



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Climate Action Roadmap 2024





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1. Introduction

This is Trinity's third Climate Action Roadmap, which has been prepared in response to the requirements set out in the Public Sector Climate Action Mandate 2024¹. This report builds on the Climate Action Roadmaps prepared in 2023², which outlined the work undertaken in Trinity with respect to monitoring and reporting of our greenhouse gas (GHG) emissions, governance structures, training obligations and sustainability initiatives across college.

In January 2024, recognising that we are facing an ecological crisis and that transition to sustainability is urgently required, Trinity College launched its first Sustainability Strategy³. The timeline of the strategy is 2023–2030 and is supported by a 2023–2026 action plan, which organises the objectives and >260 actions in to four key pillars: Education, Research, Operations and Community. The aim of the Strategy is to embed sustainability throughout everything we do, including achieving our GHG emissions reductions targets.

Trinity College is located in the heart of Dublin's city centre and has a student population of over 20,000 per year, in addition to a workforce of approximately 3,500. The university was established in 1592 and is Ireland's oldest university with an international reputation for excellence in education and research. The university spans over 190,202m² ranging from the city centre campus at College Green to St. James Hospital site, as well as two large sports campuses in Santry and Crumlin. The university also offers residential accommodation and has over 1,500 places located in the College Green Campus and at Trinity Halls, Dartry.

Trinity College is a site of historical significance and there are a number of protected structures, as well as a recorded monument, on the College Green campus. The university is also a tourist destination with up to 1 million tourists visiting the College Green campus per annum. The campus also caters for a diverse number of activities with around 450 labs, and multiple lecture halls, libraries, offices, catering facilities and a large sports hall. The range of activities that take place in the university means that a multifaceted approach to reducing GHG emissions is required.

¹ [Public Sector Climate Action \(www.gov.ie\)](http://www.gov.ie)

² [Climate Action Roadmaps - Trinity Sustainability | Trinity College Dublin \(tcd.ie\)](https://www.tcd.ie/sustainability)

³ [Sustainability Strategy - Trinity Sustainability | Trinity College Dublin \(tcd.ie\)](https://www.tcd.ie/sustainability)



The university faces many challenges to reach the 51% GHG emissions target by 2030. On the current trajectory, it is highly unlikely that Trinity will meet the 2030 target without significant increases in human and financial capital, up-skilling of staff and students, rapid acceleration of investment and associated policy measures that support scalable climate action.

It has been estimated that across the eight Irish Universities Association (IUA) member universities, carbon savings of 70.7ktCO₂ can be delivered by 2030. This is a substantial saving considering that collectively the eight universities equate to the 4th largest emitter of GHG in the Irish public sector.

The ambition to meet this target exists within Trinity, but to deliver on our obligations, we require an equally ambitious multi-annual sectoral partnership approach from Government, to replace the annual grant processes that have dominated to date. This sectoral partnership approach has been outlined by the IUA Sustainability Group⁴, who are proposing:

- a Higher Education decarbonisation major project fund of €275m for IUA universities.
- a targeted decarbonisation investment programme of €100m for IUA universities in key areas of focus, including renewable electrical energy generation, renewable thermal generation/district heating schemes, digital transformation of the built environment, design and planning of post 2030 deep retrofit projects.
- a new specific devolved grant of €20m per annum over the 5-year period to 2030 for IUA universities for sustainability related minor works.

In addition to these proposals, we are also concerned about the pace at which the electrification of the national grid is taking place. The onus on the public sector to decarbonise and switch to electricity requires investment, capital, and skills development within the college all of which is dependent on the national grid to provide renewable electricity.

⁴ The IUA Working Group comprises Sustainability leads from all IUA members, and during Q1 2024 drafted a document *Climate Action Roadmap Delivery to 2030* with input from Green Team colleagues.



There is also a lack of information in the public domain about progress being made by Dublin City Council on the delivery of the district heating infrastructure from the waste to energy plant. Trinity are lobbying for a credible plan for the delivery of this project to be released to inform us how much energy we can obtain from this source, what investment Trinity will have to make to connect to it, and timeline for rollout of the infrastructure so that our decarbonisation plans can be phased in tandem with it.

The staff and students in Trinity are working hard to overcome the challenges involved in meeting targets, and we recognise the limitations we face with respect to funding, capacity, and skills shortages. It is therefore critical that the Government focuses on developing a cross sectoral approach to supporting not only Trinity but other universities on this expensive and complex transition to net zero. Trinity has set a net zero target for 2040, however this ambition can only be met with significant investment from Government as well as investment in human capital and skills development from within the Trinity community.



2. Our people

2.1 GOVERNANCE

Trinity is focused on strengthening the governance structure of the university to support climate and biodiversity action, as well as broader sustainability aims.

The new Principal Committee of Board on Environment and Sustainability was established in 2023 and meetings of the Committee have been held. The committee has agreed terms of reference, a workplan and meets approximately every six weeks. The workplan includes oversight of Trinity's Sustainability Strategy 2030 and Action Plan, including targets under the Climate Action Plan. In addition, a Sustainability Management Group has been established to track the delivery of the Action Plan.

The College's sustainability governance is supported by two voluntary committees focused on student engagement, behaviour change and awareness raising. The two committees are:

→ Trinity's Green Campus Committee, established in the early 1990s, is still in operation and comprises of staff and students. The committee is co-chaired by the Students Union Environment Officer and the Sustainability Manager and supports a partnership approach to environmental management and action.

→ Green Labs committee has been operational since 2019. To date, five labs have been certified as My Green Labs and 17 are now participating in SFI's Sustainable Lab programme. A further 40 labs have signed up to the My Green Labs accreditation programme in 2024. TCD is also an active member of the network of Irish Green Labs and sits on the SEAI Public Sector Labs Working Group.

Trinity has established a new unit, Trinity Sustainability, with a Vice President for Biodiversity and Climate Action leading the team, supported by a Sustainability Manager and a part-time PA. The team will be expanded in 2024 with the recruitment of the following positions:

- Green Labs Officer
- Sustainability Communications Officer
- ESD Student Experience Officer (short-term role)
- Healthy Campus Manager

A core element of their workload will involve supporting behavioural and cultural change with a focus on supporting staff and students to change their behaviours both in the university and at home.



FIG 1 Governance Structure in TCD



2.2 ESTABLISHMENT OF GREEN TEAMS

The Sustainability Management Group will be the de-facto high-level ‘Green Team’⁵ in Trinity College, comprising a wide range of senior management, who oversee core implementation, academic and operational areas and are involved in delivery of the Climate Action Roadmap. These areas include: education, research, energy, waste, food, procurement, capital projects, finance, communications and human resources.

The Vice President for Biodiversity and Climate Action (VPBCA) has been nominated as the Climate and Sustainability Champion for the university with responsibility for overseeing development and implementation of Trinity’s Sustainability Strategy. The VPBCA is also responsible for implementing and reporting on the Mandate across the entire University.

⁵ See Appendix 1 for a list of members.

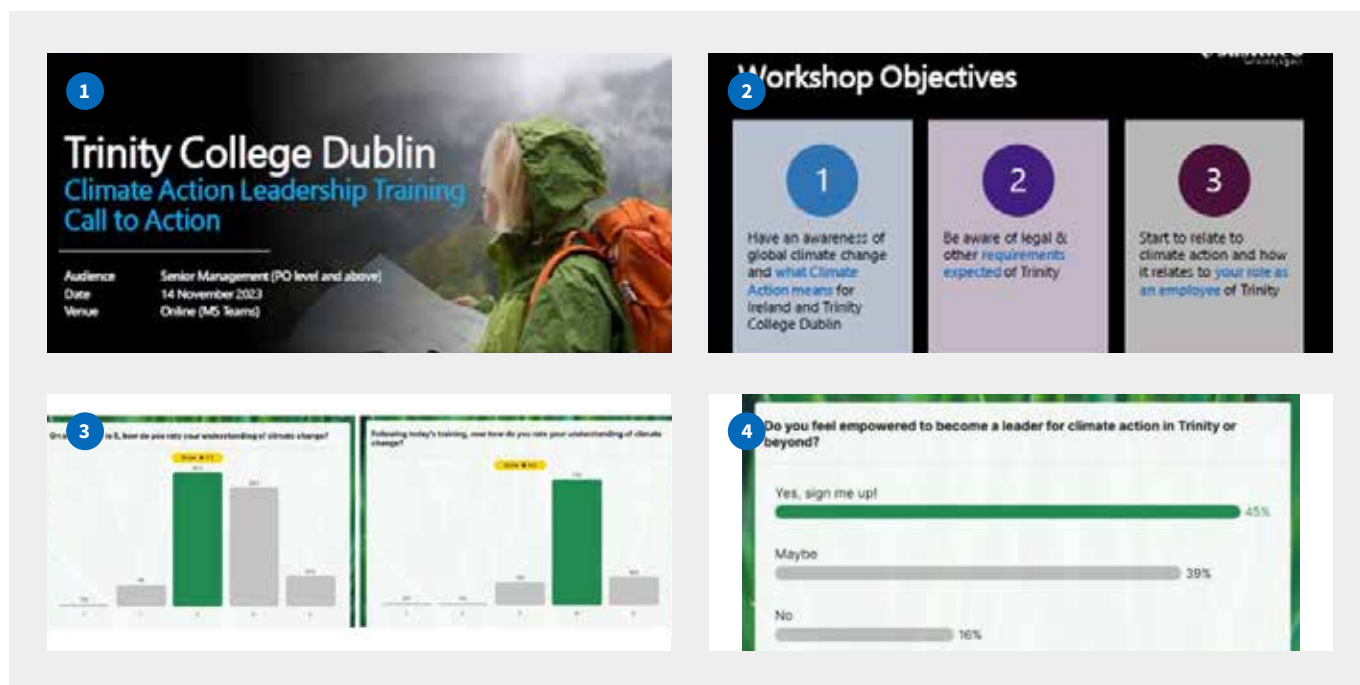


2.3 ENGAGING AND TRAINING STAFF

Climate Leadership Training was delivered to 320 staff members (with the grade PO Level and above) during the months of November and December 2023, with a final day of training in January 2024. The training was delivered as follows:

- 1 day in-person training for senior leaders (Provost, COO, CFO, Bursar, Dean of Research, etc.) – December 14th
- 7 online webinars for 300 professional and academic staff members – November 2023 to January 2024

The content of the training was in line with Minister Ryan’s letter of June 2023 with the training focusing on climate science, mitigation and adaptation, climate policy, climate leadership and progressing climate action and behaviour change within the university. The aim of the training was for staff to walk away feeling empowered with an understanding about the basics of climate science as well as how it applies to their lives and the professional decisions they make.



IMG 1 Online Webinar Slides
IMG 2 Online Webinar Slides
IMG 3 Slido polls from online webinar
IMG 4 Slido polls from online webinar



The university's senior leadership team attended an in person full day climate leadership training on December 14th 2023. The content of the one-day course was as follows;

- Climate science, risk and action,
- Knowing what matters and managing risk,
- The Role of TCD in climate action,
- Climate and Sustainability Leadership,
- Communicating and bringing people with you.

The senior leadership team comprises of members of the university's academic and professional staff ranging from the Provost to the Chief Operating Officer, Chief Financial Officer, and academic and research Deans. The training day was attended by over twenty staff members and will support the ongoing work within the university with respect to our GHG emissions reductions targets.



IMG 5 Senior Leadership Team attending in person Climate Leadership Training

IMG 6 Senior Leadership Team attending in person Climate Leadership Training



3. Our Targets

3.1 GHG AND ENERGY EFFICIENCY TARGETS

The Climate Action Mandate sets emission reduction and energy efficiency targets for public bodies as follows:

- Reduce GHG emissions by 51% in 2030
- Increase the improvement in energy efficiency in the public sector from the 33% target in 2020 to 50% by 2030
- Put in place a Climate Action Roadmap by the end of 2022

Trinity's Sustainability Strategy 2023–2030 and Action Plan sets out a high-level strategic target of:

NET ZERO EMISSIONS BY 2040

- We will aim to reduce our GHG emissions by 51% by 2030 in line with our commitments under the national Climate Action Plan.
- We will aim to reach net zero (across all categories of emissions, not just from our buildings) by 2040, due to the urgency of our climate emergency and the radical actions that are required from all of us.
- We will aim to be a leader for our sector, city and country.

The strategic target is supported by a short-term action plan (2023-2025) which sets out >260 actions across education, research, operations and community. The objectives for carbon reduction are:

- Decarbonise energy sources to meet 2030 and 2040 targets across all activities.
- Reduce our overall greenhouse gas emissions from our existing buildings thermal and electricity by 51% in 2030.
- Reduce the greenhouse gas emissions from transport vehicles owned by Trinity by 51% in 2030.
- Improve energy efficiency of college to meet 2030 target of 50% improvement on baseline. "BE LEAN"
- Built infrastructure –new buildings to be net zero, both during construction and operations.



4. Our Way of Working

4.1 GHG EMISSIONS

Trinity carried out a Carbon Footprinting Exercise for the 2021-2022 financial and academic year. The exercise looked at all carbon emissions associated with the activities of the university using the Greenhouse Gas Protocol Methodology which assesses Scope 1, 2 and 3 emissions. Scope 1 emissions included fuels for thermal heat sources such as natural gas, LPG, gasoil as well as fuels for vehicles owned by the university; road diesel, petrol and marked diesel. Scope 2 included purchased electricity, and Scope 3 emission sources included purchased goods and services, capital goods, water consumption, fuel and energy related activities, waste generated in operations, business travel, student and staff commuting, upstream transportation and distribution, and investments.

We found that Trinity College emitted a total of 171,184 tCO₂e in this time period. Broken down by Scope, this amounts to 8,564 tCO₂e in Scope 1, 11,283 tCO₂e in Scope 2, and 146,123 tCO₂e in Scope 3. The exercise went beyond GHG emissions from our heating and electricity (Scope 1 & 2) but also attempted to examine the GHG emissions coming from our supply chain both in terms of upstream and downstream emissions (Scope 3). This exercise goes beyond the data captured in the SEAI M&R platform and gives a more holistic picture of where GHG emissions are generated by the university's activities over an academic & financial year.

This is currently being repeated for the 2022-23 academic year and has been delayed due to a lack of capacity within the Trinity Sustainability team, as well as disparate data sources within the university. The report will be available on the TCD website over the coming months and is expected to be similar to the findings of the 2021/2022 Carbon Footprint Report.

In addition to the Carbon Footprint Report, we use the SEAI Gap To Target tool to model the carbon reductions from retrofits/efficiency improvements and from switching our heating requirements to all-electric solutions such as heat pumps.



- Scope 1:
8,864 tCO₂e = **5.2% total emissions**
- Scope 2:
11,283 tCO₂e = **6.6% total emissions**
- Scope 3 (Capital Goods Only):
67,921 tCO₂e = **39.9% total emissions**
- Scope 3 (Excl. Capital Goods):
82,137 tCO₂e = **48.3% total emissions**



GAP TO TARGET DATA	THERMAL EMISSIONS TCO ₂
Baseline 2016 – 2018	8,487
2022 (Latest data on SEAI M&R)	8,532
Target for 2030	4,176
‘Gap to Target’	4,356

TABLE 1 Gap to Target June 2024



4.1.1 Medium and long-term strategy/Decarbonisation Plan

For this revision of the Climate Action Roadmap, we have carried out a high-level identification of projects which would allow a reduction of the Thermal Emissions Gap by 51% by 2030.

The next step is that the Estates & Facilities team will engage a consultant design team to assess in more detail the Gap to Target projects, calculate the costs to implement and prioritise them and identify how they could be phased. We plan for the completion of this assessment by approximately end of September 2024.

The GTT projects are very ambitious and would have to work in tandem with Trinity's overall strategy and campus Masterplan.

Significant amounts of capital funding would be required to deliver them, and an increased budget allocation would need to be provided for the extra utility costs as we move to all-electric heating.





LOCATION	THERMAL CO ₂ TONNES AVOIDED	PROJECT/ACTION
MAIN CAMPUS WEST END	366	Switch off heating 4 months every year June–Sept (Incl) plus other efficiency savings
MAIN CAMPUS NORTHEAST ENERGY CENTRE	751	New energy centre building with centralised heat pump serving Sports/Crann, Lloyd, O'Reilly, SNIAMs
MAIN CAMPUS ARTS AREA ENERGY CENTRE	595	New energy centre building with centralised heat pump serving Arts, Ussher and the 'Library'
MAIN CAMPUS EAST END ENERGY CENTRE	189	New energy centre building serving Panoz, Smurfit and Watts
MAIN CAMPUS NORTH ENERGY CENTRE	284	New energy centre building serving AAP, PHS, House 33-40
MAIN CAMPUS SITEWIDE	80	Heating system savings of 30% of the rest of main campus gas usage through BMS or mechanical upgrades to plant
TBSI	344	Turn off the Combined Heat & Power (CHP) and use grid electricity only
TBSI	226	Reduce steam losses say, 10% through increased maintenance and transfer 30% of capacity to electric boilers
GOLDSMITH HALL	180	New heat pumps to deliver 80% of the thermal load
FOSTER PLACE/ COLLEGE GREEN	95	Vacate & lease out or sell these properties
DARTRY	665	Efficiency saving through BMS and new heat pumps doing 80% residual load
ST JAMES	393	Efficiency saving through BMS and controls and new heat pumps doing 80% residual load
SANTRY	134	Book Repository heat pump Air Handling Units (AHU) in Book Repository and heat pumps in Pavilion
IVEAGH GROUNDS	52	Heat pump 100% of the load
TOTAL SAVING	4,354	We may need to undertake additional modelling to address the emissions from the heat pumps etc, so additional projects to offset these increases may need to be identified in due course
CURRENT GAP	2	

TABLE 2 Projects deemed suitable to reduce the Thermal Emissions Gap by 51%



Below is a graphic representation of our thermal and total CO₂ emissions if all the projects listed above were funded and implemented before the end of 2030.

BREAKDOWN OF CARBON FOOTPRINT BY SCOPE

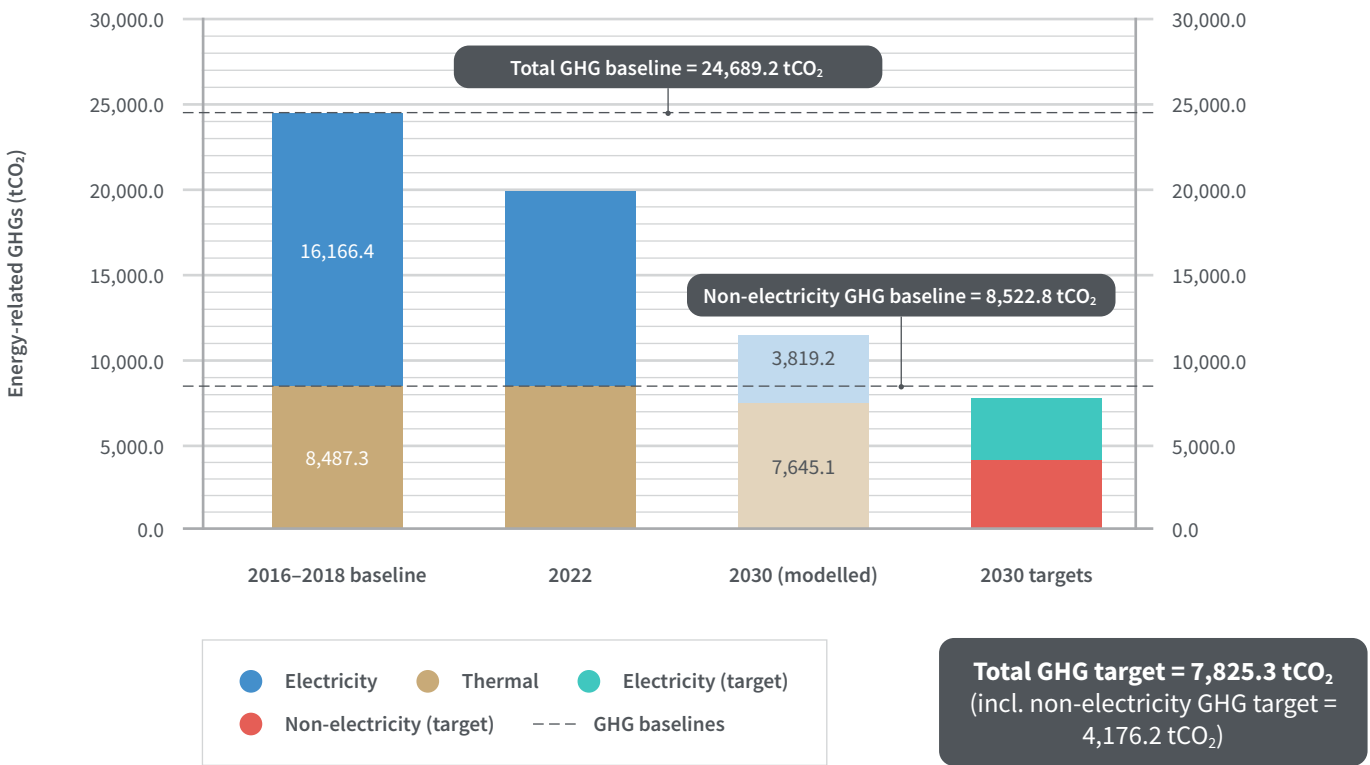


FIG 2 GAP to Target Tool Modelled Projects June 2024





4.1.2 Decarbonisation of the Electricity Grid

By 2030, SEAI and the Government have forecasted that the electricity grid will gradually decarbonise using more renewable sources. The delivery of this is outside Trinity's control and there is some concern that this will not be met by 2030. The Gap to Target tool projects that the extra electricity that Trinity would consume in 2030 (because of implementing all of the above heat decarbonisation projects) would lead to a 500t annual CO₂ emission gap due to the extra electricity used (i.e. through the use of heat pump technology).

Therefore, we are lobbying the Government and SEAI to accelerate the greening of the electricity grid so that we can meet our GHG emissions reductions targets.

4.1.3 Opportunities of External District Heating

Centralised provision of heat through heat networks or district heating has been implemented widely in Europe and is currently being implemented in many UK cities. This allows the universities in those cities to connect to a heat network fed by a decarbonised heat source. In the Climate Action Roadmaps of those universities, they are benefitting from the lower CO₂ emissions from the solutions being provided by the city council where they are based.

A district heating network serving Dublin city would be of major benefit to Trinity College, allowing the heat to be generated centrally without the tight space constraints which we have within our campus.

Trinity's city centre location and proximity to the Ringsend waste to energy plant favours this solution; and we also have some year-round heating requirements which should be attractive from an operational point of view for the utility company supplying this district heating utility.

Therefore, we are lobbying the Government, Dublin City Council & SEAI for an accelerated delivery of the Dublin City district heating scheme so Trinity can benefit from it.

4.1.4 Current Activities and Projects

DELIVER ENERGY MANAGEMENT PROJECTS

INCLUDING:

- The completion of Phase 1 campus energy management system which includes 23 main building electricity meters and 15 main gas meters being measured and monitored in real-time. These largest buildings account for about 92% of Trinity's overall utility use and scope 1 and 2 CO₂ emissions. Already this system has delivered significant benefits in identifying energy saving opportunities.



→ LED lighting retrofits will continue, focussing on our largest buildings to deliver the maximum benefit. In 2023, we retrofitted 5,740 fittings to LED, saving circa 85 tonnes of CO₂ per annum. The following General Application lighting tenders and Emergency Lighting upgrade projects and Mechanical Infrastructure Projects on site for 2024 are:

- St James Science Centre Lighting Upgrades
- Sports Centre Lighting Upgrade
- Dartry Mechanical upgrade
- Goldsmith Hall

It is projected that CO₂ savings of about 100 tonnes of CO₂ per annum will be achieved from these four projects.

HEATING AND VENTILATION SYSTEMS

We expect savings through control system upgrades and demand-driven ventilation. The connection of data from teaching-space bookings and room CO₂ levels which would automatically schedule fans to speed up and slow down would deliver improvements. We will trial this on an empirical basis in the Arts block in Autumn 2024. To achieve this campus wide will require both an exchange of data between sensors and systems. If achievable campus-wide, savings of 33 tonnes CO₂ thermal plus 60 tonnes CO₂ electric are projected per annum.

SOLAR PV

We have modelled in our Gap to Target model the installation of 1200 solar PV panels on the Arts Block and selected other buildings.

This is a small part of the decarbonisation solution because the GHG emission saving of Solar PV compared to grid electricity declines as the electricity network gradually decarbonises. There will also be planning and other challenges to implement and it will have an increased maintenance factor compared to grid electricity.

ADDITIONAL METERING

Additional metering on heating and hot water circuits to allow us to understand the loads and how they can be managed more efficiently or decarbonised. This work will be included in the Mechanical Infrastructure Projects for 2024.

Trinity has a unique mix of buildings, ranging from protected structures to modern Near Zero Energy buildings and, as such, a full scoping exercise is required to determine the cost associated with decarbonisation and the solutions available per building type.

Progress has been made on auditing several buildings on the College Green campus to assess the potential costs involved in refurbishment and retrofitting. The audits will inform the development of a campus wide decarbonisation plan which will identify potential deep retrofit projects, energy saving projects and prioritisation of projects based on potential GHG emissions reductions. The audits are fundamental if we are to understand the amount of investment needed over the next six years to meet our GHG emissions target, however securing the funding required for such projects on an historic campus is an ongoing risk to delivery.



SEVERAL AUDITS WILL TAKE PLACE IN 2024 INCLUDING:

→ **Arts Building**

Built in 1978, we have been awarded a HESIF Grant in 2023 to complete this work. The purpose of the audit is to identify the measures necessary to decarbonise the building by 51% and the costs and carbon savings of those measures. It is expected to be completed in August 2024.

→ **House 33-37**

Built between 1815 and 1820. These historic buildings are used for student accommodation. The audit will show a shallow and deep retrofit options using heat pumps as the heat source, and the costs and carbon savings of each option. It is intended that this audit will give a cost benchmark for retrofit of similar age buildings. It is expected to be completed in August 2024.

→ **Trinity Biomedical Sciences Institute (TBSI)**

TBSI uses a significant amount of steam in sterilisation process and in humidification, and that steam is generated from natural gas. This audit and a follow-up steam trap review is being undertaken to assess the energy saving opportunities on the steam system.

→ **The Sports Building**

With a purpose of decarbonising the building by 51%. This will be procured in Autumn 2024.





4.2 ENVIRONMENTAL MANAGEMENT AND ACCREDITATION

As reported in the 2023 Climate Action Roadmap, Trinity is committed to implementing ISO 50001-based energy management system and ISO14001 environmental management system over the coming years. The implementation of the systems will require significant investment in terms of human capacity due to the length of time it takes to gain certification which can take between 18-24 months. Currently there are a number of limitations to achieving the accreditation as follows:

- Trinity does not have sufficient human resources in place
- It will be complicated to implement due to the historic site
- It will give a low return on investment in terms of management time (high) versus decarbonisation impact (low)
- Building an energy project delivery pipeline is far more urgent than achieving certification

The adopted Sustainability Strategy has identified the need for the EMS and has set out the following objective and actions:

OBJECTIVE 3.2.8 Introduce an Energy Management System and/or Environmental Management System.

- **3.2.8A** Seek accreditation under the ISO 50001 or ISO 14001 Standard by Q4 2025.
- **3.2.8B** Where applicable, display an up-to-date Display Energy Certificate on publicly accessible buildings.

4.3 PROCUREMENT

Trinity began implementing green procurement practices across the university in 2017 and the procurement team are supporting green procurement in the following ways:

- Applying sustainability as an Award Criterion for Goods & Services tenders.
- The Contract Management System specifies the need for Green Public Procurement inclusion as a Selection Criterion, an Award Criterion and/or a Contractual element.
- A Top-50 Supplier programme, engaging with our most important suppliers, seeks to understand and improve the full lifespan and impact of the products and services purchased and to apply the lessons learned across all spend categories.
- Sustainable Procurement is in place which seeks to ensure government legislation and policy are reflected in our planning and operations.

In addition, Trinity employs a Category Management approach to procurement and Sustainability and Biodiversity are viewed as drivers for improvement in these categories:

Lab & Research, ICT, Facilities, Travel, Marcomms, Professional Services, HR, Commercial Revenue and Capital Projects. The diverse nature of the categories requires a different approach and capacity is required within the team to deliver this in full.



4.4 PAPER AND WATER

As previously reported, Trinity set a target of 20% decrease in paper use by 2020 versus 2011 baseline. This target was reached in the 2014/2015 financial year. Since 2014/2015 there has been a consistent reduction in the amount of paper used with a 66% reduction in total. The current annual rate of consumption equates to 9 pallets/3,600 reams/1.8m sheets per year. Trinity has recently switched from 100% recycled paper to 100% Carbon Neutral Paper (Black Label Zero) which is certified by FSC, Nordic Ecolabel and EU Ecolabel as being produced in a carbon neutral way. The ultimate aim is to reduce the use of paper across all functions of the university and to move to digital processes, however these processes will also need to be mapped against potential carbon emissions.

Trinity has installed 29 water fountains across the whole campus estate since 2017 to reduce the use of bottled water. In addition, water savings have been made in other areas including using onsite groundwater and rainwater for the sports grounds and gardens. The latest data for water use per capita is from 2021 with Trinity showing a decrease in its water use by 45% since the 2010 baseline, equivalent to a 48% reduction per full time student.

A map which shows where the water fountains are located can be found here:

[TCD Water Map: Google My Maps](#)

4.5 DISPOSABLE ITEMS

Trinity eliminated single use plastic items from catering and events (delivered by Trinity Catering) in 2018, 3 years ahead of the EU Single Use Plastics Directive in 2021. However, the Covid-19 pandemic delayed the elimination of single use food and beverage containers until 2021.

- Plastic straws – eliminated in 2018
- Plastic cutlery – eliminated in 2018
- Plastic stirrers - eliminated in 2018
- Expanded polystyrene single use food and beverage containers – eliminated in 2021.

The catering team have also eliminated the sale of disposable coffee cups from two outlets (The Forum Trinity Business School and Aras an Phiarsaigh) since 2023 and have carried out a trial in another outlet (The Perch Arts Block) in July and Oct. 2023. The university also gives a discount for reusable coffee cups as well as promoting the 2GoCup scheme across all outlets.

The Sustainability Strategy has identified a number of key actions to promote circularity and a reduction in resource use as follows:

OBJECTIVE 3.4.1 Develop a Waste Action Plan for a Circular Campus.

- **3.4.1D** Eliminate all single use disposable items (plates, coffee cups, containers) related to catering.
- **3.4.1H** Introduce schemes to support reuse i.e. Vytal, Loop etc.



4.6 OTHER MATERIALS

Trinity's Estates and Facilities team operate an extensive collection and recycling scheme for all products outlined under Ireland's Producer Responsibility Initiative including packaging, Waste Electrical and Electronic Equipment (WEEE) and batteries. In terms of packaging waste Trinity segregates the following materials: glass (including lightbulbs), plastic, paper and cardboard, metals and wood. These materials are collected across the multiple campus locations in separate containers for segregated waste streams. These are then collected by our waste and recycling contracted partner and their sub-contractors. Our procurement policy also requires suppliers to take back their packaging where possible, especially pallets.

Trinity established a waste segregation stream in 2017 which includes residual/general waste, recycling waste and organic waste. A comprehensive map of waste infrastructure at the College Green campus can be found here:

[TCD Waste & Recycling – Google My Maps](#)

4.7 FOOD WASTE

Trinity has been capturing data on food waste and has separated food waste from green waste material since 2018. The amount of food waste generated on campus has been reduced by 70.75 tonnes since the 2018 (baseline).





FOOD WASTE (TONNES) 2018–2023

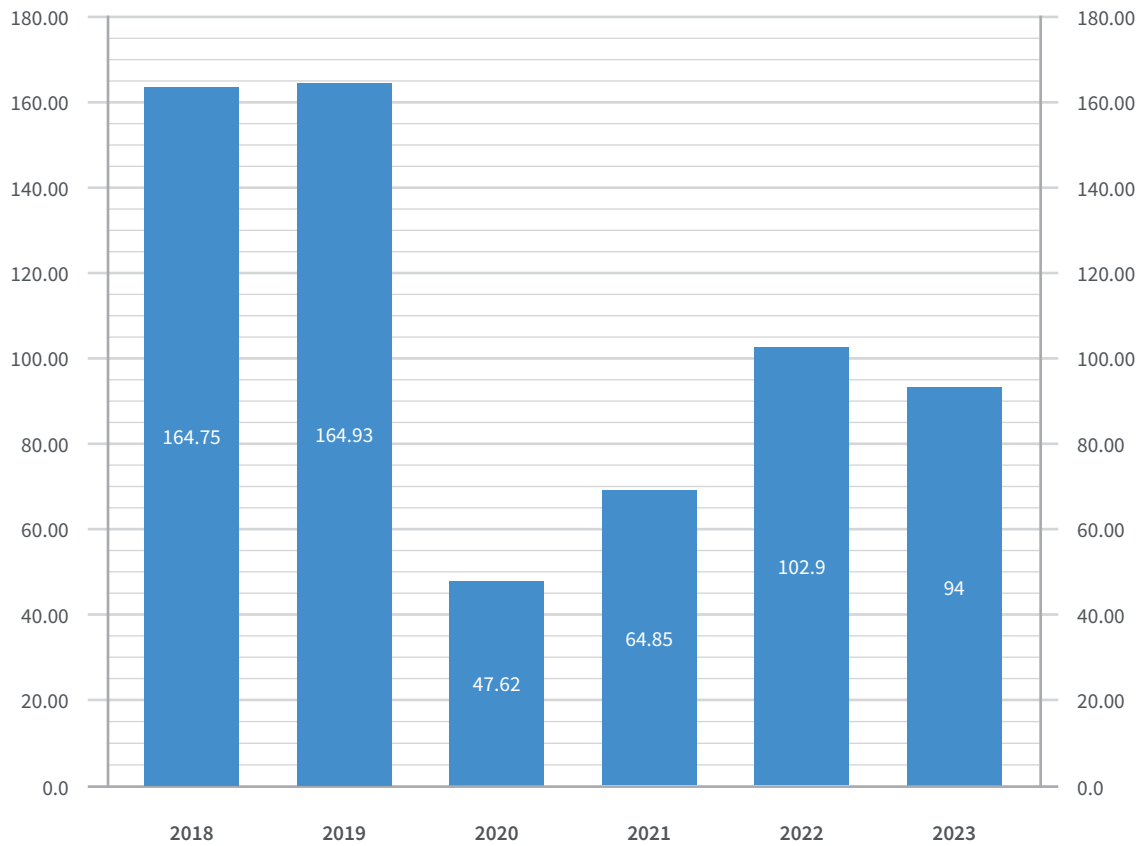


FIG 3 Food Waste Generated 2018–2023





4.8 CONSTRUCTION

As of 1st January 2024, the International Cost Management Standards (ICMS3) cost and carbon reporting templates are mandated for use. ICMS3 has been developed and refined to implement global standards for benchmarking, measuring and reporting construction costs.

ICMS3 will contribute very positively to efforts to decarbonise the construction sector in the most cost-effective way, by adopting globally consistent methodology for carbon life cycle reporting across construction projects across a variety of different construction projects.

ICMS3 has been integrated into the tender documentation for the Old Library Redevelopment Project, (OLRP) and will ensure that all of the embedded carbon in the construction cycle, and life cycle costs are captured in the correct manner.

Our capital project programme supports the Government's Climate Action Plan 2024 and the targets set within. As we wait for new design guidance from the Dept. of Enterprise, Trade and Employment (DETE) regarding the procurement of cement and concrete products in particular, we are moving away from new builds, concentrating on deep retrofitting our older building stock and reevaluating how we use our existing space. Engagement with Design Teams regarding Energy Efficiency Directive (EED) at the initial stages of a project is now essential and the availability of the Life-Cycle Assessment (LCA) tools allow us to calculate and reduce the environmental impacts of buildings and renovation projects.

The inclusion of Sustainable Development Goals (SDG) in the Capital Works Management Framework (CWMF) will allow us to develop a Green Public Procurement plan. One such inclusion of an SDG in the CWMF is with the introduction of new cost and carbon reporting templates incorporating the International Cost Management Standards (ICMS3). ICMS is a principles-based international standard that sets out how to classify, define, measure, record, analyse, present and compare construction project life cycle costs and carbon emissions in a structured and logical format thus allowing the Project sponsors to make informed decisions on the entire project ensuring the best value for money.

In terms of resource and waste management for construction and demolition projects, the Capital Projects team has required building/maintenance contractors to report on the recycled and general waste created from capital projects in Trinity. The data is collated monthly and annually and reported to the Grounds & Gardens Committee under the Environmental Services heading. There is also a requirement as part of the tender process that stipulates that contractors who are undertaking capital projects must provide waste data with respect to the waste generated by the building works and how it is managed; this information is provided at handover stage of the project i.e. project completion. In addition, we have completed phase 1 of a waste and recycling practices audit and the output will feed into the new waste and recycling tender due later this year. It includes some recommendations on construction and demolition waste which will be looked at across the Estates & Facilities directorate.



4.9 SUSTAINABILITY ENGAGEMENT

Trinity has been progressing sustainability initiatives on campus over the last months to increase awareness of our climate targets and biodiversity commitments as well as to empower students and staff to take real action. The main initiatives which have been undertaken are summarised below.

UNFCCC COP28

Trinity achieved Observer Status as part of the UNFCCC Conference of Parties process. A number of staff and students from the college participated in COP28 with two staff and two students attending in person and a further seven attending virtually. An on-campus event was held in December to inform the community about the COP process and how it affects our daily lives.

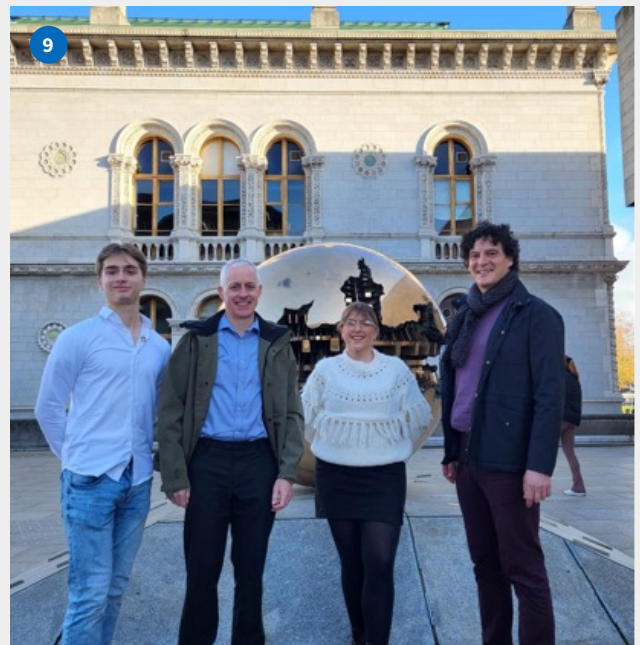


IMAGE 7 COP28 Attendees Feedback Session and COP28

IMAGE 8 COP28 Attendees Feedback Session and COP28

IMAGE 9 COP28 Attendees Feedback Session and COP28



TREE PLANTING

Following on from Climate & Biodiversity Action Week a tree planting event took place in Santry Sports Grounds in November 2023 where over 250 trees were planted by Trinity staff and students.

GREEN WEEK

Green Week took place from 11th - 15th March and included a sustainable sculptures competition, Sustainable Clothes Swap, launch of student-led Cup Collective waste management scheme, Climate Ambassador event with An Taisce, Climate and Sports Panel with Trinity Sport, Climate Action and Sustainability panel webinar on climate and health and various student events.

SUSTAINABILITY LEADERSHIP AWARDS

The Sustainability Leadership Awards took place in March with twenty awardees being recognised for their work and commitment to sustainability. The awardees were from across the college with 8 students and 12 staff members (academic and professional) receiving awards.



IMAGE 10 Tree planting

IMAGE 11 Green Week 2024

IMAGE 12 Sustainability Leadership Awards 2024



GREEN LABS FORUM

A Green Labs Forum took place on the 8th May and over 50 staff members attended to hear about the My Green Lab programme as well as to learn from labs in Trinity that are already accredited. The forum provided an opportunity for staff members to meet and discuss the impact of labs on our GHG emissions and the benefits of reducing their impact through the My Green Lab programme or similar programmes.

SPACE UTILISATION CONSULTATIONS

Space Utilisation Consultations took place during the months of February and March to consult with staff members about the use of teaching and office space on campus. This work forms part of the long-term work in the University to determine how space is used, how often it is used and the requirements for space by academic and professional staff members.



13



14

IMAGE 13 Green Labs Forum

IMAGE 14 Space Utilisation Consultations



5. Our Buildings and Vehicles

5.1 SUSTAINABLE TRAVEL: TRAVEL & COMMUTING EMISSIONS

Trinity has undertaken a carbon footprinting exercise for the financial year 2021-2022. This process estimated included staff travel and commuting in the calculation of scope 3 emissions. Business travel and commuting were 0.42% and 3.26% of total emissions, respectively for 2021-2022, representing a small percentage of total carbon emissions of the university. Most of Trinity's staff business travel emissions arise from flying, which in 2021-2022 emitted 690.60 tCO₂e compared to 26.43 tCO₂e from all other modes of transport (private road vehicles, ferry, trains, light tram and rail, bus, and taxi) combined. Trinity's Financial Service Division capture information about staff travel through the iExpenses process which is hosted on our Oracle financial information system. Additional data are captured through our travel provider, Club Travel, and all data are then uploaded to the M&R 2030 Staff Business Travel.

Trinity College is part of the National Transport Authority's Smarter Travel Campus programme and celebrated its tenth anniversary in 2021. Trinity undertakes travel surveys every three years to determine modal shift and on average over 90% of all students and staff travel in a sustainable way to campus.

The travel survey was undertaken in early 2023 and results show a continued preference for sustainable travel based on the city centre location and availability of extensive public transport networks. The survey has shown a slight decline in active travel modes (5% decline in cycling and 8% decline in walking modes between 2018 and 2023) as well as an increased reliance on bus transport, possibly due to longer commuting distances.

The university is committed to supporting sustainable travel and has installed extensive bike parking in various locations across the university to support cycling, including Ireland's very first disabled bike parking space in 2019. The university has gained additional funding from the National Transport Authority to upgrade bike parking spaces in October 2023. The university also operates the Bike-to-Work scheme for all staff. In addition, car parking is restricted on all sites.

Trinity has started a Transport Study with the support of the National Transport Authority. The study will be completed by DBFL Consultants in partnership with key stakeholders within the university and in the wider community.



THE SCOPE OF THE STUDY FOCUSES ON EIGHT KEY PRIORITIES AS FOLLOWS:

→ **Priority 1 Conduct a Campus Cordon Study**

To understand multi-modal movements to, from and within the campus, as well as between multiple campus locations.

→ **Priority 2 Conduct a Freight study**

Provide college with an overview on the current freight access to the campus and identify the peak periods for deliveries.

→ **Priority 3 Undertake a Cycle Audit**

To understand if cycling infrastructure adequately caters for and responds to the needs of cyclists.

→ **Priority 4 Investigate the concept for a proposed new TCD Mobility Hub**

To increase access to multiple sites as well as to integrate Trinity East with the wider Campus through the provision of micro-mobility and active travel infrastructure.

→ **Priority 5 Undertake a microsimulation traffic model**

This model would determine the impacts of changes to access to the campus at Lincoln Placed due to the recently announced DCC/NTA pathfinder project.

→ **Priority 6 Develop a Campus Travel Plan/ Mobility Management Plan**

To promote sustainable travel to all campus locations by staff, students, and visitors and to reduce the number of vehicles accessing the College Green Campus.

→ **Priority 7 Develop an Annual Staff & Student Commuter Travel Survey**

To understand current travel behaviours, mode share, associated carbon emissions of travel and barriers to increased sustainable travel choices using a mix of quantitative and qualitative questions.

→ **Priority 8 Development of a ZEV Charging and Maintenance Strategy**

To identify possible locations on campus, funding opportunities, partner organisations for delivery and a timeline for rollout.

In addition, Trinity's Sustainability Strategy and Action Plan focuses on supporting sustainable and active travel through the following objectives:

→ **OBJECTIVE 3.3.3** Reduce the number of vehicles using the College Green Campus.

→ **OBJECTIVE 3.3.4** Reduce car parking by 50% in the College Green Campus.

→ **OBJECTIVE 3.3.5** Continue to support sustainable travel to all sites.

→ **OBJECTIVE 3.3.6** Support the delivery of walking and cycling infrastructure.



5.2 OUR VEHICLES

Vehicles owned or leased by Trinity account for less than 1% of our annual energy use. We do however have a small number of vehicles owned by Estates and Facilities, and these have either been replaced by electric vehicles or all diesel-powered vehicles switched to Hydrogenated Vegetable Oil (HVO) since November 2023. Grounds maintenance equipment is already being replaced by electric equivalent at time of renewal and this process is 50% complete. We will review the current fleet and assess the need for replacement on a 'like for like' basis with a view to reducing the number of vehicles required by requiring shared use across the different academic/operational areas. Trinity's Sustainability Strategy outlines the actions associated with vehicles:

OBJECTIVE 3.2.3 Reduce the greenhouse gas emissions from transport vehicles owned by Trinity by 51% in 2030.

- **3.2.3A** Review the number of petrol/diesel cars/vans that are owned by various departments on campus.
- **3.2.3B** Reduce the number of vehicles owned by various departments on campus by 50%.
- **3.2.3C** Investigate a car/van sharing scheme i.e. GoCar,YUKO.
- **3.2.3D** Procure (purchase or lease) only zero-emission vehicles.
- **3.2.3E** If applicable develop a comprehensive ZEV Charging and Maintenance Strategy to guide ZEV transitions on campus.



IMAGE 15 Proposed Signage for Vehicles



5.3 OUR BUILDINGS: EXAMPLE OF A DEEP RETROFIT PROJECT

In 2023 Trinity completed an extensive deep retrofit of the Rubrics building which is the oldest building on campus which dates back to 1699. The Chief Stewards House was also part of the renovation project and the ambition was to have a BER rating of B2 (from D2) to ensure that the building was future proofed as student residences for the next century. The works have now been completed which included:

- Ground sourced heating from 21 boreholes in New Square
- Reroofing with a warm roof construction and with Irish sourced slate
- Ground floor insulation with recycled foamed glass
- Insulated limestone external render
- Refurbishment of all existing windows and shutters

Additional electricity metering has been installed in summer 2024 allowing us to measure the coefficient of performance of the ground source heat pumps in real time throughout the heating season, allowing us to optimise the performance of this building and giving us enhanced information as an exemplary project.

Initial tests have shown 100% of space heat and 84% of domestic hot water now come from the decarbonised ground source heat pumps in Rubrics.

More information can be found here:

[The Rubrics – Estates & Facilities: Trinity College Dublin \(tcd.ie\)](https://www.tcd.ie/estates-facilities/)

The Old Library Redevelopment Project will go out for tender for a design team in Q3 2024. This is an essential project for Trinity, where it will conserve and safeguard the Old Library and its collections for future generations of students, staff and visitors to enjoy. The following energy design principles will be applied to this project. This will involve the following:

- Improving insulation to minimise heat loss
- Refurbishment of the windows
- Installation of approximately 28 ground source heat pumps to meet heating and cooling requirements
- Energy Efficient Active Systems including sensors (Temp, RH, CO2, Particulates, VOCs)
- Building Management System Control
- Automatic LED lighting controls
- Automatic daylighting controls in the Long Room
- Use of Air Handling Units with energy efficient motors and incorporating heat recovery

The Capital Projects division within E&F have ensured that they have included all of the new requirements from the Office of Government Procurement (OGP) mandated from 1st January 2024, the new Cost Controls and Carbon reporting templates which incorporate ICMS3.



5.4 BUILDING STOCK PLAN

Trinity is starting to develop a building stock plan to identify buildings for retrofitting in line with GHG emissions targets. We are at an initial stage of data gathering and need to determine which buildings are the most energy intensive so that building works can be prioritised when funding becomes available. Trinity is also undertaking a masterplanning process and the 'gap to target' projects will need to work in tandem with the emerging 'Masterplan' to ensure that we have a co-ordinated strategic approach to the development of the Estate.

The key lessons learnt to date with respect to the development of the Building Stock Plan are:

- We are fully aware of our future reliance on our electrical infrastructure, which will have to be increased as we head towards 2030.
- It is the intention that air source heat pumps in energy centres will provide 80% of annual heat loads with boilers doing the winter peak conditions.
- There is a need to increase capacity within the team to undertake this work and funding must be made available so that project planning can be put in place not only on an annual basis but for the next decade.



PROJECTS THAT ARE ALREADY UNDERWAY OR IN PREPARATION PHASE ARE:

→ **Arts Building Refurbishment**

Built in 1978 and a heritage building, the current 20,283m² building is a relatively high consumer of energy in its day-to-day running. Under this project, the existing infrastructure will undergo a deep energy and functional retrofit. It is part of a current Higher Education Strategic Infrastructure Fund (HESIF) bid. The decarbonisation audit discussed above is to identify the measures necessary to decarbonise the building by 51% and the costs and carbon savings of those measures. The audit is expected to be completed in August 2024.

→ **Existing Trinity Hall student accommodation**

Trinity Hall currently houses 1,176 students in student accommodation dating from 2003. In 2023 a mechanical plant and metering upgrade is taking place in one Block which will give us the information needed to specify a potential heat pump solution in the existing larger blocks on the Trinity Hall campus. We may use a future centralised energy centre heat pump approach designed to be connected onto by a new accommodation development when funding is available for that. These works are in the region of €435K and will go to site by July 2024.

→ **The Martin Naughton E3 Learning Foundry**

Is currently being constructed to be a Nearly Zero Energy Building (NZEB) and to achieve Building Research Establishment Environmental Assessment Method (BREEAM). The specifications for the project are as follows:

- Mechanical Systems, Electrical Systems & Equipment.
- The final design includes Air Source Heat Pumps, water to water heat pumps and PV panels which will contribute positively to the facility's energy consumption and associated carbon emissions.
- The building will have a high specification Building Management System which allows full control and adjustment of systems and equipment and incorporates strategies to improve control and flexibility of the installations such as the provision of local user controls where appropriate. Energy monitoring and water monitoring is included.



- The design includes for the efficient use of potable water: eg. WCs 6/4l dual flush cisterns, Wash hand basin and kitchenette Taps 3.7l/min and 5l/min and Showers 8l/min.
- The design includes high efficiency LED lighting systems and the use of appropriate artificial lighting levels, lighting controls with perimeter areas switched separately from internal areas with daylight and occupancy (presence/absence) linking where appropriate.
- Energy efficient equipment includes the use of premium efficiency motors with variable frequency drives where practical (e.g. fans, pumps, lifts etc.)
- The heating and cooling of the building will utilize embedded slab piping as a Thermally Activated Building System (TABS). TABS helps the building cope with extremes of hot and cold temperatures. The proposed slab build-up incorporates the heating and cooling system within the structural depth, minimising the services zone required in the ceiling void, providing flexibility for future layouts and arrangements within the space.

Other sustainability features include:

- The Façade designers and architects have developed the façade and material packages in line with the aim of reducing the environmental impacts of building materials. The design specifications identify the BREEAM requirements and require the Contractor to consider the procurement of materials and to follow the Green Public Procurement guidance as well as minimized ng materials with environmental certification and identifying products with environmental product declarations (EPD).
- A rainwater harvesting system will be incorporated into the development.
- 25% of the total material value of building elements (elements described in the specification) are to be certified as responsibly sourced.
- All timber and timber-based products are to be legally harvested and comply with the Forestry Stewardship Council (FSC) certification system or Programme for the endorsement of forest certification schemes (PEFC) if FSC timber is not available. Certification must be confirmed.
- A high percentage of GGBS concrete is included in the design.
- The volume of concrete is minimized by the inclusion of voided slabs. The voids are created using recycled plastic spheres.
- The building is designed for flexibility and future adaptation to a different use- the internal spaces have been planned around a 1200mm grid. The structural design can accommodate an additional two floors should the Dublin City Council guidelines on acceptable building heights change.



Trinity East is located in the heart of the Dublin Docklands and comprises of a number of existing research, office and community facilities, as well as the new Portal innovation hub, which is currently under construction. The site was earmarked for demolition and reconstruction, however a new vision for the site has now emerged, which will have sustainability at its core. The university is now exploring how sustainability can be put into practice to refurbish, retrofit and revitalise the site with a reduced impact upon our GHG emissions both during the refurbishment phase and over the lifetime of the buildings. It is hoped that the site will a place for new ideas to be tested and explored both in terms of innovation and cultural change. The Pathfinder programme was set up by SEAI and provides initiatives and funding streams with forward thinking public bodies to improve their energy performance and reach their targets. In Q2 of 2024, Trinity made a submission to SEAI for the following two projects at Trinity East.

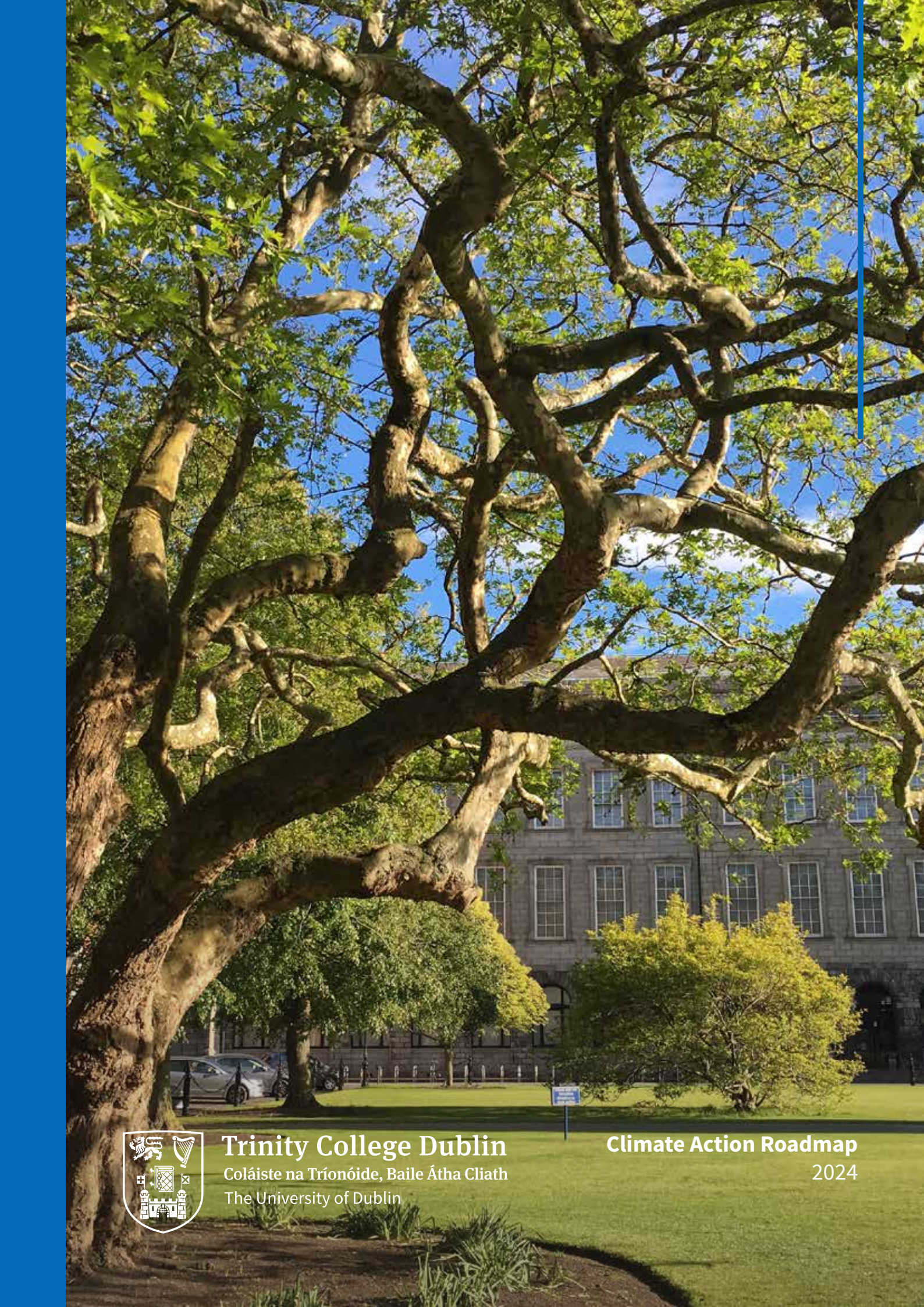
- The first of these is in relation to 3GCQ, which will be primarily used as a research facility with related offices and ancillary spaces. It is envisaged that 75% of this space will be used for research, offices and ancillary space. The other 25% is for circulation, services, break out areas. Area under consideration c 2,149m².
- The adjacent area to 3 GCQ is the second project we have submitted in relation to pathfinder is for research laboratory space, and are units 1, 2, 3 and 8. Area under consideration c 1,689m².



6. Conclusion

Trinity College continues to be highly motivated to reduce its GHG emissions in line with Government targets by 2030 and has established a robust governance structure and action plan to support the ongoing decarbonisation and energy efficiency of the university. However, like the rest of the sector, the challenges we face are complex and costly, with the need for substantial investment, particularly given our unique building stock. If our historic buildings are to undergo large scale retrofit projects to future proof them for the next century, this requires substantial funding and logistical coordination. There is a need for greater support from Government so that these projects can be delivered over the next five years in order to meet our 51% GHG reduction targets set for public sector organisations. There is also a need for the rapid deployment of key infrastructure with external partners, such as the district heating supply from the Dublin City Waste to Energy facility. Failure to meet these targets in the public sector hampers Ireland's ability to meet European targets, which will incur financial penalties. More significantly, failure to meet targets poses increasing risk to business, societal health and welfare, and the integrity and stability of ecological systems that underpin economies and societies.

In Trinity, there is university-wide support to go beyond GHG reduction targets to encompass wider sustainability challenges, and to set meaningful targets to become a nature positive, low carbon, healthy university. The staff and students of the university are strongly supportive of these actions and our aim is to embed environmental sustainability across everything we do including education, research, operations and partnership.



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

Climate Action Roadmap

2024