Green Gown Awards 2011
Highly Commended

Cranfield University

Highly commended – research and development

"Carbon Brainprint"

Profile

- Cranfield University (Cranfield campus).
- 2023 FTE students
- 14,500 CPD delegates
- 1222 staff
- 113 buildings on 1 site
- Rural

Summary

The Carbon Brainprint project developed a robust lifecycle-based methodology for quantifying the carbon brainprint of research and training. It was tested using six case studies from three universities related to research and innovation, training, and influencing behaviour. The carbon brainprint of three projects undertaken by Cranfield that already deliver emission reductions was 50 times the carbon footprint of the University.

Project partners

- **HEFCE:** Sponsor
- **Cranfield University:** Sponsor
- **Santander Universities:** Sponsor
- **University of Cambridge:** Partner
- **University of Reading (with Carnego Systems and Newera Controls):** Partner
- **Cranfield University:** Steering group
- **HEFCE:** Steering group
- **RCUK:** Steering group
- **Carbon Trust:** Steering group

The problem

We must all take responsibility for reducing our own carbon footprints, but Higher Education Institutions (HEIs) also have a duty to create and transform knowledge into sustainable solutions that address the challenge of global climate change. This intellectual contribution of helping other organisations and individuals to reduce their carbon footprint is higher education's 'carbon brainprint'. The project set out to develop a robust, repeatable methodology to estimate the brainprint for HE activities and test it on six case studies.

The approach

To quantify the carbon brainprint accurately, a robust lifecycle-based approach is used, drawing on PAS 2050:2009, the UK standard approach to calculating carbon footprints. This approach accounts for all relevant direct and indirect emissions in the entire lifetime of a product or service. It also pays close attention to addressing uncertainty, especially when predicting the long term effects of university activities. The emissions are calculated before and after the university contribution. The overall lifetime GHG saving is the carbon brainprint. It was developed and tested using six contrasting case studies covering research and innovation, training, process improvement and influencing behaviour.

Registered Office : EAUC UK Office, University of Gloucestershire, The Park, Cheltenham, GL50 2RH
Tel : 01242 714321, info@eauc.org.uk, www.eauc.org.uk

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Green Gown Awards case study

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Our goals

- Develop and make available a robust methodology for existing and potential future impacts.
- Provide evidence of the scale of the benefits of HEI activities.
- Produce worked case examples demonstrating the application of the methodology.
- Establish the extent to which this methodology will be applicable.
- Develop an innovative web-based dissemination route

Obstacles and solutions

Obstacle/challenge	Solution
Lack of experimental data on performance	Use industry results or expert estimates with uncertainties

Performance and results

Case study	Annual brainprint	When
Lack of experimental data on performance	570 kt CO_2e	Now
Improved delivery vehicle logistics to save fuel	14 kt CO_2e	Now
Training for landfill gas inspectors to improve methane capture	400 kt CO_2e	Now
Novel offshore vertical axis wind turbines compared with conventional turbines	1.7 kt CO_2e for 1 GW installed	Future
Intelligent buildings for energy management (University of Reading)	Showed 20% reduction on two buildings	Future
Optimising defouling of oil-refinery preheat trains to reduce fuel consumption (University of Cambridge)	> 1 kt CO_2e per refinery	Future

Lessons learned

The project has demonstrated the feasibility of estimating the carbon brainprint of a range of university activities and the large impact that they can have. The brainprint is most easily estimated and most reliable where results have been recorded after implementation in practice. Applications in energy-intensive industries, such as aerospace, and those affecting emissions of gases with high global warming potentials (methane and nitrous oxide), such as landfill management, are likely to give the biggest immediate results. However the potential future impact of developments in widely distributed sectors, such as buildings and road haulage, should not be overlooked.

Further information

Dr David Parsons, Building 42, Cranfield University, Cranfield, Bedford, MK43 9PB
w: www.carbonbrainprint.org.uk and www.cranfield.ac.uk/sas/cerf/carbonbrainprint.html
e: carbonbrainprint@cranfield.ac.uk
t: 01234 750111

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