Annual Environmental Report 2020 / 2021

Board for Energy and Environment

October 2021

Contents

Statement

Professor Phil Hart, 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 existing environmental objectives and sets out the new targets the University has committed to.

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

Key performance indicators

Issue	Description	Progress	Target	By when
Carbon	Scope 1 & 2 emissions[1]	42%	50% reduction	2020[2]
Waste	Total weight produced	32%	10% reduction	2020
Recycling	Segregated on-site	51%	75% of total waste	2020
Travel	Single occupancy car use	59%	53% of commuters	2023
Water	Consumption volume	17%	30% reduction	2020
Discharges	Ammonia	82%	50% below consent levels	2020
Discharges	Biochemical Oxygen Demand	69%	50% below consent levels	2020
Discharges	Suspended Solids	35%	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

[1]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.

[2]In this report, the year refers to the University's financial year e.g. 2020 is from August 2020 to July 2021.

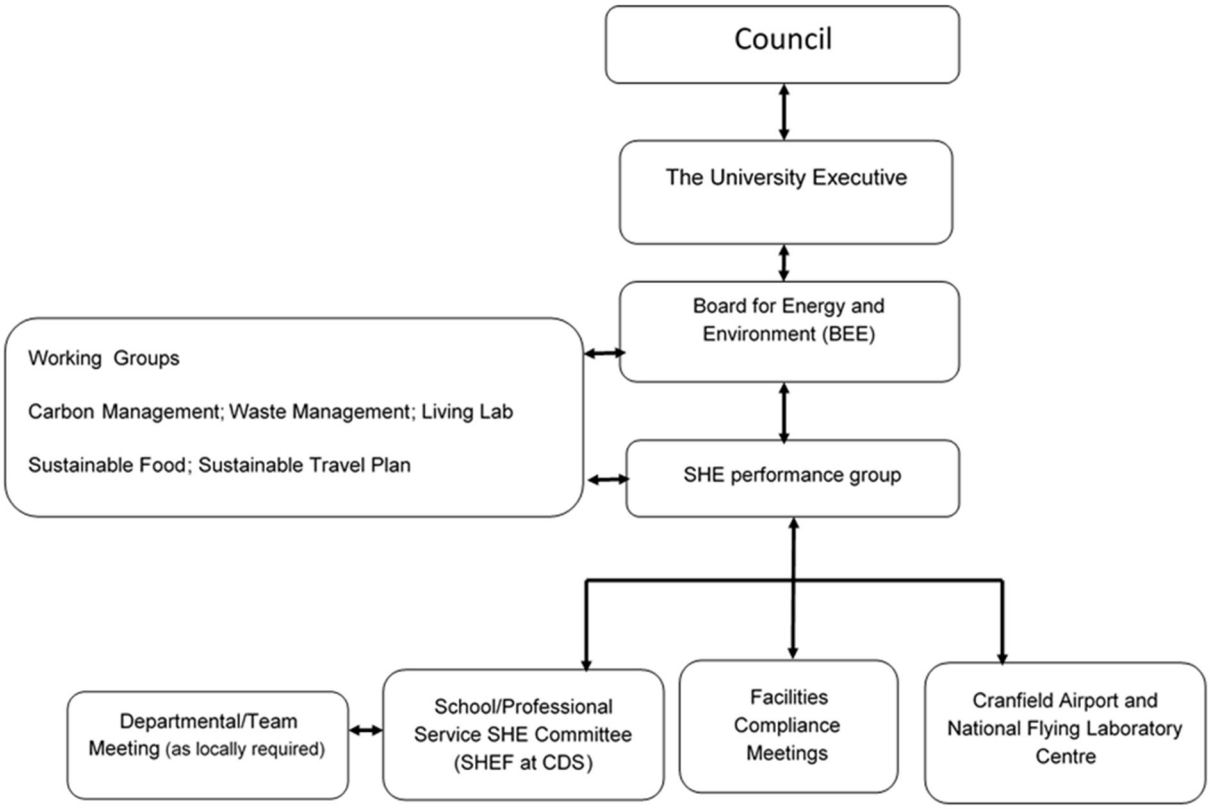
Environmental objectives

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: https://www.gov.uk/government/publications/sustainable-procurement-in-government-guidance-to-the-flexible-framework

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 14001:2015

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.

A successful re-certification audit was carried out by BSI in December 2020 followed by further surveillance audits in February and May 2021.

In a climate of continuous improvement, the reporting of all environmental incidents and near misses is encouraged. One incident was recorded for this reporting year relating to silty material

entering a drain from development work. This was rectified before any damage was done to the watercourse.

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 do not contribute to the key performance indicators such as carbon emission in this report *(see note 1, page 15).*

ISO 50001:2018

Cranfield University operates a university wide Energy Management System, which provides a framework for managing our energy use. The scope of the certification covers all University operations on the Cranfield campus, Cranfield Defence and Security at the COTEC site and MKU at Bouverie House. Certification was achieved in August 2018 and the second annual surveillance visit was completed by Lloyds in July 2020. There were no major or minor non-conformities. In August 2020 a further audit was undertaken by Lloyds to transition from ISO 50001:2011 to ISO 50001:2018 and that was also successfully completed with no non-conformities. In June 2021 there was a recertification audit without any 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. Under the new Streamlined Energy and Carbon Reporting (SECR) rules, which replaced the Carbon Reduction Commitment (CRC) Energy Efficiency scheme in 2020, the University reports its annual carbon emissions in the University's annual Finance report. That data includes all primary energy use by the University Group, all imported electricity use and all fuel put into University owned vehicles or private or hire vehicles used for Business Travel. . 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^2. Cranfield is a wholly Postgraduate University undertaking industrial scale research. This makes environmental impacts per student or per m^2 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

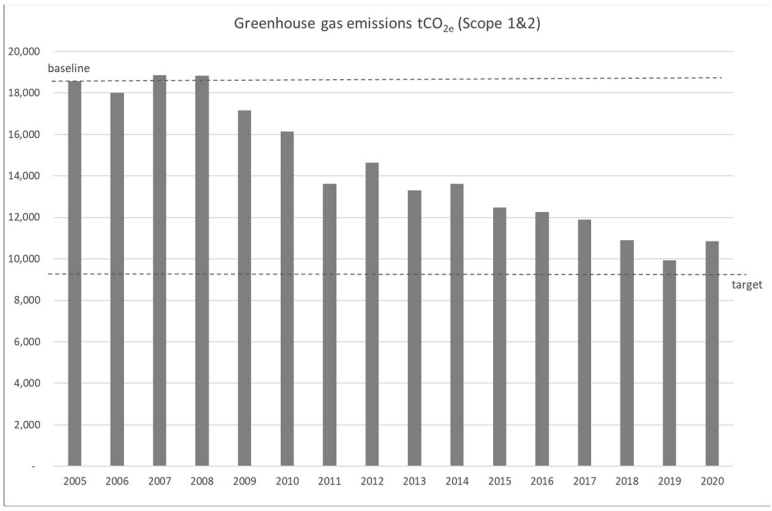
Our base year figures for reporting are reviewed from time to time to ensure like for like reporting. In 2013, the University sold Sudbury House Hotel prompting a recalculation of the base-year carbon emissions data and subsequent years to remove reference to this asset, similarly the acquisition of Martell House added to emissions *(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

- Successful Decarbonisation Scheme bid
- ISO 50001 recertification

A £5 Million bid to the Government's Public Sector Decarbonisation Scheme has secured funding for several measures to reduce carbon on the Cranfield campus. This includes improvements to the heating distribution, improved Building Management System control, additional buildings added onto the network and a 1 MW Air Source Heat Pump. There are also LED lighting upgrades and a solar farm extension with batteries to help balance the electrical system as reliance on the existing Combined Heat and Power system is reduced. There was only one Salix project completed with this year. In June 2021 the University was successfully recertified to the ISO 50001:2018 standard for a further 3 years.



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

There has been a 42% reduction in emission compared with the baseline. The University had been on target to reach the 50% target, however there was an increase in gas consumption due to ventilation changes of teaching spaces to mitigate Covid-19 spread combined with a very cold winter. This pushed up emissions compared with the previous year.

Plans for 2021/22

- Improved BMS and District Heating Control
- Further develop opportunities for energy storage
- Expansion of solar farm

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, BOD and suspended solids

Water demand has decreased but this is largely due to Covid. There was an increased demand for irrigation in summer 2021 due to establishing new landscaping in hot and dry conditions and water for Martell water feature. There was also a water leak in Medway Court. A further estimated 5,000 m3 could have been saved with better management and this will be focused on in future.

Water use	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Water use '000 m^3	185	183	180	164	167	163	168	170	164	154	153
Water use reduction	0%	1%	3%	11%	10%	12%	9%	8%	11%	17%	17%

The University's sewage treatment works encompasses a leading edge pilot hall research facility used by staff and students on campus. Over 2020-21 the STW have operated well, adapting to the reduced demand from a less occupied campus. Both BOD and ammonia discharges met the target of below 50% of discharge consent limits. Total Suspended Solids averaged only 35% below consent limit but remained within consent. Two incidences of heightened TSS occurred February and April which required the plant to recirculate. Plans are in place for improvements in infrastructure and capacity to enable the works to operate within consent limits as the campus increases the number of students living on campus in newly built halls of residence in the 21-22 academic year.

Discharges (average % below discharge consent limits)	2013	2014	2015	2016	2017	2018	2019	2020
Ammoniacal nitrogen	87%	88%	86%	64%	52%	55%	59%	82%
Biochemical oxygen demand (BOD)	57%	46%	48%	45%	60%	48%	27%	69%
Suspended solids (TSS)	22%	2%	15%	10%	33%	24%	82%	35%

(see note 5, page 15)

Plans for 2021/22

- Improvements in capacity of treatment works
- Water conservation awareness raising campaign
- Continue 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

- Food collected for food banks as well as clothes and household items sent to charity for re-use as part of the 'Great Cranfield Donate' campaign for students moving out.
- Further food recycling established in offices

The proportion of waste segregated for recycling on site was 51%. The residual general waste is sorted off site in a materials recycling facility which picks up a further 114 tonnes to be recycled and therefore in total 66% of waste was recycled. The total amount of waste generated reduced by 32% compared to the 2010 baseline year.

Waste Indicators	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total waste (tonnes)	1181	1130	1134	1206	1233	1199	1176	1014	1021	949	784
Total waste reduction from 2010 baseline	0%	4%	4%	-2%	-4%	-2%	0%	14%	14%	20%	32%
Segregated on site to recycle (tonnes)	323	397	423	509	613	628	641	551	562	500	403
Total recycled overall (tonnes)	498	796	803	865	772	776	793	820	695	635	517
% segregated on site for recycling	27%	35%	37%	42%	50%	52%	55%	54%	55%	53%	51%

(see note 6, page 15)

Plans for 2021/22

- Scope and implement onsite composting project
- Further reduction of single use plastics
- Introduce monitoring of recycling capture rates for different materials

Travel

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

- Cycle repair workshops
- New cycle/footpath around north of airfield to village

Surplus bikes are collected each year on campus when students leave. These are then donated to Cycle Saviours a local charity who repair the bikes and offer them back for sale at a reasonable cost to new students. Despite COVID-19 restrictions. Bicycle repairs were seen as an essential service. Cycle Saviours came to campus to repair student bicycles and sell bicycles to students in October, November 2020, and January, April, and July 2021. These sessions are an opportunity for the Energy and Environment team to register the students bicycles and distribute Hi Vis vests and safety leaflets and information. Students are encouraged to have lights and helmets for cycling.

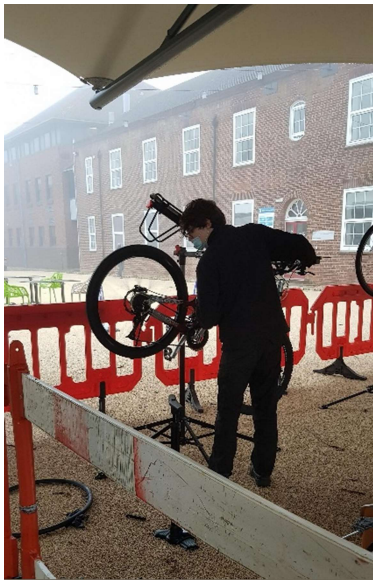
A new cycle lane is being constructed which will connect the north of Cranfield Village with the campus. Eventually there will a circular route for cycling, walking, and running all the way around the airfield.

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

The bus service continued to operate through the Covid pandemic but with much reduced passenger numbers due to social distancing.

Plans for 2021/22

- New fast bus service to Milton Keynes at weekends
- More cycle parking facilities
- More electric charging points.



Sustainable procurement and Fairtrade

The campaign to reduce single use plastics continues. Some of the actions taken include: All plastic cups now removed from distribution. Reusable bottles supplied to new students. Alternatives to plastic packaging such as compostable vegware sought where possible. 'Fairtrade Fortnight' and 'Food waste action week' were celebrated in March, with most messages being communicated virtually. Reggie's put on some Fairtrade promotions for the fortnight. The vegetable plots near the CSA have been used by some keen students this year to grow fresh fruit and vegetables on campus.

Plans for 2021/22

- Review progress on the flexible framework
- Sustainable food and beverage strategy.
- Further action on single use plastic

Sustainable buildings and Living Lab

The first phase of the new Baroness Young Halls of Residence has been opened. The buildings are built with high insulation levels requiring low levels of heating. There are also extra trees being planted on campus, because of the development, as a contribution to the Forest of Marston Vale Community Forest.

The Urban Observatory continues to evolve with more data being collected and sensors planned. The Living Lab approach has led to the establishment of a Green Infrastructure committee by the Research and Innovation Office to ensure that academic research makes the most of relevant facilities on site.

Plans for 2021/22

- Install further sensors for Urban Observatory
- Continue to develop Design Standards

Biodiversity

A hedgehog survey conducted in June with the help of the Student Green Team revealed that we have a very active hedgehog community on campus. More annual flower areas were seeded to attract pollinators. A Grizzled Skipper butterfly (rare for Bedfordshire) was spotted near the woodland. Mental Health awareness week in May had a focus on 'nature' and finding mindfulness in nature. It has been a poor year for Cranfield University's bees and honey production. With the cold, wet weather extending into the summer, honey production in the hives has been low for 2021.

Plans for 2021/22

- Renew Biodiversity Action Plan
- Develop habitat management plans
- Build bee colonies back up

Community involvement

Green Week took place virtually in November 2020. A video was produced to celebrate 10 years of Green Week. There were presentations by Dr Sofia Kourmpetli, Dr Guy Gratton, Bedfordshire Climate change forum and 'The Green House Theatre'. The SOM sustainability network went ahead with their lecture series which ran virtually throughout the year. A new student green team was created with students taking part in photography campaigns and a hedgehog survey. A new 'Cranfield Green Instagram account' and Flickr were used to share 'mindful' photos from staff and students during Mental Health awareness week.

Plans for 2021/22

- COP26/Green Week collaboration event
- Residential sustainability campaign
- Hybrid meetings and events

Ten years of progress

The Carbon target was set in 2009 but the other environmental targets did not follow until 2011. There have been many highlights along the way but here are a few:

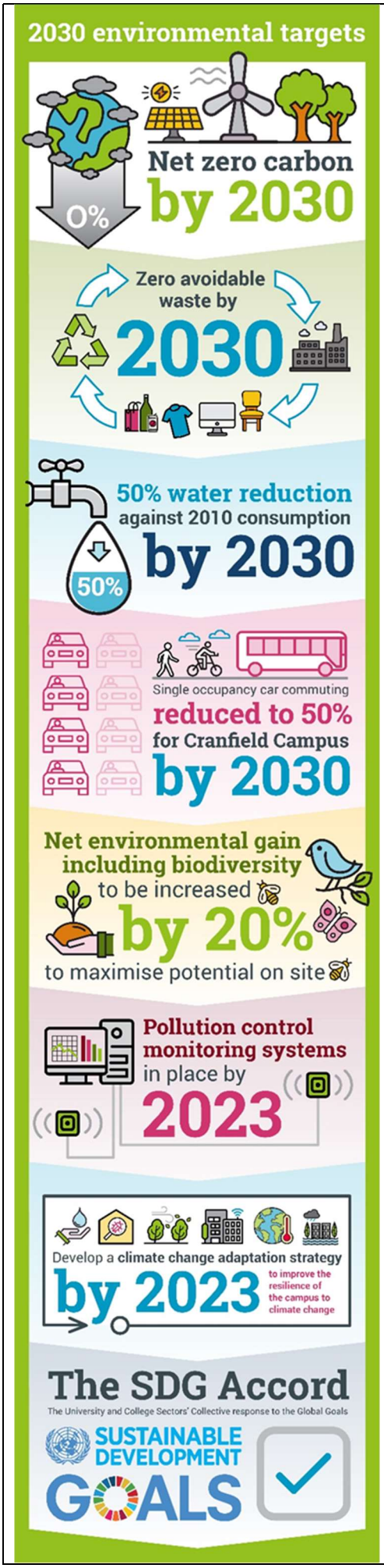
The Carbon reduction target led to some significant investments. These included a 1.4 MW CHP unit in 2011, which continues to produce over 50% of the electricity and 20% of the heat demand of the university. In 2014 a 1 MW biomass boiler was installed and this provides a quarter of the heat required by the district heating. In 2017 a 1 MW solar farm was installed on the airfield, producing over 5% of the electricity demand. Throughout there has been ongoing investments each year in energy efficiency measures using our revolving green fund set up partnership with Salix and HEFCE. And each year various campaigns and promotions have helped to encourage all staff and students to make their own contributions to reducing and preventing energy waste. The overall result has been a break in the link between energy growth and the growth of the university and a steady reduction in carbon emissions in line with the actions necessary to minimise climate change.

The management of waste has improved significantly since the baseline year 2010. Working with contractors Cawleys a number of waste streams were brought into the central operation. The University also worked to increase the proportion of waste going for recycling, composting and anaerobic digestion through providing a wider range of facilities for segregation into individual recyclable waste streams and corresponding internal bin facilities. This also helped the capture of waste data for different waste streams to be able to measure and monitor KPIs. To engage staff and students, information was made available through signage, intranet and social media communications, Green Team meetings and events such as Student Switch Off inter hall recycling competition, and visits to Cawleys Materials Recycling Facility (MRF).

The installation of new water ring main in 2012 replacing aging pipework across campus significantly reduced leaks. This met the original 10% water reduction target, so a more challenging target was set. Progress has been slow since then however the living lab is helping with investment in metering and a PhD project is investigating shower usage and behaviour change. The sewage treatment works has seen significant investments in trickle filters and pumping, control and storage. This has led to overall better performance.

Inspired by the Urban BESS project a small number of wildflower plots were established. These were well received and led to more areas being planted and other areas being set aside for natural flowers and other habitats to emerge. The discovery and protection of Bee Orchids on site helped to gain wider acceptance of having long grass and wilder areas on campus. A new Grounds contract with Nurture ensured the actions were successful. In 2016 a Biodiversity Action Plan set out these principles to conserve and develop key habitats and establish a wildlife corridor along the west side of the campus. There have been some notable sightings on site including otter, little egret, kingfisher, grizzled skipper butterfly.

Sustainable travel options for Cranfield campus have been transformed. Originally there were only two bus journeys a day to Bedford with a few at weekends to Milton Keynes. Working with Uno bus this has been transformed to a bus service every 30 mins to Bedford and to Milton Keynes, from early in the day to late at night 7 days/week. The roads around Cranfield are narrow and busy, making cycling and walking hazardous. The installation of a cycle/foot path in 2014 to the South of Cranfield village has made a huge difference. This year work has started on a similar path around the north of the airfield.



New Environmental Targets

In 2020 the University Council committed to a new set of environmental targets. The plans for these targets have been developed over 2020/21 and will be presented later this year.

The targets are to be achieved by academic tear 2030/31. They include All Cranfield University activities including the activities of any subsidiaries including the new Milton Keynes University MKU.

The Net Zero Carbon target will include Scope 3 emissions as appropriate. The aim is to reduce Scope 1 and 2 emissions as quickly as possible through energy saving and renewable energy. Any remaining emissions will require other measures.

The Zero Avoidable Waste target aims to minimise waste ending up in landfill or going for incineration and embraces the application of circular economy principles.

The water reduction target aims to be consistent with best practice and future supply pressures in this part of the UK.

The sustainable commuting target continues to focus on promoting alternatives to the car. Walking, cycling and bus are the main options.

Biodiversity will benefit from the new target ensuring any development on site results in a net environmental gain. The masterplan for the University sets out areas for new buildings and also a wildlife corridor where new habitats can be established.

The application of sensors on campus through the Urban Observatory is helping with the monitoring of air, water and soil. This will be developed in the short term to set out new pollution control monitoring and targets.

The risks of climate change impacts on the University are being investigated. This will be developed into a climate change strategy.

The University has signed the SDG Accord. This will lead to more focus on the SDGs and how the university's contribution can be better communicated and developed.

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 is 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 exclude emissions for tenants on Cranfield Campus, Silsoe Campus, COTEC where these can be separately identified but include 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, and Bouverie House in 2021 with the baseline recalculated accordingly. Shrivenham Campus is excluded.
5. **Water consumption and discharges figures**: These are for Cranfield Campus, including tenants. COTEC is included. 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 the overall recycling performance, and it is this figure, which is reported in the HESA Estates Management Reporting.
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; SECR Streamlined Energy & Carbon Reporting, SHE Safety Health and Environment; SHEF Safety Health Environment and Fire; SUDS Sustainable Urban Drainage System.

Key contacts

Board for Energy and Environment members:

- Chair, Professor Phil Hart, Director of Energy
- 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
- Stewart Elsmore, Director of Campus Services
- Rosina Watson, Head of Sustainability Group
- Becky Shepherd, Environment Officer
- Niall Marsay, CSA Green Officer
- Jackie Whelan, PA to Director of Energy (Board Secretary)

*Gio Lusignani retired in August 2021

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.