



ICT Sustainability Roadmap 2026 – 2031

Buy less, buy better, use better and use for longer



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Executive summary

“Our Information and Communication Technologies (ICT) team is dedicated to reducing the environmental impact of ICT across the university.

Sustainability underpins everything we do and is a cross-cutting theme of our [Digital Plan](#).

As part of our sustainability roadmap we will baseline our impact, take action to extend the life of hardware and transform responsibly using highly efficient data centres.”

Jenny Rae, Chief Information Officer, Imperial College London

Worldwide emissions from IT are now larger than aviation! We may consider not taking a flight, but do we consider not buying the laptop, workstation or using AI?

Information and Communication Technologies (ICT)¹ at Imperial has a material impact on the university’s environmental footprint, accounting for nearly one fifth of the university’s total greenhouse gas emissions when electricity use, data centres, cloud services, digital infrastructure and procurement are considered. At the same time, ICT is critical to delivering world-leading research, education, and operations.

Our roadmap sets out a balanced and evidence-based approach to reducing ICT-related emissions and waste, starting to understand and manage the environmental impact of AI, and enabling sustainability across the university through the intelligent use of digital technologies.

The roadmap aligns with Imperial’s commitment to reach net zero Scope 1 and Scope 2 emissions by 2040 and to minimise Scope 3 emissions wherever possible.

It is structured around four strategic Roadmap Themes:

- 1. Baseline our emissions and waste**
- 2. Taking action on emissions and waste**
- 3. Artificial Intelligence (AI)**
- 4. ICT enabled sustainability**

Together, the actions set out in our roadmap are an ambitious and practical pathway for Imperial to reduce its environmental impact.

We need your help to **buy less, buy better, use better** and **use for longer**.

¹ ICT refers to all Information and Communication Technologies across Imperial, and not just the ICT division unless stated.



The Executive summary and **Roadmap themes, 2026 – 2031** provide an overview of our objectives, and we introduce you to **The Seven Steps of ICT Sustainability**.

Progress against this roadmap will be overseen through established ICT governance structures including the ICT Leadership team, the Sustainability Committee, and it is aligned with the university's Digital Plan under the Operations and Infrastructure Committee.



Roadmap themes, 2026 – 2031

1. Baseline our emissions and waste

We will baseline our impacts by September 2028:

Baseline our ICT emissions, including:

- Embodied carbon and emissions from electricity use of our hardware e.g. desktops and laptops.
- Emissions created from our own/co-located data centres.
- Emissions from our cloud use.
- Emissions from all other ICT use.

Baseline our ICT waste:

- Number of ICT devices sent through the WEEE process.

2. Take action on emissions and waste

Achieve Green DiSC bronze by Autumn 2026 and silver by 2028 for central ICT systems.

Emissions

- **Buy less** - embed sustainability into research bids by 2028, encouraging the use of ICT compute services rather than large personal devices where possible.
- **Buy better** - investigate the purchase of remanufactured devices instead of buying brand new. Remanufactured laptops have been repaired and rebuilt and sold as new.
- **Use better** - introduce a sustainable data centre for High-Performance Computing (HPC) and reduce reliance on the aging South Kensington data centre (non HPC) by moving applications to the cloud and modern data centres.
- **Use for longer** - extend the life of hardware against a balance of performance and user requirements. We will establish a refurbished first principle by 2028, investigating if laptops can be refurbished before disposal.
- Create sustainable ICT short courses and wider sustainable communication to enhance the in-house culture around sustainable use of computing infrastructure and reduce emissions.

Waste

- **Use for longer** - reuse ICT equipment within property refurbishment projects where possible and establish a project specific ICT % reuse target by end of 2026.
- Investigate the impact of Windows upgrades on our waste.



3. Artificial Intelligence

Start to understand the impact from AI:

- Start a Professional Services AI working group in 2026 which will include investigating how to evaluate and reduce the environmental impact of AI.
- Facilitate collaborative working between the ICT division, research technical professionals and academics, other universities and groups with a focus on data centres and AI.
- Understand the increase in emissions due to our AI use to 2031, where available data allows.

4. ICT enabled sustainability

Enable Imperial wide sustainability:

- Continue to embed data into the Imperial Emissions Pathway so departments can make low carbon decisions.
- Create projects within the Imperial sustainability sandbox to showcase university wide sustainability.
- Use Wi-Fi to understand space usage, as using space more efficiently will lower carbon and costs across our buildings.
- Use My Imperial Campus app to promote sustainable behaviours.
- Encouraging the use of Ecosia search engine.
- Look out for the new green computing course for researchers, launching summer 2026 by our Research Computing Service.



The Seven Steps of ICT Sustainability

How you can help - you may be wondering how you can champion sustainability.

Our **Seven Steps to ICT Sustainability** gives you top tips to **buy less, buy better, use better** and **use for longer**.

1. Buy less and buy better

A large volume of greenhouse gas emissions is released during the manufacturing process of ICT equipment, including phones, laptops, desktops, workstations and servers. This is called embodied carbon.

- You should only buy what is needed.
- Consider purchasing certified refurbished and remanufactured devices.
- Consider using Imperial's Research Computing Service instead of buying workstations or new servers for your research.

Next, you'll find out how to **use better** in points 2-6.

2. With great AI power comes great responsibility!

AI comes with a significant environmental cost, consuming vast amounts of electricity and water, with its impact growing exponentially each year. It has been predicted that during 2026 the electricity used by the world's data centres will reach a level equivalent to the fifth largest electricity consuming country ([Paper by MIT](#)).

- **For everyday use, ask:** Is it truly necessary for your task? For example, 'do you need to use [dAIsy](#) or MS Copilot for that email?'
- For research, use it **well, wisely and efficiently** and when it adds real additional value.

Thoughtful use helps us balance innovation with sustainability.

3. Geek out - the green way!

Carrying out computational research has an environmental impact!

- Look out for Imperial's 'green computing' courses, coming soon!

4. Delete what you don't need

Data is filling up storage platforms, including OneDrive and BOX at a fast pace, like millions of garages filled with filing cabinets. Additional storage requires more hardware which results in more embodied carbon and more energy use!

- Review your electronic data regularly and delete what's no longer needed.
- Set a six-monthly reminder to do this within your calendar.

Let's spring clean our cloud garages!



5. Shut the lid to save the grid & Think before you print!

The electricity our devices use creates greenhouse gas emissions when running.

- Turn devices off when not required.

Imperial prints over 5.1 million pages a year, using over 600 trees annually just for our paper demand!

- Don't print unless you really need to.

6. Switch your search engine to Ecosia.

[Ecosia](#) is a privacy-friendly search engine that uses 100% of its profits to plant trees and fund climate action.

- You can easily switch off automatic AI summaries in Ecosia, which saves electricity and water!

7. Use for longer!

We have extended the warranty of ICT-managed laptops to five years. We encourage everyone to keep their laptops for at least five years. You should:

- When staff leave, reassign devices that are less than five years old for use within your team/department.
- Ensure that good-quality computers, monitors, keyboards, etc., are reused during property refurbishment projects.

[Get a Seven Steps infographic](#) for use in your presentations.



Baselining our emissions and waste

Emissions

Greenhouse gas emissions from Imperial's ICT arise from **five** areas:

1. Embodied emissions of purchased hardware (**scope 3**) - the emissions created when procured hardware is manufactured e.g. from the gas/electricity/fuel used when the resources are mined and the laptops, desktops and workstations are manufactured and transported.
2. The emissions created when electricity is used on campus to power the ICT hardware (**scope 2**).
3. The emissions from Imperial's servers – the electricity used to power and cool our servers, either on site (**scope 2**) or in colocation sites (**scope 3**).
4. The emissions from any cloud services we use (electricity use in their data centres).
5. Any other emissions from our procurement e.g. from data centres that power the software as a service that we use.

Calculating the emissions data

In 2023/2024 we used the **Pound Spent Metric** to calculate approximate emissions for purchases. (See Appendix A.)

In this calculation the amount spent on each type of product or service is multiplied by a carbon factor provided by the **Higher Education Supply Chain Emissions Tool (HESCET)** to estimate the emissions within that spend.

Using this method, the 2023/24 emissions from the procurement of hardware, software and services, such as cloud and server use, totalled **43,000 tonnes of CO₂e**. Accounting for nearly **one fifth** of the whole university's footprint, (Imperial's total footprint is 244,000 tCO₂e) and highlights the impact ICT makes on Imperial's overall carbon footprint.

We recognised that Pound Spent Metric is not an exact way of calculating emissions and to obtain more accurate data, in 2025 we commissioned a piece of work to measure the embodied carbon and emissions from the electricity use of our hardware (such as laptops and desktops, excluding our onsite servers) using the manufacturers data for each make and model.

Take a look at the table on the following page to see a breakdown of device type and the associated emissions.



Large volumes of emissions are created when hardware is manufactured, promoting the need to keep devices for as long as practically possible or to buy remanufactured where possible.

Key insights:

- Embodied carbon from all hardware surveyed totalled **4153 tCO2e**. (Shown as scope 3 in Table 1 below).
- The approximate emissions created from the electricity use of our devices each year was much smaller, totalling **138 tCO2e** (Shown as scope 2; 138,501 kg CO2e).
- As an example of manufacturing emissions against general use the HP Elite Book creates an average of 248kg of CO2e during its manufacture, whereas just 5.2kg CO2e is created each year from its estimated electricity use.

Table 1 shows the hardware device type and the associated emissions. (More detail on how this data was collated is found in Appendix B.)

	Devices	Emissions from manufacturing Scope 3 (Kg CO2e)	Emissions from electricity use Scope 2 (Kg CO2e)	4 Year Total (CO2e)	Average scope 3 per device (Kg CO2e)	Average Scope 2 over 4 years per device (Kg CO2e)
Laptop	8,079	1,606,726	32,976	1,738,631	199	16
Desktop	8,426	1,840,119	70,715	2,122,980	218	34
Integrated desktop	1,821	701,018	34,678	839,731	385	76
Total	18,354	4,153,261	138,501	4,707,269	-	-

Table 1: Number of devices and associated average scope 2 (from electricity use) and 3 emissions (embodied carbon).

NB: This is a snapshot from 2024 of our hardware, rather than purchases per year.

The electricity use of ICT hardware was **1.3%** of total emissions from Imperial’s electricity use annually.

Hardware created **188 tCO2e** from the electricity use compared to the total emissions from electricity use at the university - 14,000 tCO2e.



(These figures do not include the electricity used from our on-site or off-site servers, and there are some other inaccuracies detailed in Appendix C)



Baselining - Going forwards

Data accuracy

We will continue to work on the accuracy of the data and move forwards with calculating the emissions from servers on and off site, our cloud use and all other emissions.

Procurement data

When procuring devices such as laptops, we will ask for Product Carbon Footprints (PCFs) including an explanation of what they have included in this embodied carbon calculation.

We will ask for the Typical Energy Consumption (TEC) from the manufacturers providing us with an estimate of energy demand of the laptops.

Cloud data

Much of Imperial's cloud use, e.g. OneDrive and Teams, is provided by Microsoft Azure, therefore we will work directly with Microsoft to understand the emissions from this service.

We use Amazon Web Service (AWS) and BOX who we will work with to understand the impact from these services.

Net Positive Tool

For all other services, we will use the Net Positive Tool. This provides us with our suppliers' reported scope 1 and 2 emissions, and their reported scope 3 in some cases.

The Net Positive Tool calculates our spend as a percentage of the suppliers' turnover, which is multiplied by their total emissions. This gives the % of their emissions attributed to Imperial. (This is more accurate than the Pound Spent Metric).

Waste

It is important that we baseline the amount of ICT waste we produce.

Currently [Waste Electrical and Electronic Equipment \(WEEE\)](#) is disposed of through the Imperial Property division and the ICT division will collaborate with them to fully calculate this baseline.



Taking action on emissions and waste

Emissions

We have already started to act on reducing emissions through our [Shut the lid to save the grid](#) and [Think before you print campaigns](#).

We now need to **buy less, buy better, use better** and **use for longer**.

Green DiSC

A sustainable ICT certification scheme for research groups and institutions.

One of our flagship projects is the [Green DiSC](#) Bronze award which we intend to complete by the end of 2026, following with Green DiSC Silver by 2028.

This bronze accreditation includes criteria such as:

- including computing sustainability in induction procedures
- creating a central institutional repository for sustainable resources
- creating an inventory of the different purchasing streams for hardware, main data solutions and computing infrastructures,
- carrying out regular cleaning of centrally managed data storage and
- providing training on green computing best practices.

Taking these actions will help reduce ICT related emissions and waste across the university while fostering a more sustainable ICT culture.

Research England Research Culture funding

ICT, the Research Computing Service, the Department of Computing and the Early Career Research Institute have partnered to secure Imperial's Research England Research Culture funding, enabling us to embed ICT sustainability more deeply within research practices.

This funding supported the addition of new artwork for **The Seven Steps of ICT Sustainability** developed by the Sustainability, which will be used in induction processes and wider communications.

It will also enable the creation of a new green computing course, which will be ready for release summer 2026.

Buy less and buy better - Reduce emissions from purchases of equipment (scope 3)

As shown in **Table 1** and **Figure 1** across the whole life cycle a large proportion of the emissions created by hardware are embodied, - released during the mining of metals and manufacturing process. That's why it's important that we **buy less**.



When completing funding bids researchers may want their own equipment such as workstations/servers instead of using the university's computing services. The ICT division will work on a communication plan to ensure that the university computer service offer and costs are clear, as these may now be as attractive as owning personal equipment.

It is also important that we **buy better**. We will investigate if we can purchase remanufactured devices which have been made using recycled laptops - reducing the initial embodied carbon and impact from mining significantly.

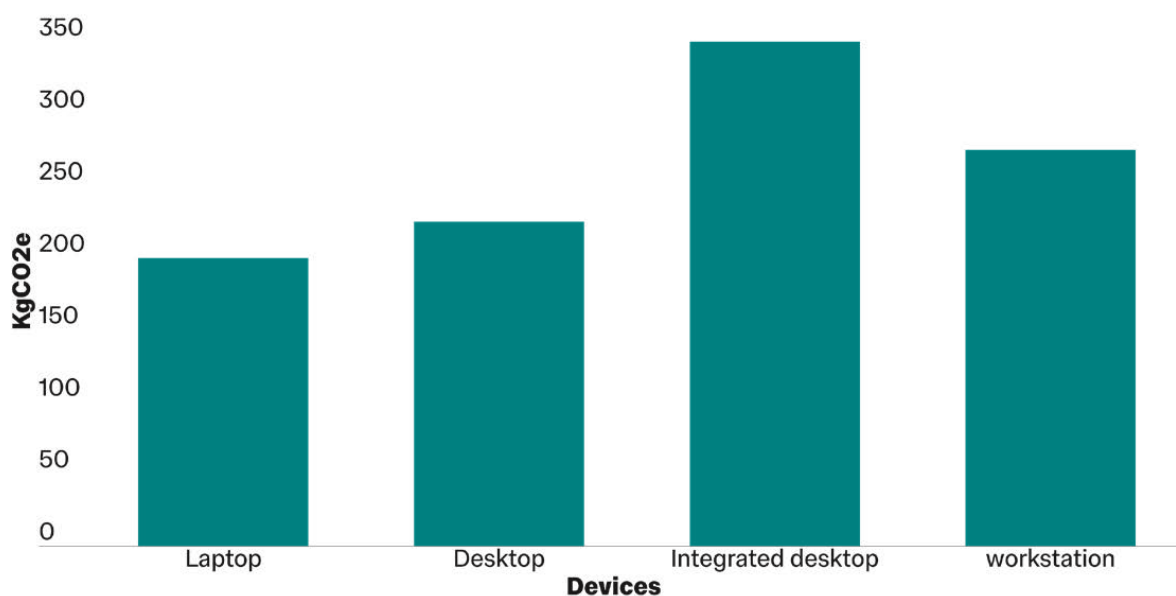


Figure 1 - Shows average embodied carbon within different hardware, with an integrated desktop or a workstation producing more KgCO₂e than a laptop or desktop.



Use better - Reduce emissions from data centres

“We are looking forward to evolutionising research across Imperial with our newest HPC system”. **Dr Andrew Richards, Director of Research Computing Services.**

After calculating the baseline of emissions from our data centres we will monitor this use, which is likely to increase.

As AI and the university’s data storage needs to grow to assist world leading research, we will need to grow in a sustainable fashion.

We typically use air-cooled data centres for our research data needs but have now introduced a sustainable data centre for High-Performance Computing in 2026. This is a much more efficient data centre as it cools the servers using a direct water-cooling system (Power Use Efficiency of 1.1) and the water in a closed loop meaning that none is lost.

For further data needs, we will need to consider how the extra electricity required to power the servers is sourced, ensuring that it is green and through purchase power agreements (which includes additionality) in the contracts where possible.

Our work with LENOVO and INTEL will enable us to understand the environmental impact of our High-Performance Computing data centre.

We want to understand the detailed electricity use of these efficient servers and investigate if we can understand electricity use and CO2e emissions per project.

We also plan to reduce reliance on the aging South Kensington data centre (non HPC) by moving applications to the cloud and to modern data centres.

Use for longer - Reduce emissions from devices

If we buy new, we will purchase quality products and use for longer or for as long as practically possible, reducing the embodied carbon per year.

We have agreed to increase the warranty of our laptops to 5 years and will continue to push this further where possible e.g. we will investigate a refurbishment scheme where aging laptops are refreshed and the warranty is increased.

Waste

The university disposes of electrical equipment in a responsible fashion ([WEEE](#)).

The electronic components are reused as far as possible, and we work with suppliers that guarantee zero to landfill recycling.

The ICT division works with Property to ensure equipment is reused during refurbishment wherever possible and will calculate project specific % reuse within refurbishments going forwards - use for longer!



We are also considering if we can triage ICT waste in house so that more is reused within Imperial.

Due to Operating System upgrades, for example Windows 10 to Windows 11, many laptops - some only a few years old - become obsolete. It is therefore important that we understand the impact that such upgrades have on our embodied carbon and waste and then feed back to suppliers.



Artificial Intelligence

“Not everything that is faced can be changed, but nothing can be changed until it is faced”. James Baldwin, American writer and civil rights activist.

It is difficult to achieve exact figures on the impact of worldwide AI use, but we ‘will not let the perfect be the enemy of the good’. Papers by Stanford explain the following:

Training the early AI models, such as AlexNet (2012) used modest amounts of carbon emissions at 0.01 tonnes, whereas, more recent models have had significantly higher emissions for training, for example:

- GPT-3 (2020) - 588 tonnes
- GPT-4 (2023) - 5,184 tonnes
- Llama 3.1 405B (2024) - 8,930 tonnes

(Ref: [AI Index | Stanford HAI](#)).

The emissions created from the training of Llama 3.1 405B (2024) is equivalent to the emissions from the electricity use of over 15,000 UK homes.

A [recent paper by MIT](#) points out that globally, the electricity consumption of data centres rose to 460 terawatt-hours in 2022.

This made data centres the 11th largest electricity consumer in the world – that’s higher than the energy consumption of Saudi Arabia (371 terawatt-hours), according to the Organisation for Economic Co-operation and Development (OECD).

In 2026, the electricity consumption of data centres is expected to approach 1,050 terawatt-hours - which will move data centres up to fifth place on the ‘global electricity use list by country’, between Japan and Russia’s consumption!

We understand that the increased use AI is of concern to many at the university.

An existing AI committee is in place for Education, and we are currently establishing an AI committee for Professional Services.

Sustainability will be a key theme within that committee to ensure the work progressed on AI application across Imperial is in line with our sustainability goals.

Imperial already has researchers investigating the energy demand from AI datacentres and an [International Workshop on Managing Global Energy Demand of AI Data Centres](#) was convened at Imperial in 2025.

We will facilitate collaborative working between the ICT division, research technical professionals and academics, other universities and groups with a focus on data centres and AI.



ICT enabled sustainability

ICT enables sustainability action across the university and has a positive role to play in the Imperial's overarching Sustainability Strategy and journey to Net Zero:

Imperial Transition Pathway Explorer (Carbon Emissions Analysis Tool)

The ICT division supports the [Transition Pathway Explorer](#), designed to empower staff across faculties and departments to make informed strategic decisions to reduce emissions.

The tool offers detailed reporting in three key areas: electricity usage, procurement and spend, and business travel. It also ranks suppliers with the highest CO₂ emissions.

Whilst the data gives a good indicative picture of the current carbon emissions, work will continue to further refine the data inputted to improve the accuracy going forwards.

We will continue to work on localised emission footprints to empower departments to make informed choices.

Analysing space usage to inform buildings requirements

The ICT division is using Wi-Fi and in person measurements to understand space usage, so that when we grow we may not need to build more but instead use our space more efficiently.

This is important as constructing buildings is a carbon intensive activity, whereas using space more efficiently will lower carbon and costs.

Creating projects within the Imperial sustainability sandbox

We will ensure we are creating projects within the Imperial sustainability sandbox to showcase our sustainability work. For example, we will promote the renewable electricity produced from the Silwood Solar PV across our campus digital screens.

Using the My Imperial Campus app

We will use My Imperial Campus app to encourage sustainable behaviours.

For example, we will work on notifying students if there is cheaper end of day food to reduce food waste.

Sustainable searching

We are also encouraging students to use the search engine Ecosia, a search engine that uses its profits to plant trees around the world.

Install Imperial's Ecosia search engine on your device - ecosia.co/ImperialCollegeLondon.



Governance

This roadmap is monitored through the ICT leadership team and follows the governance of the ICT Digital plan.

It is also governed by the Sustainability Committee which meets quarterly.

The Operations and Infrastructure Committee monitor progress against the delivery of the roadmap goals, reviewing quarterly.

ICT colleagues are also members of the Government Digital Sustainability Alliance formed by the Chief Digital and Information Officer at the Department of Environment, Food and Rural Affairs, (DEFRA) allowing cross fertilisation of ideas between academia, business and the government.



Thank you

With thanks to

“Thank you to all the colleagues across Imperial and beyond who have supported the ICT Sustainability Roadmap and our continued work to baseline our emissions data, review the impact of AI, and to all our staff and students who will take action on waste and emissions to ensure a more sustainable future.” Dr Hannah Scott, Head of Sustainability - Lead author.

Special thanks to:

- Harriet Wallace, Director of Sustainability, The Sustainability Hub
- Stav Friedman, Sustainability Engagement and Project Support Officer, The Sustainability Hub
- The Sustainability Strategy Committee
- Dr Jeremy Cohen, Advanced Research Fellow, Department of Computing
- Michael Bearpark, Professor and Director of User Engagement, Department of Chemistry
- Dr Fei Teng, Reader in Intelligent Energy Systems, Department of Electrical and Electronic Engineering
- Neil Hanham, Head of Digital Workplace, ICT
- The Operations and Infrastructure Committee
- Government Digital Sustainability Alliance, led by the Department of Environment, Food and Rural Affairs (DEFRA)
- Liz Scholfield, Communications Specialist, ICT (Document design)

Find out more

Got to the [ICT Sustainability webpages](#) to find out more.

Accessibility – This document has been designed to be as accessible as possible, but if you find issues or require assistance please contact our [Accessibility Officer](#).

Publication

This ICT Sustainability Roadmap is a living document and will be updated as we progress through the roadmap.

This document is ICT Sustainability Roadmap - version 1.0 and was published in May 2026.

Please Think before you print. Do not print this document unless absolutely necessary.



Appendix

Appendix A

See table below which shows how Imperial reported ICT services emissions in the annual sustainability report 23/24.

Category	Subcategory	Emissions 23/24 (tonnes CO2e)	% of total emissions	Emissions 22/23 (tonnes CO2e)	% increase / decrease
IT Services	Audio visual and multimedia supplies and services	683	0.68%	873	-22%
IT Services	Library services	9,287	9.29%	9,072	+2%
IT Services	Computer supplies and services	32,647	32.6%	33,934	-4%
IT Services	Printing, reprographics and photocopying	17	0.02%	24	-31%
IT Services	Telecommunications	104	0.10%	177	-41%
IT Services	Stationery and office supplies	0	0	0	0

Appendix B

Scope 3 (embodied carbon) figures are taken from product specific Lifecycle Analysis (LCA) / Product Carbon Footprint (PCF) reports issued by the manufacturer. These are analysed to remove any scope 2 (emissions from energy use) figures as these are often subject to assumptions (device management, country of use, years of house and hours per year of use) which are not correct for the organisation in the study.

The **scope 2 figures** are calculated based on energy use in kWh for the specific product in various states (off, sleep, idle etc). These are combined with location and use factors to give an annual kWh energy consumption which is then converted to kg CO2e using the conversion factor for the country of use.

Appendix C

The electricity data calculated:

- does not include the electricity use of screens
- Might not include all devices across the university especially workstations purchased for research purposes.