A Zero Carbon Plan for UCL
Our commitment to become a zero-carbon university has brought our whole community together to innovate and test out new ideas. From carbon pricing to sustainable laboratories, we want to demonstrate how a fair and climate resilient university can operate.

This Zero Carbon Plan sets out the main approach to how UCL will deliver on its commitment to be a zero carbon university by 2030; and the contribution that every part of UCL has to make in meeting this ambition.

Richard Jackson, Director of Sustainability
July 2021
Executive Summary
Executive Summary: UCL’s carbon challenge

As part of the 2019-24 Sustainability Strategy, UCL has committed to achieve:
• Net zero carbon institution by 2030
• Net zero carbon for its building energy use by 2024
• Reduce energy use by 40% by 2024

UCL has also committed to:
To reduce emissions from student start and end of term travel by 5% by 2030.
To reduce emissions from student and staff commuting by 55% by 2030.

Carbon emissions for UCL 2019/20 year:

<table>
<thead>
<tr>
<th>Category</th>
<th>tonnes CO2e (2019-20)</th>
<th>% of total</th>
<th>% change vs 2018-19 baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy for our campus (including all accommodation)</td>
<td>52,570*</td>
<td>12%</td>
<td>-9%</td>
</tr>
<tr>
<td>Organisational Travel</td>
<td>17,272**</td>
<td>4%</td>
<td>-51%</td>
</tr>
<tr>
<td>Food</td>
<td>2,990</td>
<td>1%</td>
<td>14%</td>
</tr>
<tr>
<td>Waste &amp; Water</td>
<td>642</td>
<td>0.1%</td>
<td>12%</td>
</tr>
<tr>
<td>Products that we buy</td>
<td>358,802***</td>
<td>84%</td>
<td>-15%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>432,276</strong>**</td>
<td><strong>84%</strong></td>
<td><strong>-15%</strong></td>
</tr>
</tbody>
</table>

Carbon emissions outside of Zero Carbon by 2030 Scope

<table>
<thead>
<tr>
<th>Category</th>
<th>CO2e (2019-20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff &amp; Student Commuting</td>
<td>3,845</td>
</tr>
<tr>
<td>Student start &amp; end of term travel</td>
<td>171,136</td>
</tr>
</tbody>
</table>
Executive Summary: UCL fundamental approach to net zero

Four main elements to our approach:

<table>
<thead>
<tr>
<th>Use data &amp; insights to drive culture change</th>
<th>Improve understanding of emissions and opportunities for reducing carbon wastage</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Provision of targeted data and insights to key decision makers to drive change</td>
</tr>
<tr>
<td></td>
<td>Behaviour change initiatives with students and staff to act on carbon wastage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Smarter operation and use of existing assets</th>
<th>Space optimization &amp; rationalization to reduce energy use (inc. consolidation: labs &amp; data centres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Buying lower carbon and fewer products</td>
</tr>
<tr>
<td></td>
<td>Less and lower carbon forms of travel</td>
</tr>
<tr>
<td></td>
<td>Improved controls for heating and cooling to prevent wastage</td>
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<td>Sharing and repairing of equipment</td>
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<table>
<thead>
<tr>
<th>Invest in zero carbon infrastructure</th>
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<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>Upgrade district energy network to zero carbon energy network</td>
</tr>
</tbody>
</table>

| Offset | Offset remaining carbon emissions using accredited ethical projects. |
Introduction
UCL response to climate change

As part of the 2019-24 Sustainability Strategy, UCL has committed to achieve:

All carbon emissions:
• Net zero carbon institution by 2030

Carbon emissions from building energy use
• Net zero carbon for its building energy use by 2024
• Reduce energy use by 40% by 2024

In addition to the strategy UCL has made a public commitment to be net zero carbon by 2030 through the UNFCCC Race to Zero campaign.

The following plan sets out our broad approach to achieving our commitments.
What do we mean by a net zero carbon university?

What does the zero carbon target apply to?
The target applies to the carbon produced directly from UCL’s energy use and the carbon indirectly related to organisational travel, waste and water, products and materials that UCL purchases. Although efforts will be made to reduce emissions from investments, staff and student commuting and student start and end of term travel, this does not currently form part of UCL’s reportable emissions.

What does achieving net zero carbon mean?
• By 2024 we will seek to reduce the carbon associated with the energy we use in our buildings
• Where we cannot reduce energy use, we will purchase renewable electricity and green gas to achieve net zero energy from buildings
• By 2030 we will seek to achieve absolute zero carbon emissions from energy use (under UCL’s direct control) by generating our own renewable electricity and by displacing fossil fuel use to renewable alternatives.
• We will reduce avoidable carbon emissions as much as possible from travel, products, waste and water.
• We will undertake accredited offsetting for the remaining emissions.

How will we measure net zero progress?
• We will use a science-based targets approach to reporting, following the ISO standard 14064 to ensure that all appropriate emissions are in scope and that our targets are aligned with the Paris climate agreements.
UCL’s current carbon footprint

Current emissions for UCL 2019/20 year.

<table>
<thead>
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Carbon emissions outside of Zero Carbon by 2030 Scope

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* Travel figures reflect impact of covid-19 enforced cessation of international travel
** Data on products is calculated on spend and is therefore approximate. This methodology is used across the sector
*** International travel to and from UCL is outside of the zero carbon by 2030 scope
**** Internis outside of the zero carbon by 2030 scope
Objectives and Considerations for Zero Carbon UCL

**Overarching objective:** To meet UCL’s commitment to be a net zero carbon institution by 2030.

**Factors to be considered:**

1. **Our approach should be Innovative and evidence based:** Using UCL research and the best of international innovation to demonstrate what a zero carbon university looks like; which can then provide a rich environment for learning and research. UCL will follow a science-based targets approach to determining what our emissions are, what reductions are needed and how these can be achieved.

2. **We need to be customer focussed:** Ensure we have resilient and maintainable energy systems which deliver a comfortable working environment for students and staff as well as reliable and stable conditions for scientific research.

3. **We should aim to be cost effective:** By reducing energy, product and travel demands to limit costs and ensuring that we purchase competitively priced energy to support our ongoing/future activities.

4. **Our approach should align with other sustainability strategy objectives:** E.g. improved air quality, workers rights, biodiversity.

5. **Our actions should support resilience and future-proofing:** Flexibility to accommodate changes in the university, technology innovation, regulatory and market landscape and changing climatic conditions.

6. **We should be inclusive and equitable:** Ensuring that we take a fair approach to offshoring of emissions and offsetting.
### UCL fundamental approach to net zero

Four main elements to our approach:

| Use data & insights to drive culture change | Improve understanding of emissions and opportunities for reducing carbon wastage  
Provision of targeted data and insights to key decision makers to drive change  
Behaviour change initiatives with students and staff to act on carbon wastage |
| Smarter operation and use of existing assets | Space optimization & rationalization to reduce energy use (inc. consolidation: labs & data centres)  
Buying lower carbon and fewer products  
Less and lower carbon forms of travel  
Improved controls for heating and cooling to prevent wastage  
Sharing and repairing of equipment |
| Invest in zero carbon infrastructure | Invest in new carbon efficient kit/building design/fabric upgrades/  
Videoconferencing to reduce the need to travel  
Upgrade district energy network to zero carbon energy network |
| Offset | Offset remaining carbon emissions using accredited ethical projects. |
Governance and reporting

• Successful delivery of the Zero Carbon Plan will require action from across UCL; with key areas delivered by UCL departments across Procurement, Finance, ISD, Estates Development and Operations, Planning as well as UCL Faculties and Sustainable UCL.

• A Zero Carbon Plan Programme Board will be established with representation from the areas listed above.

• Project Boards will also be created for each of the different projects within the programme.

• A Zero Carbon steering group will be established with representation from UCL researchers and students to guide the implementation and direction of the programme.

• Reporting of progress on the Zero Carbon Plan will be termly to the Sustainability Committee, and annually to UCL’s Senior Management Team.

• UCL’s Climate Action Lead (part of Sustainable UCL) is responsible for the day to day delivery of the Zero Carbon Plan.
Carbon emissions from heating and powering UCL’s buildings (Scope 1 and 2)
Steps to zero-carbon energy use from buildings

BAU
assumes small (~2%) savings, mainly due to grid decarbonisation

Step 1: Reducing Energy
Demand/Improve management
40% energy saving by 2024, as per strategy, then following BAU

Step 2: Replace/Upgrade: Zero carbon district energy step 1, followed by full decarbonisation of the district energy network

Step 3: Replace/Upgrade: Zero carbon decentralised heating supply
Step 1 and 2 followed by decarbonisation all other gas heating sources

Step 4. Remaining emissions will need to be met from offsite renewable electricity supply.
Step 1 Reducing energy demand.

Data & Insights to drive culture change

Behaviour change project:
• Increase uptake of existing schemes to 80% participation schemes (Green Impact, switch-offs). Saving 3%.
• Carbon Accountability Scheme – extending to all departments; target 15% reduction in emissions.
• Review building opening hours.

Improved controls
• Enhanced metering to help identify areas of energy wastage.
• Improvements to control of heating and cooling preventing wastage

Smarter operation of existing assets

Optimising our use of space (programme dependency)
• Review of poor energy performing buildings as part of Estates strategy (disposal for worst assets).
• Increase densification of space (balanced with increased cooling demand from high density occupancy).
• Lab rationalisation; reducing the need to heat/cool whole buildings 24/7.

Laboratories
• Increased uptake of LEAF sustainable laboratory programme (targeting 90% of labs).
• More shared facilities e.g. through research platforms reduce wastage from running multiple small facilities.
• UCL wide biobanking offer to reduce lab cooling demand and increase resilience.

Data centres/ HPC
• Consolidation of decentralised server rooms into data centres
• Activity to improve PUE (power usage effectiveness) in all data centres.
Step 1 Reducing energy demand: Zero carbon infrastructure

Zero carbon new buildings – this should be cost neutral* with any additional cost to a project off set by either revenue or other project cost savings. This will ensure BAU emissions do not grow. Planning will also be a driver to implementing this work. PEARL is the first showing how this can be achieved.

Plans for New projects/ Major Refurbishments:

• Sustainable Buildings Standard sets out energy reduction targets for new builds and refurbishments (a key part of the strategy to achieve energy efficiency across the estate).

• A shadow carbon price will help to rebalance business cases for life-cycle carbon costs.

Upgrade building fabric and plant by retrofitting inherently efficient materials, plant and systems for heating, ventilation, humidity, lighting, IT, insulation and equipment. Investment would be in two phases:

1. An initial energy efficiency programme, aimed at reducing carbon by 6%, delivered between 2021 and 2024. This will focus on insulation, heating/cooling/ventilation upgrades and lighting.

2. A second round energy efficiency programme, reducing carbon by 7%, delivered between 2025 and 2030.
Currently power and heating for campus buildings is provided by 2 energy networks (Gower St. Which is wholly owned by UCL) and Bloomsury Heat and Power (a consortium with UoL and SOAS).

Upgrading the infrastructure for both networks can enable up to 31% of the zero carbon targets to be achieved.

The upgraded network design would:
• Integrate waste heat for both heating and cooling supplemented and amplified by electricity.
• Waste heat sources: sewer network and the ventilation shafts for the London Underground. This could be purchased for a lower cost than electricity or gas.
• Energy storage both thermally and batteries.
• Provision of centralised cooling; remedying issues with the current individual air conditioning systems (capacity resiliency, GHG emissions, noise)

Additional Benefits would include:
• Ability to switch between electricity, heating and cooling to respond to both seasonal peaks or price signals from the national grid.
• Provides additional capacity to improve resilience by incorporating buildings currently not on district networks which are being served by life-expired equipment
• Potential revenue stream by supplying heat to customers such as the British Museum and UCLH.
• Approach provides flexibility to adopt new technologies as they emerge preventing over-reliance on single fuel source
Moving away from natural gas: A programme to replace local gas-fired heating plant to electric heating (e.g. heat pumps) or connect to one of the district energy networks could deliver 15% of proposed carbon reduction. These boilers currently account for 47% of total gas consumption.

We will also need to work with partners (e.g. NHS Trusts) where we are tenants to encourage move away from fossil fuels.

Onsite renewable energy:
Already have 600m2 of solar panels (generating 120,000kWh pa).
It has been identified that there is space for 3,000m2 of additional panels.

Given UCL’s city centre location it is not possible to meet all of our energy demands through onsite generation and therefore offsite assets need to be explored.
Low carbon energy supply to meet remaining UCL energy demand
UCL already purchasing 100% zero carbon renewable electricity (REGO certified).

By 2024 we aim to be purchasing “Green Gas” (biomethane and hydrogen) as a stepping stone to the decarbonisation of heat.

Longer term UCL is seeking to generate electricity from UCL owned assets; which would increase the additionality of carbon savings. Options for this include:
• Entering a Power Purchase Agreement with a renewable electricity generator; typically lower than wholesale rates.
• Investing in off-site renewable energy assets
• Building off-site renewable electricity generation assets

These could deliver 9% of the targeted carbon reduction.

In 2030 UCL's energy use is predicted to be 86.6MWh - this could be met with 23MW of wind turbines.
Summary of steps to meet 2024 & 2030 targets

<table>
<thead>
<tr>
<th>Workstreams</th>
<th>Contribution to zero carbon target (2030)</th>
<th>Contribution to 40% energy reduction target (2024)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1: Reduce energy demand</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioural programmes/ space management</td>
<td>43%</td>
<td>61%</td>
</tr>
<tr>
<td>Improved energy management</td>
<td>18%</td>
<td>26%</td>
</tr>
<tr>
<td>Upgrades to building fabric and plant and equipment</td>
<td>8%</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Step 2 and 3: Zero carbon energy on campus</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upgrades to energy networks and decentralised heating supply</td>
<td>22%</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Step 4: Zero carbon energy supply offsite</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renewable electricity supply for UCL</td>
<td>9%</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Carbon emissions from organisational travel (Scope 3)
Organisational Travel: Proposed approach

Data & Insights to support departments and staff to reduce travel

- Provide information on travel spend and CO2e to departments through Tableau
- Travel booking system provides nudges for lower carbon travel
- Exploring travel carbon budgets taking into account the types of activity that departments undertake
- Currently UCL currently operates a travel offset scheme (introduced in early 2011), charged at 1.72% of all spend on flights, which raises around £170k per year (of which £80k is reinvested in campus energy efficiency). The potential for raising the levy could be explored.

Smarter operation of existing assets

Facilitate travel mode switching

- New travel policy which requires users to take the most carbon efficient mode of travel.
- New travel booking service provides easier international rail connections.
- New travel policy requires all UK journeys under 6 hours to be completed by train.

Investment in zero carbon infrastructure

- Fleet: Move to electric fleet for all UCL vehicles (in progress)
- Connecting virtually instead of travelling
  - Improved onsite video conferencing facilities to enable more complex virtual meetings.
  - UCL to undertake a number of flagship virtual conferences
Carbon emissions from products
(Scope 3)
Products: Proposed approach

The key to reducing scope 3 emissions from procurement is to buy less. This is supported by making better use of what we already have – sharing and repairing. Remaining purchasing should aim for low or zero carbon options.

Reduce
First step is to reduce the volume of procurement; which will also provide a cost saving.
- Central procurement initiatives such as consolidating suppliers, hub approach to deliveries, including other local organisations.
- Department level – Reporting on purchasing activity and increase uptake of LEAF and Green Impact
- Training for staff undertaking purchasing within departments.
- Establish sharing opportunities for equipment between depts, labs etc
- Create shared facilities for some common research processes; e.g. tissue culture, imaging.

Improve the way we use products - Reuse and repair
- Reuse as standard as an initial question before buying new.
- Develop an in-house workshop/repair team to repair equipment.
- Establish regular reporting of reuse across UCL; and develop targets.

Replace/Upgrade - Zero carbon buying
For the remaining products that we need to purchase, work with suppliers to provide and choose products with a lower carbon impact
### Products: what savings can we expect?

<table>
<thead>
<tr>
<th>Product area</th>
<th>Baseline emissions tCO₂e 2020</th>
<th>Actions to reduce emissions by 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste &amp; Water</td>
<td>642</td>
<td>30% reduction in water use 85% recycling rate</td>
</tr>
<tr>
<td>Lab Equipment</td>
<td>170,890</td>
<td>15% reduction through repairing/reusing; 20% reduction in manufacturer emissions</td>
</tr>
<tr>
<td>IT &amp; Comms</td>
<td>56,592</td>
<td>15% reduction through repairing/reusing; 20% reduction in manufacturer emissions</td>
</tr>
<tr>
<td>Food</td>
<td>2,990</td>
<td>40% reduction from vege / vegan catering</td>
</tr>
<tr>
<td>Paper</td>
<td>3,075</td>
<td>80% reduction based on phasing out paper use</td>
</tr>
<tr>
<td>Construction</td>
<td>39,970</td>
<td>Reductions in line with UK target (net zero by 2050)</td>
</tr>
<tr>
<td>Other Products</td>
<td>23,285</td>
<td>Reductions in line with UK target (net zero by 2050)</td>
</tr>
<tr>
<td>Other Services</td>
<td>64,990</td>
<td>Reductions in line with UK target (net zero by 2050)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>362,433</strong></td>
<td></td>
</tr>
</tbody>
</table>
Offsetting
Offsetting residual emissions

- Residual carbon emissions will need to be offset. The table below is indicative and our priority remains to remove emissions
- Currently have voluntary Trees for Life Scheme, which has planted 188 trees in the UCL Grove.
- UCL to develop strategic partnership with carbon offsetting provider which links to UCL’s values & meets additionality tests.

UCL’s offsetting provider must meet the principles below:

- Additionality – does the project result in a carbon reduction that would not otherwise have happened, either naturally or without this funding
- Social impact – does the project create any social benefits such as alleviating poverty, or are there any potential negative impacts such as loss of agricultural land
- Verifiability – what is the evidence that the project has been carried out, and is it possible to quantify the carbon reductions delivered
- Communicability – how easily can the benefits of the project be explained
- Cost – how near is the carbon price to “social cost of carbon”
Baseline and targets for areas that are out of Scope of the Zero Carbon by 2030 target
With UCL based in the heart of London the majority of both students and staff use public transport, which has a low carbon footprint compared to journeys made by car.

70% of daily journeys to and from UCL are made by public transport, and a further 28% by walking or cycling.

The focus of our commuting strand is therefore to influence those people who do still drive to work, with further encouragement for those using public transport to try active travel options like walking or cycling.

Commuting actions:
• Reduce the need for staff to travel by supporting remote and agile working
• Develop proposals and work with partners to improve public transport and walking and cycling connectivity between sites used by the University.

Target: To reduce emissions from student and staff commuting by 55% by 2030.

### Student and staff commuting

Emissions from term-time commuting between UCL and place of residence (this is not included in the 2030 zero carbon target):

<table>
<thead>
<tr>
<th>Scope 3 emissions</th>
<th>Students (tonnes CO₂e)</th>
<th>Staff (tonnes CO₂e)</th>
<th>Total (tonnes CO₂e)</th>
</tr>
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<tr>
<td>Term-time commuting</td>
<td>1,856</td>
<td>1,989</td>
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### Breakdown of staff and student commuting:

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<th>Tonnes CO2 Staff</th>
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<tbody>
<tr>
<td>Rail</td>
<td>1,072</td>
<td>824</td>
</tr>
<tr>
<td>Underground</td>
<td>598</td>
<td>784</td>
</tr>
<tr>
<td>Bus</td>
<td>125</td>
<td>229</td>
</tr>
<tr>
<td>Car</td>
<td>174</td>
<td>17</td>
</tr>
<tr>
<td>Motorbike</td>
<td>19</td>
<td>2</td>
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Student start and end of term travel

Breakdown of current student travel at start and end of term (this is not included in the 2030 zero carbon target):

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<tr>
<th>Scope 3 emissions</th>
<th>Students (tonnes CO₂e) UK</th>
<th>Students (tonnes CO₂e) International</th>
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</thead>
<tbody>
<tr>
<td>Travel between UCL and home</td>
<td>583</td>
<td>170,552</td>
<td>171,136</td>
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UCL’s baseline for start and end of term travel is currently derived from extrapolating data from student home locations with the assumption that all students go home at the end of each term. However, we know for some students this will not be the case. Therefore over the next 2 years we will be working to develop a more robust baseline for the start and end of term travel.

Student start and end of term travel - proposed actions:
- Offer further in-country graduation ceremonies for international students.
- Consider how we could provide holiday season activities to incentivise international students to stay in the UK during these periods.
- Offering students enhanced options to swap the plane for the train for near Europe travel.

Target: To reduce emissions from student start and end of term travel by 5% 2030.