



# Annual Environmental Report 2018 / 2019

Board for Energy and Environment

November 2019



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# Statement



Professor Leon Terry, Chair  
Board for Energy and Environment

Cranfield University is a global leader for education and transformational research in technology and management. Key to our mission is delivery of a sustainable estate that reflects our aspirations and our core values. This includes making the world a better place. Here, the Board for Energy and Environment (BEE) reports progress on our environmental objectives. Highlights for 2018/19 are:

- The bus fleet has been renewed and a new fast route to Milton Keynes established
- Funding has been secured for an Urban Observatory
- The campus woodland has been opened up and a new trail and bridge installed
- The Salix revolving fund has been increased enabling more energy saving projects

We remain indebted to our staff and students that contribute to our on-going improvements and to our Energy and Environment Team and BEE working group members who lead and coordinate our combined efforts. We are grateful to the on-going support of our contractors.

## Key performance indicators

Issue	Description	Progress	Target	By when
Carbon	Scope 1 & 2 emissions <sup>1</sup>	38%	50% reduction	2020 <sup>2</sup>
Waste	Total weight produced	14%	10% reduction	2020
Recycling	Segregated on-site	55%	75% of total waste	2020
Travel	Single occupancy car use	59%	53% of commuters	2023
Water	Consumption volume	11%	30% reduction	2020
Discharges	Ammonia	55%	50% below consent levels	2020
Discharges	Biochemical Oxygen Demand	48%	50% below consent levels	2020
Discharges	Suspended Solids	24%	50% below consent levels	2020

### Key

-  Indicates that progress is well behind trend to meet target in time
-  Indicates that progress is behind trend but can still recover to meet target
-  Indicates that progress is on trend to meet target

<sup>1</sup>Scope 1 emissions are direct emissions from owned or controlled sources relating to energy and fuel use. Scope 2 emissions are indirect emissions from the generation of purchased energy.

<sup>2</sup>In this report, the year refers to the University's financial year e.g. 2020 is from August 2020 to July 2021.

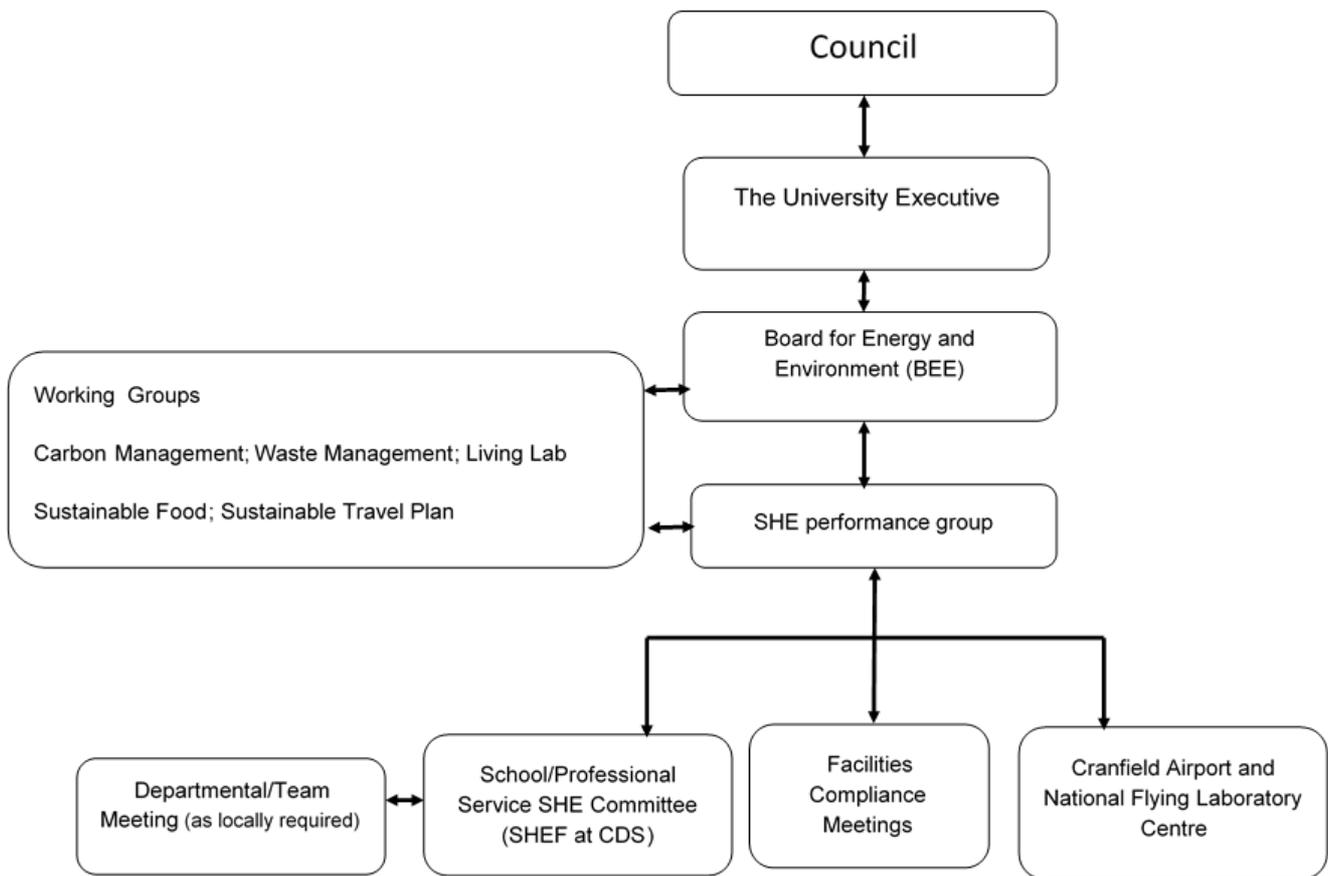
# Environmental objectives

Focus	Objectives	Rationale for action
Carbon & energy	Reduce absolute Scope 1 & 2 carbon emissions by 30% in 2015 and 50% in 2020 from a 2005 baseline.	Contributes to the HEFCE sector carbon reduction target; supports Plan 415i, reducing operating costs.
Waste & recycling	Reduce absolute total waste by 5% in 2017 and 10% in 2020 against a 2010 baseline.	Improves resource efficiency; demonstrates best practice to staff and students; supports Plan 415i, reducing costs.
	Increase segregated waste reused or recycled to 50% of waste produced in 2015 and 75% in 2020.	
Travel	Reduce commuting in a single occupancy car to 53% by 2023	Reduces local road congestion; travel emissions and supports Plan 415i.
Water, emissions & discharges	Reduce Cranfield campus water consumption by 30% by 2020 from a 2009 baseline.	Maintains legal compliance and supports Plan 415i, reducing operating costs and demonstrates best practice to staff and students.
	Discharge treated effluent from the sewage works, which is on average 50% below permitted consent levels for ammonia, biochemical oxygen demand and suspended solids by 2017.	
Sustainable buildings & infrastructure	Achieve BREEAM Excellent for new buildings and all major refurbishments from 2012. Develop "zero carbon" standard for University Buildings by 2014	Supports carbon reduction and resource efficiency and Plan 415i, reducing operating costs and demonstrating best practice to staff and students.
Sustainable Procurement	To complete Level 1 of DEFRA's flexible framework	See: <a href="https://www.gov.uk/government/publications/sustainable-procurement-in-government-guidance-to-the-flexible-framework">https://www.gov.uk/government/publications/sustainable-procurement-in-government-guidance-to-the-flexible-framework</a>

# Quality assurance

## Governance

The Board for Energy and Environment (BEE) reports to the Cranfield Executive and Council on energy and environmental management issues. The priority of the Board is to ensure Cranfield University demonstrates a leading capability in environmental performance by providing oversight and direction. The Board is a sub-committee of the Executive and consists of senior managers from across the University along with student representation. The Board has working groups, with members drawn from operational and academic staff and students, to progress key environmental objectives. A dedicated Energy and Environment team facilitates delivery of the objectives and reports progress towards target to the Board on a regular basis. The Board aims to ensure a close relationship between BEE’s environmental activities across the University and the teaching, learning and research taking place within the Themes on environmental best practice. The Governance structure is outlined below:



## ISO 14001

Cranfield University operates a university wide environmental management system. The system provides a framework for managing our environmental impacts, risks, and opportunities, for setting environmental objectives and establishing programmes to achieve them. The scope of the certification covers all University operations including Cranfield Defence and Security at the Shrivenham and COTEC sites.

Successful surveillance audits were carried out by BSI in April and May 2019.

In a climate of continuous improvement, the reporting of all environmental incidents and near misses is encouraged. 18 environmental notifications were received by the Energy and Environment Team this year. These included:

- 12 internal reports of nuisance odours, mainly associated with contractor and aviation activities.
- 4 spills/leaks. Two were notifiable to the Environment Agency.
- 2 non-compliance events related to our waste water discharge consent.

#### Scope of reporting

The environmental objectives on page 4 encompass activities taking place on the Cranfield Campus, including subsidiary companies and tenants on site (*see note 1, page 15*). The University's operation at the Cranfield Ordnance Test & Evaluation Centre (COTEC) is included. The University is not directly involved in the management of Shrivenham Campus, so the University activities there are not included in this report (*see note 1, page 15*).

## ISO 50001

Cranfield University operates a university wide energy management system. The system provides a framework for managing our energy use. The scope of the certification covers all University operations on the Cranfield campus, and Cranfield Defence and Security at the COTEC site. Certification was achieved in August 2018 and the first annual surveillance visit was completed by Lloyds in July 2019. There were no major or minor non-conformities.

## Other reporting

In line with the Higher Education Statistics Association (HESA) requirements, the University submits environmental data as part of the annual estate management reporting statistics. This data attempts to exclude tenant data and differs slightly from the data that appears in this report. As part of the Carbon Reduction Commitment (CRC) Energy Efficiency scheme requirements, the University provides energy data to the Environment Agency on an annual basis. The scope of CRC reporting is slightly different to that of this report and the HESA return. Data submitted to HESA is also used by the 'Green League' (a student-led, People and Planet voluntary league table of University environmental performance). In the Green League comparisons are made per student or per m<sup>2</sup>. Cranfield is a wholly Postgraduate University undertaking industrial scale research. This makes environmental impacts per student or per m<sup>2</sup> appear high. This annual report focuses on how the environmental performance of the University is improving over time. The University is also participating with an alternative metric for the environmental performance of Universities, devised by the Association of University Directors of Estates (AUDE) called the Green Scorecard.

## Base year recalculation policy

Our base year figures for reporting are reviewed from time to time to ensure like for like reporting. In 2013, the University sold Sudbury House Hotel prompting a recalculation of the base-year carbon emissions data and subsequent years to remove reference to this asset (*see notes 2 and 3, page 15*).

# Carbon and energy



Reduce absolute Scope 1 & 2 carbon emissions by 30% in 2015 and 50% in 2020/2021 from a 2005 baseline

- Solar farm official opening
- Carbon saving campaign in key buildings
- LED lighting replacements

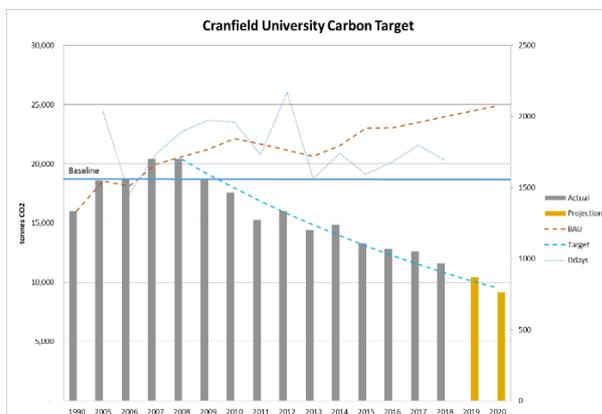


The Salix Revolving fund has been increased. This will allow larger carbon saving projects to be installed. As part of this two existing buildings have been added to the district heating and another is planned for next year. A trial of novel heat storage system was successful and funding will now be sought to develop this further. A pilot carbon awareness campaign was rolled out in some of the larger buildings.

Carbon emissions	Year	2005*	2006	2007	2008	2009	2010	2011
'000 tCO <sub>2</sub> e		18.6	18.7	20.4	20.4	18.7	17.6	15.3
	Year	2012	2013	2014	2015	2016	2017	2018
'000 tCO <sub>2</sub> e		16	14.4	14.9	13.3	12.8	12.3	11.6

(\*HEFCE required a carbon reduction target against a 2005 baseline year. (see note 4, page 15)

Carbon emissions reduced by 4% compared with the previous year. This was not as high as planned, partly because of ongoing issues with building controls. A new BMS system is planned for next year which should help improve this.



Carbon emissions and target

## Plans for 2019

- Improved BMS
- Further improvements to District Heating
- Further develop opportunities for energy storage
- Expansion of solar farm
- Continued migration of computing to the Cloud

# Water, emissions and discharges



Reduce Cranfield campus water consumption by 30% by end of 2020/21 from a 2009 baseline

Discharge treated effluent from the sewage works, which is on average, 50% below permitted consent levels for ammonia, biochemical oxygen demand and suspended solids by end of 2017/18.

- Earth mounding has been installed around the trickle filters to give some protection from cold weather
- Automatic metering has been installed on a number of key water meters across the campus



Water usage has gone down this year. Some minor leaks have been found and rectified but the reduction is largely due to a reduction in use. More meters have been fitted with automatic monitoring. This will allow patterns of consumption and leaks to be identified on site. A campaign to identify water saving and leakage prevention in buildings is being developed, focussing on toilets and sinks.

Water use	2010	2011	2012	2013	2014	2015	2016	2017	2018
Water use '000 m <sup>3</sup>	185	183	180	164	167	163	168	170	164
Water use reduction	0%	1%	3%	11%	10%	12%	9%	8%	11%

The University's sewage treatment works encompasses a leading edge pilot hall research facility used by staff and students on campus. A new pilot hall has also been installed for research into clean water systems. The performance of the works continues to be affected by cold weather but improvement to flow control and earth mounding will help to mitigate this.

Discharges (average % below permit level)	2013	2014	2015	2016	2017	2018
Ammoniacal nitrogen	87%	88%	86%	64%	52%	55%
Biochemical oxygen demand (BOD)	57%	46%	48%	45%	60%	48%
Suspended solids	22%	2%	15%	10%	33%	24%

(see note 5, page 15)

## Plans for 2019

- Further work to improve the resilience of the Sewage works in low temperatures
- Water conservation awareness raising campaign
- Water leakage campaign



# Waste and recycling



Reduce absolute total waste by 5% in 2017 and 10% in 2020/2021 against a 2010 baseline

Increase segregated waste for reuse or recycling to 50% of waste in 2015 and 75% in 2020/2021

- Segregated food collections continued across campus offices and residences.
- 2.7 tonnes of clothes and household items sent to charity for re-use as part of the 'Great Cranfield Donate' campaign for students moving out.
- Supported Small Action Big Impact campaign
- Provision of reusable water bottles for new students to reduce waste plastic cups. Use of disposable water cups significantly reduced



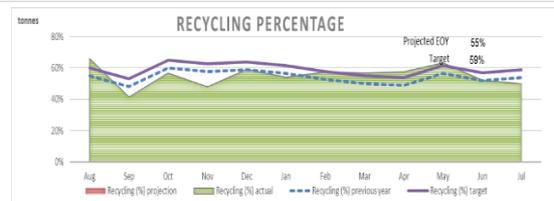
The proportion of waste segregated for recycling on site was 55%. The residual general waste is sorted off site in a materials recycling facility and therefore in total 81% of waste was recycled. The total amount of waste generated reduced by 14% compared to the 2010 baseline year.

Waste Indicators	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total waste (tonnes)	1181	1130	1134	1206	1233	1199	1176	1014	1021
Total waste reduction from 2010 baseline	0%	4%	4%	-2%	-4%	-2%	0%	14%	14%
Segregated on site to recycle (tonnes)	323	397	423	509	613	628	641	551	562
Total recycled overall (tonnes)	498	796	803	865	772	776	793	820	695
% segregated on site for recycling	27%	35%	37%	42%	50%	52%	55%	54%	55%

(see note 6, page 15)

## Plans for 2019

- Improve waste communications across campus including a new 'Code of Practice'
- Scope and implement onsite composting project
- Further reduction of single use plastics
- Introduce monitoring of recycling capture rates for different materials
- Develop of resource and waste targets for 2020-2030



# Travel



Reduce commuting in a single occupancy car to 53% by 2023

- New travel plan has been developed
- Uno bus contract has been extended
- New fleet of buses introduced
- Real time bus information is now available



A new travel plan has been developed for the next 5 years. The overall target is to further reduce single car occupancy commuting. The will cover all commuting to campus unlike previous targets which focused on staff. To achieve this increased bus travel, cycling, walking and car sharing all to be encouraged.

Objective	2012	2014	2016	2018
Single occupancy car use (All commuters)	70%	58%	59%	59%

A new fast bus service to Milton Keynes is planned and a campus shuttle service is being investigated. More cycling facilities will be introduced and cycling safety promoted. The installation of electric car charging points is also being looked into.

## Plans for 2019

- New fast bus route to Milton Keynes rail station
- More cycle parking facilities
- More electric charging points.



# Sustainable procurement and Fairtrade



To complete Level 1 of DEFRA's flexible framework by 2020/2021

- Campaign to reduce single use plastics
- Continued support for Fairtrade fortnight



The University is committed to following the Fairtrade principals of better prices, decent working conditions, local sustainability, and fair terms of trade for farmers and workers in the developing world. To raise awareness of Fairtrade, the University hosted Fairtrade Fortnight in February. The University continues to support Fairtrade products and awareness raising events, however has decided not to renew its Fairtrade Certification from February 2019 due to changes in certification requirements.

The University is working towards a target achievement of level 1 DEFRA flexible framework by 2021. Flexible framework level 1 includes the following:

- Sustainable procurement champion identified
- Key procurement staff received training in sustainable procurement principles
- Overarching sustainability objectives for procurement agreed
- Sustainable Procurement Policy in place
- Expenditure analysis undertaken and key sustainability impacts identified
- Key contracts start to include general sustainability criteria
- Contracts awarded for value not lowest price
- Government buying standards adopted
- Key suppliers targeted for engagement and views on procurement policy sought

In addition the University is also working towards a Sustainable Food and Beverage Policy and Strategy and has already made progress in the procurement of more sustainable food and catering options.

Campus services and the CSA have been active in reducing the use of single use plastics. Also a key initiative this year has been to provide all new students with a re-usable water bottle. This has significantly reduced the number of single use plastic cups used at water drinking stations. Fairtrade Fortnight was celebrated this year 25th February – 8th March.



## Plans for 2019

- Review progress towards the flexible framework
- Further develop our sustainable food and beverage strategy.

# Biodiversity

- New woodland trail and bridge over brook
- Meet the bees event
- More annual flower plantings to attract pollinators
- Regular biodiversity walks



A new woodland trail has been installed in the woodland next to the water works. This includes a new bridge over Chicheley Brook and links into the public footpath. The trail was part funded through the Central Bedfordshire Green Infrastructure Grant scheme.

Biodiversity Action Areas were increased again this year with a new long grass border and path to Fedden field.



The honey harvesting which went down well last year was repeated with great success in Green Week. This year a meet the bees event was organised which was also oversubscribed. Biodiversity walks have become regular feature throughout the year. An evening bat walk was also organised in September.

Work is ongoing to develop a Tree Plan for the campus and to develop the wildlife corridor identified in the Landscape Strategy.

## Plans for 2018

- Develop habitat management plans
- Further develop GIS mapping of biodiversity on campus.
- Install allotments on main campus



# Community involvement

- Green Week took place 29<sup>th</sup> October to 2nd November
- Very successful honey harvesting event
- Tree planting in the Community Forest
- Scrub clearance at Wildlife site
- Litter picking events on campus and cycle path



There have been a number of volunteering events including litter picking on campus, on the woodland trail and along the cycle path to the village; scrub clearance for the Wildlife Trust, tree planting for the Community Forest; delivering food caddies in residences, and carbon saving campaign meetings.



Events that took place during Green Week included: a talk on "Recovering Value from landfill waste" by Dr Philip Longhurst, a talk on the Living Lab and Urban Observatory an exhibit from Cawleys on their Small Action Big Impact campaign. The student Green Team organised a quiz and a honey harvesting event was very well supported. The honey was subsequently sold at the Christmas Fayre in support of the student charity SAFAD. Both staff and student Green Teams remained active, attending a series of events and initiatives throughout the year. They also helped with student switch off audits

## Plans for 2019

- A new student engagement program with awards and incentives
- 2020 Energy saving campaign
- Promotion of sustainable transport
- Ongoing events such as green week, walks and volunteering events



# Sustainable buildings, infrastructure and Living Lab



Achieve BREEAM Excellent for new buildings and all major refurbishments from 2012

Develop 'zero carbon' standard for University buildings

- Major construction works in progress
- BREEAM assessments are ongoing
- Number of student projects and thesis applied to University infrastructure



Major construction works have been ongoing with preparations for UKCRIC Pilot Hall, and Water Sciences building, DARTeC building and AgriTech building. Post construction BREEAM assessments are still in progress.

## Plans for 2019

- Further develop Design Standards
- Review BREEAM target

## Living Lab

The University has been granted funding to establish an “Urban Observatory”. This will provide funding for a range of sensors providing data on a range of issues including soil, air and water quality; biodiversity, water use, weather, noise and traffic movement.

Recent examples of student projects applied to the estate include:  
Corporate Sustainability Strategy for Cranfield University  
Exploring perceptions of Cranfield Campus as an Urban Observatory  
Climate Adaptation Strategy for Cranfield University

## Plans for 2019

- Install sensors for Urban Observatory

# Notes

1. **Objectives:** Baseline and target years refers to the financial/academic year August to July (for example, for the Carbon target, the baseline year 2005 is financial year 2005/2006 and the 50% target is to be achieved in year 2020, which is academic year 2020/2021).
2. **Scope:** Tenants are included because it is often not possible to distinguish between what is and is not a direct impact to the University as opposed to an impact of others operating on site. Examples include waste, car travel, some aspects of energy and water consumption and sewage discharges. As measurements and monitoring on site improve, this may become easier to distinguish. Additionally, the University is providing utility and other services to tenants and in a position as landlord and service provider to influence their behaviour and assist in the reduction of their environmental impacts, whilst at the same time having an interest in minimising the risks to the University. The converse applies to the University's Campus at Shrivenham. Here the University is a tenant on a MOD site. It is not possible at this stage to include this Campus within the targets. However, when information becomes available this will be reviewed.
3. **Base Year Recalculation Policy:** Cranfield University will ensure that its greenhouse gas reporting is up to date, accurate and consistent with current Government guidance. In particular, when there are structural changes that have a significant effect on the baseline and the reported progress towards targets, the baseline and, if necessary, data for years in between will be recalculated.  
**Base year recalculation:** It is important that progress is measured on a like for like basis. This means that any changes in calculation methodologies are applied to the previous figures as well as current figures.  
**Structural changes may include:** mergers, acquisitions, and divestments; outsourcing and insourcing of relevant activities; changes in calculation methods or improvements in the accuracy of factors, such as emission, factors, or activity data that result in a significant impact on the base year figures; discovery of significant errors, or a number of cumulative errors that is collectively significant. The recalculation will be triggered and reported if the structural changes would result in a change of greater than 2% in the total baseline figure. At the same time any errors in the current year reporting greater than 2% will be amended and relevant reports updated or notes attached explaining amendments.
4. **Changes to carbon data:** Our carbon footprint is recalculated each year for all years in order to account for errors, changes to the scope and material changes to the conversion factors provided by DEFRA for company reporting purposes. They may not therefore compare directly with previous figures reported in the University Financial Statement. See also our baseline recalculation policy above. Note the figures include emissions for tenants on Cranfield Campus, Silsoe Campus, COTEC and subsidiary companies. Sudbury House Hotel was included historically but has since its sale has been removed from the baseline and all years. The figures also include Martell House, acquired in 2011, with the recalculated accordingly. Shrivenham Campus is excluded.
5. **Water consumption and discharges figures:** These are for Cranfield Campus, including tenants. COTEC and Shrivenham data is not included. Discharges are taken as the average of the three consent targets.
6. **Waste figures:** These are for Cranfield Campus and include some, if not all, tenant waste. Note the key performance indicator for recycling is waste segregated on site. However, the waste contractor further segregates waste at their depot. This elevates our overall recycling performance and it is this figure, which is reported in the HESA Estates Management Reporting. We are working closely with local charities and organisations, collecting reusable goods from students as they leave the University and passing these on to a local homeless charity, Emmaus, to re-sell.
7. **Academic expertise:** Wherever possible, the University is making use of its academic expertise and facilities to enhance its response to environmental improvement. The estate is also offering opportunities for research and teaching. Examples of this include energy audits carried out by students and the University laboratories to analyse local discharges. The new CHP unit is regularly use as a real life demonstration for teaching.

## Glossary

AIRC Aerospace Integration Research Centre; BEE Board for Energy & Environment; BOD Biochemical Oxygen Demand; BREEAM Building Research Establishment Environment Assessment Method; CHP Combined Heat and Power; COTEC Cranfield Ordnance Test and Evaluation Centre; CRC Carbon Reduction Commitment; DEFRA Department for Environmental Food, and Rural Affairs; EA Environment Agency; EAUC the Environmental Association for Universities and Colleges; GIS Geographical Information System; HESA Higher Education Statistics Agency; IMEC Intelligent Mobility Engineering Centre; LED Light Emitting Diode; MOD Ministry of Defence; OU Open University; PV Photovoltaic; SHE Safety Health and Environment; SHEF Safety Health Environment and Fire; SUDS Sustainable Urban Drainage System.

# Key contacts

## Board for Energy and Environment:

- Chair, Professor Leon Terry, Director of Environment and Agrifood
- Ian Sibbald, Director of Finance
- John Street, Director of Facilities
- Gareth Ellis, Energy and Environment Manager
- Ginny Ford, Environment Advisor
- Angus Murchie, Energy Advisor
- Gio Lusignani, Director of Information Services
- Geoff Say, Director of Finance and Operations CDS
- Professor Frédéric Coulon, Professor of Environmental Chemistry & Microbiology,
- Becky Shepherd, Environment Officer
- Naomi Sandford-Dequincey, Green Officer, Cranfield Students' Association
- Zoe Payne, PA to Director of Environment & Agrifood (Board Secretary)

## Working groups:

- Living Lab Chair, Professor Jim Harris
- Carbon Management Chair, Dr Nazmiye Ozkan
- Fairtrade & Sustainable Food Chair, Ian Sibbald
- Sustainable Travel Plan, Gareth Ellis
- Waste Management Chair, Dr Stuart Wagland

## Further information

For further information, please visit our environmental pages on the University Website:

<https://www.cranfield.ac.uk/about/environmental-credentials>

or the University Intranet: <https://intranet.cranfield.ac.uk/EnergyEnvironment/Pages/default.aspx>

If you have any questions on any other topics outlined within this report or would like to provide us with any feedback, please contact the Energy and Environment Team at

[green@cranfield.ac.uk](mailto:green@cranfield.ac.uk).