

Net zero progress report: year 3

October 2024

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The RSC joined the [UN Race to Zero](#) (RTZ) in 2021, committing to report annually on progress towards a 50% reduction in our own emissions by 2030 and adopting a comprehensive net zero target for 2040. We are proud to take an active role in getting to net zero within the timescale necessary to achieve the climate goals of the [Paris Agreement](#) and avoid the most serious harm to society and ecosystems.

This is the third in an annual series of reports tracking our greenhouse gas (GHG) emissions, actions to mitigate them, and future plans. Previous net zero progress reports (NZPR) have set out our climate mitigation goals (see Appendix 1), our initial understanding of our organisational climate impact and first steps on the journey to net zero.

Headlines

There have been some significant changes against our baseline, according to our latest data. This is due to both updated methods and underlying activity. Ongoing work has improved the accuracy and granularity of emissions data, which has increased reported emissions in some cases and decreased in others.

It also identified rising and falling sources of emissions from trends in underlying activity, notably increases in travel to re-establish relationships after the easing of COVID-19 restrictions, the success of energy saving efforts in our buildings, and the ongoing investment in technology to support the transition to open access and improve customer experience.

Key findings include:

- A 43% reduction in direct GHG emissions from our buildings (Scope 1+2) compared with the 2019 baseline
- A 27% increase in total quantified GHG emissions from the 2019 baseline estimate, although expected to be an overestimate as the calculation does not incorporate recent price inflation
- A 38% increase in business travel emissions from the 2019 baseline estimate, in part due to an improved classification method identifying more travel previously coded as general spend
- New insights from supplier-specific data in two material-intensive categories, catering and paper, illustrating progress to date and identifying future opportunities for emissions reductions

The RSC is currently undergoing transformation and growth, as discussed in detail in the [Trustees Report](#). In this context, short-term emissions reduction is a significant challenge, though we remain committed to achieving net zero by 2040. Improvements in data quality are already revealing opportunities and we anticipate less calculation-driven variation in coming years.

Progress to date

Our GHG emissions inventory has been produced according to the [World Resources Institute Greenhouse Gas Protocol](#) categories and methods. Where available, UK Government [emission conversion factors for GHG company reporting](#) have been used throughout. The RSC boundary includes all staff activity, offices, commercial activity and procurement required to deliver our services. Non-employee travel that is part of the delivery of the RSC purpose, including for members and editors, is reported in this emission inventory where it is paid for directly by the RSC, such that we hold useable data.

In common with most other non-industrial organisations, we do not measure all GHG emissions directly. Instead, we apply emissions factors to our emissions-related activity data, such as energy use (kWh), mass of refrigerant (kg), distance travelled (km), time worked in a heated space (h) or value of goods purchased (£). The GHG Protocol provides guidance on the most appropriate activity data and calculation methods but in some cases generalisations and approximations are necessary where specifics are unknown.

We report based on the most accurate estimate of emissions available and since our first NZPR we have worked to improve both the completeness of our activity data and the appropriateness of emissions factors we use across a number of categories. We will continue to improve our reporting annually by gathering more specific data, such as the measured quantity of paper that we use in our magazines and the emissions intensity of the specific paper mills in our supply chain, prioritising areas of highest impact where more granular monitoring may improve decision making. This year we have focused on the material-intensive categories of catering and paper.

Directly controlled sources of emissions – Scopes 1 and 2

The table below presents Scope 1 and 2 emissions from 2019, our baseline year, through to 2023. These sources of emissions are under our direct control and relate to the buildings we own and operate. Scope 1 includes direct emissions from gas boilers (referred to as ‘stationary combustion’) and fugitive emissions from air conditioning units in the buildings we operate. Scope 2 represents indirect emissions from our grid electricity consumption, based on billing data and national (location based) emissions factors.

Activity type	Greenhouse gas emissions ¹ /(tCO ₂ e)					Change against 2019 baseline
	2019	2020	2021	2022	2023	
Stationary combustion	79	71	83	86	70	
Fugitive emissions from air-conditioning	3	1	115	5	1	
Scope 1 total	82	71	199	90	71	-13%
Purchased electricity – location-based	363	263	199	194	180	
Scope 2 total	363	263	199	194	180	-50%
Scope 1 + 2 total	444	335	398	285	251	-43%

Table 1: breakdown of our Scope 1 and Scope 2 GHG emissions since 2019

Our facilities team continued to succeed in driving down energy consumption so that by the end of 2023, emissions from our buildings had declined by 43% from our 2019 baseline.

Although weather introduces year-to-year variability in heat and cooling demand, we have reduced total electricity consumption by 39% against baseline through a combination of improvements in the control of heating and lighting, installation of low-energy LEDs across our UK buildings, and a focus on minimising out-of-hours consumption. Gas use has decreased by 10% against baseline despite increased ventilation to minimise respiratory disease transmission. This has been achieved by optimised building control at our main office building, defaulting to heat pumps within the ventilation system and only using gas for hot water, cooking and to top-up heating on the coldest days. However, these energy savings may have been offset by an increase in energy consumption in the homes of staff working remotely which we have accounted for in our Scope 3 data, below.

¹All greenhouse gas emissions are reported as tonnes of carbon dioxide equivalent (tCO₂e) using the 100 year Global Warming Potential (GWP) metric. Figures are rounded to whole numbers so may not total in a given category.

Indirect sources of emissions – Scope 3

Our wider Scope 3 footprint includes a broad range of indirect sources of emissions where we have varying levels of control and influence. Our UN Race to Zero commitment (Appendix 1) is to account for all GHG emissions where they are material to our total impact and where data are available. The accuracy of the emissions calculation varies among Scope 3 categories because of variation in the representativeness of sampled activity data and the relevance of the emissions factors applied to them. The activity data, for instance m³, kg, kWh, passenger-kilometres, available for water, waste, upstream energy and business air travel are good where we have billing data and can be converted to GHG emissions with reliable and relevant emissions factors ([DEFRA 2023](#)). However, we have needed to use sampled data and sectoral, spend-based emissions factors for most other sources which are inherently less accurate. For instance, to calculate commuting emissions, we participate in a business park-wide staff survey of travel frequency, mode and distance and then apply emissions factors for the national transport fleet, which is inherently less accurate than asking individuals to record and submit their fuel use for the whole year.

Business travel is a major source of emissions and one that has grown significantly during 2023, doubling over 2022, as our staff and our chemical science community have returned to face-to-face events post-COVID. This increase is expected to be temporary due to the exceptional nature of recent times. We have drawn on our internal data science capability to more accurately track the pattern of emissions, particularly from air travel, which is by far the largest source. Travel is vital to achieving our goals as an international organisation, although it comes with a financial and an environmental cost. Country-specific emissions accounting for hotel stays allows us to identify hotspots of emissions and in future will provide travellers with guidance to identify lower-carbon choices. We are also tracking policy development for delivery of sustainable aviation fuels (SAF) as this will tend to decrease emissions per passenger-kilometre in the long term.

GHG Protocol Category	Greenhouse gas emissions ¹ /tCO ₂ e				
	2019	2020	2021	2022	2023
Scope 3 1 Purchased goods and services	3,980	3,525	3,416	4,047	5,432
2 Fuel and energy related activities	41	32	32	32	27
5 Waste generated in operations	5	4	2	2	3
6 Business travel - air	1,601	420	121	945	2,005
6 Business travel - other	205	113	40	227	491
7 Commuting	478	<i>No data available</i>		85	106
7 Homeworking	26	<i>No data available</i>		242	274
Total	6,336	<i>Data incomplete</i>		5,580	8,338

Table 2: breakdown of our Scope 3 GHG emissions since 2019

¹All greenhouse gas emissions are reported as tonnes of carbon dioxide equivalent (tCO₂e) using the 100 year Global Warming Potential (GWP) metric. Figures are rounded to whole numbers so may not total in a given category.

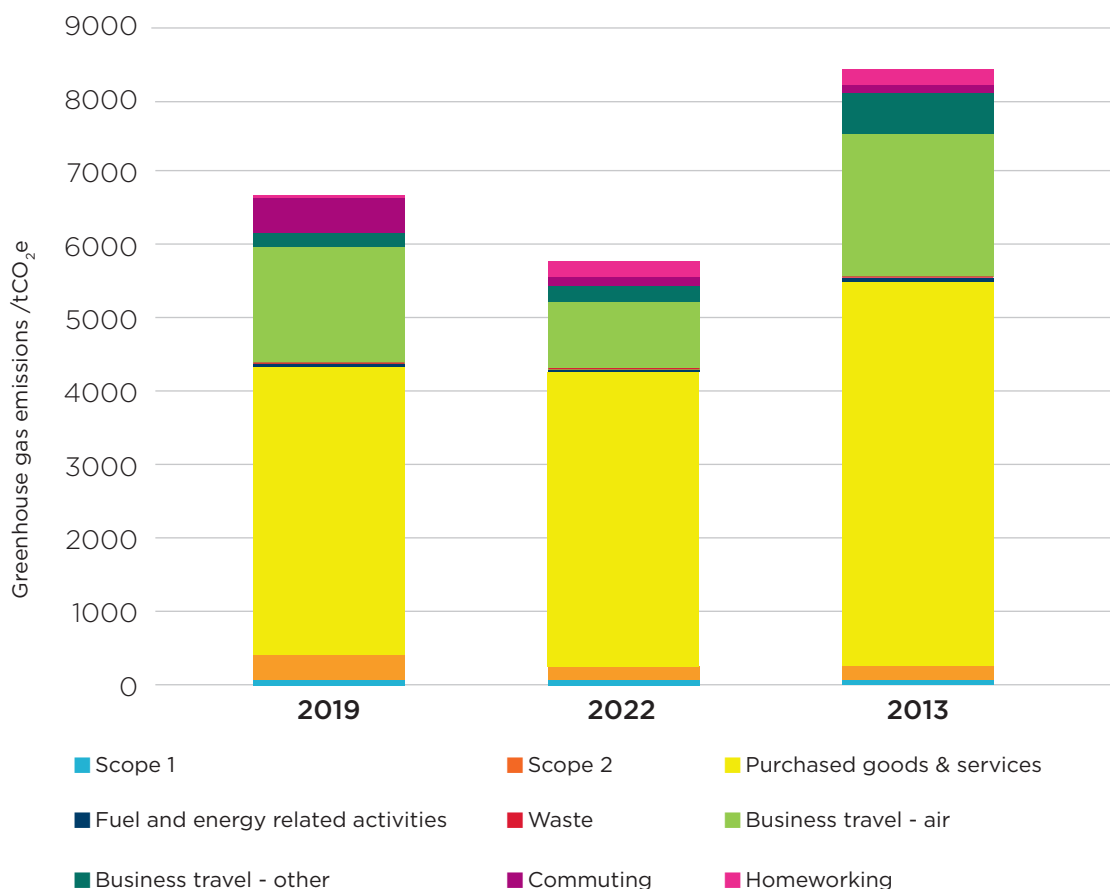


Figure 1: greenhouse gas emissions over time by GHG Protocol category

Broadly, our estimate of emissions from purchased goods and services has risen to 36% over baseline. This substantial increase is in large part due to an increase in total spend, the proxy for emissions that our calculation methodology uses. Some of the increase in spend can be attributed to inflation – which can have a significant bearing on figures when considering the use of expenditure as a proxy – and a lag in DEFRA emissions factors, although implementing technology projects, to improve the quality of our services, has also had an impact. The shift to cloud-based IT has reduced our consumption of electricity from in-house servers, part of the reduction seen in Scope 2 emissions, but increased our spend on the services required to deliver our products in this way.

We have calculated emissions associated with the purchase of goods and services using a spend-based method, classifying all of our procurement according to the economic sector it came from and applying a per-£ emissions factor. While this usefully illustrates the relative scale of this source and provides a means to identify the major sources of emissions within our supply chain, in the main, conversion to greenhouse gases is not specific to our individual suppliers. The latest update of economy-wide emissions factors provided by the UK Government also contains increases across a range of categories, including those where we spend heavily such as computer programming, consultancy and other administrative services, ranging from 16% to 78%.

We have for the first time used supplier-specific data in the material-intensive sectors of catering, paper and magazine distribution. The emissions associated with food, paper and distribution are substantial relative to the price paid for them and so present significant opportunities for emissions reduction. Through working with the catering suppliers to our UK buildings we have identified all of the food consumed and have applied category-specific emissions factors. Similarly, our paper suppliers have quantified the paper used to produce our books and magazines and identified the emissions from the relevant paper mills. This presents a significant improvement in accuracy over using sector-wide spend-based emissions factors, and we intend to repeat this process with other suppliers in coming years. It has also illustrated how the choices made to reduce the environmental impact of the food we serve, for instance substituting a proportion of beef for lentils in burgers, have led to nearly halving emissions from this category. We are now working with our paper suppliers to do the same with our paper choices and drive down emissions.

Emissions from commuting and homeworking continue to be calculated using internal data and a travel survey conducted in October 2023 for our major office in the Cambridge Science Park. The homeworking calculation uses the [EcoAct methodology](#) and its emissions factors, known specifications of IT equipment issued to staff, HR data and travel survey data. Emissions from this source have increased year on year and, although there are indications of more staff cycling to our major office, and the start of a switch to electric vehicles which now comprise 7% of commuting journeys, this has not outweighed recent growth in staff numbers.

Our first NZPR identified our investment portfolio as a significant source of emissions in our baseline, approximately one third of the total. Data availability remains poor for this source relative to others so as with last year it is not reported quantitatively in the table above. However, an estimation is included graphically below for context. During 2022-23 the allocation between investment types in our portfolio changed to reflect revised priorities for our investment strategy. Through this process, we are working with our investment managers and advisers to achieve greater transparency and more robust quantitative measures to monitor performance on the transition to net zero.

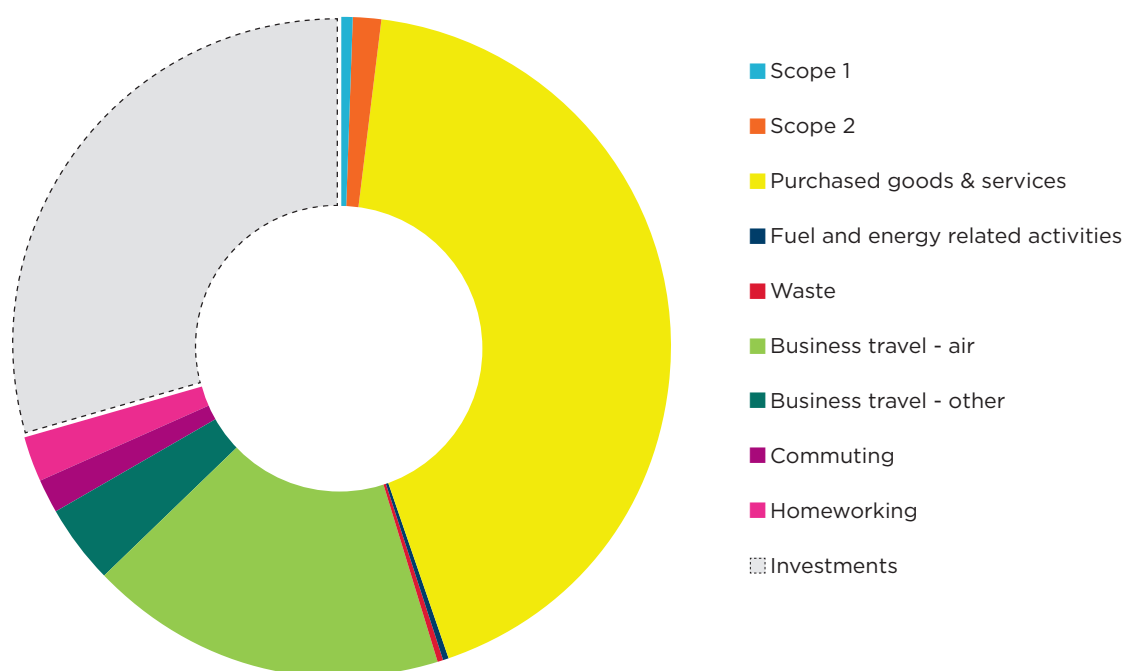


Figure 2: our greenhouse gas emissions in 2023 by GHG Protocol category

Summary

Overall, we estimate our quantified GHG emissions to have increased by 25% from our 2019 baseline. These increases are all associated with our indirect emissions from the goods and services we buy in to the organisation and we expect they are an overestimate to some extent due to the lag in emissions factors correcting for recent price inflation.

We have continued to show good progress reducing the direct emissions from our buildings through a number of proactive measures but this has been outweighed by a rebound in travel post-COVID restrictions and a significant increase in total spend on goods and services, particularly IT.

While the pandemic has led to a large and persistent reduction in commuting to our headquarters in Cambridge, this has been counterbalanced to some extent by emissions associated with home heating while our staff work remotely. Personal car travel is by far the largest source of commuter emissions, so we will continue to support the uptake of public transport, walking, cycling and electric vehicles.

	Greenhouse gas emissions ¹ /tCO ₂ e					Change against 2019 baseline
	2019	2020	2021	2022	2023	
Scope 1	82	71	199	90	71	-13%
Scope 2	363	263	199	194	180	-50%
Scope 3	6,336	<i>Data incomplete</i>		5,580	8,338	+32%
Total	6,780	<i>Data incomplete</i>		5,865	8,483	+27%

Table 3: summary view of our GHG emissions

¹All greenhouse gas emissions are reported as tonnes of carbon dioxide equivalent (tCO₂e) using the 100 year Global Warming Potential (GWP) metric. Figures are rounded to whole numbers so may not total in a given category.

Appendix 1: objectives

Targets and reporting frameworks

In July 2021 the RSC announced that it was joining the [UN Race to Zero](#) (RTZ) by adopting a comprehensive net zero target of 2040 and committing to report annually on progress towards a 50% reduction by 2030 from a 2019 baseline. Net zero means that emissions and removals of long-lived greenhouse gas emissions to and from the atmosphere are balanced. Globally, this action is required to halt ongoing warming, with the time required to reach net zero determining the extent of climate change.

Our targets align with the [Science Based Targets Initiative](#) (SBTI) 1.5°C path and have been agreed with the [Pledge to Net Zero](#), the UK environment sector programme implementing the UN RTZ developed by the Society for the Environment (SocEnv). These targets are equivalent to a 4.6% linear per annum reduction and cover all sources that are material to total carbon footprint and where data are available, including indirect Scope 3 emissions.²

We have also signed up to the UN SDG Publishers Compact in 2021, committing to accelerate progress to achieve the Sustainable Development Goals (SDGs) during the Decade of Action (2020-2030), of which Goal 13 is Climate Action. Signatories aspire to develop sustainable practices and act as champions of the SDGs, publishing books and journals, arranging meetings and other initiatives that will help inform, develop and inspire action in that direction.

Carbon offsetting, the use of sinks and credits

Net zero implies the removal of greenhouse gases from the atmosphere to balance emissions. Nature-based solutions to climate change protect and enhance ecological carbon removals, often termed sinks. Projects to chemically sequester carbon dioxide in bulk materials and geological formations are also in development. Offset credits are accounting frameworks to facilitate economic relationships between organisations that cause emissions and those that implement removals.

The RSC will aim to achieve its net zero target without the use of offset credits, taking actions that reduce emissions from our own activities as a priority. We do not intend to purchase offset credits prior to or in respect of our 50% reduction by 2030. Beyond 2030, offset credits may be considered to balance persistent emissions. We will follow the development of carbon removal projects with permanent storage and review this position in future. Where suppliers provide goods or services that include an element of offsetting (e.g. those claiming to be carbon neutral), we will only count them in respect of our targets if they align with the above principles.

² The [World Resources Institute Greenhouse Gas Protocol](#) (WRI GHG Protocol) categorises greenhouse gas emissions as Scope 1 direct emissions (such as from natural gas combustion), Scope 2 indirect emissions from energy directly consumed (such as grid electricity), and Scope 3 indirect emissions across an organisation's whole value chain (such as from purchased goods and services).