



international  
education  
sustainability  
group

2025

The Carbon Cost of  
English Proficiency Testing  
- UK Report



[www.iesg.eco](http://www.iesg.eco)

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## Foreword

We are at a pivotal moment for both education and the climate. As concerns about our changing climate grow, every sector – including higher education – is being called upon to find new ways to reduce its carbon footprint. At the same time, our universities are striving to attract the brightest talent from around the world and to remove barriers for students. These dual imperatives of sustainability and accessibility form the backdrop of this important report.

At Duolingo, our mission has always been to lower barriers to education and assessment, and we believe that same spirit of innovation can help address one of the defining challenges of our time: climate change. Yet until now, one aspect of international education has been largely overlooked from a sustainability point of view – the carbon cost of English language tests. Every year in the UK, half a million aspiring students have had to travel long distances, sometimes across countries, to prove their English proficiency. This has an environmental cost, and it also represents time, money, and effort that could be better spent preparing for university life.

That is why we commissioned this research in partnership with the International Education Sustainability Group. We wanted to rigorously quantify the carbon impact of traditional in-person English testing and explore the benefits of remote alternatives.

The findings are striking. The report shows that by enabling students to take a secure English test online at home, we can reduce testing-related carbon emissions by 98%. In practical terms, this means thousands of tonnes of CO<sub>2</sub> saved each year – the equivalent of planting a Sherwood Forest every year – a tangible contribution toward higher education's sustainability targets. Just as importantly, it means opening doors for students who might have been discouraged by the cost or inconvenience of traveling to a distant test centre. In short, what is good for students and institutions can also be good for the planet.

This issue matters now more than ever. The UK has set ambitious climate goals, and our universities are drawing up sustainability strategies and action plans. At the same time, prospective students are increasingly mindful of a university's environmental and social impact when choosing where to study. By rethinking a small but critical part of the admissions process, we have an opportunity to lead by example. Removing unnecessary travel from English language testing is a simple step that carries profound implications: it makes our admissions more inclusive and our operations more sustainable. It signals to students around the world that we are committed to innovation in the public interest – ensuring that gaining an education does not come at the expense of our planet.

I am confident that the insights in this report will inspire action. We have the technology, the evidence, and a collective imperative to change how we approach English language admissions tests. My hope is that university leaders, policy makers, and stakeholders across the sector will use these findings to inform their decisions and accelerate the adoption of greener, more accessible practices. Together, we can harness innovation to reduce carbon emissions while expanding educational opportunity. That is a win-win scenario that deserves our full attention and effort.

Michael Lynas  
UK Country Director, Duolingo

## Executive Summary

Universities and policymakers are increasingly focused on reducing carbon emissions and improving access for international students. This report, from the International Education Sustainability Group, examines the carbon footprint of the English language testing process for UK university admissions, comparing the *traditional in-person* exams (taken at physical test centres) with *remote online* tests (such as the Duolingo English Test). Using data on international student numbers, travel distance and testing requirements, as well as the carbon used by AI in remote testing, the analysis estimates the total emissions from in-person testing and the potential savings from shifting to remote alternatives. The findings show a dramatic difference in carbon intensity between the two modes of testing, with significant implications for sustainability and inclusion in higher education.

### Key findings include:

- **High volume of tests and travel:** Each year, up to **500,000** English proficiency tests are taken by students applying to UK higher education. To reach exam centres, test takers collectively travel an estimated **51 million kilometers** annually.
- **Substantial carbon emissions:** This travel results in roughly **4,300 tonnes of CO<sub>2</sub>e** emissions per year. Avoiding these emissions would be equivalent to taking about **2,000 cars** off the road or planting **two hundred thousand trees** every year.
- **Significant travel distances as a barrier:** On average, each in-person test taker makes a **175 km round trip** to a test centre. For **one in ten** candidates, the journey exceeds **600 km**, and in some countries the **average** round trip is over **800 km**<sup>1</sup>. Such requirements pose a serious barrier in terms of time, cost, and convenience for many prospective students, potentially limiting access to UK universities.

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<sup>1</sup> Analysis of location data for more than 1 million test takers and UKVI data on 1,415 authorised test centres.

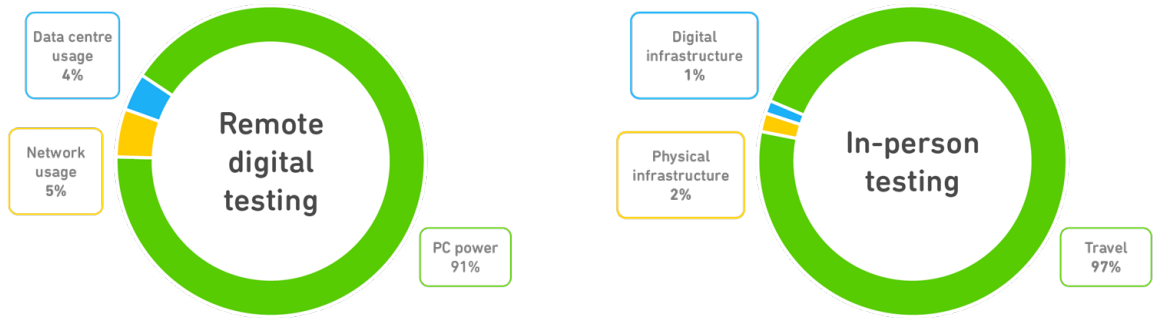
- **Carbon intensity of in-person vs remote testing:** A typical in-person, centre-based English test generates about **14.3 kg of CO<sub>2</sub>e** per test (mainly from travel). By contrast, taking an English test remotely from home produces only around **0.16 kg of CO<sub>2</sub>e<sup>2</sup>**. In other words, remote digital testing can **cut carbon emissions by more than 98%** compared to the traditional testing model.
- **Institutional impact of switching to remote tests:** Each UK university or college could reduce the emissions associated with its language testing requirements by up to **98%** by offering remote testing options. For a large university, this shift would represent an annual reduction of up to **272 tonnes of CO<sub>2</sub>e** – comparable to the annual emissions from **144 passenger cars** – without compromising admissions standards. Nationally, an estimated **1.03 million hours** of student travel time could be saved each year by eliminating the need to journey to test centres.

Alongside these findings, the research introduces a new metric, the **Carbon Cost per Test Taken (CCTT)**, and a **Carbon Saving Calculator** to help institutions estimate their own testing-related carbon footprint and potential savings from remote testing. This tool enables universities to model the impact of policy changes in real terms.

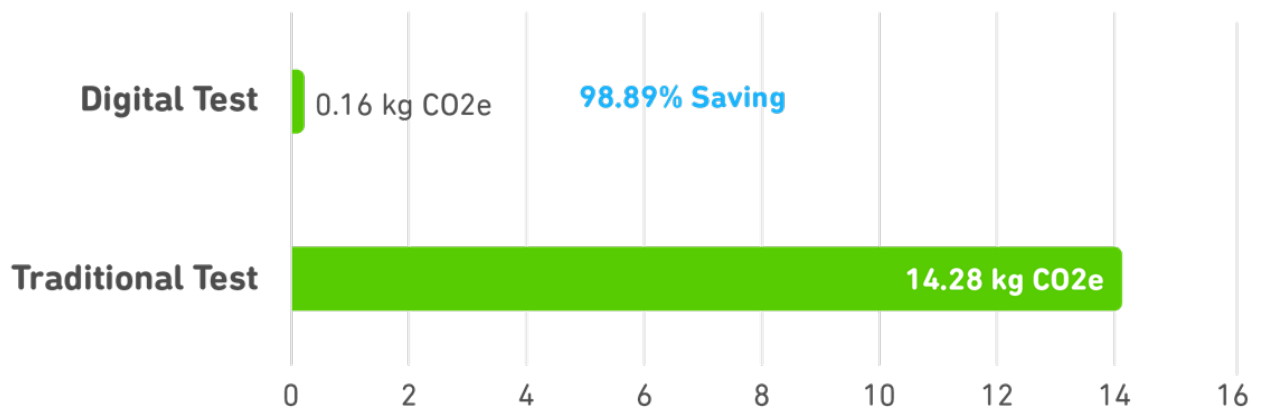
The evidence demonstrates a clear opportunity for the UK higher education sector to advance its sustainability and equity goals. Embracing **secure remote English language tests as an alternative to in-person exams would significantly cut carbon emissions** and remove access barriers for students worldwide. Such a shift can be achieved immediately and at scale, delivering year-on-year carbon savings while improving the applicant experience. By adopting remote testing alongside traditional methods, UK institutions can enhance their environmental credentials and position themselves as **forward-thinking, globally responsible destinations** for education.

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<sup>2</sup> Global averages. For UK-specific, the averages are 9.39kg of CO<sub>2</sub>e and 0.180.3 kg of CO<sub>2</sub>e. Still 98% saving from digital.



Composition of emissions associated with remote and in-person testing.  
 Note, the two charts are not to scale (see below).



Global Average: emissions associated with English proficiency testing

# 1 Introduction

The global education sector is undergoing a transformative shift, with students, institutions, and policy makers all increasingly prioritising sustainability in their decision-making processes. Greater numbers of prospective international students are factoring in the environmental credentials of universities and service providers when choosing where to study<sup>3</sup>, while education institutions are hiring sustainability leads and implementing climate strategies across their operations. Over 60% of students looking to study in the UK say that environmental sustainability is very or extremely important to them<sup>4</sup>. In this evolving context, remote digital language testing presents a significant opportunity for the UK's international education sector to lead the way in sustainable admissions and education technology.

Across academia, industry, and the public sector, growing alignment around university values, corporate Environmental, Social, and Governance (ESG) commitments, and evolving government regulations, are driving increasingly urgent conversations about reducing carbon footprints. In response, institutions are charting new territory to measure, manage, and mitigate emissions tied to their carbon footprints, reflecting a broader societal shift toward preventing the worst impacts of climate change.

Duolingo, through its Duolingo English Test (DET), was the first to provide an alternative to traditional in-person English proficiency tests by leveraging remote digital infrastructure and AI to reduce emissions associated with test-taking, in particular through removing the need to travel to test centres and the requirement for physical facilities.

The intention for this research is to encourage education providers and policy makers to consider the carbon cost of their current testing policies and consider ways to reduce them.

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<sup>3</sup> QS International Student Survey 2024, /International Student Barometer 2024

<sup>4</sup> QS International Student Survey 2024

This report, prepared by the International Education Sustainability Group (IESG)<sup>5</sup>, outlines research into calculating and comparing the environmental impact of traditional in-person English language tests and remote digital testing. It provides a model for calculating the carbon cost savings from digital tests, incorporating emissions from travel; the physical infrastructure including building usage; and digital infrastructure, including reliance on AI.

The research identified these three key areas of emissions and the analysis has sought to address each in detail. The emissions associated with each of the three aspects have been calculated through combining primary and secondary research, along with anonymised geolocation data provided by Duolingo from more than a million DET test takers. These findings form the basis for a measure of the Carbon Cost per Test Taken (CCTT) and a practical Carbon-Saving Calculator for emissions associated with English language tests, enabling HEIs to individually quantify and act upon the carbon savings they could achieve through adopting remote digital testing.

Beyond emissions calculations, the intention is for this report to provide actionable insights designed to facilitate conversations between government bodies, education providers, and students, to encourage behavioural change and policy shifts within the international education sector. By fostering this dialogue and recognising the clear benefits of remote digital testing, the intention is to help make the application journey simpler and more accessible for students, and for education providers to demonstrate leadership in addressing the climate impact of international education.

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<sup>5</sup> IESG's purpose is to accelerate positive change in sustainability policies and practices in international education, working with leading universities and education providers around the world.

## 2 The Language Testing Landscape

The UK's position as a global leader in higher education encourages students to travel to the UK to study. It is one of the 'big four' destinations for international education, alongside the United States, Canada and Australia. In the academic year 2022/23 there were 752,140 international students at UK higher education institutions (HEIs). These students were attracted to the UK from 177 countries and territories<sup>6</sup>.

The research estimates up to half a million approved English language tests are taken by prospective students for UK higher education each year.

Access to the UK for study is subject to visa requirements, governed and administered by UK Visas and Immigration (UKVI), a division of the UK Home Office. A key requirement is proof of applicants' proficiency in the English language. Only nineteen countries are exempt from English proficiency requirements. For all other countries, unless applicants can prove prior knowledge of English through educational qualifications, they must complete an approved English language test, or a test authorised by their chosen institution.

Outside of the UK, worldwide, four companies are authorised by UKVI to administer approved English language tests:

- Pearson
- PSI Services (UK) Ltd
- IELTS SELT Consortium
- LanguageCert

These companies deliver authorised tests via a global network of approved Secure English Language Test (SELT) centres, unevenly distributed across the globe. At the time of the research, there were 1,415 SELT centres<sup>7</sup>, with significant gaps in geographical availability.

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<sup>6</sup> HESA

<sup>7</sup> SELT [Updated list](#) published 27 December 2024.

In more than a third of the countries and territories represented by students in UK universities, there were no SELT facilities at all. For applicants in these countries, unless there were alternative test facilities, travel to neighbouring countries would be necessary, incurring greater costs and the potential requirement for additional visas.

The UK Home Office publishes a list of authorised SELT centres and makes the following note to visa applicants:

***“If there is not an approved test location in your country, you will have to travel to another country to take the test.”<sup>8</sup>***

Appointment availability at test centres often fails to meet fluctuating demand, requiring applicants to wait for their closest test centre or to travel further afield. The 2022 Global Talent Pool study<sup>9</sup> indicated that the majority of prospective students are unwilling or unable to travel more than 100 kilometres for a test. Time, cost, and lack of public transport options were frequently cited as major deterrents by prospective applicants.

Universities and authorised education providers sponsor international applicants under the Confirmation of Acceptance for Studies scheme (CAS)<sup>10</sup>. They are not obliged to use SELT test centres and are authorised to conduct their own verification of English language proficiency.

Under the CAS scheme UK universities typically accept a combination of IELTS Academic, TOEFT iBT, Pearson PTE Academic, PTE Academic UKVI, Cambridge English Qualifications C1 Advanced (CAE) or C2 Proficiency (CPE), Duolingo English Test, LanguageCert International ESOL and Trinity College London SELT.

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<sup>8</sup> Official GOV.UK guidance on SELT for applicants (2025)

<sup>9</sup> Unlocking the Global Talent Pool, PublicFirst, 2022.

<sup>10</sup> Student visa : Your course - GOV.UK

Some tests are licensed or leased to local agents or education providers. For the purposes of this research it was assumed that most are concentrated in the more highly populated areas in any country. Applying the Ice Cream Truck Principle<sup>11</sup> to English language test centres, the SELT locations in each country were taken to be sufficiently representative of the location and distribution of approved language test centres.

Enroly is a private provider of a cloud-based platform called CAS Shield to automate the onboarding and arrival process for international students at universities and their agents. It works with around a third of UK universities. Enroly provides the only publicly available data on language test exemptions and exclusions and the proportion of students taking authorised tests, by test type. This data was used to estimate exclusions and the split of tests taken by test type.

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<sup>11</sup> The Ice Cream Truck Principle: 'Ice cream trucks tend to co-locate at the busiest parts of any beach.'

### 3 The Duolingo English Test

Duolingo is the world's most popular way to learn a language, with more than 110 million learners worldwide. It is dedicated to making language learning free and accessible to all.

In addition to its core platform, since 2016 the company has delivered the Duolingo English Test (DET), an online language certification option accepted by over 5,700 universities. The DET describes itself as digital-first and student-first, available anytime, on demand. Students certify their English proficiency from their own computer anywhere in the world, without the requirement for appointments or travelling to test centres. The test has been taken in over 70,250 towns, cities, and villages across 230 countries and territories. It uses subject matter experts, AI and individual human proctors to ensure each test session is reliable and secure.

Remote digital language testing platforms like DET represent an innovative and scalable alternative to traditional in-person tests. Additionally, remote digital tests help institutions to access a broader and more inclusive pool of global talent.

When administering the DET, Duolingo collects data on the location of the test taker; specifically, the IP address. IESG analysed this anonymised data, for more than one million tests taken in a 12-month period. While there will be occasions where the candidate is not taking the test at home, it was considered reasonable to assume the location for the test would be the start point for travel to the nearest physical test centre, as an alternative to sitting a remote digital test.

Duolingo also collects data on the time taken to complete the test and the number of tests taken by each individual. This data informed further metrics applied to the research and in the IESG Duolingo Carbon Saving Calculator for language testing.

## 4 The Greenhouse Gas Protocol and scopes explained

Throughout this report, the Greenhouse Gas (GHG) Protocol forms a central component of our methodology. The GHG Protocol is a set of standards and tools used to account for and report on greenhouse gas emissions. It is used globally by companies, countries, and cities to track their progress toward climate goals. It is generally recognised as the world’s most widely used greenhouse gas accounting standard <sup>12</sup>.

Established in 1998 through a partnership between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), its frameworks are designed to be applicable across a wide variety of scenarios ensuring consistency and transparency in GHG accounting.

Many other highly reputable carbon reporting platforms such as CDP and SBTi use the GHG Protocol as the underlying carbon accounting standard. In 2023, 97% of disclosing S&P 500<sup>13</sup> companies reported to CDP using the GHG Protocol<sup>14</sup>.

To facilitate a thorough understanding of emissions sources, carbon accounting traditionally categorises GHG emissions into three distinct ‘scopes’ which, when combined, represent the most complete measurement of the emissions an organisation produces. The GHG Protocol defines consistent calculation methods for carbon accounting. More recently, the framework for a fourth scope has been introduced in an attempt to standardise accounting for proactive measures taken to mitigate GHG emissions. The scopes are outlined below.

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<sup>12</sup> <https://ghgprotocol.org/standards-guidance>

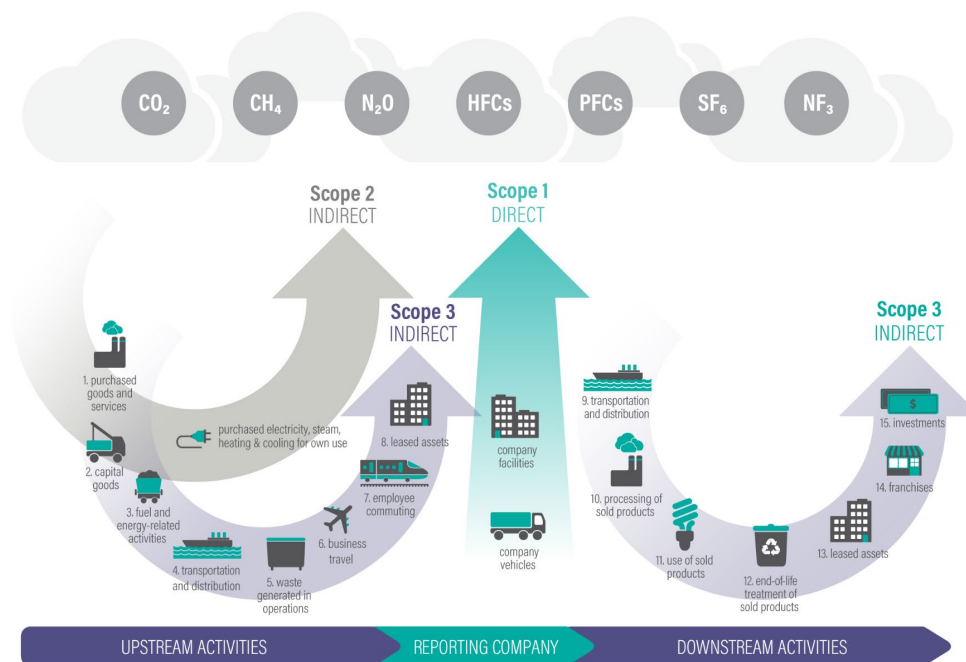
<sup>13</sup> The S&P 500 is a stock market index tracking 500 of the largest companies listed on stock exchanges in the United States.

<sup>14</sup> <https://ghgprotocol.org/about-us>

**Scope 1: Direct Emissions.** These are GHG emissions from sources that are directly owned or controlled by the organisation. Examples include emissions associated with the heating or cooling of buildings, petrol or diesel powered company vehicles, and emissions from physical processes.

**Scope 2: Indirect Energy Emissions.** Scope 2 encompasses indirect GHG emissions from the consumption of purchased electricity. Although these emissions occur upstream at the facility where the energy is generated, they are accounted for in an organisation's GHG inventory because they result from the organisation's energy use.

**Scope 3: Other Indirect Emissions.** This category includes all other indirect emissions that occur in the value chain of the reporting organisation, both upstream and downstream. Upstream activities might involve emissions from purchased goods and services, business travel, and waste generated in operations. Downstream activities could include emissions from the use of sold products and the end-of-life treatment of sold products.



Explaining the Scopes (GHG Protocol)<sup>15</sup>.

<sup>15</sup> [GHGprotocol.org](https://ghgprotocol.org)

## 5 Sustainability reporting in UK higher education

HEIs in the UK are subject to significant regulatory reporting requirements across all aspects of the services they provide. In addition to statutory requirements, there is also a range of discretionary data submissions that HEIs may decide to comply with. In terms of sustainability, HEIs complete the HESA (Higher Education Statistics Agency) submission for Estates Management<sup>16</sup> and this is a key source of emissions data for the sector.

The less-reported aspect is international education. The measurement and reporting of GHG emissions for international students and the requirements of the international application process (including proof of language proficiency) are still at a formative stage. From a GHG Protocol perspective, this component of travel and the use of in-person language testing would be considered part of the Scope 3 supply chain requirement for academic institutions.

In addition to the HESA reporting requirements, most UK HEIs are also members of various associations and membership bodies including:

**EAUC**<sup>17</sup>, the Alliance for Sustainability Leadership in Education, a membership organisation representing the sector for sustainability and the environment. EAUC provides resources, guidance and support for institutions seeking to implement good practice and policies. It is particularly strong on travel and travel-related emissions, with a dedicated team and network.

**UUCN**<sup>18</sup>, the UK Universities Climate Network. Based at the Grantham Institute for Climate Change and Environment at Imperial College London, it engages with its more than 90 current member HEIs to develop thought leadership on opportunities

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<sup>16</sup> <https://www.hesa.ac.uk/support/definitions/estates>

<sup>17</sup> <https://www.eauc.org.uk>

<sup>18</sup> <https://uucn.ac.uk/>

for climate action and raise the profile and impact of the climate research community in the UK and internationally.

**CANIE**<sup>19</sup>, the Climate Action Network for International Education, is a global member association providing advice, advocacy and support and an Accord to which a number of UK HEIs have become signatories.

In this context, it is clear that significant work is being undertaken around environmental sustainability across the UK international education sector. It is hoped that this report and research will contribute to the existing body of knowledge, to the benefit of education providers and policy makers.

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<sup>19</sup> <https://canie.org/>

## 6 Defining the scope of the research

The focus of the research was the requirement for international students to provide evidence of English language proficiency as a condition of admission to UK universities.

The research considered carbon emissions associated with traditional in-person test taking and remote digital tests at three levels: the individual level, by education provider and at a national (UK) level. For traditional tests the approach focused on three areas: the physical infrastructure required for in-person language testing, the digital infrastructure requirement and the necessary travel of proctors and test-takers to and from test centres. For remote digital tests, the focus was on digital infrastructure.

For traditional tests, each of the three areas (physical, digital, and travel) were examined, to identify the underlying components. Through this process it was possible to identify what data would be required for meaningful calculations and, from there, to build a picture of what data would be available, where it might require distillation, and where assumptions or proxies would be necessary.

During this initial process, there were a small number of factors identified as being outside of the scope of our research. First, it was decided not to attempt to estimate the development costs from an emissions perspective of each English language test. While acknowledging the significant resources required to develop these tests, obtaining confidential data from the various qualification providers would not be possible; some have been developed over decades, and any estimates would be of low confidence.

It was also decided not to include figures in respect of paper-based English language tests. The assumption made for the purposes of this research was that all traditional in-person tests are taken on a laptop or a PC.

As with development costs, accurate and consistent data regarding the proportion of tests being sat in the paper-based format was not available. At the time of writing most test-takers still have the option to complete a paper-based test<sup>20</sup>.

Our assumption is that paper-based testing would inevitably have a higher carbon cost than the equivalent computer-based test due to the requirement for printing and securely transporting test papers internationally, marking and secure storage.

When analysing the distances test takers travel to a test centre, distances were assumed to be 'straight-line'. Actual distances travelled will be significantly greater. Various studies have been carried out on the ratio of straight-line travel relative to actual travel distance, and many suggest the figures could be 20-60% higher<sup>21</sup>. This would, of course, greatly increase the Scope 3 emissions associated with in-person testing.

From the perspective of test-taker numbers, it was determined the scope should extend to international students studying at UK HEIs in the academic year 2022/23, as detailed in HESA reporting, for whom proof of English language proficiency would have been a requirement.

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<sup>20</sup> <https://ielts.idp.com/about/which-test-do-i-take/paper-based-ielts> Accessed 20.01.25

<sup>21</sup> <https://pmc.ncbi.nlm.nih.gov/articles/PMC3835347/>

## 7 Methodology

Working from the start-point of the GHG Protocol and the associated scopes, the research sought to identify the potential carbon cost savings for UK higher education institutions from accepting remote digital English language tests. To achieve this across multiple countries and territories required comparable data sources and standardised sets of measures and assumptions, combined to achieve reasonable estimates for emissions associated with traditional in-person testing and those associated with remote digital testing.

The estimates and calculations for three areas were:

**Physical infrastructure** – the emissions associated with the space required for each test-taker, including considerations for heating and lighting a building, and geographical differences in electricity generation.

**Digital infrastructure** – the emissions associated with the computational requirements, including data centre and network usage, and the impact of AI.

**Travel** – the emissions associated with student and staff transport to and from physical test centres, including distances travelled and modes of transport.

The core principles applied were objectivity, comparability of data and conservative estimates. Where accurate and consistent data was not identified, the research sought reasonable proxies to validate assumptions.

**Traditional in-person test-taking** incorporates all three of the above areas. Students travel to a physical testing space, with the assumption that they will take the test on a digital platform.

**Remote digital test-taking** addresses the digital infrastructure, including remote proctoring. The calculations and assumptions made are based on verified measures of power consumption and direct knowledge of the DET digital infrastructure and the use of AI in the delivery of the test.

## 8 Physical Infrastructure

When considering the physical infrastructure required for in-person testing and its associated carbon footprint, the focus was on estimating the space required for test-takers and staff, the emissions of the buildings being used, the test time, and how these factors might reasonably vary by country.

### Built environment emissions

Occupancy of a space for the purpose of language testing requires energy intensive activities that will cause emissions from the built environment. The built environment includes the physical infrastructure of a building and the operational components within this infrastructure. For the purpose of the analysis, only operational carbon emissions were considered. Operational emissions from the built environment include heating, cooling, lighting, as well as water and wastewater utilities. Some governments produce energy intensity figures by building function, such as residential, commercial, or public. However, this data was not available consistently across the global language testing landscape. With this understanding, a proxy was identified for built environment emissions to apply to the calculations.

In the UK, HESA collects a significant dataset of annual Scope 1, 2, and 3 emissions from UK universities. This dataset, comprising data from 141 institutions, enables total university emissions to be downscaled to kg CO<sub>2</sub>e per m<sup>2</sup>.

The HESA data provides the total gross internal area of buildings split by residential and non-residential, which, along with the breakdowns of Scope 1, 2, and 3 emissions, allows for the calculation of an average annual total emission per m<sup>2</sup>. Taking into consideration only non-residential buildings, an annual total emission of 33.981kg CO<sub>2</sub>e per m<sup>2</sup> was identified.

To produce an estimate to apply to the calculations, the figure was converted from an annual amount to an hourly value of 0.0212 kg CO<sub>2</sub>e per m<sup>2</sup> by assuming an average of 200 working days of 8 hours across UK HEIs.

## Test space

In-person tests require physical space for each candidate. This space not only includes the area for a candidate's desk, but also a given distance between individuals to remove the possibility of cheating and additional space to create aisles for proctors to move along. In addition to this, proctors also require their own space in the room, to observe and supervise candidates.

Consistent data on required test space across geographical regions was not found to be available. However, the Joint Council on Qualifications (JCQ), the regulatory body in the UK, provides guidance on examination practice, in particular desk size and the space required between desks. Using these guidelines, an estimate of the space required for each candidate was derived.

*"Each candidate should have a separate desk or table big enough to hold question papers, maps (as appropriate) and answer booklets. Candidates who are not working at individual desks must be far enough apart so that their work cannot be seen by, and contact cannot be made with other candidates;"<sup>22</sup>*

From the above inputs, an estimated minimum space requirement of 2.5m<sup>2</sup> per test-taker was assumed, to include additional space required for proctors.

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<sup>22</sup> JCQ ICE 24-25 chapter 11.11.b

## Test time

The permitted time for test-takers varies between test providers. Each qualification contains sections covering listening, reading, writing, and speaking. For the purposes of the physical infrastructure calculations, the maximum permitted time has been used and a weighted average has been applied, using reported proportions of approved tests taken by applicants to UK universities<sup>23</sup>.

## Carbon intensity

While HESA data provides information on the estimated operational carbon emissions for tests taken in the UK, this report and the research sought to achieve global comparisons. There was a need to understand how emissions would differ across countries, to apply measures of those differences to the calculations.

Carbon intensity is a measure of the amount of carbon dioxide emissions produced per unit of activity, such as energy generation, transportation, or economic output. This research sought to identify the carbon intensity of grid electricity generation, expressed in grams of CO<sub>2</sub> per kilowatt-hour (gCO<sub>2</sub>/kWh). Lower carbon intensity would typically indicate greater efficiency or reliance on cleaner energy sources.

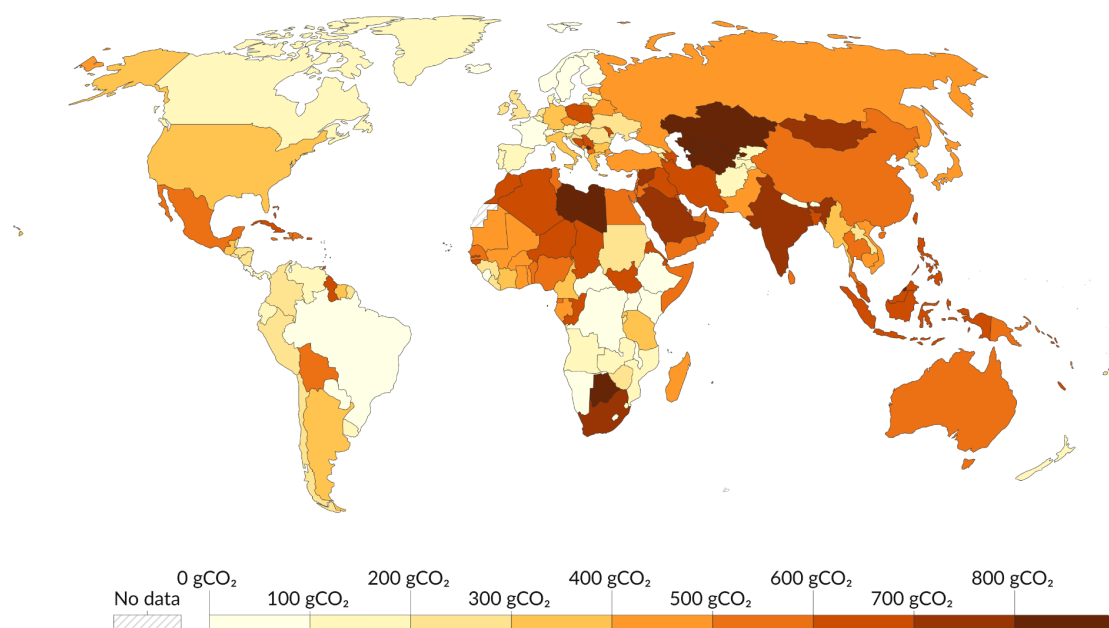
To extrapolate the UK-centric HESA data to the global datasets, a 'Carbon Intensity Factor' was applied – providing a ratio of an individual country's carbon intensity of grid electricity generation relative to that of the UK based on Ember and Energy Institute data published annually.

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<sup>23</sup> Enrolly/PIE News Oct 2024

## Carbon intensity of electricity generation, 2023

Carbon intensity is measured in grams of carbon dioxide-equivalents<sup>1</sup> emitted per kilowatt-hour<sup>2</sup> of electricity generated.



Data source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

OurWorldinData.org/energy | CC BY

**1. Carbon dioxide equivalents (CO<sub>2</sub>eq):** Carbon dioxide is the most important greenhouse gas, but not the only one. To capture all greenhouse gas emissions, researchers express them in "carbon dioxide equivalents" (CO<sub>2</sub>eq). This takes all greenhouse gases into account, not just CO<sub>2</sub>. To express all greenhouse gases in carbon dioxide equivalents (CO<sub>2</sub>eq), each one is weighted by its global warming potential (GWP) value. GWP measures the amount of warming a gas creates compared to CO<sub>2</sub>. CO<sub>2</sub> is given a GWP value of one. If a gas had a GWP of 10 then one kilogram of that gas would generate ten times the warming effect as one kilogram of CO<sub>2</sub>. Carbon dioxide equivalents are calculated for each gas by multiplying the mass of emissions of a specific greenhouse gas by its GWP factor. This warming can be stated over different timescales. To calculate CO<sub>2</sub>eq over 100 years, we'd multiply each gas by its GWP over a 100-year timescale (GWP100). Total greenhouse gas emissions – measured in CO<sub>2</sub>eq – are then calculated by summing each gas' CO<sub>2</sub>eq value.

As an example, the UK's carbon intensity of grid electricity generation in 2023 was 238gCO<sub>2</sub>/kWh in 2023. India's was 713gCO<sub>2</sub>/kWh<sup>24</sup>. By dividing India's figure by the UK's, a ratio of 2.996 was identified, indicating that India emits approximately three times as much carbon as the UK per kilowatt hour in grid electricity generation.

Using the most current information available, Carbon Intensity Factors were identified for 214 countries and territories.

<sup>24</sup> Source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024)

## Further considerations

Not included in the estimates is the time spent before and after the test that test-takers and staff will spend at an examination centre; time to check in to the centre, time waiting for the test to begin, and wrap-up time.

Also not included is the additional space requirement at testing centres, for registration, common areas and staff space.

The above exclusions indicate that the physical infrastructure figures in the calculations underestimate the true values, with emissions increasing for any additional space and time required at in-person centres.

By limiting the scope to the immediate test environment, the intention was to ensure the calculations remained focused on the primary contributors to emissions related to the test session itself and the space required by a single test taker.

Similarly, the analysis did not account for travel emissions or energy use associated with additional facility staff outside of the proctors required for test administration. The decision to omit additional facility staff reflected a methodological focus on the direct resources required for the test-taking process, excluding peripheral staff such as facility managers or administrative staff. While these roles are essential to overall operations, their contributions to emissions are not specific to the test itself and were therefore excluded from the study.

Expanding the scope to include ancillary spaces and additional staffing roles could be considered for future analysis.

## 9 Digital Infrastructure and remote digital tests

Analysis of the test-taking environment assumed a PC-based language test. The emissions can be broken down by the energy consumption of each part of the network:

1. User device (PC power)
2. Network usage
3. Data centre usage

The other contributing factor is the data transfer rate.

### User device (PC power)

Operationally, and for the purposes of the calculations, it was assumed a PC will be on and in use for the duration of the test time.

A typical desktop PC uses around 100 to 300 watts per hour. A laptop typically uses between 50 and 100 watts per hour<sup>25</sup>. It was assumed that test-takers used a PC for the duration of the test, with 150W power consumption. This factor was applied to both in-person and remote testing.

For emissions calculations, power consumption was multiplied by average test time and then carbon intensity factor to convert the electricity use to GHG emissions.

### Network usage

Network usage was taken to mean the connection of a device to a website hosting the online test, and the transfer of data between the website and the data centre housing and processing the test-taking information.

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<sup>25</sup> Energy Consumption in the UK (ECUK), 2022

Emissions associated with network usage were calculated using an estimate of the hardware energy usage and the energy intensity of data transmission combined with the data transfer rate, usage duration, and electricity grid's carbon intensity. The Sustainable Web Design Model (SWDM) proposes an energy intensity of 0.059 kWh/GB for networks<sup>26</sup>, which is within the ranges stated in surveyed research.

For network usage, for the purposes of the calculations, the analysis applied this unit of 0.059 kWh/GB of data transferred, to represent the total electricity usage of the network components. This figure was used in the calculations for both in-person and remote testing.

## Emissions from Data Centres

The research considered hyperscale data centres connected to the contracting of Amazon Web Services (AWS), Google Cloud, and Microsoft Azure. AWS provided detailed emissions reporting data specific to Duolingo and the Duolingo English Test, for the purposes of this research. The data centre usage during testing was estimated at 0.055kWh/GB.

## Data transfer rate

The estimate for data transfer rates was established from discussions with cloud engineers and IT staff and data from the Duolingo English Test. The agreed figure was 0.133 GB/hr.

## Completing the digital emissions calculation

The localised IESG Carbon Intensity Factor was then applied to each of these measures<sup>27</sup> to achieve an estimate of the emissions associated with the digital infrastructure for test-taking.

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<sup>26</sup> "Top-Down generalized emissions calculations for the digital environment," the Sustainable Web Design Model (SWDM)

<sup>27</sup> <https://ember-energy.org/data/electricity-data-explorer/>

## 10 Travel associated with test taking

Travel is by far the most significant contributor to the emissions associated with traditional English language test-taking.

Traditional in-person testing often requires individuals to travel considerable distances to test centres. The greater the distance, the more likely test-takers are to use high-emission modes of transportation.

It is also understood that test-takers will not always take their test at the nearest test centre. The conservative assumption for the research was the nearest test centre to the test-taker.

### Average distance travelled per student

Proprietary research data from Duolingo identifies the geolocation of DET-takers across the globe. When these locations are mapped to the nearest UK-approved in-person SELT test centre (noting that, for the purposes of this research, this is the accepted proxy for the location of approved test centres), the distance to the nearest centre can be calculated for each individual test-taker. By analysing the Duolingo data, the research was able to calculate the average distances of candidates from their nearest testing centres by country, across 219 countries and territories.

For the purposes of the calculations, the research uses straight-line distances. Relevant research in this area indicates 20% to 60% more for on-the-ground distances. It would be reasonable to take the middle ground of 41% based on straight-line to actual distances to hospitals and automated External Defibrillator (AED) locations<sup>28</sup>.

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<sup>28</sup> [Smith C. 2021](#)

## Transport mix (modal split)

In the analysis of the Duolingo dataset, test-taker distances were grouped into four categories: less than 5 kilometres to the nearest test centre, 5 to 49 kilometres, 50 to 300 kilometres and over 300 kilometres.

In order to calculate the emissions attributable to a test-taker's travel, three pieces of information were required. The first was an estimate of the required travel distance. The second was an informed estimate of the modes of transport used. The third was an indication of the emissions per unit of distance by transport type. Emissions by transport types were taken from the UK Government's Department for Energy Security and Net Zero, Greenhouse gas reporting conversion factors<sup>29</sup>.

Consistent and verified modal share data (percentages of travellers using a particular type of transport) for global geographies is not available. As such, assumptions needed to be made on the modal share to apply to the calculations. Informed by IESG's work with leading universities in multiple countries and its ClimateEye methodology, the agreed modal splits were:

- Test-takers less than 5km from their nearest centre (each-way journey) were assumed to travel 60% by foot or bicycle, 20% by road (car, motorbike or bus) and 20% by urban rail.
- Between 5 and 49km each way, test-takers were assumed to be evenly split between taking a car, a motorcycle, a bus or a train. An average of the applicable emissions factors was used to create a single emissions figure for this group.
- Between 50 and 299km each way, an even split between travel by car, motorcycle, bus and train was considered to be most defensible.

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<sup>29</sup> <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024>

- 300km and beyond, each way, 60% of test-takers were assumed to use air travel, 20% road and 20% rail.

The split by round trip distance required between the location of the test taker and the nearest SELT test centre, was as follows:

<10km	10-99km	100-599km	600km+	Average round trip
50.5%	24.7%	15.3%	9.6%	175km

It is noted again here, there may be non-SELT IELTS test centres closer to individual test-takers. These figures are indicative, based on the UKVI data available at the time of the research. The emissions calculations were as follows:

Modal Split for less than 5 km from nearest test centre

Transport type	Emissions kg CO2e per km*	Percentage
Walk, cycle	0.00000	60%
Car, motorbike, bus	0.13066	20%
Metro rail	0.03546	20%
Weighted Average	0.03322	100%

Modal Split for 5-299 km from nearest test centre

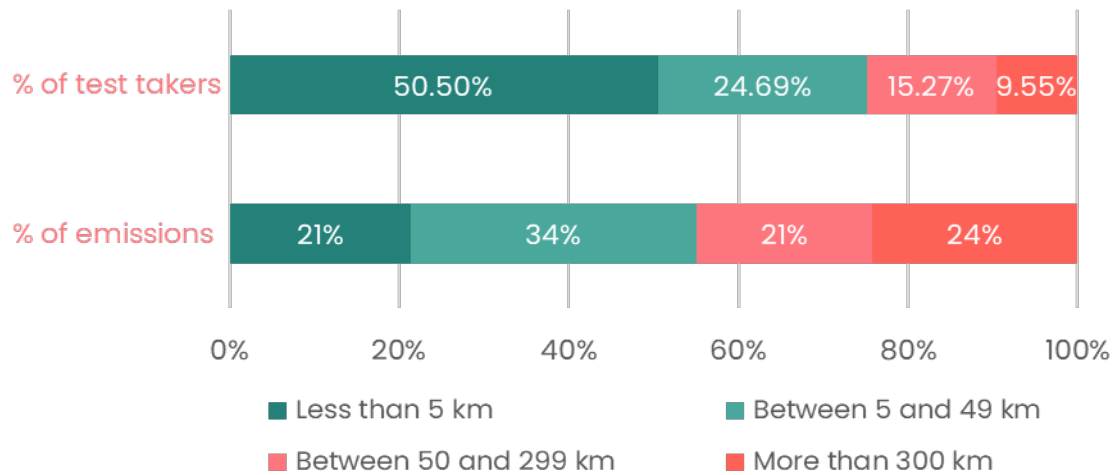
Transport type	Emissions kg CO2e per km*	Percentage
Car	0.16984	25%
Motorbike	0.11367	25%
Bus	0.10846	25%
Rail	0.03546	25%
Weighted Average	0.10686	100%

Modal Split for more than 300 km from nearest test centre

Transport type	Emissions kg CO2e per km*	Percentage
Airplane	0.27257	60%
Road (bus/car)	0.13915	20%
Rail	0.03546	20%
Weighted Average	0.19846	100%

\*Source: DEFRA and Department for Energy Security and Net Zero (gov.uk)

These calculations were applied by country, based on average distances required for test-takers to travel. The overall split, for more than a million tests taken, by distance and associated emissions is indicated here:



In China the dataset included 174 test centres (noting these were the UKVI approved centres) and analysis of the locations of 185,238 test takers. The average round-trip distance to the nearest identified test centre was 82km.

China						
<10km	10-99km	100-599km	600km+	Tests analysed	Average distance (km)	Average round trip
103,025	52,618	23,769	5,826	185,238	41.0	82.0
56%	28%	13%	3%	100%		

For India the dataset included 151 UKVI-listed test centre locations. It should be noted that IELTS and other test providers list more than 430 locations, so the average round-trip is likely to be less than 61km.

India						
<10km	10-99km	100-599km	600km+	Tests analysed	Average distance (km)	Average round trip
134,610	36,844	14,554	4,730	190,738	30.4	60.8
71%	19%	8%	2%	100%		

## Emissions per test-taker

Estimated emissions per student were calculated by taking the emissions (kg CO<sub>2</sub>e per km) for each transport type, creating a mean for each category, then applying the mean of the relevant category to the actual distance for each of the million-plus test-taker records. The round-trip distance and emissions were calculated by doubling the one-way journey for each. Dividing the total associated emissions by the total number of students provides the Carbon Cost per Test Taken (CCTT).

For institution-level analysis, the source country composition of international student numbers was used to calculate the relevant associated emissions by source country, combined to achieve an aggregate figure.

## Emissions for staff travel

Traditional in-person testing relies heavily on the presence of proctors to ensure security and integrity during assessments. As with the test-takers, these proctors must travel to testing centres, from various locations, contributing to additional transportation-related emissions. Depending on the distance and mode of transport, this additional travel can significantly amplify the carbon footprint of in-person testing, making it a consideration in evaluating the overall impact of traditional testing methods.

The research identified three elements to consider when evaluating the emissions for staff travel – the number of staff required to run the tests and test centres, the distance they travel, and the modal split of transport type.

**Staff requirements:** when looking at the requirements established by examination boards, there is broad consensus around the need for one proctor for approximately every 20 to 30 test-takers, to ensure appropriate resources to reduce the chance of cheating.

In the UK, the Joint Council for Qualifications prescribes “at least one invigilator must be present for each group of 30 candidates or fewer sitting timetabled written examinations.”<sup>30</sup> Similarly, Cambridge International Education also prescribes a ratio of between 1:20 and 1:30, depending on the examination<sup>31</sup>. In India, guidelines from the Central Board of Secondary Education stipulate “One Assistant Superintendent for every 20 candidates or a part in the hall or big rooms, or two for each room having 40 or less candidates, are to be provided.”<sup>32</sup>

Specifically, through the lens of in-person testing, the speaking section of the IELTS requires a face-to-face session with a trained examiner, further increasing the staff-to-student ratio. Each examiner typically handles up to 20 candidates per day<sup>33</sup>.

Although there is no agreed single figure for the proctor requirements, the research considered these sources sufficient to provide a high level of confidence in using the assumption of a requirement of one proctor per 25 candidates in the calculations.

**Staff travel distance:** whilst the Duolingo research on distances of test-takers provides excellent insights into the travel behaviour of candidates, data specifically relating to the distance travelled by proctors was not forthcoming. As such, an effective proxy was required to determine the average distances of employees travelling to their place of work.

Consistent data regarding commuter travel behaviours across various geographies is challenging to source. The research was able, however, to identify the average round trip distance in the UK, India, and China. Using data from the pre-covid 2021 Census in the UK, an average round-trip commute of 22km was identified. A 2019 study on the intensity and daily patterns of passenger vehicle use in China found the average round trip commute to be approximately 25km.

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<sup>30</sup> JCQ ICE 24-25 chapter 12.8.b

<sup>31</sup> Cambridge Handbook 2024 p100

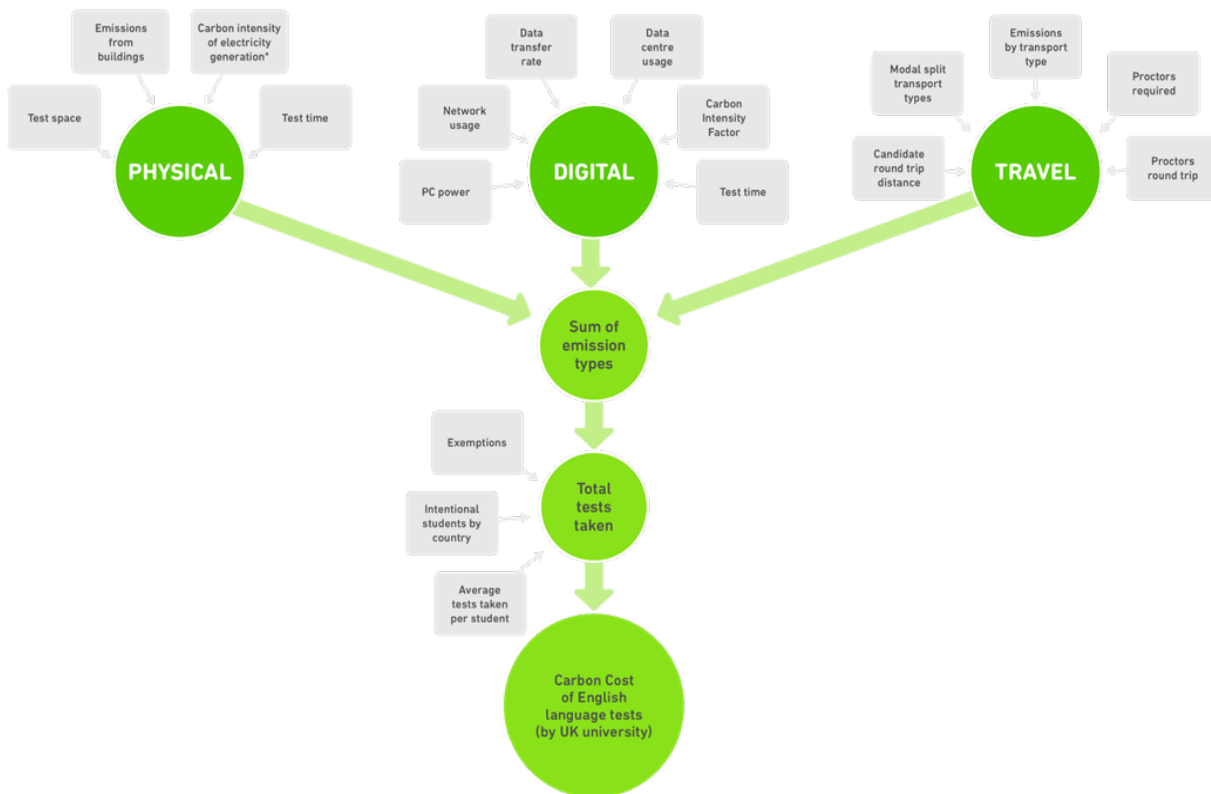
<sup>32</sup> CBSE Examination Bye Laws 2013 chapter 6 section 34.3.v

<sup>33</sup> IELTS examiner role profile

Analysis of data from India’s national Census found the average there was 33km. For the purposes of the calculations the research therefore assumed the average distance travelled by staff to be 25km for a round trip.

**Modal split:** by using the same methodology for identifying the modal split of test-takers, test centre proctors were assumed to be in the 5–49km cohort (equally weighted between car, motorcycles, and bus). From this, an average emission figure of 0.13066kg CO<sub>2</sub>e per km was applied, calculated to 3.2665kg CO<sub>2</sub>e per proctor.

Summary of inputs to estimate emissions associated with traditional test-taking:



## 11 Results – Carbon Cost per Test Taken

Combining the data and assumptions produced from the research provides a construct for calculating an estimate of the emissions associated with English language test taking, through the lenses of traditional in-person and remote digital testing. This subsequently enables identification of the potential carbon cost savings as the difference between the two.

The primary target was to understand the carbon cost for the average individual test-taker. From a physical infrastructure perspective, using the average emissions for a test space, the global average carbon intensity, and the average amount of time an English language test takes. Digital infrastructure considered the average electricity usage for powering PCs, and the energy consumed by connecting to networks and using data centres and AI. For travel emissions, it was assumed a test-taker would be travelling the average distance based on location data from more than a million tests taken. This average distance was then multiplied by the average of emissions by different transport types for that category of distance travelled. By combining all of these factors, the Carbon Cost per Test Taken (CCTT) could be estimated.

From the datasets from DET, HESA and the Energy Institute, the average estimated CCTT for international students taking **traditional tests** was **14.28 kg CO<sub>2</sub>e**.

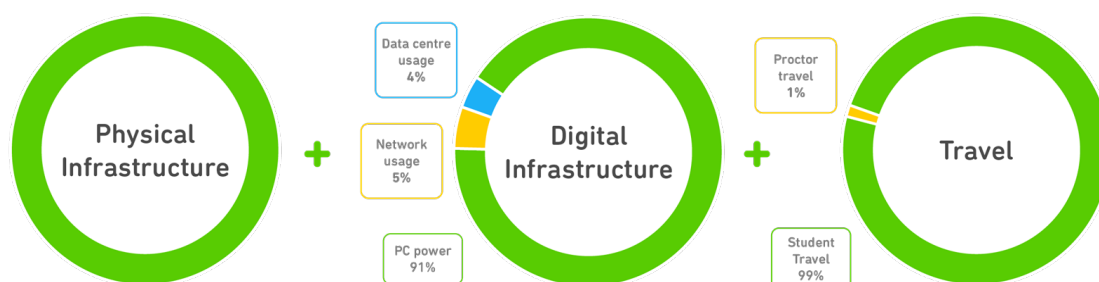
Using these same datasets, the average estimated Carbon Cost per test taken for **digital tests** was **0.16 kg CO<sub>2</sub>e**, 160 grams of carbon dioxide equivalent emissions.

This represents **a net carbon cost saving of 14.12 kg CO<sub>2</sub>e per test taken**.

This would indicate a potential 98% carbon cost saving for universities accepting remote digital test results as proof of English language capability in place of traditional tests.

## Emissions associated with traditional in-person test-taking

Combining all of the estimates and assumptions previously discussed provided a construct for calculating the emissions associated with traditional test taking.



## Number of international students

The HESA data on non-UK permanent address students by HE provider and country of permanent address for the academic year 2022/23 (the most recent year available) provides numbers by country of origin for all UK HEIs.

UK Visas and Immigration (UKVI) provides a list of 19 visa exempt countries. Students from these countries were excluded from the calculation of student numbers.

Students from all other countries are required to provide proof of English proficiency. The exceptions are: 'passing a Secure English Language Test (SELT) from an approved provider, having a GCSE, A level, Scottish National Qualification level 4 or 5, Scottish Higher or Advanced Higher in English, gained through study at a UK school that began before the age of 18, or having a degree-level academic qualification that was taught in English'<sup>34</sup>.

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<sup>34</sup> UKVI '[Knowledge of English](#)' 2024

For the most recent year of applications, 27.92% of students were categorised as ‘English assessed based on previous qualification’. A further 7.48% were ‘exempt as from approved English speaking country / requirements met in prior student visa’<sup>35</sup>.

To estimate the number of students required to take a language test, the international student numbers for each education provider were adjusted down by these percentages.

For students studying for degree level or above, the Higher Education Provider (HEP) can assess the level of English themselves and verify it as part of the Confirmation of Acceptance for Studies (CAS) process. The CAS is a unique reference number which confirms that a university or college has agreed to sponsor a student’s visa application, and provides information about the student to UK Visas and Immigration (UKVI), including verification of language proficiency.

51.90% of students completed a SELT test and 12.70% of students completed another non-SELT language test<sup>36</sup>.

English language qualification / exemption	Proportion of applications (%)
English assessed based on previous qualification	27.92
Exempt as from approved English speaking country / requirements met in prior student visa	7.48
IELTS	34.32
Pearson Test of English	7.90
Other secure English language test (SELT)	9.68
Other non-SELT language test	12.70
Total	100

The calculations take all international students for whom proof of English proficiency would have been a requirement, excluding those with prior qualification or exemption.

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<sup>35</sup> Enrolly/PIE data 2024

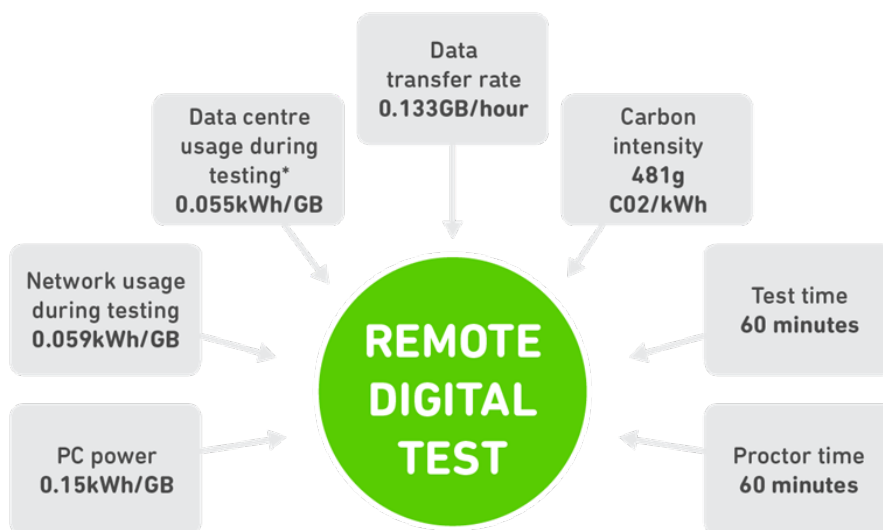
<sup>36</sup> Enrolly and ThePIE, 2024

HESA collects data on new entrants but does not publish by institution and country of origin. JISC, the HESA parent, has these numbers, but reporting would be partial as some higher education providers withhold consent for their data to be shared. A factor of 0.615 was applied for new entrants, based on the national HESA figures by level of study<sup>37</sup>.

### Emissions associated with remote digital test-taking

The construct, sources and assumptions for Digital Infrastructure Emissions apply to remote digital test-taking. To calculate the Carbon Cost per Digital Test Taken the figure was adjusted upwards to incorporate test length and post-proctoring (2 x 60 minutes). This calculation incorporates the Carbon Intensity Factor (the carbon intensity of electricity generation).

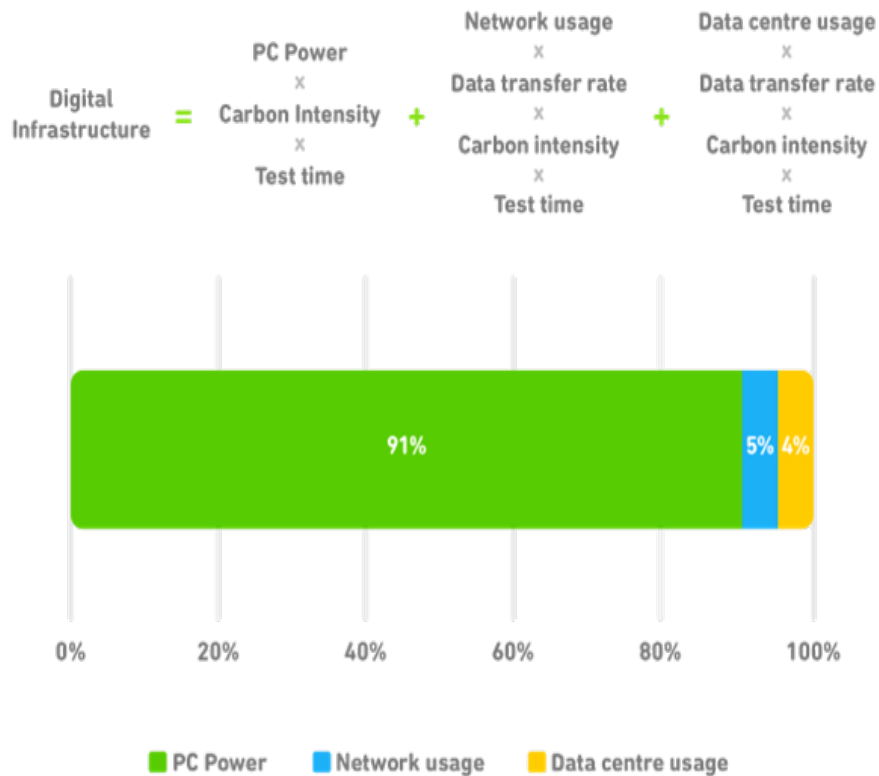
Summary of inputs to estimate emissions associated with remote digital test-taking:



\*Source: AWS

<sup>37</sup> HESA Table 28, 2023

Summary of inputs to estimate emissions associated with remote digital test-taking:  
 Calculations to estimate emissions associated with remote digital test-taking:



### Re-test rate

From test data and expert opinion, it is evident that many test-takers take a test more than once. For the purposes of calculations, the re-test rate (the average number of tests taken per test-taker) was assumed to be 1.51 times.

## Carbon-Saving Calculator for test-taking

By combining all of the data sources and assumptions, it is possible to estimate the emissions associated with required traditional test-taking by country of origin and by higher education provider, across the UK.

The IESG Duolingo Carbon-Saving Calculator™ enables 177 UK universities and colleges to estimate the climate cost of language tests taken, and the net carbon savings to be made from adopting remote digital testing.

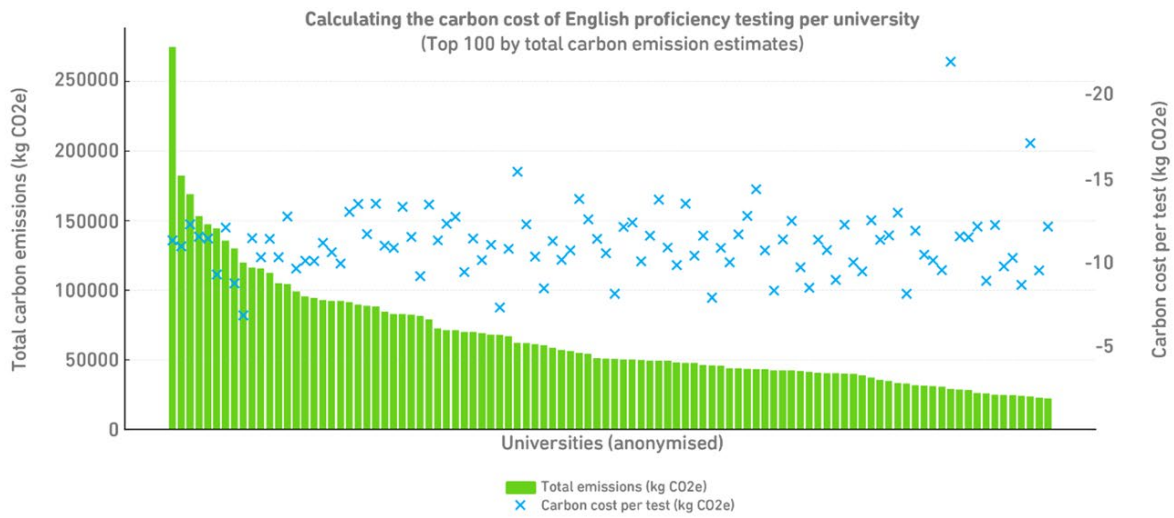
Institution-specific calculations are available to each UK HEI on request<sup>38</sup>. At the institution level it is possible to update student numbers to show new entrants and year on year changes. Additionally, the calculator enables analysis by mission group within the UK.



<b>Welcome to the IESG Duolingo Carbon-Saving Calculator!</b>	
<b>Choose a university here &gt;&gt;&gt;</b>	University
Total international students	28,090
International students excl exempt countries	26,435
International students excl all exemptions (estimated)	16,654
Carbon Intensity of electricity generation (CIEG)	525 gCO <sub>2</sub> /kWh
Carbon Intensity factor (CIF)	2.210
<b>Physical Infrastructure - Calculations</b>	
Test space per student	2.5 m <sup>2</sup>
HE baseline emissions	0.021 kg CO <sub>2</sub> e/m <sup>2</sup> /hour
Carbon Intensity factor (CIF)	2.210
Emissions for a test centre per student	0.116 kg CO <sub>2</sub> e/hour

<sup>38</sup> Ask your Duolingo or IESG contact or email [hello@iesg.eco](mailto:hello@iesg.eco) or [institutional@duolingo.com](mailto:institutional@duolingo.com)

There is a significant variance by university. In total estimated emissions, this is most obviously dependent on the number of international students. The variance in Carbon Cost per Test Taken reflects the differing composition by institution of international students by country of origin, as shown below.

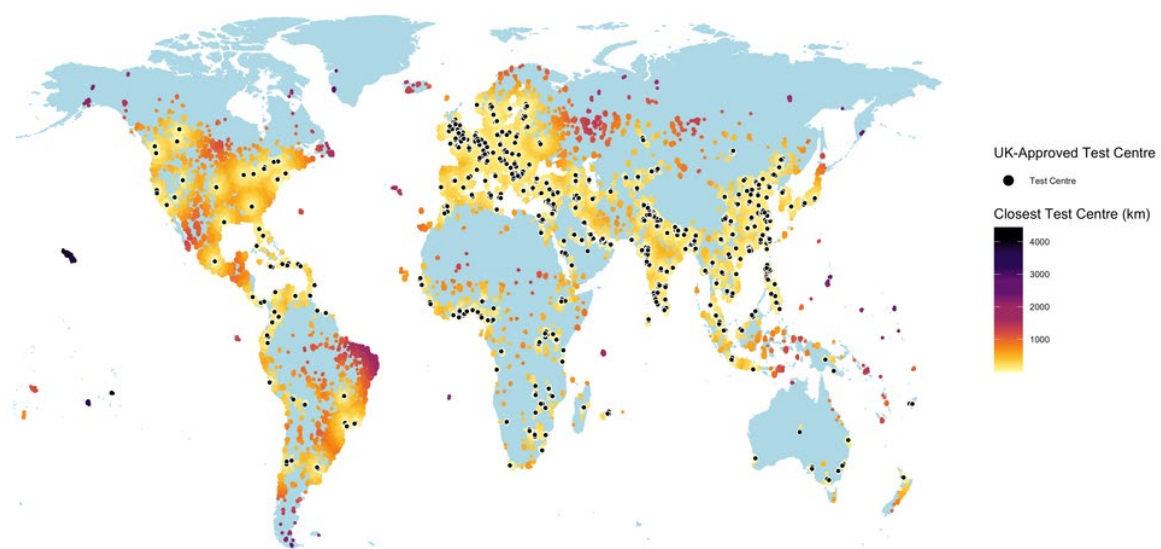


## Variations by country and region

Earlier research from Duolingo (2023) mapped the distances between test-takers and the nearest SELT test centre<sup>39</sup>. By applying the metrics for travel and for physical and digital emissions applying the Carbon Intensity Factor by country, the emissions associated with the required traditional in-person English language testing can be estimated. The distances have been updated using 2024 data, with a date range from 1st November 2023 to 31st October 2024.

At a global level the average distance of required travel for test-takers in 2024 was 87km. In calculating the associated emissions, the round trip calculation for the average required distance to travel to and from a test centre was 175km.

The image below shows the global one-way distances in the form of a heat map.



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<sup>39</sup> [From the Gobi to the Sahara, digital tests let students prove their English everywhere](#), Tamsin Thomas and Will Belzak, 2023.

From this world view it is evident that there are wide differences in the distances test takers would have had to travel, to the nearest approved test centre.

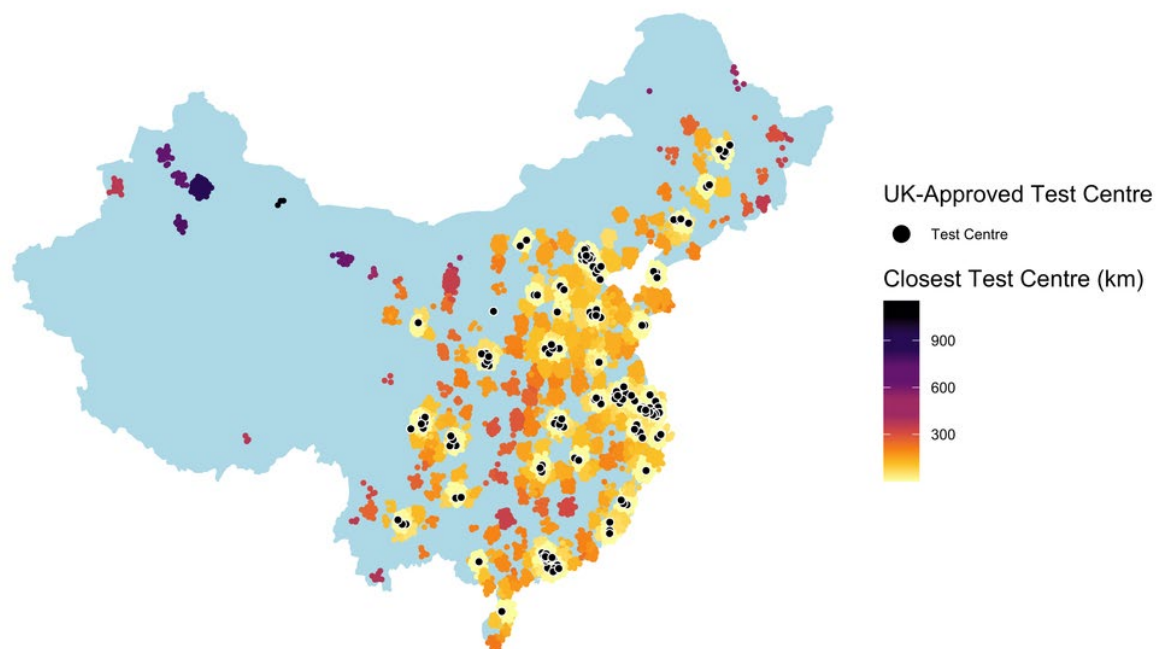
And within countries, there are huge variations in the average distance necessary to attend an authorised physical English language test. Three national pictures and three regional examples are illustrated below.

## China

For China the average distance required to travel to a test centre is 41km, a round trip of 82 km. This reflects the concentration of test-takers in major cities, served by 175 SELT centres plus hundreds more authorised testing centres.

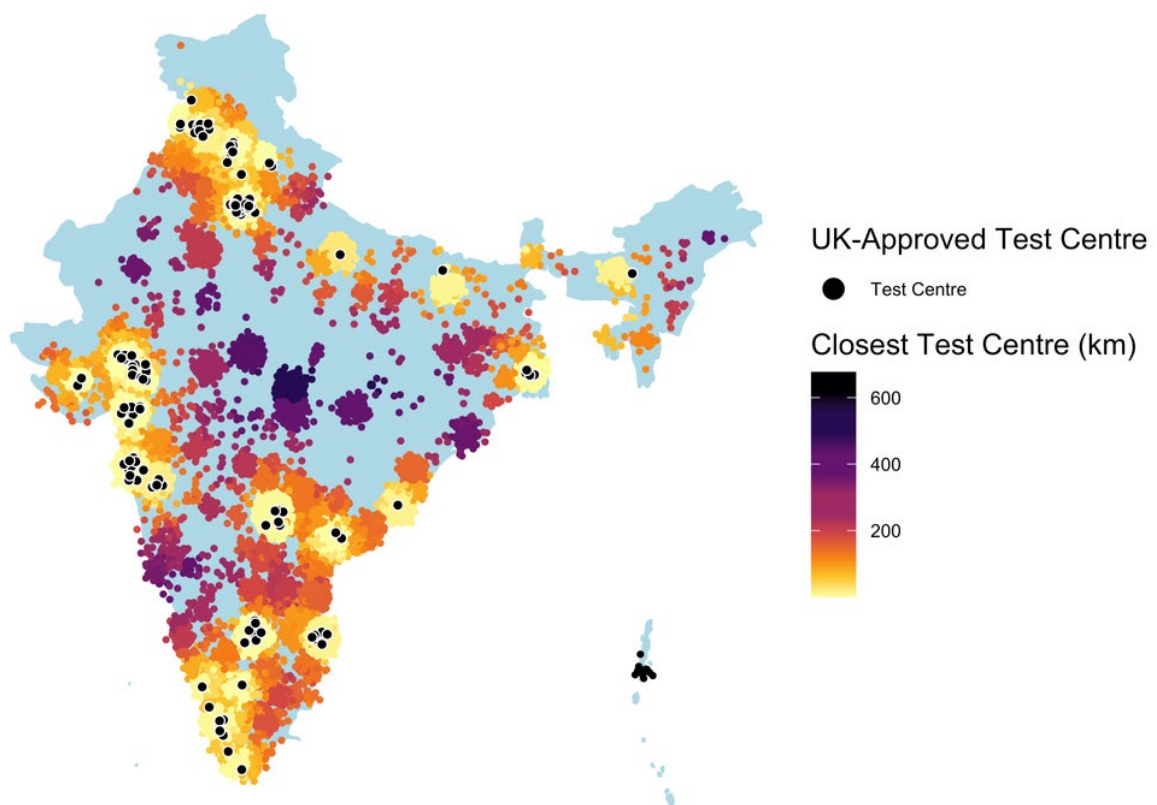
56% of test-takers would have had to travel less than 10km on a round trip. The high average distance reflects the 44% who would have to travel further.

Taking into account the distances and travel types, combined with the physical and digital infrastructure requirements and the Carbon Intensity Factor for China (2.45), the average emissions per test taken are estimated to be 8.10 kg CO<sub>2</sub>e.



## India

For India, the average distance required to travel to a test centre is 30.4km, a round trip of 60.8km. Like China, this reflects the concentration of test-takers in major cities. Served by 158 SELT centres plus other approved test centres. 70.6% of test-takers would have had to travel less than 10km on a round trip. 10.1% of tests would have required a return journey of more than 100km. It is interesting to note that 36% of respondents in the PublicFirst survey of prospective students in India<sup>40</sup> said they would be willing to travel 100km or more. 14% said nothing would deter them from travelling to a test centre. Taking into account the distances (comparatively low) and travel types, combined with the physical and digital infrastructure requirements and the Carbon Intensity Factor for India (713.44), average emissions per test taken are 6.03 kg CO<sub>2</sub>e.

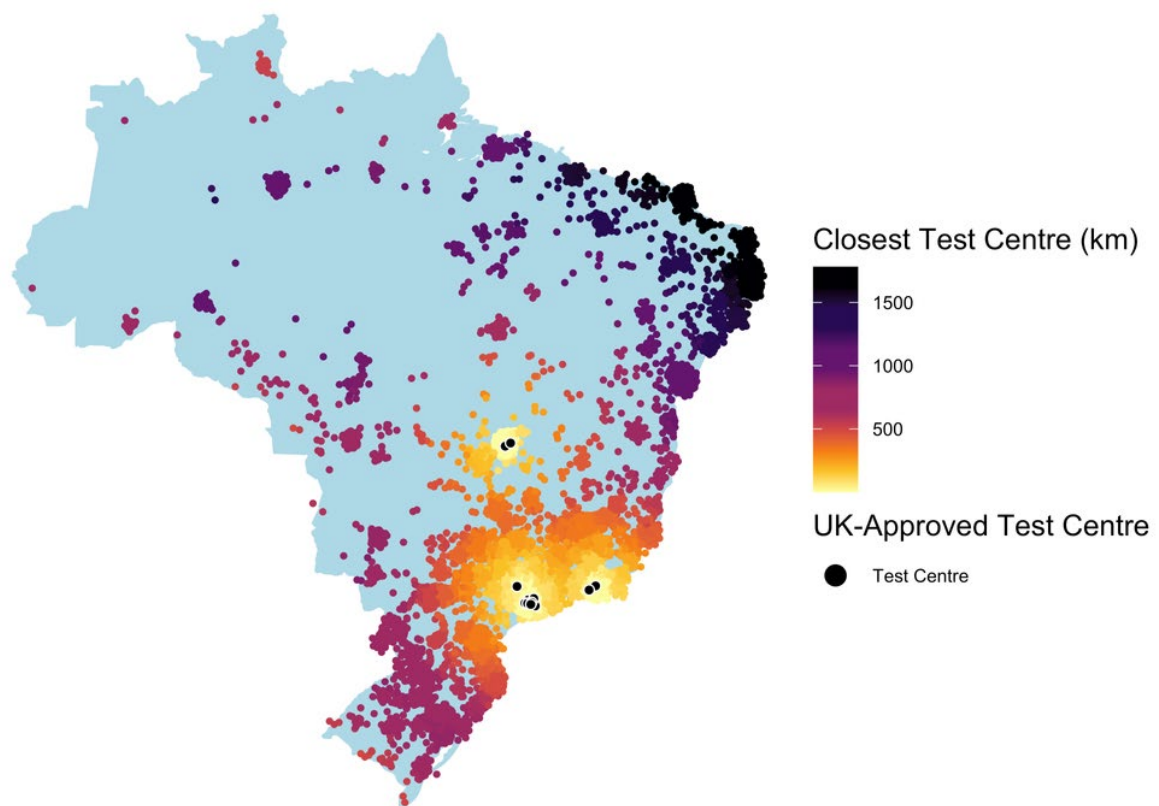


<sup>40</sup> Unlocking the Global Talent Pool, 2023

## Brazil

Brazil, as the heat map shows, is under-served with authorised test centres. The average distance required for a test-taker to get to a test centre is 308 km, a round trip of 616km. This distance would require a domestic flight for most of the test candidates falling into this category.

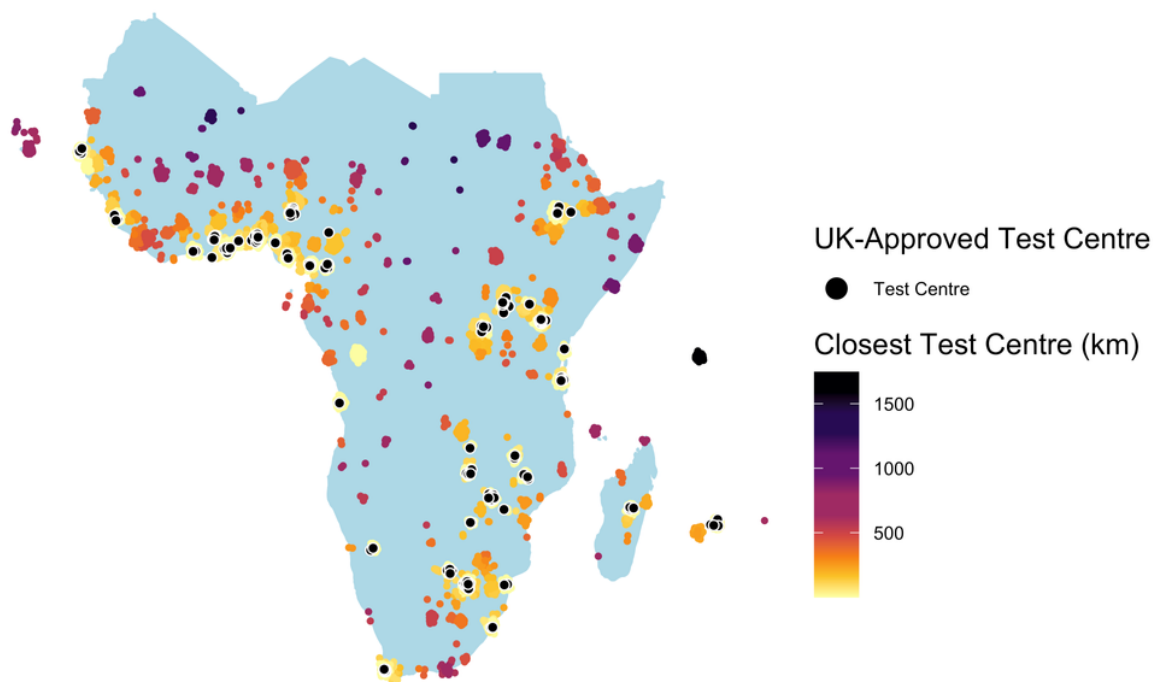
The associated emissions are therefore very high. The carbon cost per test taken (CCTT) for test takers in Brazil is 74.03 kg CO<sub>2</sub>e - more than 12 times greater than India.



## Sub-Saharan Africa

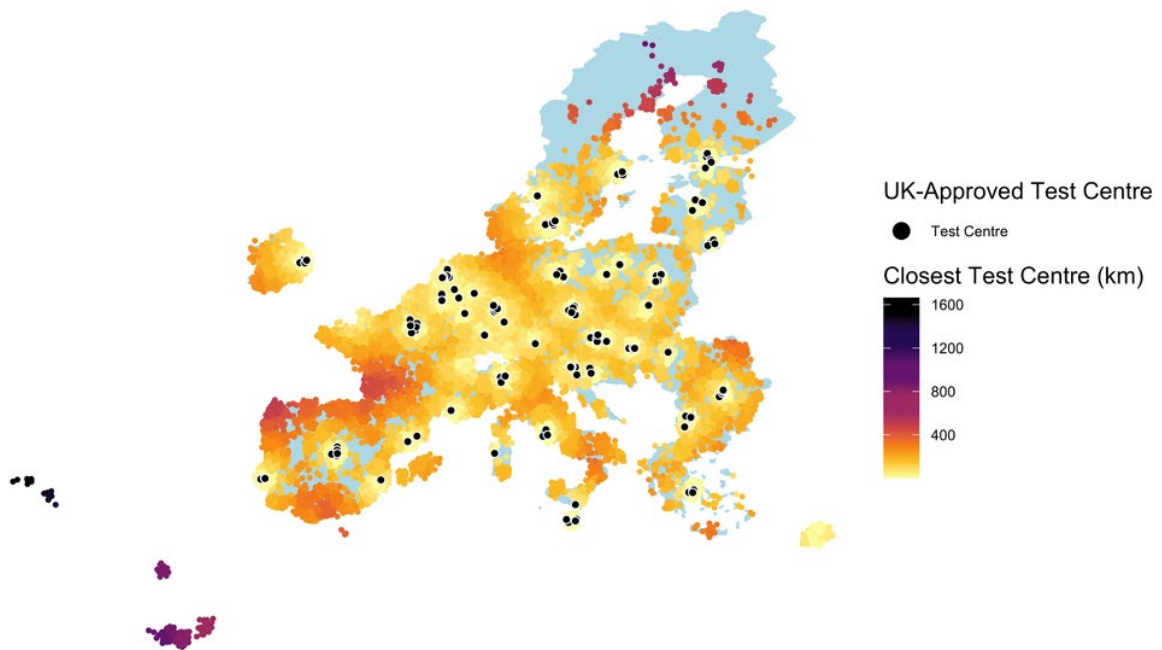
Nigeria has the largest number of sub-Saharan students in the UK. In Nigeria the average distance to the nearest authorised test centre is 77 km. For Ghana and Kenya the average distance is much lower at 39.9 km and for Kenya 47.5 km.

Still this means test-takers would have to take a round trip of 80 to 154 km. Average distances for most Sub-Saharan countries are comparatively low in countries with authorised test centres, reflecting the high concentration of populations in urban areas. While the average distances are relatively low, the time taken to travel will still be high, noting these are straight-line distances, and the road and rail infrastructures differ significantly.



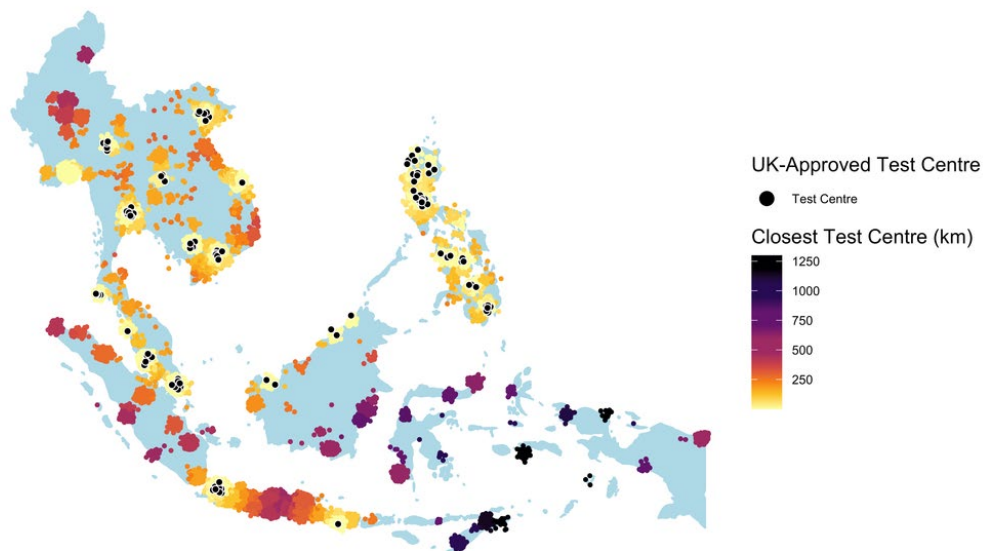
## European Union

In France, test-takers would cover an average distance of 98 km to reach a test centre, resulting in a round trip of 196km and average emissions of 17.42 kg CO<sub>2</sub>e per test. Italy sees similar travel distances, with test-takers journeying 95 km on average, equating to emissions of 14.42 kg CO<sub>2</sub>e. Germany benefits from its higher population density which is reflected in the total distance travelled, with test-takers traveling an average round trip of 179 km, producing 13.81 kg CO<sub>2</sub>e per test—the lowest in the region. By contrast, Portugal's average distance of 96.34 km (192 km round trip) per test results in emissions of 16.99 kg CO<sub>2</sub>e, comparable to France's figures. Spain presents a challenge, with test-takers traveling the greatest distance with an average of 119 km per a one-way trip, leading to higher emissions in the region at 25.35 kg CO<sub>2</sub>e. This disparity underscores the impact of Spain's geography and the concentration of testing centres.



## South East Asia

In South East Asia, the travel distances and emissions associated with test-taking reveal significant differences between countries challenged by geography layout and approved SELT test centres. In Thailand, test-takers travel an average of 39 km to reach a test centre, making a round trip of approximately 78 km. This results in relatively low emissions, averaging 7.61 kg CO<sub>2</sub>e per test. Vietnam sees slightly longer travel distances, with an average of 55 km per journey (110 km round trip) and emissions of 10.92 kg CO<sub>2</sub>e. In the Philippines, the distances become more substantial, with test-takers traveling an average of 80 km, leading to a round trip of 160 km. This higher travel requirement contributes to emissions of 17.82 kg CO<sub>2</sub>e per test. However, it is Indonesia that presents the most notable figures where the average journey to a test centre is 193 km, resulting in a round trip of 386 km – the longest in the region. Unsurprisingly, this leads to significantly higher emissions, averaging 44.85 kg CO<sub>2</sub>e per test taken.



## 12 Proxies for carbon emissions

The average carbon dioxide emission per person is approximately 4.3 tonnes per year<sup>41</sup> and in the UK, 4.5 tonnes<sup>42</sup>.

Most people engaged in sustainability and climate action question the reliability of tree-planting to offset emissions. However, it is a popular proxy with politicians and consumers. To offset the average amount (4.3 tonnes), an individual would have to plant about 165 trees<sup>43</sup>.

Using this proxy UK universities and colleges would have to plant more than 200,000 trees to offset the carbon cost of traditional language testing.

If the emissions associated with the UK requiring traditional English language tests are compared with the annual emissions for an average UK family car<sup>44</sup>, it would equate to taking more than 2,000 cars off the UK's roads, each year.

The average Carbon Cost per Test Taken (CCTT) is 14.28 kg CO<sub>2</sub>e, the equivalent of 15 wash cycles at 60 degrees centigrade.

Looking at the DET global dataset for one year of tests taken, Duolingo can reasonably claim a global carbon handprint of 182 million kilometres of travel saved for its test-takers in 2024 and more than 14,000 tonnes of CO<sub>2</sub>e emissions saved.

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<sup>41</sup> World Bank, 2020

<sup>42</sup> Statista 2023

<sup>43</sup> <https://afocosec.org/act-main/>

<sup>44</sup> Source: DEFRA / DESNZ 2024 (0.16817KgCO<sub>2</sub>-e/km)

"A carbon handprint is a relative value measured by comparing the impact of the baseline product to that of a new alternative, i.e. the emissions resulting from the current product or system compared to a different one. Such a comparison tells us how much better one product or service can be for the climate over another."<sup>45</sup>



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<sup>45</sup> 2025 UK Green Building Council <https://ukgbc.org/news/whats-a-carbon-handprint-understanding-your-organisations-positive-impact/>

## 13 Conclusions & recommendations

In 2025 the vast majority of English language tests taken are in-person. The reliance of the UK HE sector on attendance at physical test centres presents significant barriers, particularly for applicants from rural or underserved regions. These challenges affect the UK's ability to attract the most diverse and talented applicant pool, limiting the global talent pipeline for UK higher education. And for those who make the journey, this research demonstrates the significant emissions associated with the distances travelled and tests taken.

Secure remote digital language testing brings increased accessibility and affordability, and significant time savings for prospective students. For UK higher education providers, helping to access a broader and more inclusive pool of potential students.

At the same time, each digital test taken has a positive impact in reducing emissions associated with the requirement to demonstrate English language proficiency. For UK universities and colleges seeking to reduce carbon emissions, this is a positive move, and a positive message for international student recruitment.

### Carbon accounting – a currency for change

For international education, carbon accounting is increasingly important. International students increasingly expect to see evidence of how educators are making a difference.

International students enrich the higher education experience and underpin the business model for much of the sector.

By measuring and comparing the emissions associated with admissions, institutions can share best practices and implement better policies to minimise the associated carbon cost. They can also demonstrate the impact of changes made, over time, on the emissions associated with the delivery of international education.

Climate-related data helps to drive better-informed decision making and to encourage positive climate action at the institution level. This is particularly true for the HE sector, where argument is a founding principle. Debate requires disagreement; Data drives decisions.

### Refining the model – challenges accepted

This research is new. The numbers and the comparisons are estimates, intended to be indicative of the emissions associated with the requirement for proof of English language proficiency. At each data point and for each assumption the research sought to be conservative in its estimations.

The process of carbon cost calculation for English language testing will be iterative. The carbon saving calculator is intended as a living model, not as a one-off measure.

### Regional comparisons – other markets

The core methodology established with this analysis is intended for application in the UK. Most of the metrics can be adapted and applied to other destination countries for international study.

### Expanding the Scope – the Carbon Cost of Admissions

The requirement for language proficiency is a key part of the application process. Further research will seek to set the emissions associated with language testing in the wider context of recruitment through to admissions.

## Recommendations

For **education providers**, the recommendation is to consider accepting secure remote digital tests as proof of language proficiency.

For **international recruiters and sustainability teams**, consideration should be given to adapting the processes in this report, applying institution-specific numbers, to report the emissions associated with language testing, in the context of international student recruitment. This is included for universities as part of the Climate Action Barometer.

For **policy makers**, this report recommends updating the requirement for secure in-person English language tests, to include secure English language testing online.

## IESG, the Climate Action Barometer and ClimateEye

The International Education Sustainability Group ([IESG](#)) exists to accelerate positive change in sustainability policies and practices in international education. It is a social enterprise with operations across the globe, working in partnership with leading universities. It is a trusted partner for UK education providers, working with senior management teams in UK universities, particularly in international education.

Since 2023 IESG has been benchmarking the carbon footprint of the international education sector, working with leading universities, government and peak bodies across major international student markets.

IESG has specific expertise in the highly specialised area of emissions associated with international education. Its Climate Action Barometer ([CAB](#)) is the global benchmark for environmental sustainability in international education, measuring and comparing policies, practices and emissions worldwide. The founders' group comprises leading universities in the UK, Europe, Australia, New Zealand and North America.

Founding partners for the CAB in the UK include Edinburgh, Reading, Salford, Cardiff, Newcastle, Queen's University Belfast, Royal Holloway and London Metropolitan.

In Australia and New Zealand the CAB Founders' Group includes the global number one university for sustainability, University of Western Sydney and the world number one for climate action, University of Tasmania (THE Impact Rankings, 2024) and the University of Auckland, plus the universities of Sydney and Melbourne with some of the largest international student populations in the world.

As part of its benchmarking IESG developed the ClimateEye Emissions Calculation Process. The ClimateEye calculates emissions based on international student and staff travel including learning abroad and transnational education (TNE). The Climate Action Barometer calculates and reports on more than 900,000 journeys each year using the ClimateEye process.

## Duolingo and the Duolingo English Test (DET)

Duolingo's mission is to develop the best education in the world and make it universally available.

Its flagship app is the leading mobile learning platform globally. With over 500 million downloads, it has organically become the world's most popular way to learn languages.

Duolingo launched the Duolingo English Test in 2016 to lower barriers to English-language proficiency assessments. The Duolingo English Test is an innovative and accessible English proficiency assessment for today's international students and institutions. Digital-first and student-first, the test is available online, on demand—all while using subject matter experts, AI and individual human proctors to ensure each session is reliable and secure.

Students can certify their English from their own computer anywhere - no appointments or travelling to test centres needed. Secure results are available within 48 hours and can be shared with an unlimited number of institutions - opening doors for students, and providing institutions access to a diverse pool of candidates. Test takers, representing 210+ countries and territories of origin, have taken the Duolingo English Test because of its radical accessibility.

Find out more: [englishtest.duolingo.com](https://englishtest.duolingo.com) [englishtest.duolingo.com/research](https://englishtest.duolingo.com/research)  
[englishtest.duolingo.com/security](https://englishtest.duolingo.com/security)

## Appendix – Carbon-Saving Calculator Assumptions

### Carbon Intensity of electricity generation

From the Ember and Energy Institute annual Statistical Review of World Energy.

### Carbon Intensity factor

The emissions associated with physical and digital infrastructure are based on estimates for the UK and UK higher education. To adjust for test-taking in countries around the world, a Carbon Intensity Factor has been applied. This is the carbon intensity per country divided by the carbon intensity for the UK.

### Test space per student

Estimated at 2.5sqm per test taker.

### HE baseline emissions

A common factor estimate of emissions per square metre for UK higher education based on HESA annual reporting of HEI emissions and internal space.

### Emissions for a test centre per student

The HE baseline emission multiplied by the space requirement, with Carbon Intensity Factor applied by country of origin in proportion to institution-specific international student numbers.

### Test Time

A weighted average of authorised tests taken.

### Physical Infrastructure Emissions

Institution-specific total estimated emissions associated with physical infrastructure, calculated from the above components.

### PC Power

Estimated at 150g per hour.

### Network usage

Estimated at 0.059 kWh/GB

### Data centre usage

Estimated at 0.055 kWh/GB

### Data transfer rate

Estimated at 0.133 GB/hour

### Electricity usage per hour

Combining the above factors to achieve a measure of energy use per hour.

### Total electricity usage for test

Multiplying the electricity usage per hour by the average test time, with the Carbon Intensity Factor applied by country of origin in proportion to institution-specific international student numbers.

### Digital Infrastructure Emissions

Institution-specific total estimated emissions associated with digital infrastructure, calculated from the above components.

### Average distance travelled per student

The estimated average distance to the nearest language testing centre for each test-taker, applied by country of origin in proportion to institution-specific international student numbers.

### Average emissions per student

The average emissions associated with standardised travel patterns to the nearest language testing centre for each test-taker, applied by country of origin in proportion to institution-specific international student numbers.

### Emissions for student travel

The total emissions associated with student travel to the nearest language testing centre for the institution-specific international student total number.

### Proctor requirement (1 per 25 students)

A standardised measure based on minimum proctoring requirements for approved English language tests.

### Emissions for proctor travel

An estimate of the total emissions for proctor travel based on the proctor requirement, the institution-specific number of students requiring tests and a standardised estimate of 25km round trip based on average commuting distances, applying standardised travel patterns for a 25km commute.

### Total Travel emissions

Institution-specific total estimated emissions associated with travel to and from language testing centres, calculated from the above components.

### Average tests per student

Based on evaluation of more than a million tests taken and the number of multiple tests taken. Estimated at 1.51 tests per student.

### Total emissions

The sum of physical infrastructure, digital infrastructure and travel emissions.

### Total international students

Taken from HESA Table 28 Academic Year 2022/23.

### International students excluding exempt countries

Total international students excluding those from countries where proof of English proficiency is not required, as specified by UKVI.

### New enrolments

Estimated figure taken from HESA Table 1 2022/23. National total new enrolments reported as 61% of total international students.

### Test centre locations

1,415 UKVI approved English language test centres as at December 2024.

### Test taker locations

Geolocation data: IP addresses for more than 1 million test takers in a 12 month period.

### Distance to nearest test centre

As the crow flies, to the nearest UKVI approved test centre. Real distances will be longer. Other test centres may be closer.

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