THE CAMBRIDGE carbon CHALLENGE

The Cambridge Carbon Challenge: Brief

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The Cambridge Carbon Challenge is a competition for Cambridge staff and students to generate new ideas for reducing building energy use and associated carbon emissions across the University of Cambridge estate. The initiative intends to harness both academic expertise and operational experience from across the University to identify new or previously untested methods for reducing energy use further.

Aims of the Cambridge Carbon Challenge

1. Harness expertise
    - Draw on research and operational knowledge from across the University of Cambridge to improve the way we manage our estate.
    - Encourage good ideas and move them through to workable solutions, bringing new pathways of involvement from amongst students and departmental staff in liaison with Estate Management staff.

2. Improve environmental performance
    - Contribute to reducing energy-related carbon emissions of the University of Cambridge.
    - Test new approaches that have not been utilised or tried within the University of Cambridge context before or that are new and ground-breaking in approach (whilst also being implementable).

3. Increase capacity (to reduce carbon)
    - Provide staff and students with an opportunity to develop new skills and gain practical experience and insights into project implementation.
    - Foster greater collaborative working between the different communities of the University and support multi-disciplinary approaches to carbon management.

Context and background

The University of Cambridge is accountable for both direct and indirect carbon emissions; it measures these every year to help monitor and reduce our impact on the environment. Carbon emissions are categorised as follows:

- Scope 1: emissions arising directly from sources that are owned or controlled by the University e.g. from fuels used in our boilers or the vehicles that departments own
- Scope 2: emissions generated by purchased electricity consumed by the University
- Scope 3: emissions that are a consequence of the activities of an organisation but occur from sources not owned or controlled by the organisation. This includes emissions associated with waste, water, business travel, commuting and procurement.

Please note that the Carbon Challenge is focusing on Scopes 1 and 2 emissions this year.

The University aims to reduce scope 1, 2 and 3 carbon emissions while supporting the University's plans for growth in research activity and staff and student numbers. The University's current targets are:

- To reduce carbon emissions from energy use by 34% by 2020 against a 2005 baseline
- To be carbon neutral from energy use by 2050

The Energy and Carbon Reduction Project (ECRP) is an initiative that funds projects to reduce energy use and carbon emissions across the University estate. It has an annual budget of £2 million and has been running since 2011. Further information and information about past projects that have been supported can be found here: http://www.environment.admin.cam.ac.uk/ecrp.

The Living Laboratory for Sustainability (Living Lab) provides opportunities for students to improve sustainability on the University estate, through projects, internships and research. Further information can be found here: http://www.environment.admin.cam.ac.uk/living-lab

One of the aims of the Living Laboratory for Sustainability is for research projects to be used to inform practical operations and to enhance efforts towards environmental sustainability; one of the founding aims of the ECRP was to pilot new and innovative approaches to carbon reduction.

The Carbon Challenge draws together these two initiatives and their aims in a collaborative project, to foster and strengthen links between academic expertise and operational knowledge held across the University and how the University manages and utilises its estate.

Who can participate?

Any member of staff or student at the University of Cambridge can participate, within teams of 3-6 people. This includes undergraduates, post-graduates, post-docs, academics and support staff. The more diverse the team, the better it is!

Benefits of being involved

- Contribute to the University's efforts to reduce emissions across the University estate.
- Develop an idea into a defined project that can be applied in a real-life context.
- Increase links and collaborations with others around the University.
- Develop experience in the practical implementation of projects.
- Enhance skills such as team work, project planning and management, and development of a business case.
- Receive expert input and mentoring support.
- Gain recognition for and promotion of your idea/proposal by a world-leading institution.

Examples of projects eligible for support through the Carbon Challenge

The following list outlines examples of the different types of projects that would be eligible for development and support as part of the Carbon Challenge:

- Projects that help to reduce the energy use associated with plug-in research equipment
- Projects that encourage and support equipment and resource sharing
- Projects that support efficient use of the University estate (e.g. efficient space utilisation, the introduction of core hours, shared facilities etc.)
- Behavioural change initiatives, that encourage and support staff and students to reduce the energy use and carbon emissions associated with their work and research.
- Building efficiency projects (projects that reduce electricity and /or gas use)
- Renewable or low carbon technology energy generation projects

How to get started

Register your team by 1 November by filling in this online form.

Note that if you are looking to find team members, please email living.laboratory@admin.cam.ac.uk by 25 October, in order to be put in touch with other interested individuals.

How the Carbon Challenge works

There are different stages to the competition, set out in the diagram on page 6. The challenge will run in two main stages:

- **Stage 1** involves developing a proposal to present to a judging panel on 8 December alongside a 1-2 page summary for the judges' prior review (using the template in Annex A). The panel consists of experienced operational and academic staff (details below) who will evaluate the proposals, shortlist projects to go forwards to the next round, and present the awards at the end of the year. The judging panel will confirm selections for the next stage before Christmas (according to the criteria set out below and in Annex B). Teams can apply at this stage for a small budget to help them to develop their proposal further and into stage 2, if needed.

- **Stage 2** will see further development of the selected proposals by teams (including consulting relevant stakeholders, carrying out any trials etc., liaising with the ECRP team to confirm the project meets all criteria necessary for approval). Teams will submit these proposals as full business cases by 27 March for review by the judging panel. A week later, teams will present their business case to the judging panel, on 3 April. The judging panel will

determine which business cases are approved for full funding and implementation on the University estate[1]. The judging panel will also decide on the overall winning team.

- **Final event:** In June, there will be an awards event where the overall winning team of the competition will be announced to receive the Cambridge Carbon Challenge Award. There will also be a presentation of successful projects.

Throughout the two stages, teams will have the opportunity for one-off meetings with mentors from academia, industry and Estate Management, depending on the areas they would like some guidance on. These meetings will be facilitated by the Carbon Challenge coordinators.

Successful projects that are approved for full funding and implementation will be taken forwards by Estate Management, in consultation with the team. We will involve team members where possible in project implementation. However, this may not be appropriate in certain circumstances. Please refer to the terms and conditions of Award and Funding below.

The full timeline is set out on the next page.

[1] Subject to Estate Management processes and timescales. Please note: for projects judged to be successful that are under £250k the panel will approve funding; for projects judged to be successful that are over £250k the panel will recommend them to the Environmental Sustainability Strategy Committee for approval.

STAGE 1

Launch - 18 October 2016

- Brief is provided, criteria and process are explained
- Ideas are discussed, teams are encouraged to form

Register team - 1 November 2016

- Submit the online application form to register your team for the Cambridge Carbon Challenge

Proposal development - Michaelmas term 2016

- Teams develop their proposals, consulting relevant people
- Guidance from mentors, E&E team; 'clinic' on **10 November** for generating ideas, checking ideas, receiving advice (details will be sent to registered teams)
- Submit proposal by **28 November**

Judging panel - 8 December 2016

- Presentation of proposals by participating teams
- Selections made by judges based on criteria outlined below

Shortlisting

STAGE 2

Business case development - Lent term 2017

- Successful proposals are worked up into a full business case
- Support from ECRP team and mentors
- Submit business case by **27 March**

Judging panel - 3 April 2017

- Teams present their business case to judging panel
- Selections made according to ECRP business case criteria (see below)

Approval

Project implementation - May 2017 onwards

- Action plan developed for projects that are approved
- Full implementation by EM, subject to EM timescales/processes

Final event and awards - June 2017

- Presentation of successful projects
- Networking, sharing experiences
- Winning team announced

Overall winner

Eligibility and criteria

Teams

- Teams must be made up of between 3-6 people who are working for or studying at the University of Cambridge (evidenced by a current University ID card).
- Teams should aim for diversity in their membership (e.g. a mixture of support staff and academic staff, a spread of academic disciplines, combination of staff and students etc).
- Teams should aim to have at least one post-graduate member if possible.

- Teams should aim to work with an academic member of staff and their research if relevant to the nature of the proposal.

Criteria for proposals at stage 1

- Proposals must be focused on solutions for University of Cambridge operational buildings and estate (this includes departments, University offices and research institutes but NOT Colleges).
- Teams must demonstrate their proposal is implementable within the University estate (e.g. has it been done somewhere before? Any trials or pilots carried out? Rationale to explain the potential for implementation?).
- Consideration must be given to risks associated with implementation, including ways to mitigate any risks.
- Focus on scope 1 and/or 2 emissions only (see 'Context and background' for definitions).
- Proposals are given preference where they link with current research, particularly if this research is taking place at the University of Cambridge.
- Teams must identify within the proposal who they need to consult with in the University context to make the project feasible for taking forwards.
- The proposal must state any funding required for further proposal development in stage 2; please note the reasonableness of the request for funding will form part of the decision making.

Shortlisting of Stage 1 entries

The proposal must take the form of a 5-10 minute presentation to the judging panel on **8 December**, supported by a 2-page brief using the template in Annex A. The 2-page brief should be submitted to the judges via email (living.laboratory@admin.cam.ac.uk) by **28 November** (10 days prior to the judging panel).

Note that teams can apply at stage 1 for a small budget to help them to develop their proposal further and into stage 2, if needed.

Proposals at stage 2

- Proposals must fulfil the criteria for proposals at stage 1
- Teams must complete an ECRP business case for their proposal. Example forms for submitting a business case are available here: http://www.environment.admin.cam.ac.uk/what-are-we-doing/carbon/ecrp/ecrp-funding-applications . Please note the form you fill in will depend the nature of your proposal; we can advise on which one you should use.

Approval of Stage 2 entries

Completed ECRP business cases must be submitted by **27 March 2017**. Each of the successful project teams will be required to present on their project business case to the judging panel on **3 April 2017**.

Stage 2 entries will be considered for approval with reference to the standard ECRP assessment criteria, as set out below:

1. Additionality

Investments made from the ECRP are intended to deliver benefits from new activity, which are additional to those that would occur anyway. ECRP funding cannot be sought to fund existing activities, or for use in place of existing departmental budgets, although ECRP can provide top up funding to departmental budgets, where this is needed to deliver a more energy efficient solution. Applications for funding must demonstrate that they are for new activity and not replacing funding for existing activity.

2. Energy Hierarchy

The project or initiative should comply with the energy hierarchy, which reflects best practice in energy management: it stipulates that priority should be given to projects that prevent unnecessary energy use and increase energy efficiency, before implementing renewable energy generation schemes.

Applications to support renewable or low-carbon energy generation initiatives will only be supported if they are part of an integrated package of measures, which includes measures to reduce the building's overall energy consumption.

3. Best Practice

Projects are normally expected to achieve current best practice in energy efficiency and management. As a minimum, eligible measures must achieve a level of performance that is above and beyond that already required through planning and building regulations.

4. Scope for Innovation

ECRP was originally set up to pilot carbon reduction measures that were previously untested on the University estate. Whilst the scope of the ECRP has broadened significantly in recent years, supporting innovation remains an objective of the project. ECRP will consider funding projects that support the development of innovative carbon reduction solutions.

5. Simple financial payback (years)

Applications for ECRP funding (apart from feasibility studies) will need to be able to deliver ongoing financial savings for the University through a reduction in energy use and/or associated carbon costs (eg: Carbon Reduction Commitment payments).

The financial payback will be calculated by dividing the ECRP funding contribution by the annual financial savings achieved through the energy efficiency enhancements/measures being funded by ECRP.

Normally, eligible projects are expected to achieve a simple payback period of ten years or less. However, when determining whether an application should be supported, E&E will also consider the expected lifetime of the building(s) concerned; projects are unlikely to be supported if the payback period is longer than the expected lifetime of the building.

6. Annual Carbon Savings (tCO_2/year)

All applications (apart from feasibility studies) need to provide quantified evidence of their potential to reduce the carbon dioxide (CO_2) emissions (measured as tonnes of CO_2/year) from the University estate. Priority will be given to those proposals that will deliver the greatest level of carbon savings.

For certain projects, in particular those projects with a simple payback period of seven years or more, the following two metrics will also be considered:

7. Cost Effectiveness Indicator (£/tCO_2LT)

We adopted Cost Effectiveness Indicator (CEI) in 2016, in place of 'Cost per tonne of carbon dioxide saved over the project lifetime', as a measure of a project's cost effectiveness. CEI takes account of the level of carbon reduction, as well as financial return, that a project will achieve over its lifetime. The benefit of using CEI, over cost per tonne of CO_2 saved over the project lifetime, is that it determines cost effectiveness based on lifetime Net Present Value (NPV, see below) rather than on capital cost alone. A project with a CEI less than zero (a negative value) is expected to save money over its lifetime.

8. Net Present Value (NPV)

NPV is the sum of all project expenditure and income, discounted to present values. Put very simply:

$$NPV = S - C$$

Where S = Total cost savings over the project lifetime, discounted to present day value

C = Cost of implementing the project.

It is used to assess the desirability or benefit of investing in a project (the higher the NPV, the more desirable the investment). NPV will be calculated according to the ECRP funding contribution, not the total project budget.

NPV will be calculated for all capital projects seeking ECRP funding, and will be calculated for other ECRP applications where deemed appropriate, particularly those projects that have a high capital cost and a long project lifetime.

Selection of the overall winning team

The overall winners will be chosen upon the basis of:

- Collaborative working
- Effective consultation
- Innovative thinking
- Resourcefulness
- Implementation potential of their proposal

The judging panel

- Nigel Slater – Pro-Vice-Chancellor for Enterprise and Regional Affairs
- Peter Guthrie – Professor in Engineering for Sustainable Development
- Joanna Chamberlain – Head of Environment and Energy, Estate Management
- Sarah Foreman – Head of Estate Facilities, Estate Management

Competition terms and conditions

General

1. Support can be sought from external bodies but a majority of the work must be completed by the team members. Please see clauses 13 - 16 (Intellectual Property in competition entries), below.
2. Teams must generate proposals for a specific technology, policy, intervention or campaign that can be applied to a defined area of the operational estate in order to generate carbon savings. Please note that colleges are not included in the operational estate. If unsure of the definition of 'operational estate' please contact living.laboratory@admin.cam.ac.uk.
3. To be judged as innovative, project proposals may have been trialled or implemented elsewhere, but they will not have been trialled previously within the University of Cambridge.
4. Carbon savings must be estimated through thorough theoretical calculations and/or physical trial and metering. All calculations should use the current year's published carbon conversion factors at http://www.carbonsmart.co.uk/tag/conversion-factors/.
5. The University reserves the right to cease or suspend the competition at any time at its sole discretion.

Award and Funding

6. It is intended that ECRP funding will be awarded to the most viable projects based on the published criteria. However, the judges' decision is final and the University further reserves the right to elect not to proceed further with and to cease funding a successful project at any time at its sole discretion.
7. ECRP funding will be retained by the University and not provided directly to the project team. As stated above in the section "How the Carbon Challenge Works", whilst it is envisaged that the successful project team(s) will be consulted prior to and during the implementation of their project(s), such involvement is at the University's sole discretion.
8. Funding is not available to compensate teams for their time or costs incurred in developing proposals, with the exception of the limited funding at stage 1, which is awarded at the University's sole discretion (see clause 10, below).
9. Spending will be subject always to the University's financial regulations and procurement rules.
10. At stage 1, limited funding (up to £1000) can be provided to support further design or feasibility work if needed. This funding is awarded at the University's sole discretion.
11. There is no limit to the funding that can be requested at stage 2 but note that financial payback is a criterion on which the business cases will be judged. The University reserves the right to reduce or otherwise vary funding at any time at its sole discretion.
12. Funding provided (whether at stage 1 or 2) cannot be used to fund salaries or payment of students or staff.

Intellectual Property in competition entries

13. The University must be satisfied that it has the necessary rights to take proposals forward. By submitting your proposal, you confirm that you have the necessary rights and permissions to submit your proposal and to comply with clauses 15 and 16, below.
14. You must declare any third party interests or involvement in your entry to the University on submission of your proposal.
15. The ownership and exploitation of any intellectual property in or disclosed by submitted competition entries and any accompanying material will be determined by the University's relevant Statutes and Ordinances.
16. You hereby agree that the University may, but is not required to, make your entry available on its website and any other media and in connection with any publicity of the competition. You further hereby grant the University a non-exclusive, worldwide, royalty-free, irrevocable licence, for the full period of any intellectual property rights, to (i) copy, adapt and publish the competition entry and any accompanying materials for publicity purposes; and (ii) develop, implement and use any project, service or product disclosed by the competition entry for the University's own purposes on its estate.

You confirm your agreement with the terms and conditions set out above by registering for the Cambridge Carbon Challenge via the online form.

If you have any queries, please email living.laboratory@admin.cam.ac.uk.

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Annex A

Cambridge Carbon Challenge: Proposal for stage 1

1. **Project proposal name:**

2. **Team:** Please include the names of all team members.

3. **Project proposal summary:** Maximum 100 words.

4. **Where will the project be implemented?** Include the name of the specific building(s) or site(s) that your project would take place on/in.

5. **How would the project work?** Please outline what your proposed project involves, key steps to implementation, any assumptions made.

6. **Rationale:** What is the potential for implementation on the University of Cambridge estate, and what are the key benefits that will be delivered by this project?

7. **Timescales:** Please identify key milestones and time involved in each step.

8. **Who is involved?** Please identify who you have consulted with so far and their main feedback, and who else you would need to speak with to take the proposal forwards.

9. **Implementation costs:** Please give an estimate of full implementation costs (and how you have calculated this estimate).

10. **Risk assessment:** Please set out the key risks associated with implementation of your project and how you would mitigate against these risks in the table below.

Risks	*Likelihood of occurring (high/medium/low)*	*Severity of the risk (high/medium/low)*	*How the risk will be mitigated*
E.g. Unforeseen costs, resistance from stakeholders, technology failure			

11. **Research links:** Please explain how your proposal links with current research (where applicable).

12. **Development costs:** Please provide a breakdown of any funding required to develop this proposal further (to enable you to submit a full business case at stage 2 of the competition).

13. **Further support needed:** Please set out what additional resources, advice or consultation you need, including themes or skills on which you would appreciate mentoring support.

Checklist

Have you:

1. *demonstrated that your proposal is focused on solutions for University of Cambridge operational buildings and estate (this includes departments, University offices and research institutes but NOT Colleges)? Question 4.*
2. *demonstrated that your proposal is implementable within the University estate? E.g. has it been done somewhere before? Any trials or pilots carried out? Rationale to explain the potential for implementation? Question 6.*
3. *considered the risks associated with implementation, including ways to mitigate any risks? Question 10.*
4. *made sure that your proposal focuses on scope 1 and/or 2 emissions? Question 3 or 5.*
5. *explained how your proposal links with current research, where relevant, and how you are working with researchers? Question 11.*
6. *identified within the proposal who you need to consult with in the University context to make the project feasible for taking forwards? Question 8.*
7. *stated any funding required for further proposal development in stage 2? Please note the reasonableness of the request for funding will form part of the decision making. Question 12.*

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Annex B

Cambridge Carbon Challenge: Judging criteria for stage 1

Initial checks

Y = yes, N = no

Checklist (internal use)	Y/N	Notes
Focuses on the University's operational buildings and estate		
Is implementable within the University estate		
Considers the risks associated with implementation and how to mitigate these effectively		
Focuses on scope 1 and/or 2 emissions		
Links with current research and researchers (where relevant)		
Identifies who to consult with		
Requires no funding, or states reasonable funding request for developing into stage 2		

The team will be asked to amend their proposal before the judging panel if there are any "N"s above.

Judges' scoring of the proposal brief

Scoring: 1=poor, 2=average, 3=good

Proposal assessment	Score (1-3)	Notes
Implementation of proposal clearly thought through		
Any assumptions made are stated within the application and reasonable assumptions to make		
Good potential for implementation on the University estate		
Convincing description of benefits to be delivered		
Timetable clearly and realistically set out		
Clear evidence of consultation with relevant people, and future plans for gaining further input		

Realistic estimate of full implementation costs		
Comprehensive consideration of risks associated with implementation		
The proposal does not present any unacceptable risks, and where risks have been identified, appropriate measures for effective mitigation have been identified		
Relevant and substantiated links with academic research		
Reasonable funding request for further development of the proposal		

Judges' scoring of the presentation to the panel

Scoring: 1=poor, 2=average, 3=good

Presentation assessment	**Score (1-3)**	**Notes**
Clearly set out idea		
Convincing 'pitch'		
Concisely conveyed		
Thorough understanding of University context		