

Net zero progress report: year 2

July 2023

Prepared by John Broderick, Net Zero Programme Manager

The RSC joined the [UN Race To Zero](#) (RTZ) in 2021, committing to report annually on progress towards a 50% reduction in 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.

Our first Net Zero Progress Report (NZPR) set out our climate mitigation goals (see Appendix 1), our initial understanding of our climate impact and first steps on the journey to net zero. This report is the second in an annual series tracking our greenhouse gas (GHG) emissions, actions to mitigate them, and future plans.

Headlines

This report improves the quality and breadth of data in a number of areas and analyses the impact of operational changes arising from the COVID pandemic.

- 14% reduction in total quantified GHG emissions from 2019 baseline estimate
- 36% reduction in GHG emissions from our buildings
- 35% reduction in business travel emissions
- New estimate of homeworking as a source of GHG emissions
- Improved data for air conditioning, travel and supply chain sources

Progress to date

Our greenhouse gas emissions inventory has been produced according to the World Resources Institute GHG Protocol categories and methods. The most appropriate UK Government [emission conversion factors for greenhouse gas company reporting](#) have been used throughout, where available. The RSC boundary includes all staff, offices, commercial activity and procurement required to deliver our services. Non-employee travel, including for members, is reported where it is paid for directly by the RSC such as travel to conferences, events and committee meetings.

In common with other charitable and commercial organisations we do not measure GHG emissions directly, instead applying emissions factors to activity data that relate to emissions, 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 the most accurate estimate of emissions available and since the first NZPR we have worked to improve both the completeness of activity data and the relevance of emissions factors across a number of categories. We will continue to seek to improve our reporting annually by gathering more specific data, prioritising areas of highest impact and where more granular monitoring may improve decision making.

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 2022. 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	Greenhouse gas emissions ¹ /tCO ₂ e			
	2019	2020	2021	2022
Stationary combustion	79	71	83	86
Fugitive emissions from air conditioning	3	1	115	5
Scope 1 Total	82	71	199	90
Purchased electricity (location based)	363	263	199	194
Scope 2 Total	363	263	199	194
Scope 1 + 2 Total	444	335	398	285

By the end of 2022, emissions from our buildings had declined by more than a third from our 2019 baseline. Although weather introduces year to year variability in heat and cooling demand, we have reduced electricity consumption by 29% against baseline through a combination of improvements in the control of heating and lighting, installation of low energy LEDs in Burlington House, our London office, library and events venue, and the altered working patterns following COVID-19 restrictions. Gas consumption has increased by 10% against baseline as we have increased ventilation in our buildings to minimise respiratory disease transmission. These energy savings have been offset by an increase in energy consumption in the homes of staff working remotely and we have accounted for these in our Scope 3 data, below.

For this NZPR we have been able to update the method used to calculate fugitive emissions from air-conditioning from a screening method based on default emissions factors to a simplified material balance using measured service data. This identified a major, isolated leak following the failure of an air-conditioning unit in 2021, which although a small mass of gas was of a refrigerant with a high global warming potential.

¹All greenhouse gases 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. Data quality varies among Scope 3 categories. The information available is good for water, waste, upstream energy and business air travel where we have billing data and reliable emissions factors ([DEFRA 2022](#)). However, it has been necessary to use sampled data and sectoral emissions factors for other sources.

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

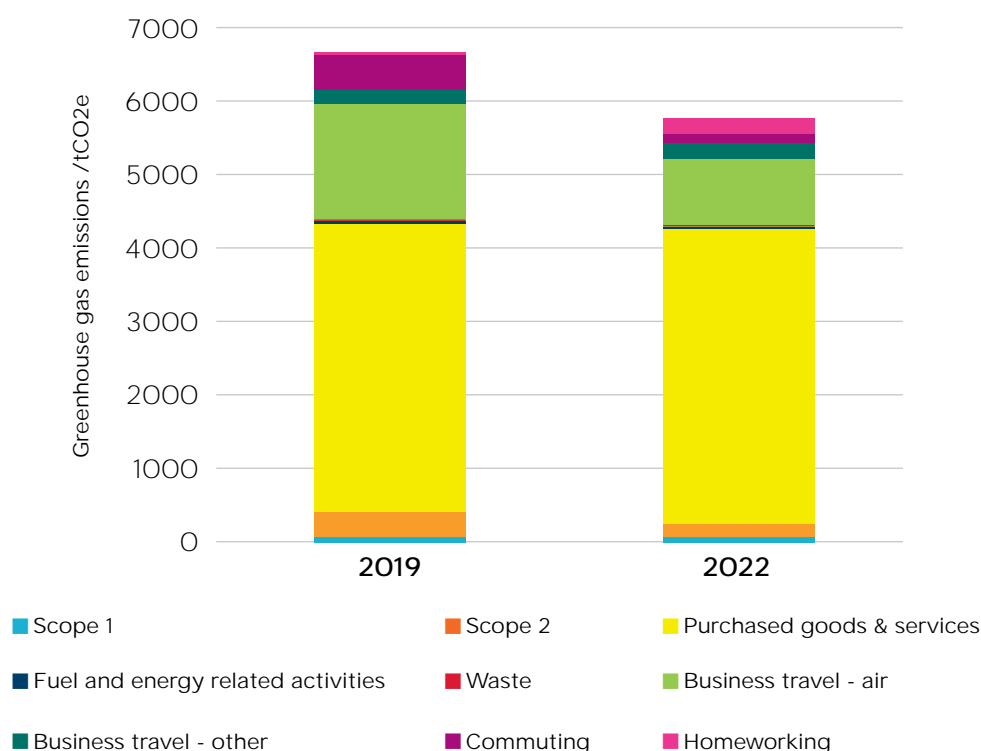


Figure 1 Greenhouse gas emissions for 2022 in comparison to our 2019 baseline

¹All greenhouse gases 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.

We have for the first time estimated emissions from commuting and homeworking using internal data and travel surveys conducted in October 2019 and 2022 for our major office on the Cambridge Science Park. The homeworking calculation drew on the [EcoAct methodology](#) and its emissions factors, known specifications of IT equipment issued to staff, HR data and travel survey data. Unfortunately, travel survey data were not available for 2020 and 2021 and the nature of the COVID-related disruption mean that we cannot provide a reliable quantification for these years.

Purchased goods and services is the largest source of quantified emissions and has increased by 2% from 2019 to 2022. While the emissions intensity of the services we procure has reduced, overall spend has increased. 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 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. Whilst this usefully illustrates the relative scale of this source and provides a means to identify the major sources of emissions within our supply chain, the conversion to greenhouse gases is not specific to our individual suppliers. This category of emissions is therefore an approximation. Since 2019 our spend on goods and services has also increased in part due to inflationary pressure which is not reflected in the emissions factors used. As a result, 2022 figures may be an overestimate of our actual GHG emissions. In future years we will refine this calculation by adopting a hybrid method with supplier-specific data in some categories of spend.

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 it is not reported quantitatively

Overall, we estimate our quantified greenhouse gas emissions to have reduced by 14% from our 2019 baseline. The largest source of reductions is business air travel which has fallen by 41% over this period. The pandemic has also led to a significant reduction in commuting to our headquarters in Cambridge. The reduction in emissions from vehicles 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	
Scope 1	82		80	71	-11 (13%)

Carbon reduction initiatives

Getting to net zero will require prolonged engagement with our suppliers of goods and services, not only to identify more accurate data for future reporting, but to work collaboratively to proceed to net zero with us.

Travel is vital to achieving our goals as an international organisation although it comes with a financial and an environmental cost. Our 2021 travel policy embodies the principles of travel less, travel smart and travel well and explicitly requires travellers to consider the impact of their travel choices. Video conferencing and remote participation are important tools, but so too are choosing lower carbon options such as fewer travellers, rail where feasible and direct flights.

We expect the continued roll-out of low carbon electricity generation will lead to ongoing reductions in our Scope 2 emissions from electricity. We are monitoring the rate of grid decarbonisation and considering whether additional actions could help us to meet our 2030 goal. We have also engaged consultants to identify where we can shift consumption of gas to electricity in our buildings, trialling the use of electric heating at Thomas Graham House, our largest office, to see what further energy and emissions reductions are possible with existing infrastructure.

The transition to electric vehicles is globally important to reaching net zero and we are supporting staff who do not have access to their own off-street parking by fitting charging points at Thomas Graham House. Four 7 kW app-controlled charging posts were installed in 2022 as a first step. We will monitor their use and look for other ways to support staff in this transition.

Appendix 1

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 being explored.