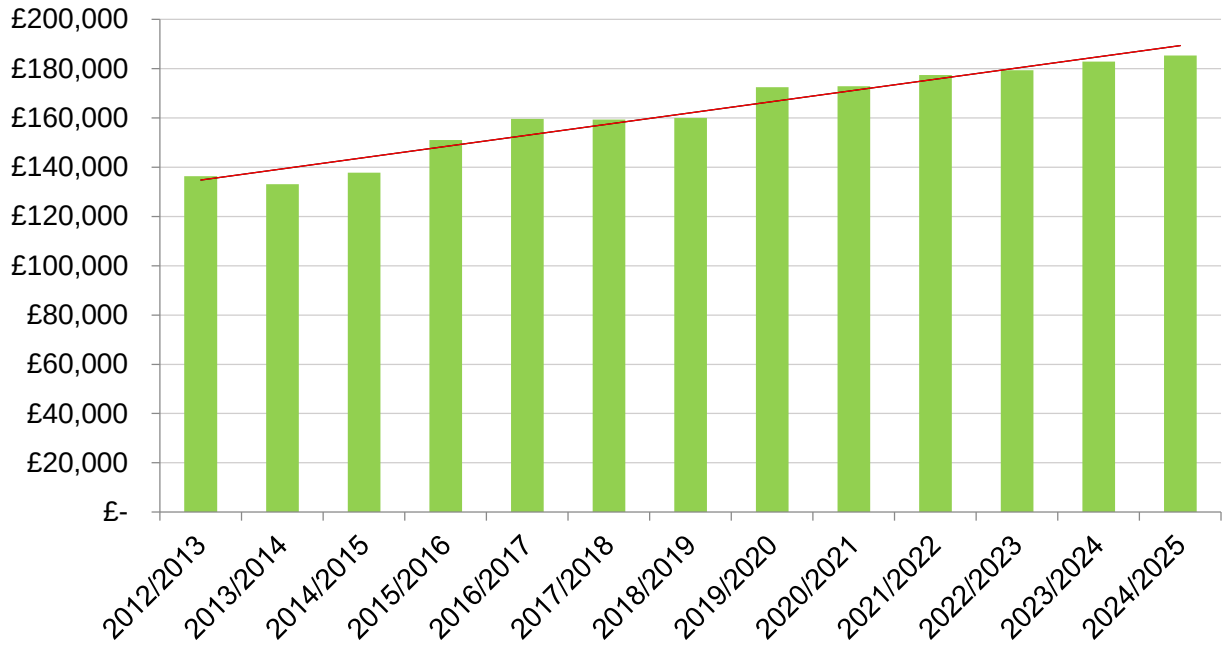


Figure 8: Predicted future electricity spend if no energy saving measures implemented

[15] March 2015

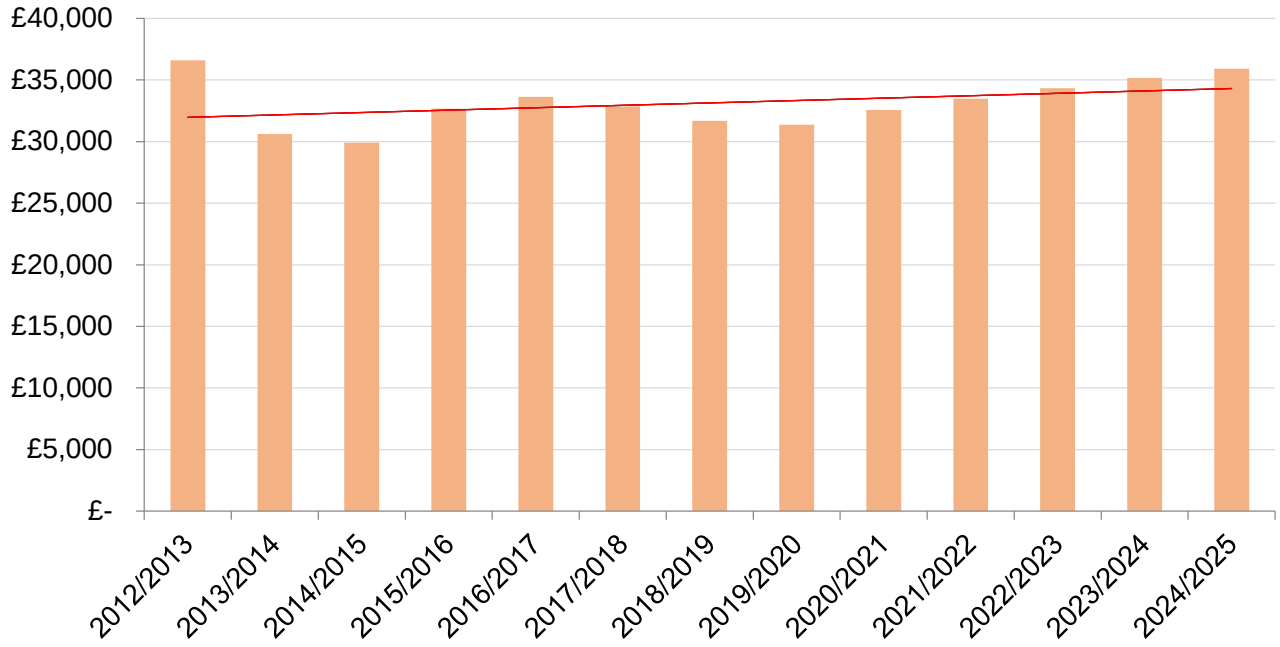


Figure 9: Predicted future gas spend if no energy saving measures implemented

3.5 Scope 3 carbon emissions baseline

The Courtauld's Scope 3 emissions have been estimated following the 2014 Defra Environmental Reporting Guidance. A breakdown of the Scope 3 emissions is presented in Figure 10. The principles in the Guidance include:

- Identify the amount spent on different products and services categories
- Multiply the amount of spending by the Defra conversion factors to get total emissions relating to the production of products or delivery of services.

The scope 3 emissions categories include:

- Procurement
- Business travel (Staff and Students)
- Commuting
- Water
- Waste

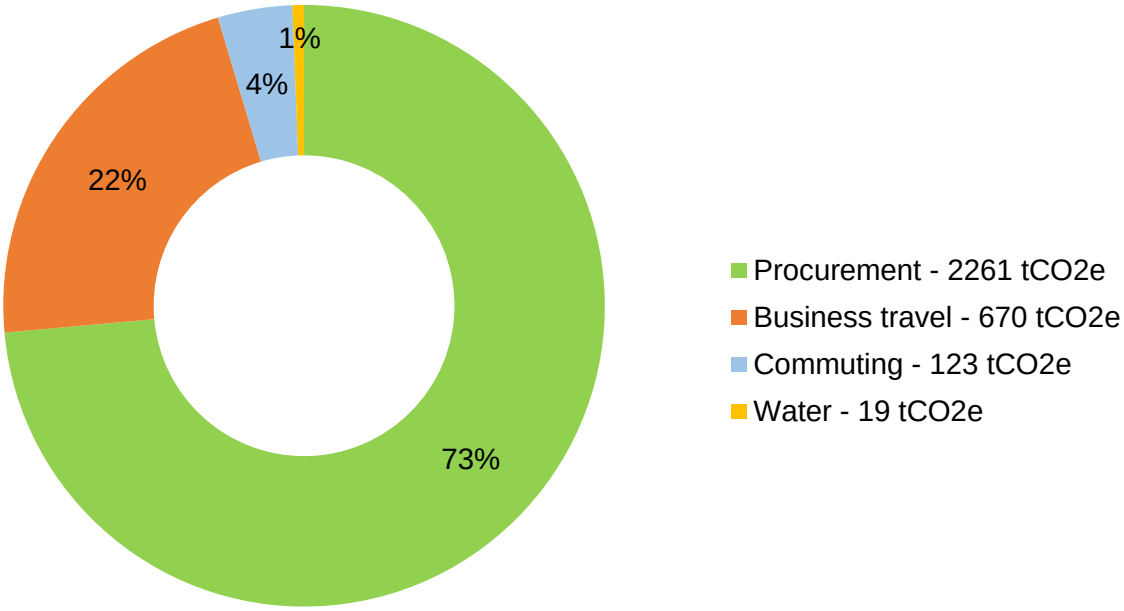


Figure 10: Scope 3 emissions breakdown

Key points:

- Procurement of goods and services is the dominant category with 2,261 tCO_2e or 73% of the total Scope 3 emissions.
- Business travel is responsible for the bulk of the remaining Scope 3 emissions with 670 tCO_2e or 22% of the total Scope 3 emissions. Business travel emissions were estimated using the procurement cost codes[16] and reconciled against the manual business travel data collection record. There were significant discrepancies between the two methods mainly due to the staff and students travel associated with the Field Course Costs / Expeditions cost code 3750 involving significant travel to Asia resulting from the overseas consultancy and research work undertaken by the Wall Paintings Department.
- Commuting[17] represents a small proportion of Scope 3 emissions, 123 tCO_2e or 4 %. Student commuting is the dominant component of this category with almost 80% of the total accounting for the Commuting carbon footprint.
- Waste and Water are not significant sources of emissions for The Courtauld.

The breakdown of the Procurement category is provided in Figure 11.

[16] Codes
[17] The average distance commuted to work in England and Wales was used. Working residents in London commute is on average 11 km (http://www.ons.gov.uk/ons/rel/census/2011-census-analysis/distance-travelled-to-work/index.html).

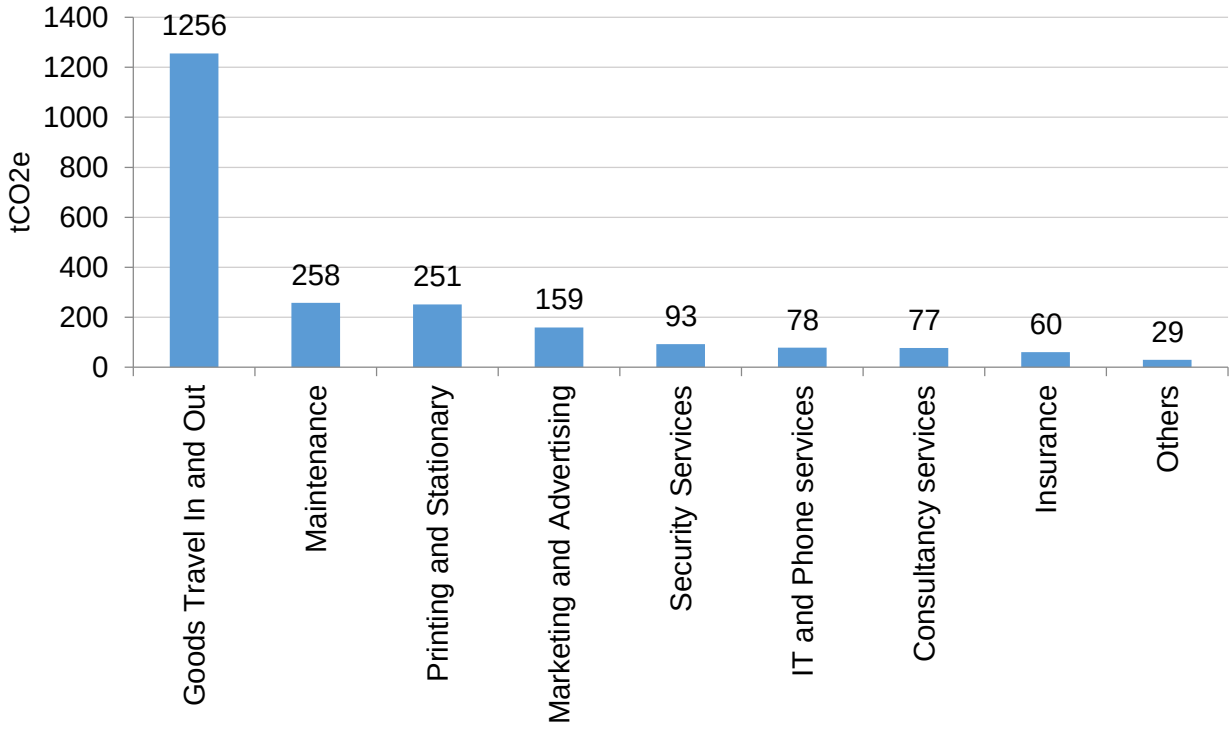


Figure 11: Procurement category emissions breakdown

Key points:

- Goods Travel In and Out is the dominant category with 1,256 tCO_2e or 56% of the total Procurement category emissions. Goods Travel In and Out represents primarily the travel of artwork in and out of The Courtauld (cost codes 3230: Exhibitions / display equipment and 3230: Storage / transport / other loan costs)

- Maintenance and Printing and Stationary[18] are the next two most impactful categories with approximately 260 tCO_2e or 11% each of the total Procurement category emissions. The Maintenance category includes all the maintenance and conservation work and contracts, cleaning services and products, minor repairs and renewals.

- Marketing and Advertising is the next category with approximately 159 tCO_2e or 7% of the total Procurement category emissions. This category includes all advertising activities, cultivation activities and corporate publications.

3.6 Exclusions from the Scope 3 baseline carbon emissions

In addition, this CMP has estimated the carbon footprint of the catering activities (operated by Leafi Food Development) and The Shop (operated by Samuel Courtauld Trust

[18] The Printing and Stationary includes Photographic Prints/Slides, Photocopying, Reports/Books printing, Stationary, Conference and seminars related printing.

Enterprises (SCTE), a subsidiary of The Courtauld). The emissions related to these two activities have been estimated following the 2014 Defra Environmental Reporting Guidance:

- Catering activities (Leafi Food Development): 172 tCO_2e
- The Shop (SCTE): 49 tCO_2e

These emissions are for information only as these activities are outside the direct control of The Courtauld. Consequently, these emissions are not included in the total Scope 3 emissions baseline reported in this CMP (i.e. the total of 3,074 tCO_2e excludes these emissions). In addition, emissions associated within these two activities are likely to increase as a direct result of the objective to increase visitors to The Gallery over the next five year period.

At this stage it is envisaged that the rebalancing of the Scope 3 baseline year in 2016/2017 will include emissions from both catering activities and The Shop.

The analyses undertaken to compile this CMP has also estimated the emissions related to an exhibition. The "Court and Craft: A Masterpiece from Northern Iraq" exhibition was selected for this assessment[19]. The emissions associated with this exhibition are estimated at 583 tCO_2e. The dominant component contributing to this figure is "*Goods Travel In and Out*" with 97% of the total emissions and printing and stationary representing 2% of the total emissions. Again this figure has been excluded from the Scope 3 baseline year calculation.

3.7 Scope 3 reduction opportunities and recommendations

Scope 3 emissions reduction opportunities include:

- **Data collection and monitoring:** Coverage and accuracy of data for Scope 3 emissions sources needs to be improved. The data collection should focus on the key Scope 3 emissions sources identified i.e. Goods Travel In and Outs and Printing and Stationary within the Procurement category and Business travel (staff and students). The data collection specifications should be part of the Environmental policy implementation plan
- **Goods Travel In and Outs:** The suppliers (e.g. Constantine) for these services should be engaged through The Courtauld's Environmental Policy to provide regular detailed records on activities/services provided to The Courtauld (e.g. detail of travel, destinations, transport modes…etc). Details of suppliers' commitments and actions to reduce their own environmental impacts should be formally requested and form part of the services procurement process. Carbon neutrality from specific suppliers should be identified (e.g. http://www.carbonneutral.com/our-clients/case-studies/radio-taxis-group)

[19] This exhibition took place between 20 February 2014 and 18 May 2014

- **Printing and Stationary:** The category's impact could be reduced through staff awareness of the environmental impact of paper/printing. Examples of the carbon footprint of some of The Courtauld's exhibitions have been provided above for the "Court and Craft: A Masterpiece from Northern Iraq" exhibition i.e. 12 tCO_2e.

- **Offsetting:** Consideration should be given to offsetting, as part of the Environmental Policy, some of The Courtauld's carbon emissions through either the mandatory carbon market offsets from compliance programmes (e.g. the EU Emissions Trading Scheme, (EUETS)) or the voluntary market where offsets are generated by independent companies and charities investing in renewable energy and resource conservation projects. Within the former market, The Courtauld could purchase carbon offsets through a broker. Within the latter, The Courtauld would need to develop an overall offsetting strategy to select a suitable offset source and provider. This process is outlined in Appendix F.

The overall recommendations for Scope 3 emissions management include:

- Consider the assessment of Scope 3 emissions in this Plan as the initial baseline for this Scope.

- Target a 10% reduction (307 tCO_2e) by 2020 against the initial baseline.

- Review the Scope 3 baseline in 2016/2017 following improvement and experience in data collection and management for the material categories i.e. Business travel and Goods Travel In and Out during the period 2014/2015 and 2015/2016.

- Embed with the revised 2016/2017 baseline year emissions associated with all on-site catering activities and The Shop.

- Separately identify and accurately access Scope 3 emissions for each temporary exhibition recording separately against all other Scope 3 data as emissions associated with exhibitions will fluctuate year-on-year depending on the type and complexity of the exhibitions displayed.

4.0 Benchmark comparison

A benchmarking exercise has been carried out to compare The Courtauld's energy consumption against two different benchmarking figures. One was from the Chartered Institute of Building Services Engineers (CIBSE) benchmarks and the other using the Display Energy Certificate (DEC) results when compared against similar universities and Art Galleries.

Benchmarking is a useful tool to assess if The Courtauld is performing well or poorly against other organisations with buildings of a similar construction and usage.

4.1 CIBSE Energy consumption benchmarks

A comparison of The Courtauld energy consumption was made against the CIBSE Guide F (2004). This is an industry standard reference which is useful to review performance.

To do this the emissions have been split between the North Block and Duchy House, as both buildings have very different functions, and should be compared against benchmarks with similar building uses.

The North Block has been compared against the benchmark for Museums and Art Galleries, as per Table 3 below. However the benchmark provided by CIBSE is for non-humidity controlled buildings, so the benchmark consumption will be lower for electricity, as can be seen in Table 3 below. CIBSE does not have a benchmark for humidity controlled Museums and Art Galleries.

	Electrical kWh/m^2	Heating kWh/m^2
North Block	137	93
Good Practice	57	96
Typical	70	142

Table 3: North Block consumption, as compared to CIBSE benchmarks.

Key points:

- For heating fuel, the North Block is in-line with the CIBSE Good Practice benchmark
- For electrical consumption, the North Block usage is significantly higher. This is likely to be in part caused by the humidity control in The Gallery to keep the environmental conditions within the tight parameters required.

Duchy House has been compared against the CIBSE benchmark for Higher Education, halls of residence, see Table 4 overleaf.

	Electrical kWh/m^2	Heating kWh/m^2
Duchy House	48	127
Good Practise	85	240
Typical	100	290

Table 4: Duchy House consumption, as compared to CIBSE benchmarks

Key points:

- For both the heating and the electrical consumption, the actual energy consumption is significantly lower than Good Practice.
- Duchy House was re-furbished in 2009/2010 prior to occupation from September/October 2010 and is performing well in terms of lower energy consumptions with comparable buildings.

4.2 Display Energy Certificates benchmarks

The Courtauld's North Block premises has also been benchmarked against a number of other similar universities and Art Galleries using Display Energy Certificate (DEC) results.

The only university with the most up to date DEC is the Royal Academy of Music, which is also the closet in floor area to The Courtauld. When comparing the two, the Courtauld has higher electrical consumption and lower heating. When looking at other selective buildings, The Courtauld is the only building with a higher electrical consumption than heating.

When comparing The Courtauld against other Art Galleries, per meter squared both the National Gallery and The Tate use significantly more heating fuel, with The Tate using more electricity, but the National Gallery far less.

	Nominated Date	Heating kWh/m^2	Electricity kWh/m^2	floor area m^2
The Courtauld Institute of Art	*Oct-14*	*100*	*142*	*7,570*
Royal Academy of Music	Oct-14	128	106	7,790
Royal College of Music	Sep-13	97	96	12,500
Central School of Speech and Drama	Oct-12	102	90	6,521
Rose Bruford College	May-10	386	132	6,495
National Gallery	Jun-14	470	77	46,710
The Tate	Nov-14	280	328	24,306

Table 5: Display Energy Certificate results for comparison

The results are also displayed below in Figure 12. These results are all from different years, as is shown in Table 5, so there is likely to have been changes in the emissions for the buildings that do not have an up to date DEC's.

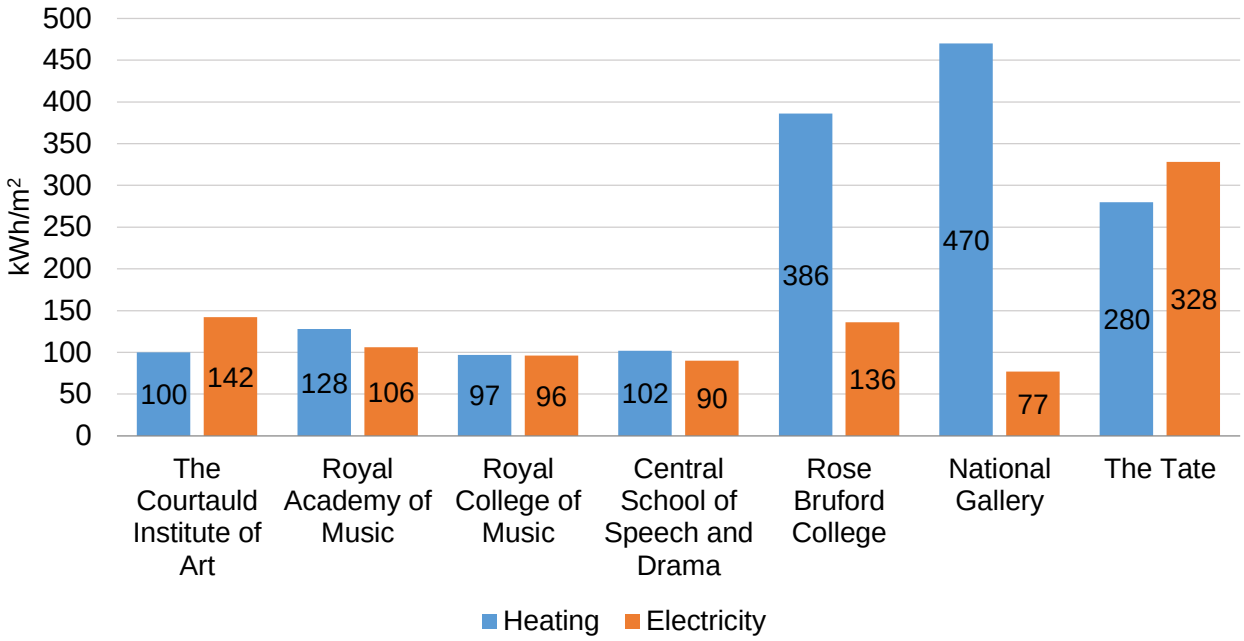


Figure 12: Display Energy Certificate result comparison

Key points:

- The Courtauld uses a similar amount of gas and electricity when compared to the other universities, apart from Rose Bruford College.

- The DEC results from both the National Gallery and The Tate show that they use significantly more energy per meter squared then The Courtauld. They are both significantly larger buildings with a greater proportion of gallery space, which is likely to result in the higher usage as the climate control areas will be proportionally larger.

4.3 Other potential benchmarks

Whilst there are no other formally regonised benchmarks currently circulating within the HEI and or Museums and Art Gallery sector, from the data The Courtauld has established there are worthwhile figures of note against which The Courtauld itself can internal measure future years performance. The figures noted overleaf are based on Scope 1 and 2 consumption and emission data for the year 2013/2014 (August to July).

Based on the Gross Internal Area (GIA)

- North Block incurred 0.08 tCO_2e per meter squared[20]
- Duchy House incurred 0.05 tCO_2e per meter squared[21] or 1.41 tCO_2e per bed space

Based on Full Time Equivalent figures carbon attributable to per member of

- staff is 4.84 tCO_2e
- student is 1.72 tCO_2e

[20] North Block GIA is 7,715m^2

[21] Duchy House GIA is 1,655m2

5.0 Carbon Reduction Projects

Following a detailed on-site energy audit of the North Block and Duchy House, (completed in January 2015) a number of carbon reduction projects have been identified. These range in investment requirements from low cost, to significant investments, and from quick wins to measures with longer paybacks.

In summary the total cost to implement all of the measures will be £172,000 and will save an estimated 230 tCO2e, which is a 31% saving over the 2011/2012 baseline. The carbon savings percentage noted in Table 6 are based on the carbon emissions calculated for, 2013/2014.

The overall projected savings over the baseline year, 2011/2012 is 38%, which includes the carbon emissions reductions (7%) made in the last two years (2012/2013 and 2013/2014). Table 6 summarises the energy savings measures that have been identified for The Courtauld, and the specific measures are presented in more detail in Table 7 The Gallery; Table 8 North Block and Table 9 Duchy House.

	Install Cost (£)	Annual kWh saving	Annual Carbon Saving (tonnes of CO^2)	Total saving (£)	% of Current Carbon footprint	Lifetime savings (£)	Simple payback (yrs)
Gallery	£25,310	64,119	27.96	£6,606	3.8%	£85,798	3.8
North Block	£145,362	565,052	195.67	£42,522	26.7%	£540,600	3.4
Duchy House	£1,000	32,186	6.14	£1,372	0.8%	£7,710	4.6
Total	£171,673	661,357	229.77	£50,500	31.3%	£634,107	3.4

Table 6: Summary result of energy saving measures

Somerset House is one of the most important buildings in London, The North Block, in which The Courtauld resides, was built between 1776 and 1801. The whole of Somerset House is Grade 1 listed, which places limitations on the energy saving works that can be carried out. The sensitive nature of the buildings architecture[22] has been taken into account during development of this CMP.

[22] See Appendix H for details of the buildings fabric

The measures recommended have also been reviewed against the *Courtauld Connects* project to make sure they are in line with the recommendations made for the change of layout and the mechanical and electrical interventions proposed.

During drafting of this CMP liaison with the Chief Conservator of The Gallery has taken place to understand the specific environmental requirements and conditions The Gallery is required to maintain.

In addition liaison with Somerset House Trust estates team has taken place to establish if there are any site wide energy reduction measures that The Courtauld could link into and or benefit from. Whilst Somerset House Trust has confirmed it is about to start on an installation of a Combined Cool and Heat Plant (CCHP) unit, this has been sized specifically to meet the needs of the estate but excluding the North Block. Thus, at present there is no capacity within the system as designed, for The Courtauld to join in this scheme. However, if in the future spare capacity from the CCHP installed is identified, Somerset House Trust has informally advised it would be open to the opportunity to add the North Block in to the scheme.

Tables 7, 8 and 9 overleaf detail the full list of energy saving measures The Courtauld should implement. The recommendations have been split between Duchy House, The Gallery and the rest of the North Block.

The measures have been ordered by their payback period, and are based on the following assumptions:

- All costs included are exclusive of VAT and are at present day costs (March 2015).
- The total savings include CRC saving cost, at the current rate of £16.40 per tonne of CO_2.
- Full calculation details and assumptions are included in Appendix B.

The Gallery – Table 7 No.	Measure	Install Cost (£)	Annual kWh saving	Annual Carbon Saving (tonnes of CO^2)	Total saving (£)	% of Carbon footprint	Measure lifetime (yrs)	Lifetime savings (£)	Simple payback (yrs)	Impact / Logistical / Operational issues	Risk / Impact	Value	Salix Funding eligible
1	Up-grade gallery exhibition track lighting to LED replacement. Savings based on current exhibition display, this will vary depending on configuration of display lamps. This is a lamp replacement recommendation based on an indicative lamp only.	£4,305	25,386	12.5	£2,998	1.7%	10	£29,982	1.4	Likely to need out of hours working. Working generally off a ladder or platform.	Low	Medium - High	Yes
2	Up-grade gallery spot lighting above picture frames to LEDs.	£1,525	8,793	4.3	£1,038	0.6%	10	£10,385	1.5	As above	Low	Medium	Yes
3	Up-grade candle lamps on gallery chandeliers, with Heritage Lighting lamps, specifically developed for use in heritage buildings.	£1,410	7,862	3.9	£929	0.5%	15	£13,929	1.5	As above	Low	Medium	Yes
4	Replace fluorescent strips around the ceiling lighting with LED strip lights. Actual number to be clarified, assumed 20 5tf T8 lamps.	£670	2,228	1.1	£263	0.2%	15	£3,947	2.5	As above	Low	Low	Yes

5	Incorporate opening windows within lantern lights at top of stairs and use two opening vents on thermostatic opening devices to vent out hot air.	£10,000	7,779	3.8	£919	0.5%	15	£13,781	10.9	Undertake as part of the *Courtauld Connects* project. Cost stated is an indicative cost for the planning and undertaking of the works.	Medium	Medium	No - not eligible
6	Repair and draught proof all sash windows and shutters in the Gallery with ventrolla or similar.	£7,400	12,072	2.2	£459	0.3%	30	£13,774	16.1	Will need to be carried out when the Gallery is closed.	Medium	Medium	No - payback period too long
Total		**£25,310**	**64,119**	**27.96**	**£6,606**	**3.8%**		**£85,798**	**3.8**				

North Block – Table 8 No.	Measure	Install Cost (£)	Annual kWh saving	Annual Carbon Saving (tonnes of CO2)	Total saving (£)	% of Carbon footprint	Measure lifetime (yrs)	Lifetime savings (£)	Simple payback (yrs)	Impact / Logistical / Operational issues	Risk / Impact	Value	Salix Funding eligible
7	Close dosing pots in the boiler rooms in North Block and Duchy House, as this is currently acting as a radiator.	£0	14,400	2.7	£548	0.4%	1	£548	0.0	Little or no impact. Implement via maintenance contract	Very Low	Very Low	No - not eligible
8	Request tap down on onsite LV transformer by DNO (current voltage running at 244v).	£500	31,115	15.4	£3,675	2.1%	15	£51,340	0.1	The electrical supply would possibly need to be turned off to make the change at the transformer. Would need to be planned to make sure all electrical equipment is safely powered down prior to the change.	Low	High	Yes
9	Use low loss REVO filters to Air Handling Units. These are more efficient and reduce energy consumption by the fans.	£200	11,563	5.7	£1,366	0.8%	1	£1,366	0.1	Little or no impact. Implement via maintenance contract	Low	Low	No - not eligible

10	Optimise BMS system based on the settings reviewed in the BMS SET strategy.	£1,500	137,664	41.5	£9,388	5.7%	5	£46,942	0.2	Can be undertaken during normal hours.	Low	High	No - not eligible
11	Repair TRVs that have failed. Such as in stair lobbies in the conservation studios	£1,000	38,400	7.1	£1,461	1.0%	15	£21,908	0.7	Little or no impact. Implement via maintenance contract	Low	Medium	No - not eligible
12	Insulate exposed flanges, valves and pipework to boiler rooms in North Block.	£3,100	72,471	13.4	£2,756	1.8%	10	£27,564	1.1	Little or no impact	Low	Medium - High	Yes
13	Insulate exposed pipework in the Seminar room and the x-ray room.	£1,182.	18,752		£808	1.3%	10	£8,083	1.5	Little or no impact	Low	Medium - High	Yes
14	Re-lamping to the Library with LEDs in areas with high usage and currently high wattage lamps	£12,036	4,517	22.2	£4,881	3.0%	15	£73,213	2.5	Likely to need out of hours working.	Low	High	Yes (But not for the T5 lamps, 16 in total)
15	Re-lamping to the North Block with LEDs in areas with high usage and currently high wattage lamps	£17,694	86,620	27.0	£5,951	3.7%	15	£89,271	3.0	There will be some disruption to change the lamps. Would need to work around teaching sessions.	Low	High	Yes (But not for the T5 lamps, 46 in total)

16	Install PIR in toilets to reduce out of hours use. Assumed one PIR per toilet suit.	£550	1,429	0.7	£169	0.1%	15	£2,532	3.3	Impact on Institute will be minimal.	Very Low	Low	Yes
17	Relocate external heat rejection units for chillers to less polluted space. Suggested location is on the roof, but final location would need to be further investigated. This in an indicative cost only.	£25,000	46,673	23.1	£5,512	3.1%	15	£82,685	4.5	Potential difficulties with planning finding a suitable location. This would best being undertaken as part of the master plan. The cost stated is a indicative cost for the planning and undertaking of the works.	Medium	High	No
18	Install variable speed pumps to replace the current pumps in main pump room that are not VSD controlled.	£16,000	14,910	7.4	£1,612	1.0%	15	£24,178	9.9	When replacing the pumps, ensure only one pump is removed from service at a time, to ensure continual running of the systems.	Low	Medium - High	No - payback period too long
19	Incorporate opening windows within lantern lights at top of stairs, and use two opening vents on thermostatic opening devices to vent out hot air. This in an indicative cost only.	£10,000	7,779	3.8	£919	0.5%	15	£13,781	10.9	This would best being undertaken as part of the master plan. The cost stated is an indicative cost for the planning and undertaking of the works.	Medium	Medium	No - not eligible

20	Repair and draught proof all sash windows and shutters in the North Block with ventrolla or similar.	£44,600	72,758	13.5	£2,767	1.8%	30	£83,019	16.1	Will be some disruption to room occupants, as the windows will need to be removed to carry out the works. But if planned well, can be carried out when rooms are unoccupied.	Medium	High	No - payback period too long
21	Open up fire places in 18 of the university rooms to then use the chimney for passive stack heat rejection system in summer. This would enable the removal of portable cooling units currently required to reduce overheating. This will require a detailed study to confirm exactly how this will be achieved.	£12000	6000	3.0	£709	0.4%	20	£14,173	16.9	This would best being undertaken as part of the master plan, the impact on the specific rooms is likely to be medium. The cost stated is a indicative cost for the planning and undertaking of the works.	Medium	Medium	No - not eligible
		£145,362	**565,052**	**195.67**	**£42,522**	**26.7%**		**£540,600**	**3.4**				

Duchy House – Table 9 No.	Measure	Install Cost (£)	Annual kWh saving	Annual Carbon Saving (tonnes of CO^2)	Total saving (£)	% of Carbon footprint	Measure lifetime (yrs)	Lifetime savings (£)	Simple payback (yrs)	Impact / Logistical / Operational issues	Risk / Impact	Value	Salix Funding eligible
22	BMS adjustments to heating settings	£500	29,165	5.4	£1,109	0.7%	5	£5,546	0.5	Little or no impact, should be part of maintenance plan	Low	Low	No - not eligible
23	BMS adjustment to laundry fan settings	£250	591	0.3	£170	0.04%	10	£1,701	1.5	Little or no impact, should be part of maintenance plan	Low	Low	No - not eligible
24	BMS adjustments to hot water settings	£250	2,430	0.4	£92	0.1%	5	£462	2.7	Little or no impact, should be part of maintenance plan	Low	Very Low	No - not eligible
		£1,000	**32,186**	**6.14**	**£1,372**	**0.8%**		**£7,710**	**4.6**				

Appendix A: Baseline emissions calculation

The baseline carbon emissions were calculated using the consumption data from the gas and electricity usage at the North Block and Duchy House. This data supplied by The Courtauld is from billing data. The total emissions from the year 2011/2012 from each utility was summed and converted in to carbon emissions using the conversion figures used by The Courtauld.

The raw data and the calculations are shown in the tables below.

2011/2012	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Total kWh
Institute Electricity	91,632	86,883	94,032	95,962	97,515	105,189	104,126	105,806	97,361	102,173	86,931	93,026	1,160,637
Institute Gas	362,175							500,748		70,167	2,038	11,843	946,971
Duchy Electricity	6,069	5,205	8,055	8,525	7,071	8,927	9,853	8,180	7,316	8,081	7,267	6,225	90,774
Duchy Gas	7,792	8,942	15,255	26,871	28,699	32,899	32,210	19,336	26,997	10,377	7,889	5,960	223,227
Total													2,421,609

Appendix A: Table 2: Gas and electricity consumption from energy bills

Baseline 2011/2012	kWh		
	North Block	Duchy House	Total
Electricity	1,160,637	90,774	1,251,411
Gas	946,971	22,3227	1,170,198
Total	2,107,608	314,001	2,421,609
%	87%	13%	

Appendix A: Table 3: Total of the kWh used in 2011/2012

Baseline 2010/2011	$kgCO_2$		
	North Block	Duchy House	Total
Electricity tCO2e	534	42	576
Gas tCO2e	175	41	217
Total	709	83	792
%	90%	10%	

Appendix A: Table 4: Total carbon emissions for 2011/2012

Appendix B: Scope 1, and 2 emissions calculation and methodology

Calculation for Scope 1 and 2 for current year (2013/2014) was carried out by taking the total energy usage from gas and electricity from the two sites in kWh and converting them into carbon emissions for the current year 2013/2014. The results are in the tables below.

2013/2014	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Total kWh
Institute Electricity	86,942	87,857	93,115	101,508	50,829	94,019	86,944	93,398	81,866	86,544	86,232	87,918	1,037,172
Institute Gas	121	0	5,293	90,553	128,398	121,218	115,398	94,220	53,136	50,354	2,351	45,878	706,920
Duchy Electricity	6,074	5,760	8,477	8,468	7,414	8,752	8,415	8,658	7,442	8,467	7,630	6,145	91,702
Duchy Gas	7,110	11,416	18,382	28,496	32,625	35,240	33,140	31,654	15,100	13,284	1,682	14,914	243,043
Total													2,421,609

Appendix B: Table 1

2013/2014	tCO_2e		
	North Block	Duchy House	Total
Electricity tCO_2e	513	45	558
Gas tCO_2e	131	45	176
Total	643	90	734
%	88%	12%	

Appendix B: Table 2: Total carbon emissions from 2013/2014

Appendix C: Scope 3 emission calculation, methodology and assumptions

The Courtauld's Scope 3 emissions have been estimated following the 2014 Defra Environmental Reporting Guidance. The principles in the Guidance include:

- Identify the amount spent on different products and services categories.
- Multiply the amount of spending by the Defra conversion factors to get total emissions relating to the production of products or delivery of services.

The Courtauld Finance ledger was used to breakdown the financial year spent per cost code. The Defra principle and emissions factors were then applied to the spend per cost code. For some cost codes, the nature and characteristics of the expenditure/claim were reviewed and assessed to verify that the appropriate Defra Emissions Factors (EF) were used.

Cost code 3750 Field Course Costs/ Expeditions (Student travel). The following criteria were used:

- For expenditure/claims above £500, the Defra EF for air transport was used
- For expenditure/claims lower than £500, the Defra EF for printing was used
- Specific claim/expenditure related to course tutor or external academic fees were removed from the spend considered for the analysis.

Cost code 2230 Travel & Subs Exps (Staff travel). The following criteria were used:

- For expenditure/claims above £200, the Defra EF for air transport was used
- For expenditure/claims lower than £200, the Defra EF for printing was used

Year	2014																
		2014 annual spent				Defra EF	Defra EF										
Accoun	Account (T)	Sum of Amount	£	tco2	Adjustments	Code	kg CO2/£	Procurement Category		Comments on procurement Category							
2071	Temp / Agency staff not on payroll	178,655	178,655	143			0.8			Staff							
2072	Occasional Lecturers	2,959	2,959	2			0.8			Staff							
2073	Examiner's/Exam fees and expenses	18,781	18,781	15			0.8			Staff							
2074	Other staff costs	24,368	24,368	19			0.8			Staff							
2075	Staff Restructuring Costs	11,686	11,686	9			0.8			Staff							
2181	PHD Supervision Fee	6,545	6,545	5			0.8			Staff							
2210	Staff Recruitment Costs-Advertising	10,013	10,013	2	2	UK-68	0.17	Marketing & Advertising		Marketing							
2230	Travel & Subs Exps	59,129	59,129	169	93	UK-58	2.86	Staff travel	0.9272	Travel including all modes, taxi, train, air							
2235	Accommodation & Relocation	5,798	5,798	3	3	UK-54	0.49	Others		Accomodation of visiting professors							
2240	Functions, entertaining, hospitality	21,546	21,546	11	11	UK-54	0.49	Others		Functions, entertaining, hospitality of visitors							
2245	Board and Committee Meetings costs	1,507	1,507	1	1	UK-54	0.49	Others		Functions, entertaining, hospitality of visitors							
2250	Training and Development	38,093	38,093	6	6	UK-68	0.17	Marketing & Advertising		Marketing of the institute for prospective students							
2300	Rent	671,757	671,757	537			0.8			Renty of duchy house							
2307	Student Travel	6,515	6,515	6	6	UK-56	0.95	Student travel	1.1%	Travel grants for student, usually £100 each, can be train or air							
2310	Rates	64,312	64,312	51			0.8			Council tax							
2400	Sykes PPM	171,581	171,581	29	29	UK-68	0.17	Maintenance		Maintenance, mainly time of people for reactive maintenance							
2402	Maintenance Contracts	100,430	100,430	31	31	UK-75	0.31	Maintenance		Mainly laundry and milk delivery							
2500	Insurance	216,050	216,050	60	60	UK-62	0.28	Insurance		Insurance services							
2600	Minor Repairs and Renewals	208,441	208,441	25	25	UK-64	0.12	Maintenance		maintenance and repair, bit of paints..etc							
2700	Security	530,123	530,123	90	90	UK-68	0.17	Security Services		Security services							
2701	Security- Non Contract	12,740	12,740	2	2	UK-68	0.17	Security Services		Security services							
2702	Security- Rechargeable	1,582	1,582	0	0	UK-68	0.17	Security Services		Security services							
2800	Cleaning	162,430	162,430	50	50	UK-75	0.31	Maintenance		cleaning services							
2805	Photographic Prints/Slides	107	107	0	0	UK-15	0.36	Printing and stationary		Printing							
2807	Photographic	16,635	16,635	6	6	UK-15	0.36	Printing and stationary		Printing							
2900	Electricity	133,498	133,498	641		UK-47	4.8			electricity							
2910	Gas	36,248	36,248	74		UK-48	2.03			gas							
2920	Water	15,589	15,589	7		UK-49	0.44			water							
2930	Telephones	41,738	41,738	17	17	UK-60	0.41	IT and Phone services		Telephone expenses							
2933	Printing/ duplication/photocopying costs	81,139	81,139	29	29	UK-15	0.36	Printing and stationary		Printing							Sc
2935	Postage	42,886	42,886	18	18	UK-60	0.41	IT and Phone services		post							
2936	Uol charges-fed sub,accomm office,careers,library	110,346	110,346	88			0.8			uni of london subscription fee							
2937	Photocopying	10,769	10,769	4	4	UK-15	0.36	Printing and stationary		Printing, photocopying							
2939	Reports, Stationery	34,027	34,027	12	12	UK-15	0.36	Printing and stationary		Stationnary							
3000	Computer Supplies	13,298	13,298	3	3	UK-66	0.2	IT and Phone services		IT services							
3100	Books & Publications	209,774	209,774	76	76	UK-15	0.36	Printing and stationary		Printing							
3101	Stationery	116,386	116,386	42	42	UK-15	0.36	Printing and stationary		Stationnary							
3200	Computing and Systems	190,967	190,967	38	38	UK-66	0.2	IT and Phone services		IT services							
3204	General website expenditure	7,394	7,394	1	1	UK-66	0.2	IT and Phone services		IT services							
3205	VLE RUNNING COST	2,940	2,940	1	1	UK-66	0.2	IT and Phone services		IT services				virtual learning env IT			
3210	Ticketing Costs	105,403	105,403	38	38	UK-15	0.36	Printing and stationary		Printing							
3220	Exhibitions / display equipment	433,192	433,192	1,239	1,239	UK-58	2.86	Goods travel in and out		Main cat for travel of goods in and out, include travel of goods and curator							
3221	Programme Costs/ Conferences and Seminars	123,783	123,783	45	45	UK-15	0.36	Printing and stationary		Printing and marketing							
3230	Storage / transport / other loan costs	47,884	47,884	17	17	UK-15	0.36	Goods travel in and out		storage services							
3250	Somerset House Joint Mktg Costs	1,916	1,916	1	1	UK-15	0.36	Marketing & Advertising		marketing							
3260	Advertising, promotions & visitor research	203,172	203,172	73	73	UK-15	0.36	Marketing & Advertising		Marketing, advertising							
3261	Cultivation	124,399	124,399	35	35	UK-74	0.28	Marketing & Advertising		Fund raising, marketing, advertising							

3265	donor Fulfilment	8,346	8,346	2	2	UK-74	0.28	Marketing & Advertising		Marketing, advertising				
3271	Corporate Publications	22,083	22,083	8	8	UK-15	0.36	Marketing & Advertising		Marketing, advertising				
3272	Market Research & Intelligence	1,755	1,755	1	1	UK-15	0.36	Marketing & Advertising		Marketing, advertising				
3273	Signage	526	526	0	0	UK-15	0.36	Marketing & Advertising		Marketing, advertising				
3300	External Audit Fees	68,988	68,988	12	12	UK-68	0.17	Consultancy services		Consultancy services for auditing accounts				
3301	Consultancy	342,753	342,753	58	58	UK-68	0.17	Consultancy services		General Consultancy services for auditing acco				
3302	Credit Card Charges	(4,658)	(4,658)	(4)			0.8							
3303	Bank charges	34,716	34,716	28			0.8							
3305	Health & Safety	18,846	18,846	3	3	UK-68	0.17	Consultancy services		General Consultancy services for H&S				
3307	Foreign Exchange Movement	28,392	28,392	23			0.8							
3313	Other Penalties / charges	38	38	0			0.8							
3322	Internal Audit	21,000	21,000	4	4	UK-68	0.17	Consultancy services		same as consultancy services, audit from Uni o				
3323	VAT Recovery etc	(88,866)	(88,866)	(71)			0.8							
3335	Bad Debt	12,296	12,296	10			0.8							
3340	Loan Interest	209	209	0			0.8							
3400	Research Committee Expenditure	(931)	(931)	(1)			0.8							
3413	Non Discretionary Research Grants	50,287	50,287	15	15	UK-67	0.3	Others		Money to academic for research activities				
3424	Other Core Seminar/Research Group Costs:WAH/MLOT/3D	1,935	1,935	2			0.8							
3431	Workshop Costs - Collections	492	492	0			0.8							
3441	Other Faculty Seminar Costs -Special Events	76	76	0			0.8							
3444	Exhibiting Research - Other Costs	207	207	0			0.8							
3451	Courtauld Seminars - Period Specific	2,170	2,170	2			0.8							
3452	Courtauld Consortia	200	200	0			0.8							
3453	Courtauld Seminars - Medium Specific	811	811	1			0.8							
3455	Collaborative/Roving Seminars - Other Costs	638	638	1			0.8							
3461	Miscellaneous Conference Costs	14,944	14,944	7	7	UK-54	0.49	Staff travel		Some travel and some expenses mainly entert				
3463	Other Workshop Costs	1,628	1,628	1			0.8							
3464	Other Student-Led Conference & Workshop Costs	3,445	3,445	3			0.8							
3465	Lecturer Fees - Lectures & Lecture Series	3,719	3,719	3			0.8							
3466	Other Lecture Costs - Lecture & Lecture Series	11,859	11,859	9			0.8							
3468	Other Section/Department Lecture & Project Costs	3	3	0			0.8							
3481	Visiting Professor Fee/Stipend	1,387	1,387	1			0.8							
3482	Other Costs for Visiting Professor Events	729	729	1			0.8							
3484	Visiting Curator Fee/Stipend	1,566	1,566	1			0.8							
3485	Other Costs for Visiting Curator Events	533	533	0			0.8							
3491	Travel Grants -AAH Fellows	500	500	0			0.8							
3493	Catering Costs - Associate Scholars Events	904	904	1			0.8							
3500	Corporate Events	21,794	21,794	17			0.8							
3600	Scholarship Maintenance	272,165	272,165	218			0.8			for students, fee and maintenance				
3602	Scholarship Fees	581,089	581,089	465			0.8							
3605	Student visa fees	1,218	1,218	1			0.8							
3700	Depreciation	608,803	608,803	487			0.8			capital equip depre				
3701	Negative goodwill released	566	566	0			0.8							
3706	Maintenance provision	(218,865)	(218,865)	(175)			0.8							
3730	Book Conservation	2,504	2,504	2			0.8							
3731	Conservation	160,736	160,736	122	122	UK-26	0.76	Maintenance		Materials for conservatin of paintings				
3750	Field Course Costs/ Expeditions	254,650	254,650	728	563	UK-58	2.86	Student travel		travel mainly of students				
3751	Student research grants	4,094	4,094	3			0.8							
3752	Subscriptions	50,404	50,404	18	18	UK-15	0.36	Marketing & Advertising		Marketing, advertising				
3753	Licences	6,801	6,801	5			0.8							
3755	Student Union	18,843	18,843	15			0.8							
3757	Graduation Costs	34,989	34,989	13	13	UK-15	0.36	Marketing & Advertising		Marketing, advertising				

3759	TQEF funded by HEFCE grant	150	150	0			0.8						
3761	Bursaries re higher tuition fees	89,063	89,063	71			0.8						
3762	Language Courses	12,556	12,556	10			0.8						
3763	Research Training Grants	12,303	12,303	10			0.8						
3764	RTSG - Research Training Support Grant	3,661	3,661	3			0.8						
3801	Goodwill Recovery	5,999	5,999	5			0.8						
3900	Misc Expenditure	15,552	15,552	12			0.8						
3920	Coordination & administration	38	38	0			0.8						
3925	International Advisory Board	115	115	0			0.8						
3930	Collaborative expenditure	28,583	28,583	23			0.8						
3950	Commission fees payable	16,527	16,527	13			0.8						
3999	Sundry Adjustments	(29,400)	(29,400)	(24)			0.8						
Grand Total		**7,146,990**	7,146,990		2,930					6,559,802			92%

Appendix D: Template for producing consistent and regular consumption reports

An example spreadsheet template has been constructed, which The Courtauld will maintain to provide consistent records and consumption reports.

Z:\Carbon Reduction Commitment\Carbon Management Plan Project\Copy of Appendix D - Carbon emissions calc spreadsheet.xlsx

Appendix E: BMS SET strategy recommendations

North Block - Trend BMS SET review / Recommendations for improvement to the BMS strategy in the North Block

Assumptions:	
Label	**Area**
North Zone	Gallery
East Zone	Teaching areas
South Zone	Library
West Zone	Conservation Studios

Page	Type	Label	Description	Current setting	Recommended setting	Queries
4 of 20	Knob	K2	Water Frost Setpoint	12	8	
4 of 20	Knob	K3	Space Frost Setpoint	12	11	
5 of 20	Knob	K4	OAT EcoSetpoint	20	17	
5 of 20	F	F7	Hyst Band	2	1	
8 of 20	Knob	K10	Water Frost Setpoint	12	8	
9 of 20	Time Zone	Z2	South Zone Heating	06:00 - 23:00 Mon-Sun	09:00 - 21:00 Mon-Fri 09:00 - 18:00 Sat-Sun	
9 of 20	Optimiser	O2	South Zone Heating Optimiser			
			Warm Up limit	360	240	
			Cool down limit	0	60	
			Htg Start Elevation	-1	-1.5	
			Htg Stop Elevation	-1	-1.5	

Page	Type	Label	Description	Current setting	Recommended setting	Queries
9 of 20	G	G22	*South Heating Pump Enable*			Check the module is configured in seconds.
11 of 20	Knob	K15	South Min VT Flow	20	40	
11 of 20	Knob	K17	South Space Deadband SetP	1	2	
12 of 20	Time Zone	Z3	East Zone Heating	06:00 - 23:00 Mon-Sun	09:00 - 21:00 Mon-Fri 09:00 - 18:00 Sat-Sun	
12 of 20	Optimiser	O3	East Zone Heating Optimiser			
			Warm Up limit	360	240	
			Cool down limit	0	60	
			Htg Start Elevation	-1	-1.5	
			Htg Stop Elevation	-1	-1.5	
14 of 20	Knob	K18	East Min VT Flow	20	40	
14 of 20	Knob	K22	Water Frost Setpoint	12	8	
14 of 20	F	F36		E1 F1	E2 F2	
15 of 20	Time Zone	Z3	West Zone Heating	06:00 - 23:00 Mon-Sun	09:00 - 21:00 Mon-Fri 09:00 - 18:00 Sat-Sun	
12 of 20	Optimiser	O4	West Zone Heating Optimiser			
			Warm Up limit	360	240	
			Cool down limit	0	60	
			Htg Start Elevation	-1	-1.5	

Page	Type	Label	Description	Current setting	Recommended setting	Queries
			Htg Stop Elevation	-1	-1.5	
15 of 20	G	G50	*West Heating Pump Enable*			Check the module is configured in seconds.
17 of 20	F	F41				Input from K22D, should be Min VT@40degrees C, not Water Frost Set Point.
17 of 20	F	F46		E1 F1	E2 F2	
19 of 20	Knob	K6				Should be changed to be on a compensated set point, e.g. +5 degrees of VT.
21 of 20	G	G2				Check the units of 'off delay' are these in seconds? If yes, good.
22 of 20	Time Zone	Z6	Negatie Stopre A/C Unit Enable	08:00 - 20:00	00:00 - 23:59	To maintain constant conditions, should this be on 24/7?
22 of 20	Time Zone	Z5	Toilet Vent Timezone	08:00 - 18:00 Mon-Sun	09:00 - 18:00 Mon-Sat Off - Sun	
22 of 20	Loop	L5				Check 'Gain' and 'Intergral Time' - need to be reset as it looks like it has wound itself up.
All						Adjust total number of pages to 22

Page	Type	Label	Description	Current setting	Recommended setting	Queries
6 of 14	Knob	K4	Outside heating hold off	18.5	17	
6 of 14	Knob	K5	Inside high set point	23.9	21	
6 of 14	Knob	K3	Room SP	24	21	
6 of 14	Zone	Z2	Heating time zone	00:00-23:59 Mon-Sun	00:00 - 10:00, 16:00 - 23:59, Mon-Sun	
6 of 14	Optimiser	O2	HTG Opt (Heating optimiser)	Warm up limit - 360 mins	120 mins	This means the heating can only come on up to 2 hours before required. Otherwise they can come on up to 5 hours before.
6 of 14	Optimiser	O2	HTG Opt (Heating optimiser)	Cool down limit - 0 mins	60 mins	This means the heating can be turned off up to 1 hour before the timezone indicates if there is enough heat in the building.
6 of 14			Compensated boiler flow control			There does not appear to be any VYT slope but this may be as there is no VT valve, in which case we suggest that the boiler flow temp is adjusted to the outside air (compensated) so that when outside air is 15 deg C boiler flow temp is 65 (needed for HWS) and when it was -5 OAT then it is up to 80 deg C on a compensation slope.
8 of 14	Knob	K7	Boiler flow temp	80	75	
11 of 14	Zone	Z3	HWS timezone	00:00-23:59 Mon-Sun	05:00 - 00:00 Mon-Sun	
11 of 14			Hot water set point			There does not appear to be a hot water set point in the strategy. This should be added and set to 60 degrees C.
13 of 14	Zone	Z5	Building Fans Time Zone			Provide the laundry (D10) with its own timezone. Run from 08:00 - 00:00 Mon-Sun.

Appendix F: Offsetting strategy structure

Company's carbon offsetting strategy to select carbon offsets and providers can be based on the seven categories listed in the table below. Company carbon neutrality strategy is driven by company publicity and reputational positioning and the strategy is geared towards achieving these objectives.

	Category	Recommendation	Comment/benefit
1	Project Type (Generating credits)	Renewable energy	Easier to prove emissions reductions Long-term benefits
2	Standard used (by which emissions reduction are measured and certified)	The Voluntary Gold Standard or Voluntary Carbon Standard	Provide minimum quality assurance Ensure projects comply to recognised standards Higher credit price but more cost effective
3	Project location	Developing countries	Easier to initiate project in developing countries Sustainable development benefits
4	Additional benefits (optional)	Add additional benefit criteria for selecting project	CSR position improvement Positive Public Relations Potential staff involvement/identification in the project
5	Aggregation (credits generated through portfolio of projects or single projects)	Add a single project criterion for project selection	Simplifies offsetting process Good message for PR
6	Provision of guarantees	Credits certified by The Voluntary Gold Standard or Voluntary Carbon Standard (VCS)	Protect against non-delivery of project Insurance when necessary
7	Labelling	Offset provider with an approved/ recognised neutrality stamp	Official recognition of status Can be placed on company documents

Company - Articulation for a carbon offsetting strategy.

Each category's definition is detailed below.

Establish reasons for buying offsets

- Part of overall carbon management strategy

- Part of carbon neutrality strategy driven by company publicity and reputational positioning.

Identification of offsets to buy

There are seven key categories to look at when defining the type of offsets to buy.

Project type: carbon offsets are generated from projects that avoid or absorb/sequester greenhouse gases. These projects can take various forms including renewable energy, energy efficiency, fuel switching…etc.

Standards used: These are the Standards by which the offsets are measured and ensure that credits generated from emissions reduction projects are equivalent to each other, standards have been developed that regulate carbon offsets. These define the main characteristics that offset projects should comply with to guarantee their integrity, especially regarding additionally and verification. In the voluntary market (applicable to Company), there is no equivalent to a defined standard or rule of engagement. Instead, there are a variety of standards, protocols, and verification methods, most of them proprietary to each offset provider. Recently there has been some effort to provide harmonisation of the voluntary market through the development of two independent standards:

The Voluntary Gold Standard (Swiss-based non-profit foundation providing high quality carbon credit label, http://www.cdmgoldstandard.org/

Voluntary Carbon Standard by the Climate Group providing a robust, new global standard for voluntary offset projects http://www.v-c-s.org/

- *Project location*: Project avoiding greenhouse gases can be located in the UK or in developing countries. Additionally is easier to demonstrate for project in developing countries and have sustainable development benefits

- *Additional benefits*: Some projects have additional benefits such as sustainable development for communities improving the CSR position, providing positive Public Relations (PR) items or staff involvement/identification in the project.

- *Aggregation*: Credits can be generated through portfolio of projects or single projects. Single projects can provide positive PR, CSR position and staff identification/involvement.

- *Provision of guarantees*: guarantees needs to be provided against non-delivery of project or insurance when necessary.

- *Labelling*: Offset label provide positive PR.

Appendix G: Carbon and cost related illustration example

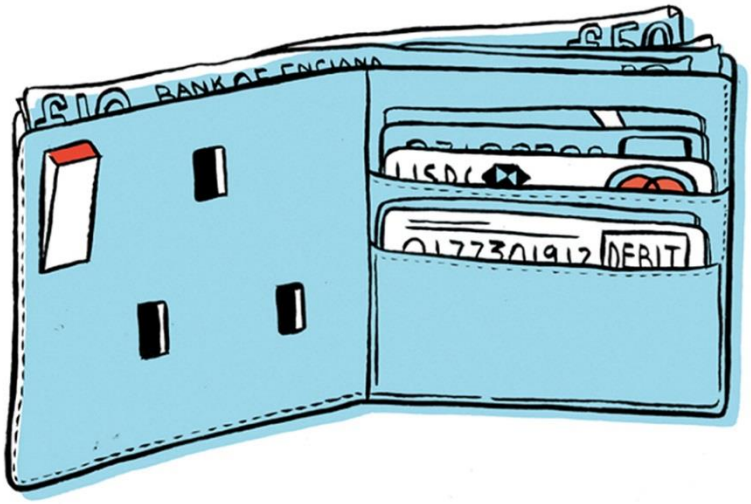


Illustration by Patch Plummer

Appendix H: North Block and Duchy House building fabric and floor plans

1.0 The Courtauld Institute of Art (The Courtauld) is an independent college of the University of London. The Courtauld is one of the world's leading centres for the study of the history and conservation of art and architecture, art research and restoration activities and its Gallery houses one of Britain's best-loved collections.

2.0 The Courtauld Institute of Art occupies the North Block of Somerset House, which is located on the south side of the Strand opposite Aldwych and is the 8th largest visitor attraction in London.

3.0 Somerset House was designed by Sir William Chambers and the original building was constructed during a period extending from 1776 to 1801. It is built around a large quadrangle and the principle use in more recent times has been as offices for various government departments. The free standing North Block was completed by c1780.

4.0 The North Block was initially built as several properties that have overtime been modified and internally linked. North Block was the original home of the Royal Academy, The Royal Society and later the Society of Antiquities.

5.0 The main structural elements of the building compromises, mainly timber beams and bond timbers supporting and tying in the brickwork with carved stonework elevations and embellishments. The roofs have Westmorland or Welsh slate covered pitches and mainly lead covered flat roofs, hips and other detailing but with copper clad roofs over the central block. The exception to this is part of the West Wing, possibly a later extension, which has stock brick elevations with stone courses and architraves around some windows, under slate mansards and lead covered crown roofs. The floors in this part unusually incorporate cast iron beams and members.

6.0 Internally, the North Block is principally constructed of load-bearing masonry with most ceilings and wall surfaces finished in plaster.

7.0 The North Block of Somerset House is configured over 7 storeys comprising two floors below ground level (basement and lower ground floor) and four above (Mezzanine, First, Second and Third).

8.0 Due to Somerset House's historic and architectural significance, it is listed Grade 1.

9.0 The Courtauld Institute of Art relocated to Somerset House during the late 1980's. The Courtauld occupies North Block on a 100 year lease from July 1987, via the University of London. The Landlord is Somerset House Trust.

10.0 The North Block equates to approximately a gross area of c7,715m^2.

11.0 North Block floor plans are below:


141297-A1L-Somers et House Basement F


141297-A1L-Somers et House Lower Grou


141297-A1L-Somers et House Ground Floc


141297-A1L-Somers et House Mezzanine a


141297-A1L-Somers et House Second and

12.0 In addition to North Block, The Courtauld occupies 2-4 Lancaster Place (133 Strand) referred to as Duchy House. This property provides 64 student bed-spaces with communal shared kitchens and common rooms. This building was refurbished in c2009/2010.

13.0 The Courtauld occupies Duchy House on a 30 year lease from June 2010. The Landlord is the Duchy of Lancaster.

14.0 Duchy House equates to approximately a gross area of c1,655m^2.

15.0 Duchy House floor plans are below


141297-A2000-Lowe r Basement - Ground.


141297-A2001-First Floor.pdf


141297-A2002-Seco nd Floor.pdf


141297-A2003-Third Floor.pdf


141297-A2004-Fourt h Floor.pdf