Net Zero UEA

What is it and how to achieve it?

Stakeholder workshops final report

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Overview

In June 2019, the University of East Anglia (UEA) declared a climate and biodiversity emergency in response to the Intergovernmental Panel on Climate Change Special Report on 1.5°C, awareness-raising by Extinction Rebellion and the School Strikes for Climate. Climate change and biodiversity are prominent areas of research and policy influence since the founding of the UEA. Indeed, it is possible that climate change and biodiversity would not be of global societal concerns without the impact of UEA researchers for the past 50 years. It is completely apt that the UEA is now looking to apply knowledge of the climate emergency and how to respond to it in its own operations on campus and across its city community.

In this context, the Tyndall Centre, UEA was tasked by the UEA Sustainability Board to help guide UEA's carbon targets and biodiversity ambitions. This included two main pillars. The first was an estimation of the UEA's carbon budget to reach NetZero; the second was a series of stakeholder workshops to understand how the UEA can achieve these targets.

The Tyndall Centre at the University of Manchester developed a carbon budget for the UEA to reduce its cumulative CO_2 emissions to net zero before 2050. This budget was calculated using a modified method applied to all UK Local Authorities to devise Net Zero pathways - a fair share of the remaining global carbon budget necessary to limit global climate change to well below 2°C, in line with the UN Paris Agreement 2015. We then used a 'Town and Gown' methodology, in which the UEA's carbon budget was calculated on the premises that the UEA is a CO_2 citizen of Norwich, not a separate entity. This carbon budget is based on a 'toolkit' approach, whereby different targets are set for emissions from building-related energy use, travel (land transport and aviation) and land-use management (biodiversity).

We co-produced how to deliver NetZero UEA with expert stakeholder by conducting three online expert workshops between June and September 2020. The workshops aimed to 1. Identify key actions needed to meet the proposed UEA carbon budget for each of the three emissions sectors; 2. Set out narrative pathways for achieving these actions; 3. Engage key stakeholders in the development and ownership of these pathways. A fourth workshop held in November 2020 disseminated our results to senior University decision-makers.

We based our workshop methodology on the backcasting approach applied by Tyndall Centre Manchester for *Decarbonising the UK*[1]. Backcasting allows to determine steps necessary to achieve a desire future. In this case, a pathway for reaching NetZero UEA. Based on the input from workshop participants, we developed narrative pathways for implementation in 5-year periods, in line with international and national policy practice. The detailed pathways are presented in our report and are summarised in Figure 1.

2020 saw remarkable changes in the way people work, travel, study and relate, due to the COVID-19 pandemic. The challenges of this disruption are well evidenced. However, these changes can also lead to more sustainable ways of working, studying, and living, with significant environmental, economic and societal benefits to be reaped. In 2021, the UK is hosting the UN climate-change summit, COP26. This is therefore an opportune moment to combine the University's operational agendas with its climate leadership record and outstanding reputation to promote a NetZero vision that goes far beyond the university to encompass Norwich city and the local area, other universities, national stakeholders and the wider international climate change community. We hope that the findings of our work, as summarised below, will provide a good starting point for helping the UEA to achieve its NetZero carbon and biodiversity ambitions.

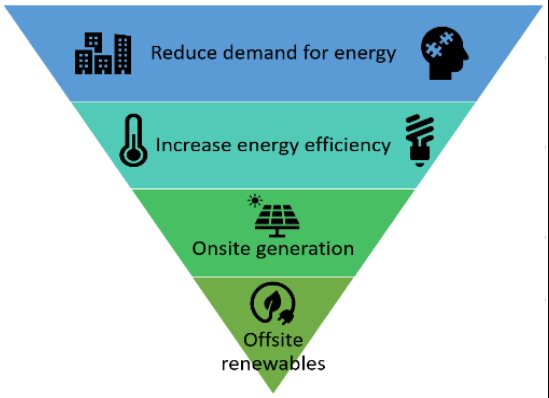
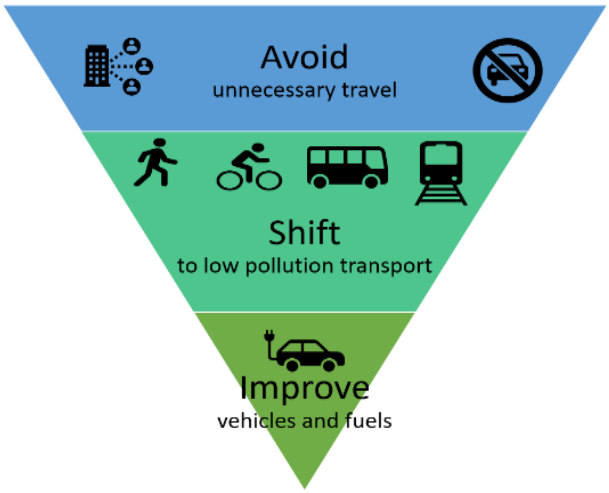
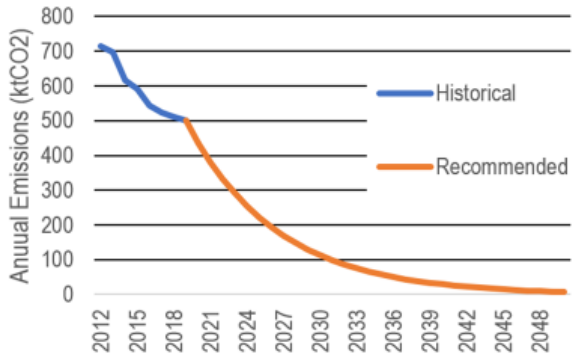
For building-related energy use, we present measures according to the energy management approach. Measures to reduce demand include space consolidation and behaviour change; measures to increase energy efficiency include building insulation, energy efficiency and temperature regulation; onsite electricity generation and storage provide additional means of reducing emissions; offsite generation of renewables can further contribute to achieving net zero.	 *Cutting emissions from campus buildings workshop*
 *Cutting emissions from travel workshop*	For travel emissions, we used the Avoid-Shift-Improve framework. Measures to avoid travel include remote working and banning single occupancy and/or fossil fuelled cars. Shifting to more sustainable modes of mobility includes encouraging walking, cycling and active travel, increasing public transport access and shifting short-haul flights to rail. Improving vehicles and fuels broadly refers to increasing uptake of electric buses and cars on campus. Data is also crucial to allow both 'greener' travel choices and to monitor progress.
For biodiversity and land-use management, several opportunities were identified to enhance the UEA's biodiversity and carbon sink. This primarily included ensuring adequate staff and resourcing levels; work with local partners and volunteer groups; identify opportunities for biodiversity offsets within the planning system; protect and enhance local habitats; manage access for competing users and uses, such as dog-walkers, recreational fishing and cycling; Access management could also be enhanced by increasing education and outreach to the wider community regarding the value and conservation of local biodiversity; Monitor progress through annual surveys is key to ensure implementation continuity.	 *Enhancing biodiversity workshop*

Figure 1: Summary of workshop findings

Introduction and background

In 2019, the UEA declared a climate and biodiversity emergency, calling for urgent action on both. In line with these ambitions, the Tyndall Centre for Climate Change Research Manchester developed a carbon budget for the UEA. The budget is aligned with the UN Paris Agreement goals of limiting global emissions to well below 2°C. It provides recommendation on reducing the UEA's cumulative CO_2 emissions to a fair share of the remaining global carbon budget. The carbon budget focuses on energy-related CO_2 emissions, including direct (Scope 1) emissions from fuel combustion and a relative share of electricity emissions, based on consumption (Scope 2, with transmission and distribution included). The UEA's carbon budget was calculated as a proportional share of the Norwich carbon budget[2] (Figure 1). It was estimated that the UEA accounts for 4% of Norwich's energy-related CO_2 emissions. On this basis, a carbon budget for UEA of 147 $ktCO_2$ was calculated. This included estimating CO_2 emissions from UEA students living in the City (10,000 people).



Milestone Year	Change in Annual CO_2 Emissions Relative to 2015
2020	26.3%
2025	62.6%
2030	81.0%
2035	90.3%
2040	95.1%
2045	97.5%
2050	98.7%

Figure 2: Norwich projected carbon budget

While good data on UEA's building-related energy use is available, it was difficult to estimate UEA's transport emissions due to data availability and double-counting of travel emissions for trips undertaken for multiple purposes (e.g. school run and commuting for work). A toolkit approach was therefore used to set differentiated commitments for building-related energy use, transport (surface and aviation) and land-use management.

In line with this approach, we held three thematic expert workshops to explore how the UEA could reach its ambitions to achieve net zero emissions for building-related energy use (Workshop 1), travel (Workshop 2) and enhancing biodiversity and land-use management (Workshop 3). An additional fourth leadership and engagement workshop presented results to University decision makers. Due to CO-VID 19 constraints on meetings, the workshops were redesigned to be held online between June and November 2020, as summarised below.

Table 1: Workshop details

	Date	Number of participants	Presenters
Workshop 1: Buildings	25.06.2020	20 (including 7 core team)	Asher Minns, Richard Bettle
Workshop 2: Travel	02.07.2020	20 (including 6 core team)	Asher Minns, David Whales
Workshop 3: Biodiversity	10.09.2020	16 (including 6 core team)	Iain Barr, Tom Everett
Workshop 4: Leadership	18.11.2020	Approximately 90	Phil Hunt, Asher Minns

The objectives of our workshops were to:

1. Identify key actions needed to meet the proposed UEA carbon budget.
2. Set out narrative pathways for achieving these actions.
3. Engage key stakeholders in the development and uptake of these pathways.

Workshop methodology

We developed our stakeholder workshops in line with the backcasting approach used by the Tyndall Centre[3] for its landmark *Decarbonising the UK* work. We simplified the approach to adapt to our timeframes and enable online discussion and interaction. Backcasting allows stakeholders to determine the steps needed to reach a desired future[4]. Our methodological framework is presented in Figure 3.

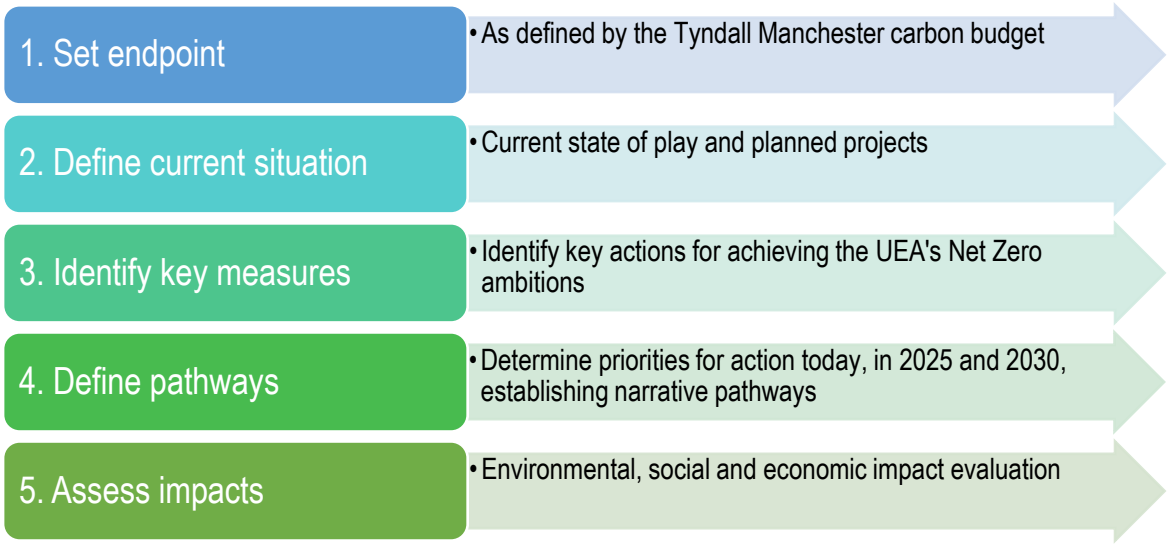


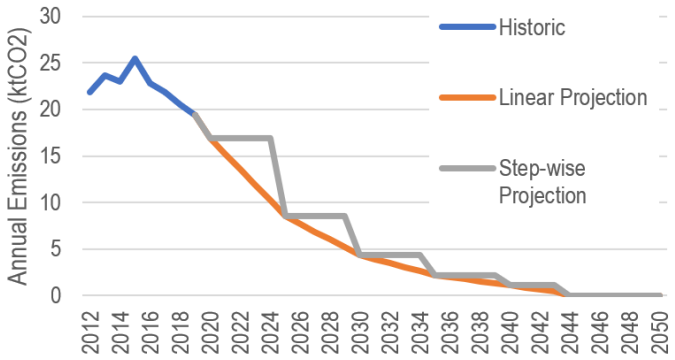
Figure 3: Backcasting framework

1. **Setting the endpoint**: For each workshop, the endpoint was based on the UEA's proposed carbon budget. For the biodiversity and land management workshop we also relied on the biodiversity expertise of Dr Iain Barr from UEA. The relevant endpoint was presented in the beginning of each thematic workshop.
2. **Describing the current situation**: In each workshop, progress to date was presented by a UEA expert. This background set the context for group discussions held subsequently and defined some key achievements, challenges and opportunities.
3. **Identifying key actions**: Group discussions were then held to identify key actions that would help UEA meet its carbon and biodiversity targets. We asked participants to share their top priorities, which were discussed with the group. A list of key measures was produced and shared with participants for group feedback.
4. **Establishing narrative pathways**: Based on the list of measures identified by workshop participants and additional expert input, we devised timelines for action up to 2025, from 2025-2030 and beyond 2030 for each workshop. These narrative pathways provide guidance on meeting the UEA's climate and biodiversity targets. They are aligned with international and UK climate commitments, which run in the same 5-year intervals.
5. **Assessing impacts**: while this is an integral part of traditional backcasting approaches, this was not undertaken in the workshops, due to time, resourcing and logistical considerations. We recommend impact / cost benefit analysis to complement and complete this work for each of the 5-year time slices.

Below we present the key findings and recommendations for each workshop.

Workshop 1: building-related energy use

UEA is a long-standing leader on sustainable buildings and energy use. Buildings such as the Elizabeth Fry, Zicer and the Enterprise Centre are best practice examples of sustainable construction and energy use. Notwithstanding, with building-related energy emissions accounting for the majority of UEA's emissions, the UEA needs to dramatically reduce its buildings-related energy emissions, as illustrated in Figure 4.



% Change in Annual Emissions	2015 Baseline	1990 Baseline
2025	-66%	-55%
2030	-83%	-77%
2035	-91%	-88%
2040	-96%	-94%
2045	-100%	-100%
2050	-100%	-100%

Figure 4: UEA's building-related energy use carbon budget projections.

The workshop included two discussion groups. One group focused on key measures to reduce supply-side emissions, such as those related to heating, cooling, electricity generation and grid use. The other group focused on demand-side measures, such as energy efficiency and behaviour change. The key measures, summarised in Table 2, were then discussed in a plenary session. Workshop notes were shared with participants for additional input.

Table 2: Key measures for reducing building-related energy emissions

Supply side measures: energy production, heating and cooling	
Heating	Central plant replacement – heat pumps and hydrogen need to be considered
	Improve building performance to reduce demand.
	Modify building heating services to run at lower temperatures. Use small local heat pumps to step up temperature in winter
	Waste heat collection: Capture waste heat to heat buildings that currently use gas boilers, using heat pumps.
Cooling	District chilled. Replace old chillers with free air coolers to be heat pumps for district in the summer and free cooling chillers in the winter. Install storage to reduce peak loading (2020-2025). Ensure all additional cooling is matched by building-mounted Photovoltaic (PV) (2025 onwards)
On-site energy generation	2020-2025: Install on site PV to ensure zero import in the summer day-time weekends. Ground based, Building mounted, solar car ports; 2025-2030: Install on site PV to ensure zero imports in summer day time, with limited battery storage; Beyond 2030: Onsite wind turbines. Fuel cells in winter if gas grid is switched to hydrogen.
Grid electricity	Maximise effective use of grid incentives: Ongoing review of technologies and incentives to minimise the cost of energy delivered to site
	Power purchase agreements with local renewable generators for remaining imports.
	Continue discussions with Research Park to have a local energy grid/network, to minimise peak loads and costs
Carbon capture and storage (CCS)	investigate if local CCS is an option to extend the life of existing power generation model
Demand side measures: Buildings, energy efficiency and use	

Behaviour change and engagement	Clear messaging to promote ownership of energy use. Highlight to staff and students who do not see the cost. Relate to budget prioritisation in other areas if no savings made.
	Key areas to target: Sciences, student residences, administration, student services e.g. library. Engagement over an 8-year period to fit with energy production timescales.
	Energy efficiency projects from staff and student ideas
	Building by building comparison, department/faculty competitions, beyond 2030: office by office/individual competitions.
Financial incentives	Incentivises demand reduction in UEA buildings, perhaps through 'pay back' to students on accommodation costs. For staff, possibly increased budget allocation to schools.
	Bonuses for staff who develop energy efficiency ideas and projects
	School carbon budgets
Communications	Energy efficiency and carbon targets with explanation on an entity-by-entity basis. Setting out the national and international context – how people can make it possible.
	Understand how people use buildings and collect input on how to engage and contribute
	Story-telling. Link to funded projects that the UEA is involved in
Physical space	Agile working and studying: teleconferencing and e-learning; UEA International Campuses (space from overseas universities with net zero commitments
	Space consolidation: group ULT rooms in efficient rooms, shared office spaces, rent out unused space.
Energy efficiency	Insulation and full refurbishment of least-efficient buildings
	Smart technology – relate energy supply to demand (e.g. timetabling, automatic equipment shutdown), just in time energy demand
Become an exemplar of net zero solutions	Net zero/sustainability core module for all students and included within all staff inductions
	Use the campus as a learning tool for low energy buildings in the professions in the built environment
	New courses in zero carbon buildings and retrofit
New builds	Embedded and operational carbon including in business plans and carbon footprint.

Based on these recommendations, a narrative pathway was developed, setting out key actions for the next 5, 10 years and beyond 2020, as presented in Figure 5.

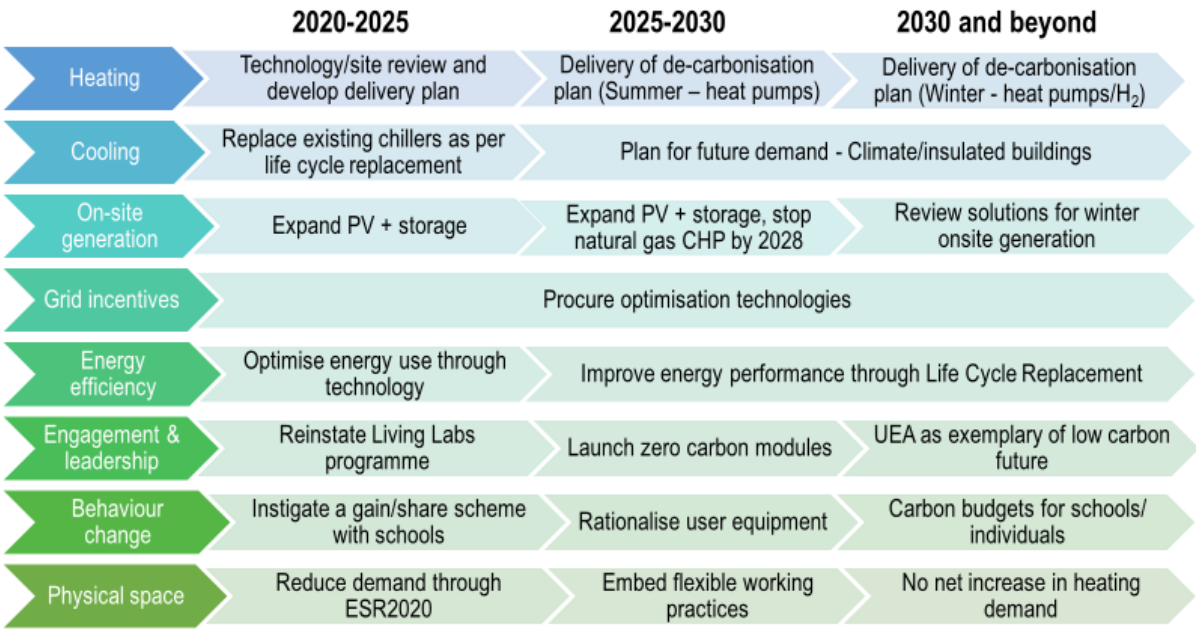


Figure 5: Narrative pathway for building-related energy use

Workshop 2: Travel emissions

UEA staff and students have more sustainable commuting habits than the national average[5]. However, commuting and aviation still accounted for approximately a fifth of UEA's CO_2 emissions in 2015. UEA staff were responsible for most of commuting-related emissions, despite their relatively small number. In 2018, over 55% of staff used private cars in some form for their commute[6] (either single occupancy, via school run, park and ride and car share). In comparison, over 77% of students relied predominantly on more sustainable travel modes, such as walking, cycling and public transport[7]. Aviation accounted for approximately a quarter of UEA's travel-related emissions in 2017-2018. These trends are likely to change in the wake of COVID-19 and related changes in commuting, remote teaching and working.

Below is a summary of the key actions identified during Workshop 2. The actions are presented according to the Avoid, Shift, Improve framework commonly used by transport practitioners. In the first instance, emission reductions result from avoiding unnecessary travel. Where travel cannot be avoided, shifting towards more sustainable modes, such as walking, cycling and public transport, is sought. Finally, improvements in vehicle technologies and fuel efficiency are sought. Highlighted actions are those prioritised by the workshop participants.

Table 3: Key measures to reduce travel emissions

	Key measure
Avoid	***Promote remote working and learning, including international recruitment***
	Virtual delivery of events, increasing technology for conferencing and collaboration to avoid international travel
	Liveable neighbourhoods – prioritising active travel and public transport
	Flexible working hours
Shift	***Improve bus services from key commuting spots, rerouting via University and hospital***
	Enable shared electric scooters and e-bike scheme
	Encourage bike use, parking, facilities and infrastructure, including electric and cargo bikes
	Incentivise walking – make campus safe and pollution free
	Discourage single occupancy car use and accommodate car sharing
	Expand Park & Ride
	Research business case for UEA-run minibuses that pick-up staff from known hotspot towns
	Have a best cost campus bike repair and service
	Ensure cycle to work allows for pricier electric and cargo bikes
Improve	***Replace diesel buses with electric buses***
	Prioritising electric vehicles and supporting infrastructure
	Parking policies to support lift share/electric vehicles
	Business travel – using lowest carbon option not business class unless signed-off by manager
	Replace fossil fuel Estates fleet with electric at end of life
	Optimise efficiency of waste collection vehicles
	Higher parking fees for SUVs
Data & Engagement	***Obtain extensive data on travel preferences to support sustainable travel choices***
	Create personalised travel plans for staff and students
	Annual reduction targets managed by school/department, with possible travel trading emissions
	Staff engagement, education and communication
	Engage and influence Norwich and Norfolk Councils & Highways, Anglia Rail, Norwich Airport, Bus and Taxi Companies, all make a lot of money from UEA users

In order to achieve net zero commuting emissions, concerted action needs to be taken within the next 10 years. To demonstrate, staff commuting emissions could be reduced to zero

carbon by encouraging work from home, shifting to electric vehicles and promoting ridesharing, as presented in Figure 6.

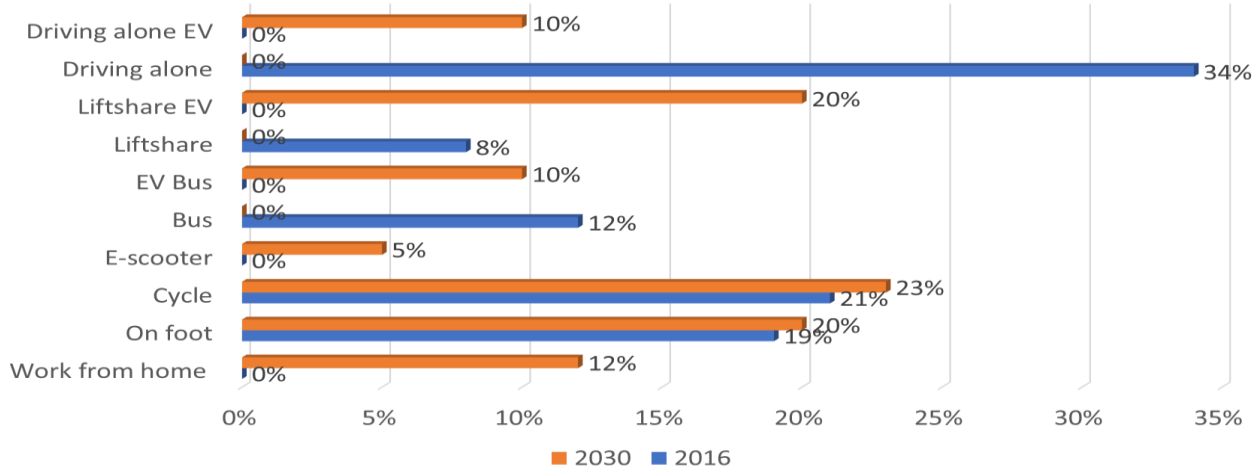


Figure 6: Reaching zero staff commuting emissions by 2030
Source: Ali Clabburn, Liftshare

In accordance with the workshop recommendations and the data above, a narrative pathway is presented below.

	2020-2025	2025-2030	2030 and beyond
Remote working	Enable remote working, learning and conferencing	10-15% of staff work remotely	Revise targets according to wider changes
Walking & Cycling	Engage, enable, incentivise & ensure suitable infrastructure is available		Increase modal share among staff and students
Shared bikes & e-scooters	With council and providers, ensure safety & availability	Review and increase uptake	Increase modal share among staff and students
Public transport	Increase on-demand access from commuting hotspots	Support uptake of e-buses	UEA: 100% e-bus campus
Private cars	Roadmap for reducing single car occupancy trips	Phase out fossil fuel cars on campus	Only Zero Emission Vehicles on campus
Ridesharing	Encourage shift from single occupancy to shared trips	Shift to shared, Zero Emission Vehicles	Reach 20% of staff trips Zero Emission car share
Aviation	Meet long-haul flight reduction target & monitoring framework	Ambitious targets for short and long haul travel	Revisit in light of changes in technology and needs
Data & information	Robust data collection & personalised travel plans	Support sustainable commute options	Monitoring & evaluation, further data needs

Figure 7: Narrative pathway for reducing UEA's transport emissions

Workshop 3: Biodiversity and land-use management

According to the UEA's carbon budget, in order to reach Net Zero carbon, the UEA should contribute to net carbon removal from land-use through land management that supports the natural carbon sink as well as enhancing ecosystem services. UEA's 145-hectare campus has many varied habitats, including five County Wildlife Sites, and is home to over 5,700 species.

50 hectares are also within the Higher-Level Stewardship (HLS) scheme to deliver significant environmental benefits. This biodiverse area is threatened by ever-increasing footfall and competing uses, such as dog walking, bike riding, fishing and other recreational uses that threaten the local habitats and their inhabitants. Moreover, climate change and increased frequency of extreme weather events, such as floods, droughts and cold/hot spells, are increasingly threatening this uniquely biodiverse campus. Within this context, the present workshops focused on the interlinked objectives of enhancing the natural carbon sink and protecting biodiversity.

Within this context, this workshop set out to identify key measures to:

- Enhance local biodiversity and adapting to climate change.
- Promote land management that supports and enhances ecosystem services, including natural carbon sink.
- Ensure net-environmental gain in the local area and beyond.

The key measures proposed by workshop participants are summarised in Table 4.

Table 4: Key measures for enhancing biodiversity and land-use management

Key measure	
Partnership working	• List of relevant stakeholders • Partnership coordination – who can take lead? Dedicated role • Norwich Fringe Project are key partners • Nature recovery network
Monitoring: Identification of potential carbon storage and enhancement of biodiversity	• Reinstate monitoring budget • Modelling of UEA carbon storage potential • Create frameworks for volunteer surveys and their auditing • Joined up monitoring for biodiversity and carbon sinks • Citizen Science – coordinated 'bio blitzes' a la Spring/Autumn Watch
Resourcing – staffing and budget	• Dedicated Biodiversity / NetZero officer • Volunteer coordination • Sufficient funding
Working with the planning system	• Environment Bill – targets 2022-2030s – funding through Planning process - 10% biodiversity net gain target • UEA design guide to reflect these requirements • Engage with developers to offset biodiversity targets on campus
Habitat enhancement	• Increase certain habitats (e.g. wetland/fenland areas) for both biodiversity and carbon sink.
Education, outreach and engagement	• Grounds used as a living lab for UEA students • Educational resource for school children, etc. • Informative nature trail and outreach to wider community
Environmental management	• Consider how water is managed on site – managing pollutants is part of the ISO 14001 Environmental Management System. • Increase nature-based water management (SUDS). • Access management
Adaptation	• Planting trees for shading in recreational spaces • Need for better understanding of impact of climate change on local biodiversity and resilience.

Based on these findings, we developed a narrative pathway for biodiversity and land-use management, as presented below.

	2020-2025	2025-2030	2030 and beyond
Planning & regulation	Work to encourage biodiversity offsets, UEA policies	Biodiversity net gain to consider carbon sink	Biodiversity net gain to include carbon sink
Resourcing	Dedicated staff and resources	Dedicated staff and resources	Dedicated staff and resources
Partnership working	Engage volunteer organisations	Project-working with external stakeholders	Long-term partnership with external stakeholders
Enhance habitats	Restoration of at-risk habitats	Enhance carbon sink and CWS habitats	Increase carbon sink and CWS habitats
Access management	Designate protected areas and recreational access zones	Consult on nature of access-nature reserve or free for all	Continue/revise access management policy
Monitoring	Reinstate annual surveys, metrics for evaluation and funds	Measuring habitats/species for carbon sink	Monitoring carbon sink and other habitats
Education & engagement	UEA grounds – an education trail	Educational use of grounds for external stakeholders	Educational use of grounds for external stakeholders

Figure 8: Narrative pathway for biodiversity and land-use management

Workshop 4: Leadership and engagement

The fourth workshop was initially designed for key senior staff to evaluate the impacts of the three narrative pathways and assess the implementation requirements. However, it was decided instead to take advantage of an opportunity to present the results of the thematic workshops to University senior staff during a UEA policy afternoon. The workshop was redesigned for a large non-specialist target audience and included the following elements:

- Introducing sustainability at the UEA and gauging why this is important to participants.
- Overview of the Net Zero and carbon budget approach.
- Summary of workshop findings.
- Discussion, including a word cloud gauging audience's thoughts and priorities.

Participants were asked to choose their top three of seven reason for sustainability at UEA. 25% agreed that looking after the environment was of most importance. 21% agreed to enhancing reputation and leadership; and 21% 'It's the right thing to do' (see Figure 9).

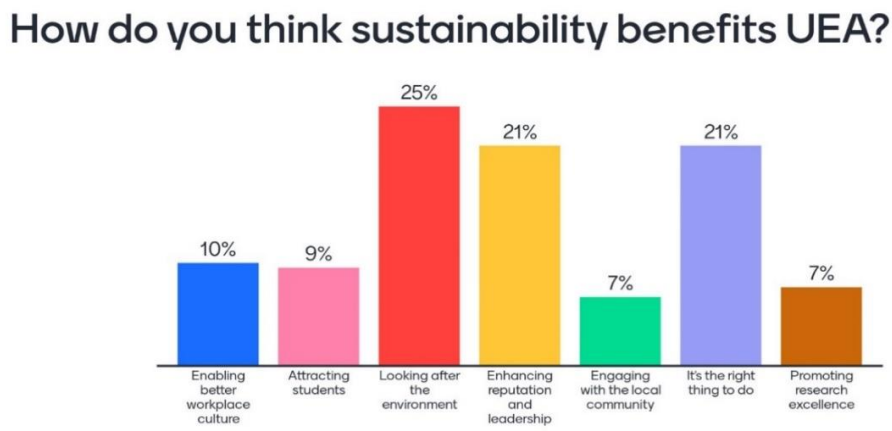


Figure 9: Survey: how do you think sustainability benefits UEA?
N=72

When asked about their thoughts and priorities for moving UEA towards net zero, workshop participants completed short 25-character entries for a live word cloud. The outcomes of which are presented in Figure 10.

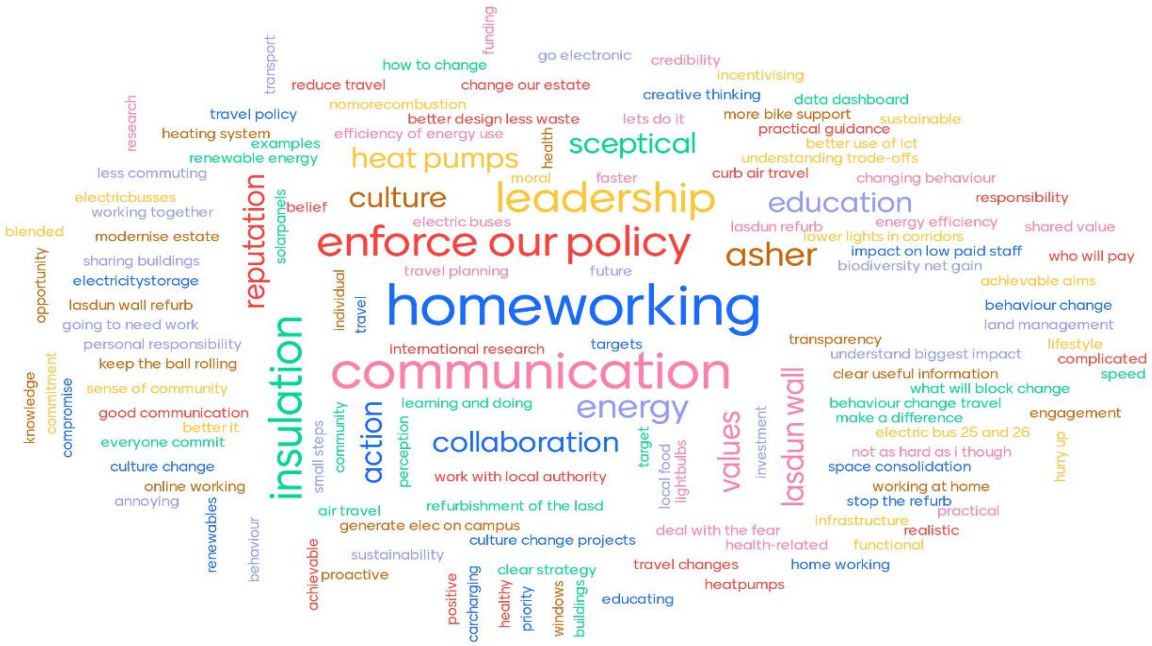


Figure 10: What are your thoughts and priorities for moving UEA towards net zero?
N=71

Next steps

The COVID-19 pandemic has led to changes in working and travel patterns, as well as employee expectations. In 2021, the UK is hosting the UN climate summit, COP26. This is an opportune moment to combine the University's climate change and biodiversity reputation with its operational agendas and public-facing climate leadership, renown in the City of Norwich and far beyond.

The informal responses to the three workshops (Workshops 1-3) and the leadership and engagement workshop (Workshop 4) were very positive. The deliberative approach we adopted ensured that we were able to identify a wide range of actions that the UEA can take to reach net zero and ownership of the NetZero UEA vision. We believe we have started UEA on its NetZero journey, supported by staff, as seen in the polling above, even in an unprecedented year of COVID-19 challenges.

We recommend consideration of these following next steps to lead in best practice NetZero UEA, as summarised in Figure 11.

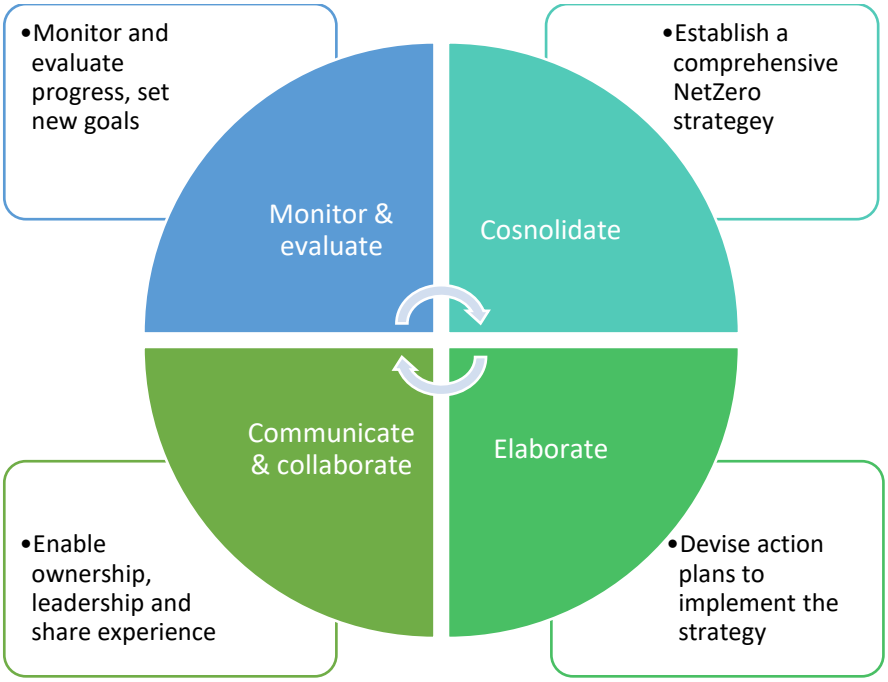


Figure 11: Next steps in implementing the UEA's NetZero Strategy

These actions may include (but are not limited to) the following:

1. **Consolidate the UEA's Net Zero Strategy**: The backcasting approach we applied is the major first stride in developing the University's NetZero strategy. Future steps could include:
   - Conduct follow-up expert workshop(s) to present the proposed and quantified pathways, ensuring they are comprehensive with current knowledge and evaluate their impact.
   - Establish how far the proposed pathways will go towards meeting the carbon budget in 5-year time slices, working with the Estates team and Tyndall Centre Manchester and exploring the Scatter Cities Tool for its usefulness to this work.
   - ***Devise a comprehensive NetZero action plan to 2050, to be reviewed and updated every 5 years***.

2. **Elaborate action plans for reaching NetZero.** These would target buildings' energy use, travel (ground and air transport), biodiversity and land-use management.
   - Detailed analysis of emissions from staff and student commuting and how to avoid this.
   - Detailed analysis of aviation emissions and how to avoid.
   - Analysis of supply chain emissions from procurement (Scope 3).
   - Explore enhanced ecosystem function of the University grounds.
   - Devise and pilot a between-school carbon trading scheme, or other behaviour change measures.
   - Explore and keep a watching brief for offsetting schemes with genuine CO_2 benefits, including the business case for a cross-University scheme
   - ***Devise a comprehensive NetZero action plan to 2050, to be reviewed and updated every 5 years***.

3. **Communicate and enable collaboration**. This is integral to establishing common ownership of the strategy, enabling implementation and reaching out to local, regional, national and international communities, including the Aurora Network.

- Establish an effective internal NetZeroUEA communication and engagement strategy.
- Engage with Norwich City stakeholders and the local community.
- Develop communication materials targeting external stakeholders.
- Liaise with other Universities and stakeholders to promote the Town and Gown and backcasting NetZero approach.

4. **Monitor and evaluate progress** to ensure the University is on track to NetZero. This includes:
   - Collecting adequate data on travel emissions.
   - Reinstating annual biodiversity surveys.
   - Conducting a carbon sink and ecosystem service modelling analysis.
   - Annual progress reporting, in line with UEA's environmental management commitments.
   - Review and revise action plans in 5-year intervals, or more frequently if required.

References

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