Energy & Carbon Plan 2023

Executive Summary

This energy plan reviews the current performance against the University target to reduce carbon emissions and sets out a plan for energy management and carbon reduction for the current year and up to 2025. This plan is a fundamental part of the University's ISO 50001:2011 certified Energy Management System. A new target for carbon reduction has now been set by the University. This is to achieve net zero carbon emissions by 2030. A KPI to monitor progress on building energy efficiency has also been set. This looks at energy use per m2 of floor area.

The very large increase in energy prices have prompted action to reduce energy wastage. A wide ranging energy campaign is underway to identify and implement energy savings. This includes an energy awareness promotion with staff and student energy champions encouraging best practice in the use of energy.

The University has secured a further £11 Million from round 3 of the Public Sector Decarbonisation Scheme, installing another large air source heat pump, extending the solar farm, and insulating the two main aircraft hangars, adding them to the district heating network.

An initial estimate of scope 3 emissions is detailed in this plan. The figures suggest that scope 3 emissions could be over three times the amount of scope 1 and 2 emissions. Further work is required to verify the figures and to develop a plan to address them.

Recommendation to prioritise the following objectives:

1. Seek to continually improve energy management through ISO 50001.
2. Continue to seek energy saving opportunities in buildings and processes and funding for same.
3. Reduce gas usage on site by seeking alternatives to gas boilers and CHP
4. Continue to develop and improve the District Heating system.
5. Continue to develop and improve the campus HV electricity system.
6. Explore the feasibility of more on and off-site generation including renewable energy options.
7. Further develop the Scope 3 data, verifying the SUPC data and substituting or adding where better data exists.
8. Develop a Carbon Offset Strategy.

Energy Planning

Buildings and Significant Energy Uses

The majority of energy use on site is associated with buildings in the form of heating, cooling, lighting, small and large power use. There are also centralised IT servers (with a mirror on site for backup), a sewage works, an airport, and a street lighting network.

The building energy uses split out into offices, teaching and meeting spaces, research spaces and equipment, workshops, hotels, halls of residence, flats, family houses, aircraft hangars, bus depot, kitchens, restaurants and other eating outlets.

The energy to heat and power the buildings is delivered in a number of ways. Over 50% of the electricity for the campus is generated on site by a 1.4 MW combined heat and power unit and 1 MW solar PV farm. The CHP also provides the base load heat for a district heating system which supplies most of the buildings on the technical site part of the campus. A biomass boiler also provides heat to this district heating system with gas boilers providing back up. Other buildings including all residential buildings are heated with gas boilers. Only two buildings on the technical site are still heated with oil, opportunities are being taken to convert these to district heating when possible.

The new buildings being delivered as part of the Masterplan are beginning to have an impact on energy consumption. This includes the AIRC building, AIRC Test Cells, IMEC building, new Glasshouse and the FAAM buildings. Agri Tech, UKCRIC 1 and 2 buildings and DARTeC building have been added in the last couple years and Baroness Young Halls have been completed in the last few months

There are over 900 electricity meters monitoring demand. When grouping these into major loads and building loads, the top 10 account for 48%.

The table below shows the top 10 electricity users (with the next 4 in grey) with the year-on-year change.

Building	**Electricity Use 20/21**		**Electricity Use 21/22**		**Electricity Use 21/22**
	kWh	kWh/Sqm	kWh	kWh/Sqm	
IT Servers	1,036,720	N/A	1,356,122	N/A	30.8%
C052A (inc Solt Building)	1,250,547	200	1,319,098	180	5.5%
Baroness Young Halls	10,708	1	1,311,149	144	12144.6%
C052	1,115,796	102	1,055,949	71	-5.4%
Mitchell Hall	660,039	94	706,291	91	7.0%
C300 Martell	641,602	103	665,314	144	3.7%
C057	1,098,277	450	638,174	303	-41.9%
C083 (inc IMEC)	776,993	83	547,619	45	-29.5%
Stringfellow Halls	469,825	59	523,442	71	11.4%
C239 Conf Hotel	197,031	55	487,429	66	147.4%
C070	537,810	367	430,721	212	-19.9%
C240 CMDC	242,079	127	341,443	77	41.0%
C085	354,184	65	322,903	59	-8.8%
C055	429,472	125	258,060	75	-39.9%

The impact of the new residential buildings at Baroness Young Halls is significant, as is the increase in the IT servers load largely due to the backup servers in Building 52 doubling their consumption. Elsewhere there are some changes in activity which may be explained by changes after Covid.

The above electricity sites will be reviewed week on week using data from the University's Half Hourly Automatic Metering System. Graphs showing monthly consumption and annual totals are maintained on an ongoing basis.

There are 186 gas meters monitoring demand. Most (61.4%) of the gas imported is used to fuel the CHP which produced 54% of the electricity consumed in 17/18. Excluding the CHP, the top 10 users of gas account for 35% of natural gas consumption.

The tables below show the top 10 gas users (with the next two in grey) with the year-on-year change.

Building	Gas Use 20/21		Gas Use 21/22		Annual change
	kWh	kWh/Sqm	kWh	kWh/Sqm	
Gas for District Heating	7,694,026	82	6,065,084	65	-21%
Gas for houses	2,907,827	192	2,635,045	174	-9%
Mitchell Hall	2,449,342	317	2,381,363	308	-3%
Lanchester	2,444,514	218	2,189,034	196	-10%
CMDC	1,527,941	531	1,705,679	593	12%
C300 Martell House	1,208,366	233	1,192,767	230	-1%
Stringfellow	1,333,607	167	1,181,346	148	-11%
Test Area	1,101,482	719	619,372	404	-44%
Fedden	583,646	200	572,655	197	-2%
Conference Hotel	366,608	50	445,931	60	22%
C046 Welding	208,637	177	156,873	133	-25%
Sports Centre	208,222	93	137,920	62	-34%

Degree days in 2021/22 were 1570 compared with 1794 in 2020/21 a decrease of 12%. This partially explains the decrease in gas usage in some areas. The test area experienced problems with the control system failing in 2020/21 which explains the large decrease when it was fixed in 2022. The gas for District heating does not allow for the other sources of heat including CHP waste heat and biomass heat. However, it is good to see a decrease in gas overall, reflecting a return to normal ventilation regimes after Covid.

The top 10 gas sites will also be reviewed week on week using the gas supplier's Half Hourly data. Graphs showing monthly consumption and annual totals are maintained on an ongoing basis.

Energy Costs

Gas prices increased by 171% between 2020/21 and 2021/22 and Electricity prices increased by over 70%. Further increases are being seen in 2022/23. This provides an increased imperative to reduce energy wastage but limits funding available for improvements, except for very quick payback measures.

Energy Infrastructure

The PSDS3 has progressed well. This project involved over £11 Million of grant to insulate the two aircraft hangars (B84 and B85), switch them to being heated by the low temperature district heating where another ASHP will be added replacing a gas boiler, removing the steam network and also installing solar PV on the roofs. These works have been delayed but are still expected to be delivered in 2023.

A proposal to further expand the district heating on to the residential estate was submitted to PSDS3b in September 2022. This also included costs for a large buffer store to provide extra capacity reducing the need for top up gas boiler usage on the district heating. The result of this application has yet to be declared. Further feasibility work is underway to also explore ground source heating for a future bid to PSDS3c.

The high voltage (HV) electricity network covers the entire campus (including residential as well as technical areas). There are 30 HV transformers on the network which are of varying age and condition. There are opportunities to replace some of these with more efficient versions, review their sizes and improve the way they are controlled to minimise losses.

Energy storage on both the heat and electricity networks would help maximise the use of renewable energy, smooth and reduce maximum demand and help optimise costs. The existing District Heating has a small buffer to deal with morning heating demand peaks. However, this is not sufficient for the expanding network and changes to the boiler house will provide the opportunity to review a more appropriate size of buffer.

The 1 MWh 900 kW battery system was installed as part of PSDS2. This is helping balance the electricity network to take advantage of changes to time of day charges, and mitigate increasing power demand from new facilities. A requirement for greater resilience (backup) for key research and operations may justify further investments in battery storage. This would also allow the expansion of onsite renewable energy generation whilst respecting the local district network operator's (DNO) requirement that there is no export of electricity from the site.

A Hydrogen ready gas boiler has been installed to provide backup heating for the district heating in the short term and provide future flexibility if green hydrogen becomes available.

Energy Management

The Energy Management System has now transitioned to version ISO50001:2018. The manual documents how the system works, setting out responsibilities, the policy, the various procedures, tracking legislative changes to maintain compliance and setting a system for monitoring and targeting energy savings.

There are 40 statutory annual DECs (Display Energy Certificates) and 31 ten year DECs (excluding new builds). The annual DECs are updated each September.

The Carbon Reduction Commitment (CRC) reporting has now ceased and replaced by SECR (Streamlined Energy & Carbon Reporting). This new reporting includes business travel by car within its scope.

The internal recharging of costs and charging of tenants has been much improved recently but more work is needed to streamline the processes involved. The charges need to be reviewed on more regular basis. A model needs to be developed to account for all the costs involved.

The Energy Advisor needs to maintain training and CPD requirements to be qualified to undertake DECs. Training is also provided to all staff and students (awareness training and online training). Training needs for FMs and Green Team members should be reviewed.

Monitoring and Targeting is being deployed on the operation of the District Heating and CHP with monthly reviews of performance. The maximum demand of the site is also being closely monitored and targeted during winter to minimise Triad charges. As described above the top 10 electricity and gas users are monitored on a more frequent basis.

KPIs

The overarching KPI is the absolute target to achieve Net Zero Carbon by 2030/31. This continues the rate of scope 1 and 2 carbon reduction from the previous target to reduce carbon emissions by 50% by 2020/21 from a 2005/6 baseline. This is equivalent to a 6% year on year reduction target since 2010.

A new KPI monitoring kWh per m2 for building energy use has been introduced. Energy efficiency KPI: "To reduce building energy demand per m^2 floor area, with a clear downwards trend on a three-year rolling basis"

Building Energy Demand by floor area over last 6 years (kWh/m2)						
	2016/17	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**
Electricity consumed*	116	111	108	96	93	100
Heat consumed**	218	216	223	199	199	176
Change in Elec efficiency		-4%	-3%	-11%	-3%	7%
Change in Heat efficiency		-1%	4%	-11%	0%	-11%
*Electricity demand excludes electricity specifically used for heating						
** Heat demand includes electricity for heating, CHP waste heat and assumes a boiler efficiency of 80% where fuel, and not heat, is metered.. Heat demand is adjusted for Degree Days.						
Energy use associated with Research activity which is not building related is excluded where possible. So, heating and electricity uses in buildings where research takes place is included but large-scale test rig energy use is excluded.						

Scope 3 Carbon

Scope 3 emissions are notoriously difficult to quantify as they represent the indirect carbon emissions incurred by third parties providing materials and services to the University. In most cases it is not possible to acquire the precise data but it is possible to use industry norms and factors for these emission based on spend. The University is a member of SUPC (Southern Universities Buying Consortium) which has undertaken an analysis of Cranfield Universities spend and the associated scope 3 emission based on industry averages.

Emissions					
Category	**Tonnes CO2e 21/22**	**Tonnes CO2e 20/21**	***Tonnes CO2e 19/20**	**Change CO2e from previous year**	**Change % from previous year**
Business services	10130	5959	12113	4171	70.0%
Paper products	117	173	496	-56	-32.5%
Other manufactured products	2381	554	942	1827	329.5%
Manufactured fuels, chemicals and glasses	765	90	2424	675	750.9%
Food and catering	334	168	1225	166	99.1%
Construction	2004	11934	40142	-9930	-83.2%
Information and communication technologies	8506	8194	1256	312	3.8%
Waste and water	445	214	416	231	107.8%
Medical and precision instruments	5300	11182	87	-5883	-52.6%
Other procurement	1349	462	7131	887	192.0%
Unclassified	775	4599	286	-3824	-83.1%
Total	**32105**	**43529**	**66518**	-11424	-26.2%

This table does not include Business Travel which this year SUPC calculate would be an additional 5,791 tonnes CO2 . There is also a further 10,644 tonnes for the bus service which Cranfield subsidises for the staff and student commute. There will be other commuting emissions associated with cars which have yet to be assessed.

The trend over the last three years is in the right direction. However it should be noted that the reduction is largely due to a significant drop in construction activity and also the year of reporting and previous year were significantly affected by the Covid pandemic.

Further work is required to verify this analysis and add to it. In particular the figure for the University bus service needs checking and also putting into context alongside the other commuting emissions particularly those associated with car travel.

The figures highlight the importance of addressing Scope 3 emissions. The scale dwarfs current Scope 1 and 2 emissions. Further work is required to ensure the accuracy of the data. A detailed plan needs to be developed to work with the supply chain to reduce emissions and also to develop a strategy for carbon offsets where this is not possible in the time frames required.

Energy and Carbon Saving Opportunities

Improving energy efficiency of buildings

Gas reduction is now the most important target for CO2 saving. Reductions in heating requirement though improved control of heating systems, better insulation and air tightness are a key focus of ongoing improvements. And alternatives to gas boilers are being sought.

Lighting is the main electrical load in some buildings. Replacing fluorescent lights with LED lighting and improved control can reduce this consumption by more than 50%. Opportunities to upgrade lighting to LED will continue to be sought. The most recent LED upgrades from PSDS2 included Buildings 3, 61,111,115, 192, Conway House, Conference Centre Car Park and the Library**.** There are still opportunities in the Conference Hotel, other car parks across campus and in Mitchell Hall.

Modern motors with improved control can significantly reduce the electrical loads associated with air handling and heating systems. BAM have been asked to identify opportunities as part of their operation and maintenance of the heating and ventilation on site.

Renewable energy

With the PSDS3 grant a further 800 kW of solar PV capacity is being installed adding up to over 2.2 MW on the campus electrical network. Discussions are also underway with a local solar farm being planned to look at direct import into the University private wire network. This could see solar providing all of the daytime needs of the campus for most of the year.

The gas CHP unit was fully renovated in August 2018 and it has an O&M contract to operate until 2026 when it is expected to reach end of life. Given that it is now no longer low carbon compared with grid electricity, plans are being made to reduce its running hours. This has been a key element of the PSDS2 and PSDS3 projects. The biomass boiler has also been renovated to ensure that it provides baseload contribution for the district heating.

The option to install an Air Source Heat Pump was chosen for the PSDS2 and PSDS3 grant applications. A Ground Source Heat pump would be preferable but not possible in the timescales allowed. Modifying heating systems to work with lower return temperatures make it more feasible to have the District Heating network supported by heat pumps. As heat pump technology develops and the grid becomes decarbonised then this becomes a more attractive low carbon option. The feasibility of ground source will be investigated for future PSDS applications. This could include the feasibility of collecting heat from the runway (when it is refurbished) to then store in ground source boreholes. This would increase the performance of any ground source system significantly.

Solar Thermal systems have been added to new buildings to provide hot water and there is some scope to extend this to some existing buildings particularly where there is a significant demand for hot water and where electricity is currently used.

Large scale wind power is still the most cost-effective form of renewable energy for electricity generation. The options for siting a large wind turbine at Cranfield are limited. The main issue is the airport and the potential impact on instrumentation and radar systems. However, this should continue to be reviewed as technology develops which may overcome these issues.

Behaviour change

Alongside the University Energy Policy there is an Energy Code of Practice which provides more detail for the interpretation of the energy policy. This helps manage expectations and ensure operations are efficient. This code is reviewed annually.

All staff and students are given awareness raising training either through presentation (students) or via online training (staff). Staff and students who are keen to volunteer to help improve the environment at Cranfield are organised in staff and student “Green Teams” and are supported to help with campaigns to save energy.

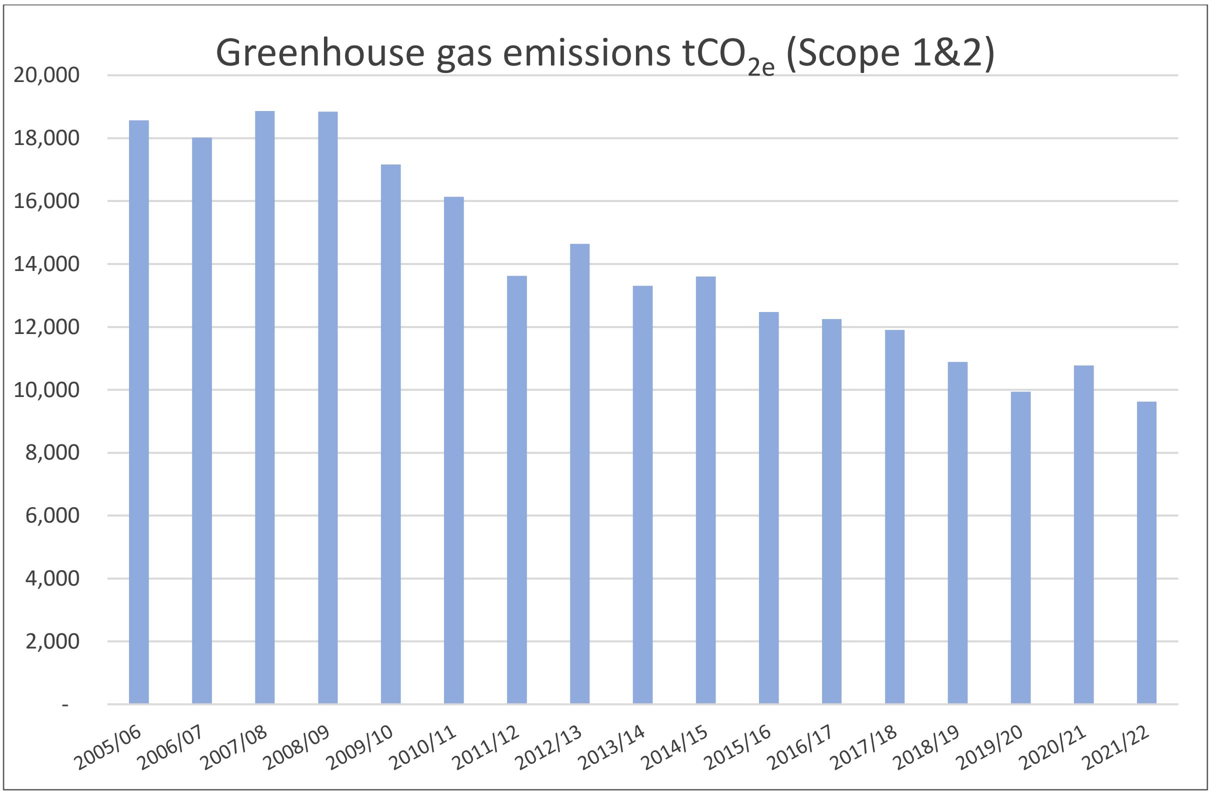
Energy Campaign

Given the huge increases in energy prices and costs there is a renewed emphasis on immediate energy savings. A campaign recruiting energy champions has been rolled out with an emphasis on cutting out energy wastage. Energy data has been made available updated on a weekly basis. More building temperature sensors have been installed to ensure there is no overheating whilst comfort is maintained. A review of operations with laboratory mangers, cleaning management, security and technical managers has helped identify opportunities to reduce energy use without affecting operations. Temperature settings have been optimised and timings controlled more effectively. This has included the setting of TRVs to a set maximum consistent with 21 degrees C. Buildings have had hours of operation set to avoid heating and lighting being used unnecessarily.

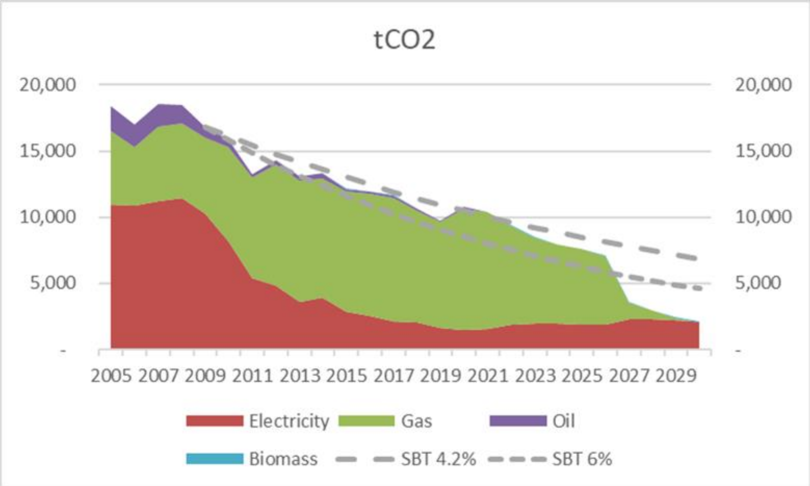
Meeting the 2030 Carbon Target

Review of Carbon Management Plan Progress

At the end of 2021-22 Carbon emissions are 42% lower than the baseline figure for 2005.



The Business As Usual (BAU) line on the graph illustrates what would happen if no energy saving measures had been undertaken and energy use allowed to grow in line with turnover. The degree days line also shows when we had colder years (2012 in particular but also 2020) and the effect on progress can be seen.



This graph shows the progress so far and the current projection to 2030. This illustrates the rate of decarbonisation compared with that required to meet a Science based target.

There has been consistent investment in energy efficiency since 2010 using a Salix Revolving Fund to install more efficient lighting, pipe insulation, new compressors and better controls. This has been supplemented by larger projects to install a CHP (in 2011), improve and expand the district heating network and install a Biomass boiler (2012 to 2014). In 2018 a 1MW Solar PV array was installed, combined with a large project to install LED lighting.

Salix Projects

Energy efficiency projects planned but not yet committed using the amended Salix Revolving Green Fund are summarised below:

Planned	Title	Annual kWh Savings	Carbon Savings tCO_2e/y	Project Costs	Annual Savings	Payback Time
22/07/2024	B37 Connection to district heating	100,000	18	£70,000	£5,000	14
28/08/2023	IT server heat recovery	500,000	92	£300,000	£25,000	12
31/7/2025	Residential heat pump	140,000	26	£90,000	£7,000	13
	Totals	**740,000**	**136**	**£460,000**	**£37,000**	**12**

The annual summary of the Commissioned Salix Revolving Green Fund Salix is shown below:

Commissioned (Salix Year)	No of Projects	Annual kWh Savings	Annual Carbon Savings tCO_2e	Project Costs	Annual Savings	Average Payback / Years
2021/2022	2	60,073	16	£125,239	£13,611	9.2

2020/2021	2	141,960	39	£181,076	£28,576	6.3
2019/2020	6	101,282	132	£137,388	£28,924	4.7
2018/2019	5	310,380	149	£164,124	£32,114	5.1
2017/2018	4	210,942	91	£187,378	£37,029	5.1
2016/2017	4	154,979	49	£62,861	£12,667	5.0
2015/2016	6	308,408	157	£173,588	£36,631	4.7
2014/2015	12	383,479	119	£124,265	£40,633	3.1
2013/2014	11	377,587	131	£136,290	£45,918	3.0
2012/2013	11	470,628	162	£194,209	£48,897	4.0
2011/2012	8	767,842	262	£208,862	£67,459	3.1
2010/2011	2	17,712	10	£6,487	£3,069	2.1
2009/2010	11	1,684,911	567	£217,901	£118,959	1.8
Totals	**84**	**4,990,183**	**1,884**	**£1,919,668**	**£514,487**	**3.7**

In addition to the above, the following one-off loan funded projects have been completed.

Completed	Loan	Project	Carbon Savings tCO_2e	Annual kWh Savings	Project Costs	Annual Savings	Payback / Years
Apr 2018	SEELS 2017	1 MW PV farm in field	439	1,037,66	£1,262,609	£211,683	6.0
Jan 2018	SEELS 2017	B052 LED Lighting Upgrade Various	56	128,262	£27,680	£26,165	1.1
Dec 2017	SEELS 2017	B114 LED Lighting Upgrade	29	64,989	£43,255	£13,258	3.3
Dec 2017	SEELS 2017	B083 LED Lighting Upgrade Various	25	57,976	£14,077	£11,827	1.2
Dec 2017	SEELS 2017	B070 LED Lighting Upgrade Room F10	4	9,903	£3,187	£2,020	1.6
Nov 2017	SEELS 2017	Lanchester LED Lighting Upgrades	151	345,468	£208,881	£70,476	3.0
Sep 2017	SEELS 2017	B052 LED Lighting Upgrade F243-F251	4	7,981	£4,896	£1,628	3.0
Jul 2017	SEELS 2017	B045 LED Lighting Upgrade Throughout	16	39,009	£36,892	£7,958	4.6
Mar 2015	HEFCE RGF	Biomass Boiler	527	20,767	£1,000,000	£154,638	6.5
Oct 2014	SEELS 6	District Heating Control Improvements (Pressure sensors)	289	1,560,00	£242,520	£66,898	3.6
Mar 2013	SEELS 5	Pipe insulation (B30,37,39,40,85,88)	59	322,348	£27,075	£9,348	2.9
Mar 2013	SEELS 5	Cavity Wall Insulation	19	104,714	£16,158	£3,560	4.5
Mar 2013	SEELS 5	Martell BMS improvements	107	375,337	£43,354	£20,977	2.1
Mar 2013	SEELS 5	Adiabatic coolers	74	141,988	£127,443	£29,817	3.3
Nov 2012	SEELS 4	DH Pipework improvements and Thermal Store	616	3,353,75	£638,772	£128,449	5.0
Jul 2010	SEELS 3	UPS Upgrade (IT Servers)	72	133,200	£71,362	£20,797	3.4
		Totals	**2,488**	**7,703,35**	**£3,768,160**	**£779,499**	**4.8**

And the following projects grant funded through BEIS/Salix PSDS2 in 2021/22

Measure	Project Costs	Savings	CO2 savings

DH distribution improvements	£417,881	£4,111	25
Upgrading and installing new BMS	£1,012,616	£34,012	208
LED Lighting	£870,506	£100,929	619
Solar Farm	£465,215	£36,724	225
Battery	£811,195	£0	-
Air source heat pump (air to water)	£1,430,433	-£75,639	412
Connect B108 & B045 to existing district heating	£133,968	£12,505	11

And BEIS/Salix PSDS3 in 2022/23

Measure	Project Costs	Savings	CO2 savings
Hangar insulation	£8,861,828	£211,008	776
Upgrading and installing new BMS	£82,249	£9,785	36
New heating	£804,697	£13,577	50
Solar Farm	£817,085	£106,978	393
Air source heat pump	£880,493	-£11,957	202

Projection 2023 to 2026

The table below has a breakdown of projected carbon savings to 2025. Note over 3,000 tCO2 savings are required by then to keep on track with the target of Net Zero by 2030/31. The PSDS3a funding has been secured for the projects listed below, and there is funding available through the Salix RGF (Revolving Green Fund) for projects but these will need to be further validated and proposals submitted. As the Salix RGF is being phased out it is suggested that an Internal Revolving Fund be set up in its place and some illustrative costs and savings are included below. Finally, more feasibility work is required to firm up on costs and savings and to enable robust and successful applications for PSDS 3b and PSDS3c.

Year	Measure	Funding	Project Costs	Savings	CO2 savings
2023/24	Hangar insulation	PSDS3a	£ 8,861,828	£ 211,008	776
2023/24	BMS	PSDS3a	£ 82,249	£ 9,785	36
2023/24	Heating system improvements	PSDS3a	£ 804,697	£ 13,577	50
2022/23	Solar PV	PSDS3a	£ 817,085	£ 106,978	393
2022/23	ASHP	PSDS3a	£ 880,493	-£ 11,957	202
2023/24	IT Server heat to B034/B111/DH	Salix RGF	£ 300,000	£ 25,00	92
2023/24	Connect B37 to DH	Salix RGF	£ 70,000	£ 5,000	18
2023/24	Various LED upgrades & small EE projects	Internal revolving fund	£ 200,000	£ 135,000	90
2024/25	Add Hotels and Stringfellow to DH and add Biomass boiler	PSDS3b	£ 4,000,000	£ 240,000	484
2024/25	Various LED upgrades & small EE projects	Internal revolving fund	£ 200,000	£ 135,000	90
2024/25	Install GSHP and extend DH to Martell	PSDS3c	£ 6,000,000	£ 28,750	771

2025/26	Install Heat Pumps in residential	Salix RGF	£ 90,000	£ 7,000	26
		Total	£ 23,599,097	£ 853,531	3,429

Part of the carbon saving in the PSDS3b and PSDS3c projects is based on the assumption that the CHP run times will be further reduced and the CHP eventually phased out by 2026. Further savings will be possible through behaviour change measures to ensure there is no wastage. This will include a review of Covid ventilation strategies to ensure they are both save and energy efficient. The continued decarbonisation of the UK National Grid will also help. As will securing the supply of zero carbon electricity from a solar farm direct. Weather influences will also be a big factor which could go either way.

Specific funding for the electricity infrastructure, such as transformers has yet to be identified the same applies to energy storage although this may be possible through future PSDS bids.

Action Plan

The following actions were completed or in progress by March 2023.

Task	Description	Who	When
Recruit new Energy Advisor	Ceri Dawson appointed	GE	Aug 2022
Recruit Building Energy Management System Engineer	Paul Mizon appointed	GE	Nov 2022
Maintain DECs	Contractor appointed	CD	Mar 2023
Revise Tenant Billing	Monthly billing & review rates	GE	Sep 2022
Secure funding for Energy improvements detailed above	Consultants for feasibility appointed	GE/SS	Apr 2023
Continue to develop strategy for Net Zero Carbon Target	Secure strategic consultancy to review campus energy systems	GF/GE	Sep 2022

The immediate plan for the current year is set out below:

Task	Description	Who	By When
Deliver Salix projects	Maintain Salix RGF fund	GE	Annual
Apply for PSDS3C	Make grant application	GE	Sep 2023
Continue to explore smart grid, renewable energy and electricity and heat storage	Develop plans for a smart energy campus with clean energy generation and storage	GE	Ongoing
Review SUPC Scope 3 data	Verify the accuracy of the data and develop an understanding of opportunities to reduce emissions	GE/GF	Oct-23
Develop a Carbon Offset Strategy	Draft a Carbon Offset Strategy for consultation	GE/GF	Oct 23

Conclusions and Recommendations

Progress is being made towards the University's 2030 target. That progress will need to be maintained in the future to achieve the new target of Net Zero Carbon emissions on time. There are still significant opportunities for further energy efficiency improvements and renewable energy investments. Continued investment in these measures will contribute to the target being achieved.

Scope 3 emissions are very significant and larger than Scope 1 and 2 emissions combined. The data needs further scrutiny and more analysis to understand fully the challenges and opportunities. Further engagement with the supply chain is needed to see where emissions can be reduced and a Carbon offsetting strategy developed.

Recommendation to prioritise the following objectives:

1. Seek to continually improve energy management through ISO 50001.
2. Continue to seek energy saving opportunities in buildings and processes and funding for same.
3. Reduce gas usage on site by seeking alternatives to gas boilers and CHP
4. Continue to develop and improve the District Heating system.
5. Continue to develop and improve the campus HV electricity system.
6. Explore the feasibility of more on and off-site generation including renewable energy options.
7. Further develop the Scope 3 data, verifying the SUPC data and substituting or adding where better data exists.
8. Develop a Carbon Offset Strategy.

Document Control

Document title	Energy and Carbon Plan
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Signature	
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Document Review

Version	Amendment	By	Date
1.1 – 2.1	Draft Versions of original Carbon Management Plan	John Street William Stephens	Dec2008
2.2	First Approved Issue of original Carbon Management Plan	John Street William Stephens	Feb 2009
2.2	Updated Version of original Carbon Management Plan	John Street William Stephens	Jul 2014
2017/18	New format for ISO 50001	Gareth Ellis	Apr 2018
2017/18v2	Verification of Tasks added to Action Plan	Gareth Ellis	Jun 2018
2018/19	Annual Update	Gareth Ellis	Mar 2019
2019/20	Annual Update	Gareth Ellis	Mar 2020
2020/21	Annual Update	Gareth Ellis	Jan 2021
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2022/23	Annual Update	Gareth Ellis	Mar 2023