Environmental Management System Report Q4 2020/21

Zero Waste Scotland's Environmental Impacts

Annual Report (April 2020 – March 2021)

Publication date: May 2021

Executive Summary

Carbon impacts for FY 2020/21 were 145 tCO_2e; 44% lower than last year (261 tCO_2e), despite a significant increase in gas use and the addition of equipment carbon for the very first time, Data relating to measured emissions sources is summarized as follows:

Travel

- By not travelling in 2020/21, Zero Waste Scotland have saved 222 tCO_2e (49 tCO_2e through cessation of corporate travel; 173 tCO_2e through cessation of commuting.
- Zero Waste Scotland must lock these savings in going forward, to avoid rebound emissions when travel again becomes possible.

Energy use

- Gas use for the year was estimated to be 67 tCO_2e – a 415% increase on last years' total.
- This is due to all staff working from home and operating separate heating systems. This figure is an estimate based on a third-party methodology.
- Electricity use was estimated to have risen 2% this year, to ~22 tCO_2e, due to a slight increase in staffing levels outpacing grid decarbonisation.

Water and Waste

- It is estimated that there was a 5% increase in food waste generation; an 8% increase in 'other' waste generation; and a 4% increase in water use during this financial year, versus 2019/20 levels.

Embodied equipment carbon

- This year, for the first time, Zero Waste Scotland has begun to account for embodied carbon relating to equipment purchases within EMS reporting.
- Across all measured purchases, embodied carbon equated to ~52 tCO_2e for the year. This figure does not account for all purchases.

Zero Waste Scotland 2020/21 EMS Report

This paper provides:

1. An overview of Zero Waste Scotland's overall annual environmental impacts (accounting for homeworking and an estimate on procurement activity)
2. Impacts of Coronavirus on operational emissions over the past year
3. An accompanying progress report on the company's net zero plan and how this has been impacted by COVID-19

Foreword on homeworking and data accessibility

Throughout FY 2020/21, Zero Waste Scotland colleagues worked exclusively from home due to COVID-19 restrictions. Offices remained closed and no travel was undertaken within the organisation. The homeworking situation has led to a fundamental shift in our carbon profile in the last year. Travel accounted for 0% of our emissions, whereas energy (and specifically heating) accounted for a significant proportion of our carbon output over the year relative to past annual reports.

As with previous quarterly reports from this year, office-based data was again largely inaccessible. To inform this report, a combination of historic emissions data and assumptions, as well as current data has been utilised. Together, these provide an *estimated overview of total organisational emissions* for the year across all currently measured emissions sources.

The following should be considered when reading this report:

- No travel was undertaken this year.
- The Zero Waste Scotland homeworking method was applied to figures relating to energy and travel. These are estimates based on previous data and do not account for energy saving initiatives.
- Heating emissions are significantly increased versus previous years.
- An estimate on embedded carbon relating to office and IT equipment has been included for the very first time.
- Despite including equipment carbon for the first time, emissions are still lower than pre-pandemic levels.

A simplified methodology has been employed to estimate emissions relating to waste and water over the year.

The organisation's overall environmental impacts

- **Summary**
  - **Total climate change impacts, expressed in carbon dioxide equivalent, in FY 2020/21 were 145 tonnes of CO_2e., 116 tCO_2e (44%) lower than in the previous year across all currently measured emissions sources.**

- Considering only those emissions sources that have previously been measured, the overall output of Zero Waste Scotland has reduced by 64%, from 261 to 93 tCO_2e.[1]
- With the addition of embodied carbon relating to purchased equipment, overall emissions are 44% of last years' total, representing a significant saving.

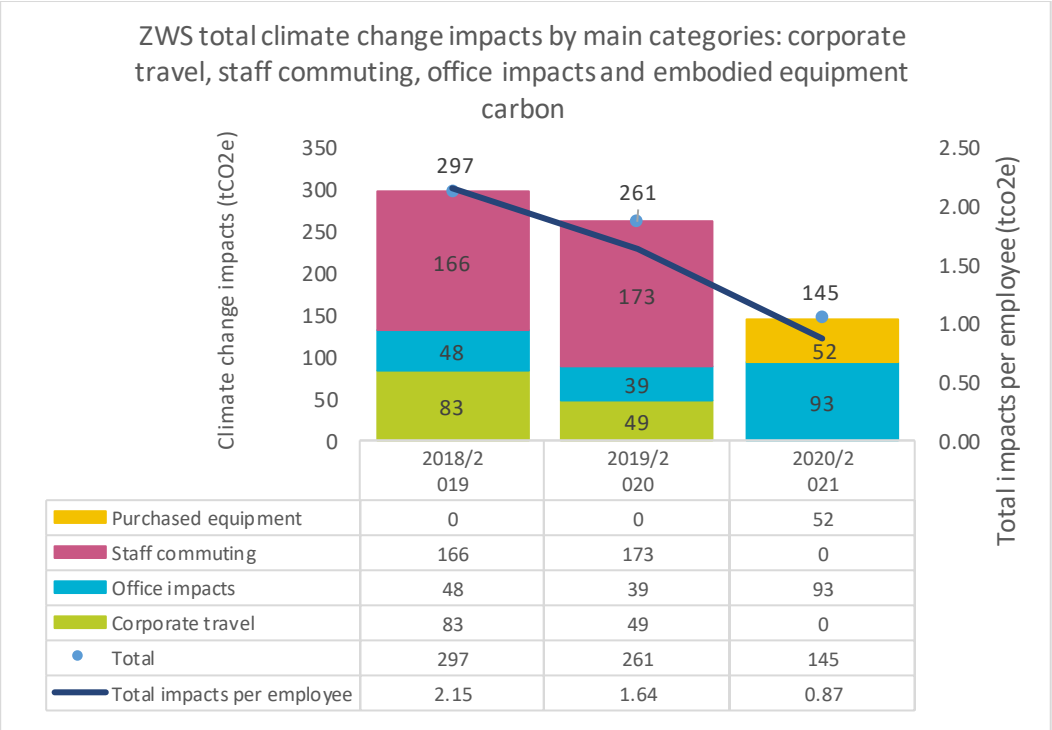

Figure 1 Breakdown of total climate change impacts by category; 2018/19 - 2020/21

Corporate travel impacts

- As a result of imposed homeworking across the organisation, *corporate travel impacts for the year were 0 tCO_2e., compared with 49 tCO_2e in FY 2019/20*. This represents a fundamental change in the emissions profile of the organisation.
- A number of initiatives are being implemented to ensure no unnecessary emissions rebound occurs in this area (detailed within accompanying net zero progress report). The Zero Waste Scotland travel hierarchy is also being updated in recognition of the need to exercise **Zero Carbon attendance**[2] wherever possible going forward.

[1] This is slightly lower than initially forecast due to an overall increase in staff role over the year, and some oversights regarding data collection (i.e. residual office gas use during homeworking).
[2] Zero carbon attendance refers to either remote attendance or attendance through active travel.

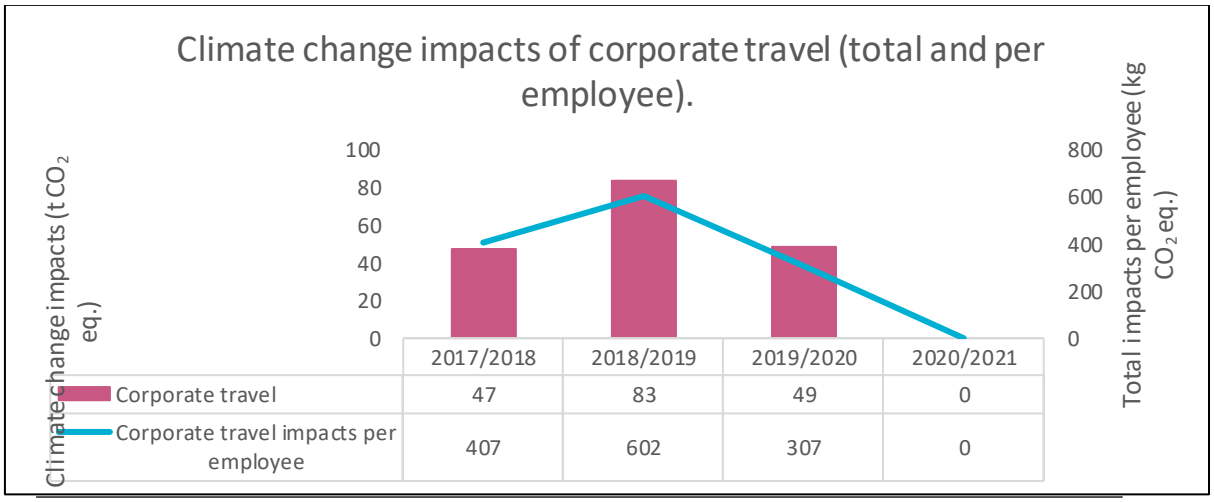

Figure 2 Per capita Corporate travel emissions.

- **Flights mileages**

The company flight cap for 2020/21 was set at 34,800 miles – 80% of the total flight mileage recorded by staff in FY 2019/20 (41,760 miles). With the financial year now complete, this cap remains intact. The environmental benefit of this situation cannot be overstated. By not flying in FY 2020/21, Zero Waste Scotland saved up to 8.8 tCO2e[3].

Figure 3 (below) shows that the flight cap of 34,800 miles remains untouched. What was previously one of the largest emissions sources for the organisation has, through a complete moratorium on all travel, been completely nullified. It is vitally important that when air travel again becomes an option, that we don't simply default to it, as the carbon reductions realised in this past year have been significant.

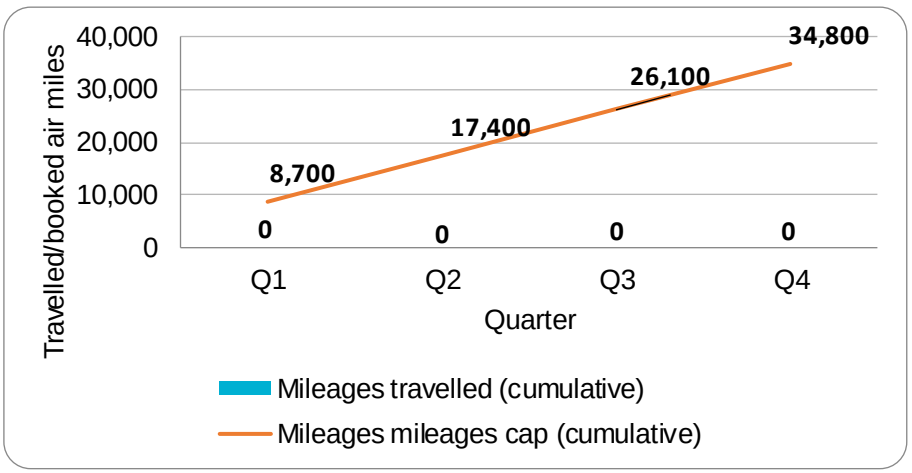

Figure 3 Air miles vs the annual cap for 2020/21.

[3] Assuming that in a BAU year Zero Waste Scotland had reached but not exceeded the allocated flight cap.

- **Commuting Impacts**

  - In previous reports, commuting has been considered separately from the core emissions of Zero Waste Scotland. Due to a widening of scope, commuting is now considered integral to the emissions profile of the business.
  - Under homeworking conditions, commuting emissions for FY 2020/21 remained at zero (0 tCO_2e). In contrast, in the previous financial year (2019/20) commuting represented by far the most significant emissions source for Zero Waste Scotland – 173 tCO_2e.
  - By avoiding all commuting in the last financial year, over 1 million commuting miles have been saved – enough to travel around the earth 40 times. It is anticipated that when offices re-open, there will be a degree of rebound, but this will be largely mitigated by ~75% of staff electing to remain home-based, as well as through targeted commuting initiatives.

Electricity

Impacts of electricity consumption in 2020/21 were estimated to be ~22 tonnes of CO_2 eq., 2% higher than the previous year. The Zero Waste Scotland homeworking method uses per-capita data to estimate energy emissions, and so, an overall increase in staff throughout the financial year versus 2019/20 levels has been noted. This has led to a very slight increase in electricity emissions for the year, despite grid decarbonisation. Figure 4 shows electricity use throughout the year, compared with previous years.

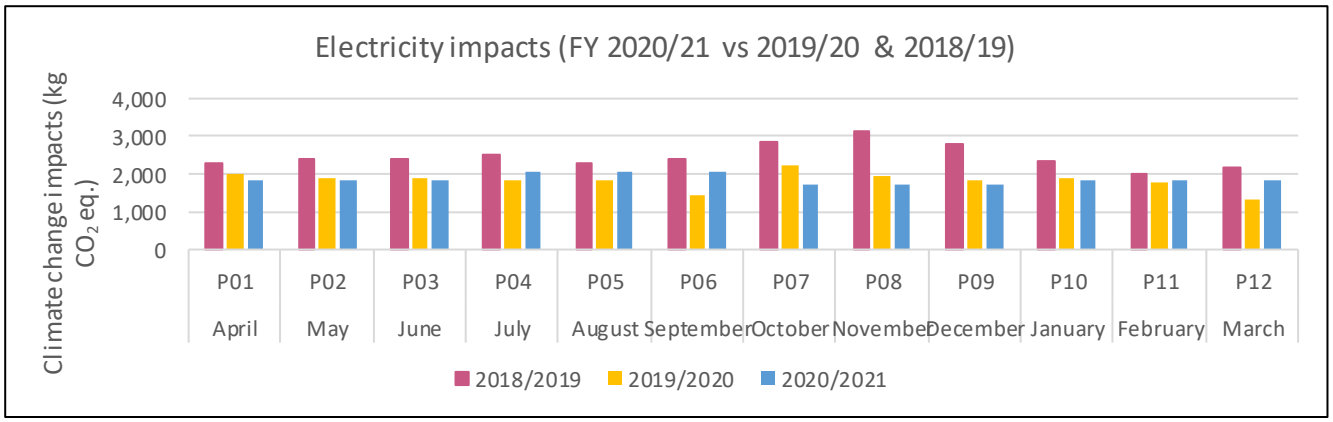

Figure 4 Climate change impacts of electricity (End-of-Year 2020/21).

Heating (Gas)

The impacts of gas consumptions rose considerably, by 415% YoY, from 13 tCO_2 eq. to ~67 tCO_2e. Due to every member of staff working from home all year, gas emissions for FY 2020/21 are estimated to be far higher than in previous years, to account for the heating of ~170 individual homes, as opposed to one single office space. Gas use now accounts for one of the largest sources of emissions across the business. Figure 5 shows estimated gas use throughout FY 2020/21 in relation to average temperature. Note that during the winter or 'heating' months, this total rises considerably. This was exacerbated by an excessively cold winter.[4]

[4] The original homeworking methodology failed to account for residual office heating which made projected overall savings less pronounced. **Residual office heating accounted for 3.5 tCO_2e** for the year.

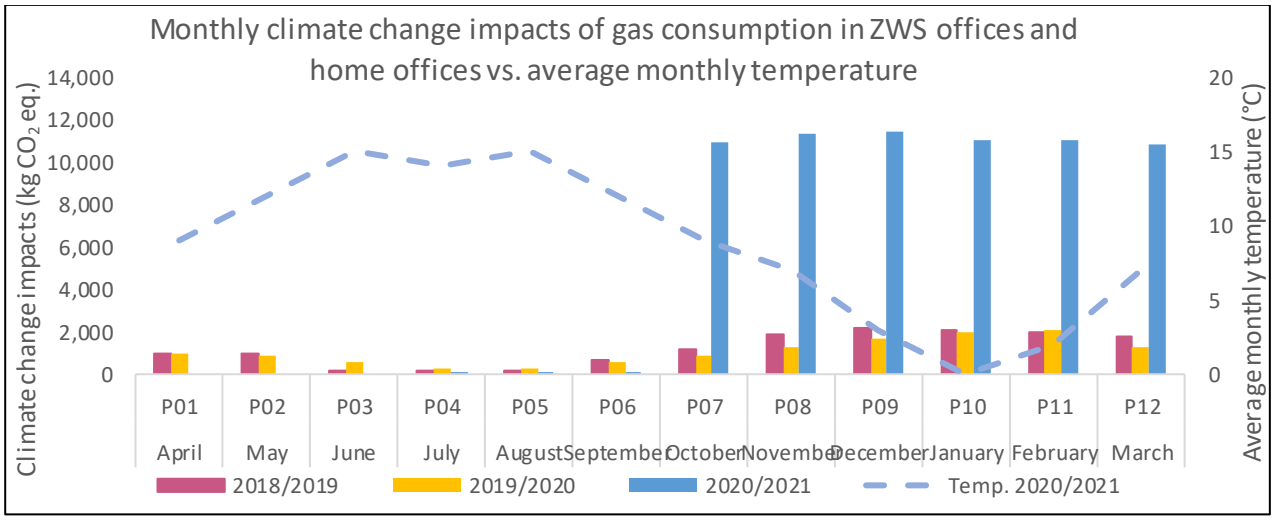

Figure 5 Monthly climate change impacts of gas consumption in our offices vs. average monthly temperature[5].

Resources loss and waste management

It is estimated that there was a 5% increase in food waste generation; an 8% increase in 'other' waste generation; and a 4% increase in water use during this financial year, versus 2019/20 levels. These figures are estimates, and show increases due to a slight rise in staff levels over the financial year, compared with previously.

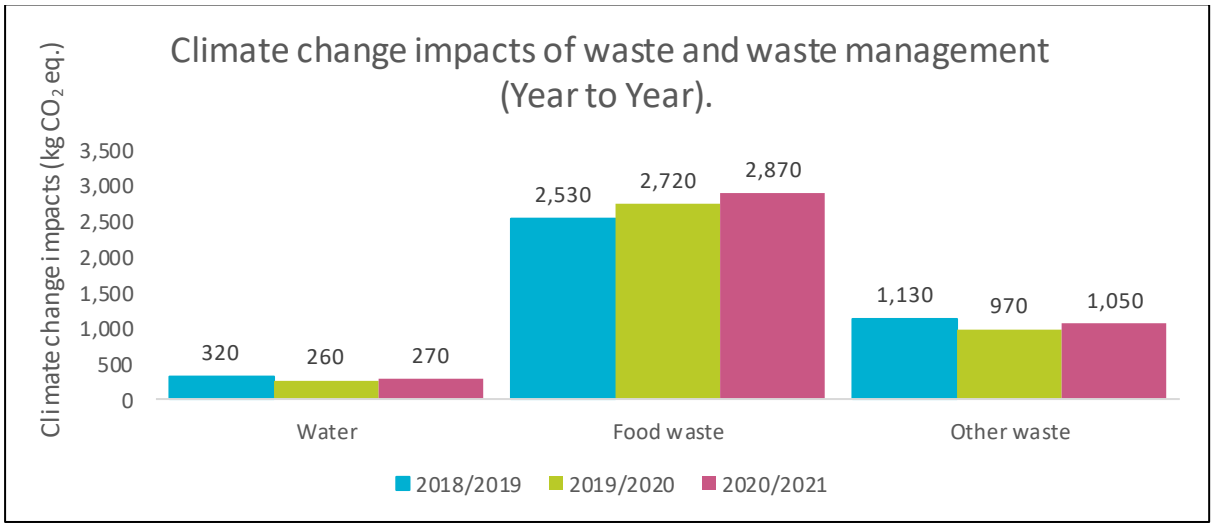

Figure 5 Climate change impacts of water and waste management.

- **Paper use: printing & copying**
  - No office printing occurred within FY 2020/21. The total number of sheets printed in the previous financial year was 24,153. It is not expected that staff are printing at home, so home-printing levels are currently considered to be zero.

[5] https://www.worldweatheronline.com/stirling-weather-averages/stirling/gb.aspx

- In FY 20120/21, the organisation has avoided the printing of over 24,000 sheets of paper (versus the previous FY). This is equal to the preservation of 2.5 fully grown pine trees.[6]

Measuring embodied carbon of equipment.

Embodied emissions relating to equipment purchases were 52 tCO2e over the year, across all measured purchases.

In FY 2020/21, for the very first time, Zero Waste Scotland has utilised specialist LCA software to obtain carbon data relating to IT and office equipment purchased over the year. Whilst the software is unable to provide model-specific data, it does provide industry-average data that was considered relatively accurate, due to the routine purchasing of brand-new, off the shelf equipment this year.[7]

By including embodied equipment carbon, Zero Waste Scotland are showing real leadership in the area of quantifying scope 3 emissions. This methodology has already been used by several other organisations wishing to obtain data relating to their own purchases.

The effects of including this data within Zero Waste Scotland carbon accounting are:

- The emissions profile of the business is significantly altered from previous years.
- The organisation has taken a significant step towards addressing its entire footprint
- There is now baseline data from which to improve upon through greater utilisation of reuse principles within equipment purchasing.

Figure 6 details the list and quantity of office and IT emissions purchased within the last year. This list is not exhaustive, and the Environmental Analysis team will work to expand on this.[8]

Equipment	**Number purchased**	**Carbon / unit** ($kgCO_2e$)	**Total embodied carbon** (tonnes CO_2e)
Mousepad	17	0.8	0.01
Keyboard rest	9	1.9	0.02
Laptop stand	67	4.1	0.27
Misc. cushioning	13	4.6	0.6
Laptop charger	4	4.6	0.02
Mouse	56	7.4	0.41
Footrest	18	8.2	0.15
Keyboard	72	30	2.16
Mobile phone	18	48	0.86
Chair	114	74	8.4
Desk	33	78	2.6
Laptop	7	175	1.23
Monitor	99	360	35.6
Total	527		52.3

Figure 6 – embodied carbon relating to office and IT equipment purchases

[6] Ribble, 2018; 'How much paper comes from one tree?', article [online]; available here
[7] For an overview of the method, see appendix i
[8] For a list of items purchased, but not included in this years' list, please see appendix i

Figure 7 compares quantity of items purchased against total embodied carbon of each item. It indicates that monitors and laptops account for a disproportionately large volume of embodied carbon relative to the quantity purchased.

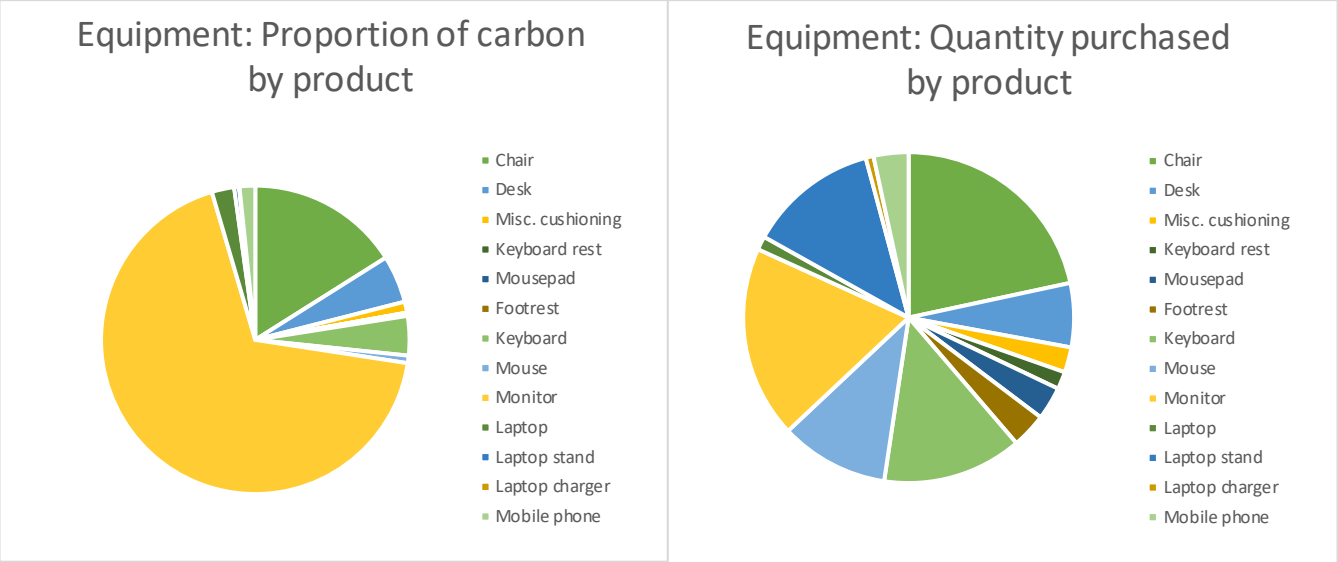

Figure 7 – equipment: embodied carbon vs quantity purchased

By exercising greater use of circular purchasing principles, the figure of 52 tCO_2e can be mitigated in subsequent years.

Appendix i – List of items and associated emissions

Item	Emissions for 1 unit ($kgCO_2e$)	Source
Laptop	175	Simapro, 2020
Office chair	74	Zero Waste Scotland, 2011
Mobile phone	48	Malmodin et al, 2016
Laptop stand	4.1	Simapro, 2020
Mouse	7.4	Simapro, 2020
Keyboard	30	Simapro, 2020
Central processing unit	227	Simapro, 2020
Desk	78	Zero Waste Scotland, 2011
Monitor	360	Simapro, 2020
Laptop charger	4.6	Simapro, 2020
Misc. cushioning	4.6	Simapro, 2020 (adapted)
footrest	8.2	Simapro, 2020 (adapted)
Keyboard rest	1.89	Simapro, 2020 (adapted)
Mousepad	4.6	Simapro, 2020 (adapted)

Office, IT items excluded from calculations, due to time/data constraints:

Item	Quantity purchased
Monitor arm	32
USB hub and cables	44
Headset	34
Speakers	8
Standing Desk converter	22
Wifi extender	**36**