

Calculating the Cost of Net Zero

One year on

The logo for AUDE (Association of University Estates & Facilities) features the letters 'AUDE' in a bold, white, sans-serif font on a purple rectangular background.

AUDE

Together, for excellent university estates & facilities

The logo for bufdg (British Universities Finance Directors Group) consists of a stylized teal 'C' shape on the left and the text 'bufdg' in a teal, lowercase, sans-serif font on the right.

bufdg
british universities
finance directors group

The logo for eauc (The Alliance for Sustainability Leadership in Education) features a stylized graphic of four overlapping shapes in purple, yellow, and blue on the left, followed by the text 'eauc' in a large, blue, lowercase, sans-serif font.

eauc
The Alliance for Sustainability
Leadership in Education

The logo for Energise features a stylized circular graphic on the left, composed of two overlapping shapes in orange and blue, with a grey circle behind them. To the right of the graphic is the word 'Energise' in a bold, grey, sans-serif font.

Energise

Agenda

PRESENTATIONS WILL BE RECORDED

11.00-11.10: Welcome, recap of the background, aims and objectives of the calculator – Fiona Goodwin, EAUC

11.10-11.35: How to use the calculator, and updates on the planned maintenance – Yasir Patel & Simon Alsbury, Energise

11.35-11.40: Engagement update and next steps – Joni Rhodes, BUFDG

11.40-11.45: AUDE's 'A Guide to Decarbonisation' – Martin Higgs, AUDE

RECORDING STOPS

11.45-12.00: Q&A / technical support – Yasir Patel & Simon Alsbury, Energise

Background

- Launched alongside 'The Cost of Net Zero' report in July 2023 by AUDE, BUFDG and the EAUC, with additional funding from the Department for Education to help F E and H E 'understand the context, the scale, and the nature of the task'
- Developed by sustainability consultancy Energise.



Aims of the Cost of Net Zero Calculator

- Assist any institution which has not already developed an approach to calculating the cost of decarbonisation to understand early-stage cost estimations for a proposed transition to net zero, understand the potential scale of investment required to meet net zero goals and act as a yardstick tool to assist financial planning
- Start conversations about the actions and resource required to decarbonise institutional footprints in order to achieve net zero targets
- Enable institutions to better understand the actions and resource required to decarbonise their individual footprint to achieve the net zero targets that have been set, or to test how achievable an institution's net zero targets are, based on the individual circumstances of the institution.
- Provide a standardised methodology and approach for modelling what the additional marginal costs on a decarbonisation journey might look like under different scenarios for short-term and long-term Scope 1 and 2 decarbonisation costs and emission reductions, using industry accepted sources.

Key features

INSTITUTION LEVEL

- **Calculator**
 - **Identify cost** - Enable users to enter their carbon footprint, produce a high-level estimated cost of decarbonisation with an adjustment factor for completion of emissions reductions to date in the respective scope/category.
 - **Conduct planning** - Select measures from database into top level project list and produce a high-level summary of the cost/impact of those measures
 - **Produce a scenario model** – Allow the user to derive a projected emissions reduction scenario and high-level estimated cost model/budget projection.
- **Opportunity Database**
 - Opportunity List of possible decarbonisation measures
- **Guidance**
 - Calculator guidance

What is the Calculator tool intended for?



- This tool acts as a **starting point** that provides early-stage cost estimations for a proposed transition to Net Zero based on the targets selected, and as a **yardstick** tool to assist financial planning.
- It is intended to provide holistic pathway modelling to forecast what the **additional** marginal costs on a decarbonisation journey might look like under different scenarios.
- It is intended to provide a figure for the **weighted cost per tonne of CO2 equivalent (tCO2e)** for adopting various reduction measures that enables users to better understand how their decarbonisation plans should be costed and better understand their payback periods for various reduction categories.
- The analysis has been undertaken to estimate the **primary cost** of Net Zero **only**.
 - The meaning of primary costs is that the figure is intended to include equipment, material and installation costs (and other equivalent costs)



- To provide a final, validated figure for the overall capital cost of decarbonisation for your individual institution.
- It is important to note that the costs given in the investment tabs do **not** relate to expenditure that would already be typically included in '**business as usual**' decarbonisation activity for reaching Net Zero – It only relates to **additional** expenditure beyond what would usually be factored in.
- The analysis has **not** been undertaken to estimate any secondary costs of Net Zero, and the figures do not include any contingency value.
 - The meaning of secondary costs are any costs that are an indirect result of undertaking decarbonisation activities, such as decant (shifting from building) costs, asbestos removal, decoration/making good, any organisation specific procurement process costs, or any estimation of the level of unrecoverable VAT
(The calculator allows for adjustments to be made for some secondary costs)

How to use the Calculator

Step 1 - Enter your footprint aligned to the Standardised Carbon Emissions Framework. Details of how to account for your emissions in this manner can be found here: <https://www.eauc.org.uk/scef>

Step 2 - Choose your scenario from a number of scenarios (BAU, 2030, 2035, 2040, 2045, 2050, or Bespoke (where you can define your own pace)).

Step 3 - Tailor Investment Programme for your institution (if required). Specific uplift mark-ups (%) can be added to tailor the calculations to reflect the nuances of your institution, e.g. Building Conditions, Procurement Costs, Operational Costs and any Other factors that may affect your institution.

Step 4 - Review results.

a) Investment graph - showing the profile of direct investment for the chosen scenario

b) Emissions graph - showing the projected carbon emissions for the chosen scenario

Project outputs – High level overview

Projected Capital Investment Estimation for decarbonisation of Scope 1 and 2 emissions

Scope	SCEF Category	Carbon footprint input (tCO ₂ e)	Cost Route	Programme Implemented (in %)	Carbon footprint remaining (tCO ₂ e)	Estimated Direct Investment required (to reach 100% decarbonisation)	Estimated Indirect Costs required (to reach 100% decarbonisation)	Estimated External Costs required (to reach 100% decarbonisation)
1	Natural Gas	4,086	Direct	20%	3,269	£ 11,456,000	£ -	£ -
1	Fuel	735	Direct	0%	735	£ 50,000	£ -	£ -
1	Refrigerants & VOC	6,868	Direct	0%	6,868	£ 40,130,000	£ -	£ -
1	Diesel & Oil	2,231	Direct	0%	2,231	£ 690,000	£ -	£ -
1	Land & Livestock	12	Direct	0%	12	£ 60,000	£ -	£ -
2	Purchased electricity	290	Direct	10%	261	£ 1,548,000	£ -	£ -
2	Renewable energy	-	Direct	0%	-	£ -	£ -	£ -
2	Heat & steam - district heating	-	Direct	0%	-	£ -	£ -	£ -
		14,222			13,376	£ 53,934,000	£ -	£ -

**TOTAL SCOPE 1 & 2
DIRECT INVESTMENT EXPECTED**

£ 53,934,000

Projected Marginal Investment / Cost for decarbonisation of Scope 3 emissions

Scope	SCEF Category	Carbon footprint input (tCO ₂ e)	Cost Route	Programme Implemented (in %)	Carbon footprint remaining (tCO ₂ e)	Estimated Direct Investment required (to reach 100% decarbonisation)	Estimated Indirect Costs required (to reach 100% decarbonisation)	Estimated External Costs required (to reach 100% decarbonisation)
3	Procurement & Supply Chain & Water	2,626	Indirect	20%	2,101	£ -	£ 1,656,000	£ -
3	Capital goods	-	Direct	0%	-	£ -	£ -	£ -
3	Fuel & Energy used to transport to the institution	-	Indirect	0%	-	£ -	£ -	£ -
3	Transportation of goods to the institution		Indirect	0%	-	£ -	£ -	£ -
3	Waste	90	Direct	5%	86	£ 522,500	£ -	£ -
3	Student accommodation	-	External Cost	0%	-	£ -	£ -	£ -
3	Leased buildings & vehicles (upstream)	-	Indirect	0%	-	£ -	£ -	£ -
3	Business travel	592	Direct	0%	592	£ 3,930,000	£ -	£ -
3	Staff commuting & working from home	1,565	Indirect	0%	1,565	£ -	£ 10,180,000	£ -

**TOTAL SCOPE 3
DIRECT INVESTMENT EXPECTED**

£ 4,452,500

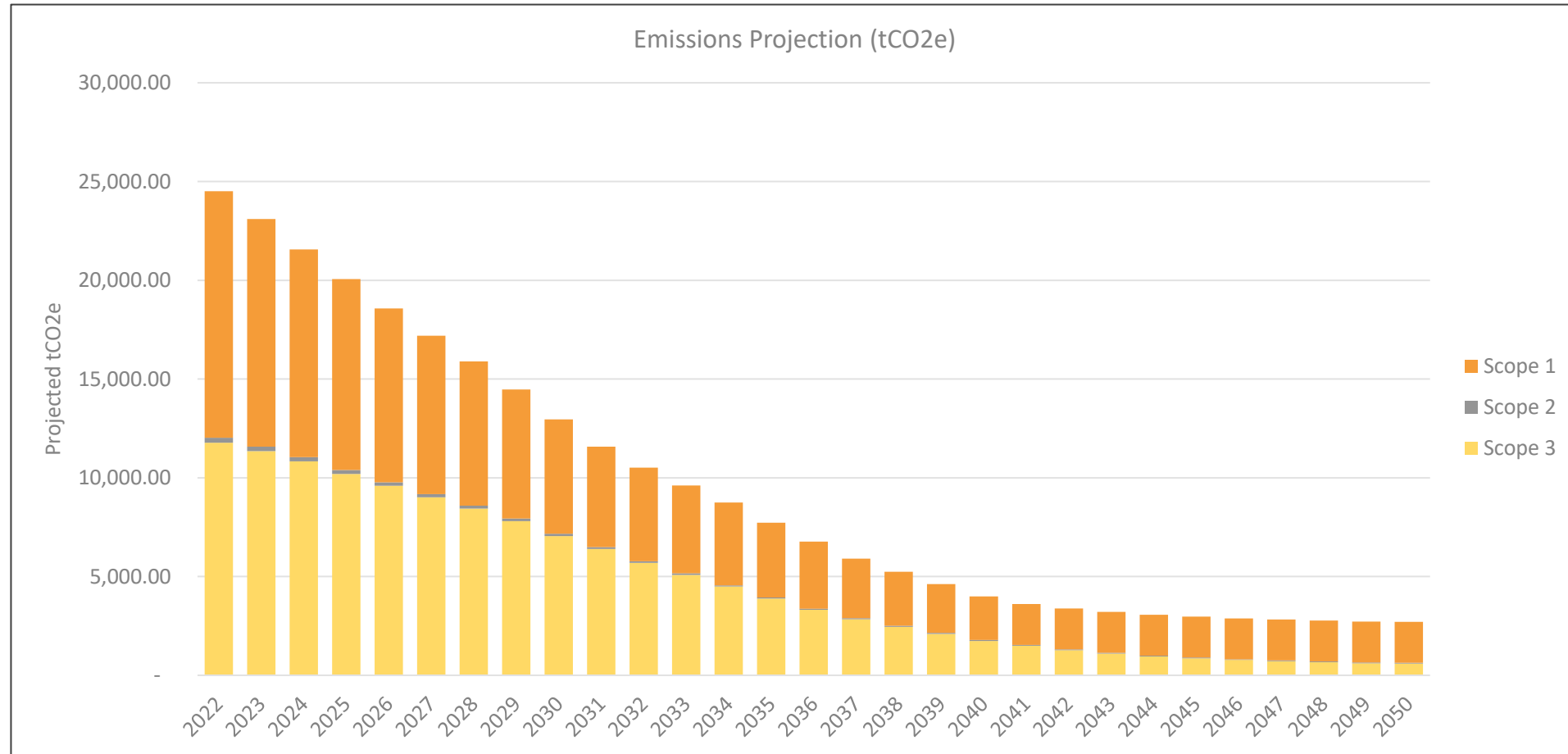
**TOTAL SCOPE 3
INDIRECT INVESTMENT EXPECTED**

£ 11,836,000

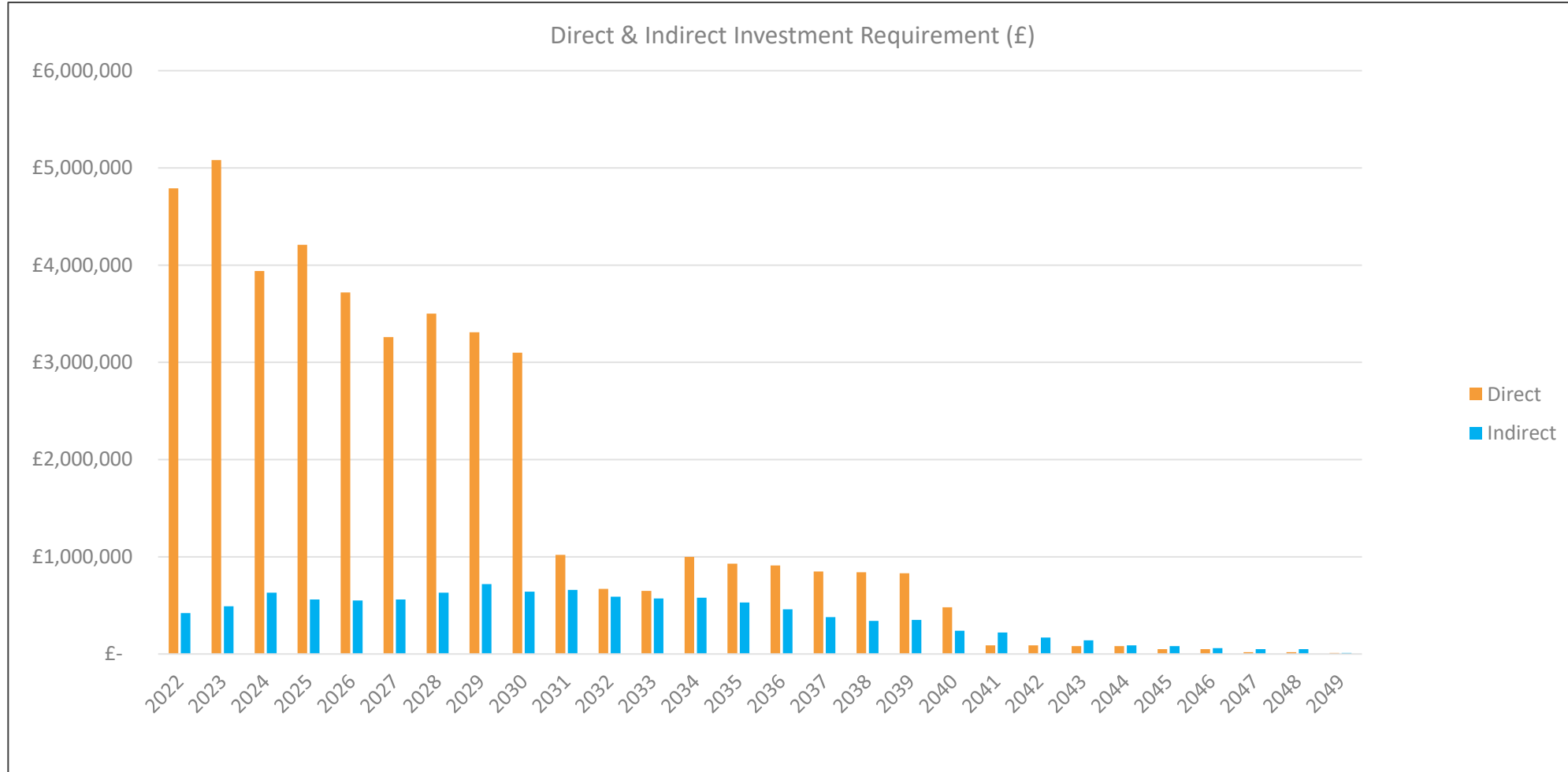
TOTAL EXTERNAL COSTS EXPECTED

£ 54,510,000

Project outputs – Emissions projection (tCO₂e)



Project outputs – Investment projections (£)



Project outputs – Scopes 1, 2, 3 Carbon Reduction Opportunities Database

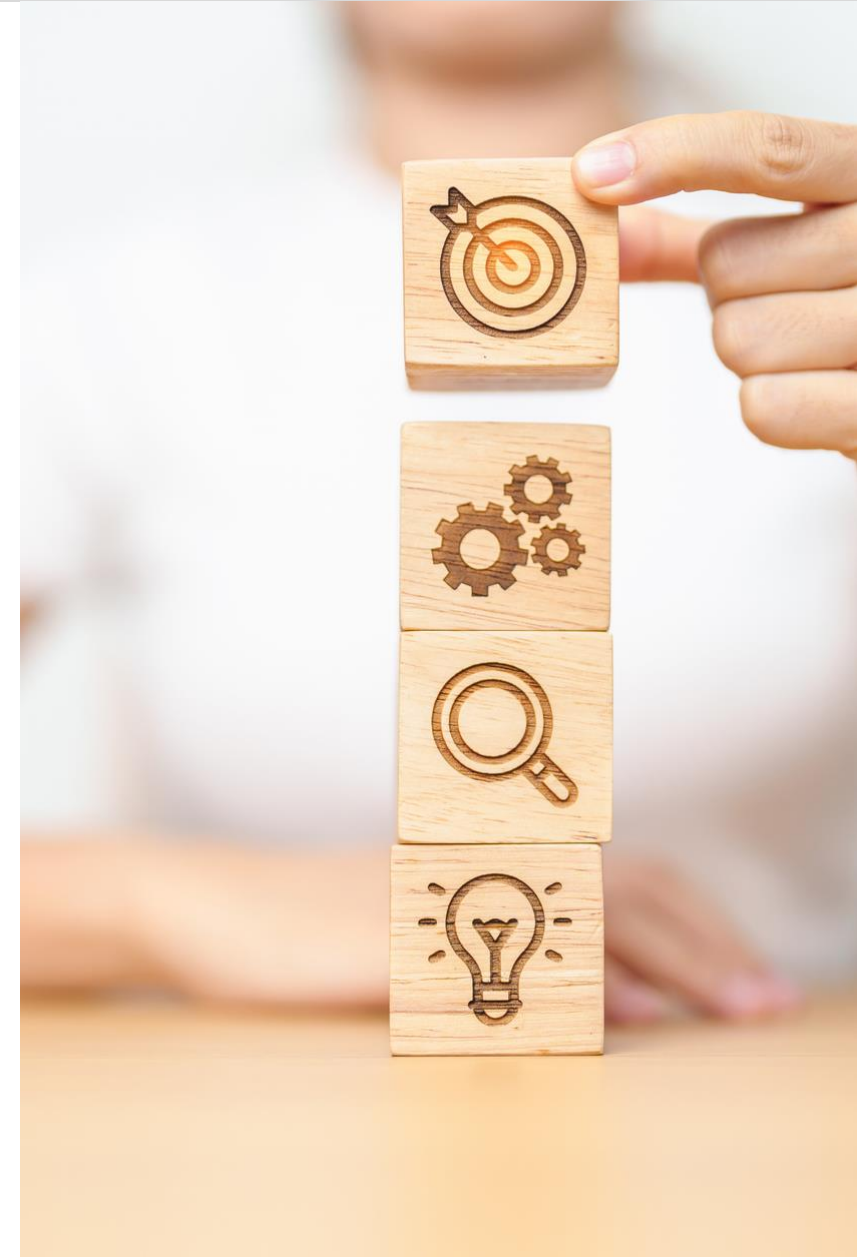
Scope	#	Section	Category	SCEF Category (main - may apply to others)	End use	High level measure	Availability of suppliers	Action timeframe/economic viability	Cost Range (per building/vehicle)	Payback Range (£, per building/vehicle)
1	C	Combustion	Generation of electricity (fossil fuel)	Diesel & Oil	Combustion efficiency	Install modular arrangements	Readily available	Available immediately	Medium	Medium term
1	C	Combustion	Generation of electricity (fossil fuel)	Diesel & Oil	Combustion efficiency	Install condensing systems	Readily available	Available immediately	Medium	Medium term
1	C	Combustion	Generation of electricity (fossil fuel)	Diesel & Oil	Combustion efficiency	Flue gas management	Readily available	Available immediately	Medium	Short term
1	C	Combustion	Generation of electricity (fossil fuel)	Diesel & Oil	Combustion efficiency	Fire settings/tune ups	Readily available	Available immediately	Low	Short term
1	C	Combustion	Generation of electricity (fossil fuel)	Diesel & Oil	Combustion efficiency	Maintenance programme	Readily available	Available immediately	Low	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Control systems	Building Automation Systems	Readily available	Available immediately	Medium	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Control systems	Smart Thermostats	Readily available	Available immediately	Low	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Combustion	Biogas	Specialist	Available immediately	Medium	Long term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Combustion efficiency	Install modular arrangements	Readily available	Available immediately	Medium	Medium term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Combustion efficiency	Install condensing systems	Readily available	Available immediately	Medium	Medium term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Combustion efficiency	Flue gas management	Readily available	Available immediately	Medium	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Combustion efficiency	Fire settings/tune ups	Readily available	Available immediately	Low	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Combustion efficiency	Maintenance programme	Readily available	Available immediately	Low	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Separable - Swimming pool	Reduce evaporation	Specialist	Available immediately	Low	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Separable - Swimming pool	Manage pool hall air temperature	Specialist	Available immediately	Low	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Separable - Swimming pool	Manage ventilation rates	Specialist	Available immediately	Low	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Separable - Swimming pool	Manage backwashes	Specialist	Available immediately	Low	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Separable - Bakery oven	Bakery oven design/operation	Specialist	Available immediately	Low	Short term
1	C	Combustion	Generation of heat (fossil fuel)	Natural Gas	Separable - Furnaces	Furnace equipment design/operation	Specialist	Available immediately	Medium	Short term

Updates on the planned maintenance

Functional updates made	Why was this update made?	Where can I find it?
Add descriptions to pathways	Providing a deeper insight into the assumptions that went into the selected pathways based on the information provided in the 6th Carbon Budget	High Level Overview Net Zero Target Year Tab -> Column E Long Description All Net Zero Target Scenario Tabs (e.g. Business As Usual, 2030, 2035 etc) -> Column AF
Add two new cost adjustments and increase % limit for other factors for secondary costs	The two new cost adjustments added allows users to uplift the cost for Natural Gas and Fuel decarbonisation based on 'Building Specification' by up to 200% and 'Inflation' by up to 500%. The other existing cost adjustments were amended to allow users to uplift up to 200%. This was done following feedback from users indicated that some of the cost uplifts were at times higher than the 40% limit initially set and wanted greater flexibility	Programme Phasing Tab -> Columns E to I
Enable different approaches to Scope 1 decarbonisation to be implemented.	For Gas Decarbonisation, feedback from numerous institutions indicated that various technical approaches have been undertaken which have differing approaches between the specification (namely focusing on energy efficiency/fabric improvements before heating system transitions). This creates significant variances from institution to institution, with some coming in under the previous modelling and some up to 4-5x greater than it per tonne. An adjustment factor has been included to allow institutions to reflect this cost/benefit decision in their model.	Programme Phasing Tab -> Cell F11 and F12
Split travel between surface transport and aviation for travel related pathways	Following feedback, Business Travel and Student Travel pathways have been split into surface transport and aviation models to more accurately represent the emissions picture for an institution who have emissions related to surface travel and aviation related emissions	High Level Tab -> Rows 37 – 40 Net Zero Target Year Tab -> Rows 30 – 33 Net Zero Target Year Tab -> Rows 61 - 64 Programme Phasing Tab -> Rows 29 – 32
Split out 'Water' from 'Procurement & Supply Chain & Water' pathway	Following feedback, the Water pathway has now been split out. This was done to allow for better visibility of Water emissions separately from Procurement & Supply Chain.	High Level Tab -> Row 30 / Row 42 Net Zero Target Year Tab -> Row 23 / Row 39 Net Zero Target Year Tab -> Row 54 / Row 66 Programme Phasing Tab -> Row 22 / Row 34
Updated cost and carbon factors	Following the release of the latest sets of carbon factors, and movements in the economy with respect to utility/fuel prices, models have been updated to reflect those available in 2024.	Embedded throughout the spreadsheet
Inflationary adjustments	ONS data on inflation has been applied to the model to update economic assumptions relative to the original calculator's release.	Embedded throughout the spreadsheet

Engagement

- Over half of BUFDG member institutions have engaged with the calculator since launch, indicative of the picture across the sector
- More than 700 bookings for calculator related webinars across the three membership organisations since launch in July 2023
- Around 60% sustainability teams, 30% estates, 10% finance teams



Top 5 ways the calculator has helped users



1. Initiating conversations on the cost of achieving net zero
2. Better informing your organisation on the cost of achieving net zero
3. Better understanding the timeframes involved in decarbonisation planning
4. Raising awareness of the net zero agenda within your organisation
5. Supporting your net zero implementation plans

Limitations & challenges

Calculator

- Great as a starting point but costs likely to be much higher in real world application due to factors outside of scope of tool
- Doesn't take into account, for example, listed buildings, cost of decant
- Scope 3 not in scope but a major factor for all
- Data not always available, easy to find

Bigger picture

- Joining this work up across departments for a whole organisation approach
- Making the business case against competing priorities
- Cost, investment, and time
- Feasibility, for example national grid connections

Use cases – three areas noted

- **Early-stage financial planning**
 - “First overview of manageable costs”
 - “Supported financial planning”
 - “Provides a good understanding at high level of likely cost”
- **Communications/making the case**
 - “The results of the tool will be presented at the University's next Energy Committee and Sustainability Strategy Committee meetings to inform discussions around net zero”
- **Calculating residual emissions**
 - “Used it for estimating residual emissions (rather than for calculating cost/investment)”
 - “Used to compare emissions projections with SBTi projections, calculate anticipated offset cost of residual emissions 2040-2050, and demonstrate need for supplier engagement”.
 - “I really like the calculator as a tool for estimating the residual emissions of the university at our NZC target year. I think this is underplayed as a benefit of the Tool - obviously there is a cost associated with residual emissions when it comes to offsetting”

Next steps

- Today is the last planned surgery with Energise, and completes the comprehensive one-year maintenance and support contract put in place to help launch the tool
- Although downloads have subsided in recent months, many are coming to the report/calculator for the first time (for example over 40% of those on the call today are new or potential users)
- The recent FES maintenance ensures the figures underpinning the calculator valid until future FES updates occur, expected to be at least another year
- AUDE, BUFDG and EAUC continue to support members with net zero more broadly
- Imperial are launching an intuitional level tool that allows them to identify emissions hotspots and the full range of possible technological and behavioural interventions along with a scheduling capability to prioritise the timing of those interventions (includes Scope 3, but not a costing tool, designed for Imperial, but they are aiming to let others access it). Will keep you posted!
- Detailed decarbonisation planning is a natural next step for those who have used the calculator as a starting point....

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ASSOCIATION OF UNIVERSITY DIRECTORS OF ESTATES

A Guide to Decarbonisation

Intended to help you navigate your way through decarbonising your operations by optimising and specifying a decarbonisation plan that will have real-world impact on emissions.



AUDE's new 'A Guide to Decarbonisation'

- The latest tool in what we hope is a logical flow of guidance to the sector
- Available from 'all good membership associations' -
<https://www.aude.ac.uk/news-and-blogs/publications/>
- Cross-campus look at what needs to be done next – this is for you and your peers in Finance, Strategic Planning etc
- Developed on our behalf by Arup, with the support of BUFDG, HESPA, the EAUC, and a significant number of member universities
- If you are considering getting a bespoke plan from a consultancy, let this be the first step
- Organisational structure of the document is around the level of institutional maturity on this theme – are you at the 'Foundation Plans' stage or the 'Enhanced Plans' stage
- AUDE EMR: 'no other game in town' than to decarbonise

AUDE's new 'A Guide to Decarbonisation'

- Foundation Plans
 - Characterised by relative 'newness' to this theme, plans starting to emerge
 - Internal and external drivers to action (e.g. reputation, government policy, financial position)
 - Understanding your position, specific opportunities and your options
 - Setting targets and establishing a baseline
- Enhanced Plans
 - Characterised by the search for more detailed and enhanced planning
 - Greater certainty, accuracy and robustness
 - Whole life carbon assessments, Scope 3 emissions, nature and biodiversity, renewables, climate adaptation and resilience and more
 - Real world implementation

AUDE's new 'A Guide to Decarbonisation'

- A Guide to Decarbonisation – introductory webinar 1: Foundation Plans
- 2 October at 3pm
- <https://www.aude.ac.uk/eventbooking/view?id=7191>

- A Guide to Decarbonisation – introductory webinar 2: Enhanced Plans
- 10 October at 10am
- <https://www.aude.ac.uk/eventbooking/view?id=7192>

- HESPA - An introduction to AUDE's 'Guide to Decarbonisation' for Strategic Planners
- 14 October at 11am
- <https://www.aude.ac.uk/eventbooking/view?id=7215>

- Cross-campus project – bring a colleague from another related function

Q&A

Any general questions before we stop recording and dive into technical support?



Ask the experts

The rest of this session is over to you for technical support queries with:

- Yasir Patel - Principal Consultant (Sector Strategy)
- Simon Alsbury – Co-CEO



Energise