

The Living Laboratory for Sustainability

Annual Report 2016-17



Overview

The Living Laboratory for Sustainability provides opportunities for students to help improve environmental sustainability across the University estate, through projects, internships and research. Funded by Santander, the project aims to enhance students' educational and practical experience, contribute to teaching and research, foster collaboration across the University and contribute to the University's efforts on environmental sustainability.

Activities



Academic projects



Voluntary projects



Internships



Award scheme

Practical assistance

- Provision of data and information
- Linking up with relevant contacts

Collaboration

- 'Go-to place' for information on environmental activities across the University
- 'Connecting the dots' between different initiatives

Communication

- Highlights stories of success
- Increases awareness of the Environment and Energy section

Engagement

- Provides opportunities for students to get involved
- Helps engage people who are not already involved in environmental action



Outcomes



Effects on University operations

- Enhanced links between academics and Estate Management
- Use of research to apply on the estate
- Allows for work to be done that might not otherwise be focused upon



Environmental impacts

- Cuts resource use and reduces the University's environmental footprint
- Demonstrates that the University is acting in a sustainable way on multiple scales



Culture change across the University

- Embeds sustainability into the fabric of the University
- Fosters greater innovation
- Allows new approaches to be trialled



Teaching and research

- Contributes to the impact agenda of academic research
- Provides local and relevant examples and case studies to enhance learning
- Allows operational and administrative areas of the University to contribute to the core aims of teaching and research



Student experience

- Students learn professional skills
- Improves students' employability
- Provides meaningful opportunities for students to contribute to improving the University's environmental sustainability

64
students
involved
directly



and
32
staff

"A paid internship from the Living Lab has provided me with an invaluable opportunity in the sustainability sector and a head-start to my career. I've received training, career advice and the ability to manage my own project – it's been a really fantastic learning experience."

Florence Best, Sustainable Food Intern

"... a great scheme, a great resource and always comes through with information and support for students."

Dr Ruchi Choudhary,
Architectural
Engineering



10
events

623
participants





21 

projects
completed



"The Living Lab offers real data from a real-world environment, not cleaned up or artificially simplified. There are an almost unlimited number of projects for students to get involved in."

Professor Peter Guthrie, Centre for Sustainable Development

"The Living Lab organised academic engagement which was essential in gaining University support for the implementation of the University's award-winning Sustainable Food Policy."

Nick White, Head of
University Catering
Service

6
(out of 9) areas
of the
University's
environmental
policy
supported









9
academic
departments
involved



Sustainable food

The Living Lab enabled the development and implementation of the University's first ever sustainable food policy, launched in February 2017. The University Catering Service (UCS) were keen to understand how they could have the biggest sustainability impact. The Living Lab helped to link up the UCS with academic expertise leading to the identification of four priority areas (see below). The UCS then needed an evidence base to help secure approval of the policy. So the Living Lab set up student projects to do this, as well as to investigate the issues and monitor trial initiatives. The resulting Sustainable Food Policy was launched at an event facilitated by the Living Lab, and has since drawn attention inside and outside of the University, including a coveted Green Gown Award.

Seek academic input

Academics from three departments within the University have provided their expertise to determine the most impactful interventions, resulting in four key principles as set out below.



Link research and practice

The student projects below are all significantly shaping the development and implementation of the sustainable food policy.



Emma Garnett PhD research

Investigation of product placements within Cambridge College canteens to understand which interventions work for reducing the environmental impact of diet. Emma provided the **academic background** for the policy, which contributed to its successful approval by the University. She has also presented at all three events (see next page).



Florence Best Internship 2017

Development of a marketing strategy for promoting the most sustainable food options within University catering outlets. Florence's work has supported **full implementation** of the policy by researching and trialling marketing approaches to determine which are most effective.

[Click here for more information](#)



Laura Farrell Internship 2016

Analysis of food purchasing data to estimate impacts on carbon emissions and costs of trialling reduced ruminant meat. Laura's work provided the **evidence base** for the policy, contributing to its approval by the University.

[Click here for more information](#)

**109t
CO₂e
savings per
year**

Collaborate and engage

The Living Lab has organised or facilitated a number of events to increase potential for wider change. Feedback has been incredibly positive and the approach being used is gaining traction within other contexts too.

With students and staff

Staff and students across the University attended the **launch of the sustainable food policy**. [Click below](#)

106
attendees



Student and staff representatives in colleges and departments are guided and encouraged to run their own sustainable food initiatives and events.

With Colleges

We have presented at the Catering and Conference Managers Forum to engage more people. We know that there are some fantastic food initiatives within the Colleges. [Click here for more information](#)

With the general public

At **#EarthOptimism**, we ran a stall to engage people on what can be achieved using a Living Lab approach on sustainable food.



With other universities

We hosted a **sustainable food event** with the Environmental Association of Universities and Colleges (EAUC), in order to share experiences and learning amongst UK universities.

25
attendees

Benefits and outcomes



Student experience

"I enjoyed the freedom that came with having my own project. I felt I strengthened my project management and have more self-knowledge about the way I work."

Laura Farrell, Sustainable Food Intern



University operations

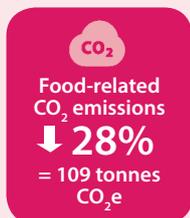
The Living Lab "made a major contribution to the creation and implementation of the Policy... and also ensured that it was communicated widely throughout the University."

Nick White, Head of University Catering Service

Between 2015 and 2016...



Environmental impact



Culture change

A 'spotlight on food' month saw 14 events held by different departments and colleges around the University to further engage people in this topic

14
events

"We ran a plant-based cooking workshop with the Humane Society, which I found out about in Cambridge, and have now added more vegetarian meals and introduced vegan meals on menus in our halls."

Biodiversity and ecosystems

The Living Lab is supporting the University's commitments and targets on biodiversity and ecosystems, through the newly established Ecological Advisory Panel. Academic input is informing the approach for biodiversity conservation within the University; findings from student projects are contributing to our understanding; and an internship is providing a baseline from which to build our efforts.

Seek academic input

Three professors are advising the University alongside practitioners from local and national wildlife conservation charities. Together they will inform the development of a baseline assessment and biodiversity action plan for the University.



Link research and practice

The Living Lab set up a student internship, enabling the collation of previous research, data records and assessments inside and outside of the University to inform the baseline assessment.

Student research projects 2013-2017

Research investigating garden versus meadow biodiversity at Madingley Hall and how gardens can contribute to biodiversity (2013).

Madingley Hall 'Bioblitz' records cataloguing species found on site over 24 hours (2014).

Geography undergraduate survey of plant biodiversity at Madingley Wood (2016).

Examples and recommendations for supporting and encouraging biodiversity in College gardens (2017).



Ben Walton Internship 2017

Compilation of data and information on biodiversity across the University estate, including **research from previous student projects** (see left), to inform a baseline assessment from which to build efforts. Consultation with academic experts, practitioners, grounds staff and local groups to inform future plans.

[Click here for more information](#)

Benefits and outcomes

"This internship has been a great opportunity to manage a project of my own from start to finish, with a real feeling of autonomy, control and ownership of the work I have done and the direction it has taken.



Student experience

I've really enjoyed working on ideas to promote biodiversity across the University, and I feel like my work has real value and will influence decisions moving forward."
Ben Walton



University operations

Increased communication between Environment and Energy team and grounds maintenance staff.



Environmental impact

17 recommendations made for encouraging and supporting biodiversity within the University estate.

**17
recomm-
endations**

Energy and carbon management

The Living Lab has supported many projects investigating energy reduction within the University over the years. Below are some of the projects from 2016/17 and their benefits and outcomes.

Link research and practice

Energy Cost Metric workshop

As part of the development of a new Civil Engineering building, a group of academics and practitioners have together developed the **Energy Cost Metric**. This innovative approach accounts for energy use alongside cost in order to integrate low energy objectives into building design. With the support of the Living Lab Coordinator, a workshop was convened between Engineering academics and the University's Estate Management project managers to discuss how it can be embedded into decision-making and applied to further capital projects. One of the outcomes from this was conception of an internship project – see right.



Ben Langslow Undergraduate research

Measurement of the **performance of the James Dyson Building** over its first year of use including occupant survey and building metrics. Results highlighted an initial fault with the ventilation. Once this was fixed, follow up suggested overall high satisfaction with the building by its occupants.

[i Click here for more information](#)



Jackie Lai Internship 2017 (with the Undergraduate Research Opportunities Programme)

Application of the new Energy Cost Metric to different categories and sizes of building projects, in order to understand its use for **real life applications**. How it can be applied, how it might affect decisions, and what issues arise for collecting data longer-term have all been investigated. Results show that embodied energy data is the main gap when applying the ECM, and that it is harder to use than current methodology but provides more insight into energy use.

[i Click here for more information](#)



Chris Galpin Undergraduate research

Investigation into the effectiveness of solar panels for carbon emissions reductions by considering **embedded carbon** too (i.e. whole life cycle assessment). Results highlight sensitivity to reporting methodology. The case study of Greenwich House shows solar panels do reduce the building's carbon footprint here, even taking account of whole life cycle impacts.

[i Click here for more information](#)



Collaborate and engage

Cambridge Carbon Challenge

The Cambridge Carbon Challenge was launched in October 2016. It is a competition inviting staff and students to submit their **ideas for reducing building energy use** and carbon emissions across the University estate. Its aims are set out below:

- Link academic expertise and operational knowledge
- Encourage good ideas and new approaches and channel them into workable solutions
- Foster greater collaboration
- Aid development of skills and experience
- Reduce carbon emissions

Over
100
people
attended
launch event

6
teams
registered,
involving
30
people

2
successful
teams

Melanie Jans-Singh, Mark Allen and André Neto-Bradley

Hydroponics project

This group of PhD students are using their own research to trial the use of **hydroponics** – a dense soil-less plant growth system – within buildings to lower energy use. The presence of plants reduces the energy required for ventilation and heating (due to lowering CO₂ levels within buildings), with potential added benefits of enhanced health and wellbeing.

Louis Tate, Jesse Allardice and Shanshan Wang

Solar storage project

This multidisciplinary team (an Engineer, a Land Economist and a Physicist) met at the launch event. They propose the use of battery storage alongside solar panels at Laundry Farm (where the University's fleet of electric vehicles are charged). They want to demonstrate the benefits of using batteries to shift load demands to maximise renewable energy generation.

Benefits and outcomes



Student
experience

Carbon Challenge teams have gained practical skills (e.g. carpentry) and learnt about considerations needed to take an idea through to implementation (e.g. Health and Safety requirements, budgeting and finances).



Environmental
impact

Ben's project helped identify a fault with the ventilation system. This was fixed, resulting in greater efficiency of the heating and ventilation system.



University
operations

Life cycle costing and embodied energy have risen up the agenda for future projects in Estate Management thanks to Jackie's project.



Culture
change

The Carbon Challenge invited innovative ideas and increased the opportunity for student and staff input into reducing carbon emissions.



Cambridge Carbon Challenge winners



Teaching and
research

The hydroponics project links to the students' own PhD research. Chris Galpin presented his research at an academic conference and published a paper for the first time.



University
operations

The proposed solar storage project is currently being assessed for implementation at one of the University's sites.

Student support, engagement and development

The Living Lab engages with students in many different ways in order to enhance their skills, experiences and knowledge on sustainability, as set out below.

Provide input to courses

One-off lectures

Example: Adam Fjaerem and Emily Dunning delivered a guest lecture as part of the Department of Engineering's module on Sustainable Development, providing insights on the policy and practice of managing energy use.

Online course content

"Very inspirational. It is useful as an example of intrapreneurship as well as potential future projects/engagement for our students."
Executive Director, Centre for Social Innovation, Judge Business School

Student inductions

5 in-person presentations resulting in 7 new collaborations/projects



Support for student research projects

"The Living Lab is very flexible and accommodating, and works hard to get students what they need in terms of data and to support a project throughout its life." Dr Minna Sunnika Blank, Architecture

Facilitate learning and development

Careers workshops (co-led with Cambridge Institute for Sustainability Leadership)

Oversubscribed on both occasions

Average feedback score



Webinars for green officers

Green officers are student environmental representatives from the Colleges.

4 webinars

39 students

Internship training

Training is provided to our interns on:

- productivity
- email etiquette
- giving presentations
- networking
- teamwork

Interview experience

We ask for a cover letter and CV, interviewing those shortlisted.

Tips for future applications sent to all.

70 applications

14 interviewed

3 successful

Support student-led initiatives

Climate and Sustainability Forum

10-strong student committee

120 attendees

2 film screenings and art exhibition for wider engagement

 [Click here for more information](#)

CU Environmental Consulting Society

College best practice guide – advice and suggestions

Using a thermal imaging camera – support for training and practicing newly-developed skills

Cambridge Hub's Social Innovation Programme

4 students carried out a 6-week project on Education for Sustainable Development and how it relates to the University of Cambridge

One off green officer projects

Advice and support for initiatives in colleges

Example: Wolfson College 'Green Week' – to raise awareness of sustainability

Example: Creation of St Edmund's environmental policy

Living Lab linkages

Through the Living Lab, many connections are established between staff and students across departments and Colleges within the University. Ideas are also shared between universities to provide contributions more widely.

Encourage collaboration

The **celebration event** provides the chance to meet and speak with others involved in the Living Lab, and the opportunity to hear about projects that have been happening over the course of the academic year to help improve and/or inform the University's environmental sustainability performance. The event is also intended to provide inspiration, new ideas and useful connections for future efforts to enhance the environmental sustainability of the University.

The Living Lab *"does a fantastic job of bringing people together from across the University (and outside) who are interested in sustainability."*

"Many thanks for ... your invitation to Living Labs! It was a really nice event, with a serendipitous outcome of fellow academics sharing her interest for one of her PhD candidates to look into ... I would like to thank you for enabling this."

Share experiences

Workshop – The Environmental Association of Universities and Colleges invited the Living Lab Coordinator to run a workshop at their Living Lab event for universities across the UK, focused on understanding the relationship between academia and operations.

Individual insights – One-to-one support, advice and lessons learnt have been shared with various universities on specific topics, including Nottingham Trent in the UK and Calgary in Canada.

Learning from others – We learnt from the University of Oxford's experience for establishing the Carbon Challenge; now the Students' Association of the University of the West of Scotland are borrowing and adapting our model.



Contribute to external research

Provision of insights, feedback and examples to the **EAUC's research on Living Labs** in universities, to provide greater understanding of the potential of Living Labs across the sector.

[!\[\]\(cf907b6581366ac39ee91719072e5253_img.jpg\) Click here for more information](#)



Future plans – aspirations for 2017/18



Improve links between **ideas and innovations with processes and practice.**



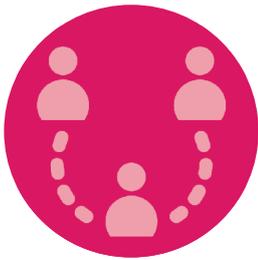
Run the Carbon Challenge with a focus on **innovative idea generation**, providing support for those proposals with potential for implementation.



Support **broader programmes of work** on energy and carbon, transport and travel, biodiversity and ecosystems, sustainable food.



Continue to build **student engagement with sustainability**, in order to support students' skills development, employability and opportunity to create positive impact.



Continue to **build relationships** across departments in order to increase opportunities for collaboration.



More internships, in order to provide opportunities for PhD students as well as undergraduate students.

Acknowledgements

Thank you to Santander for funding the Living Laboratory for Sustainability, to all the students and staff involved in projects, and to all those outside collaborators for sharing their experiences.

