

## Guide to measuring impact on emissions from home working

### Who is this guide for?

Home working as opposed to office working accelerated during the Covid 19 pandemic and many organisations are seeking ways to measure and compare the carbon emissions of both settings. This guidance is for organisations who are considering moving to a working from home or blended model who want to get a better understanding of the emissions impact of this decision and how to report their emissions.

### Which emissions should we count?

For both office and home working we focus on emissions from electricity, gas and water for a desk-based model of working rather than use of a studio or workshop. Travel is not included as this should be captured through your organisation's standard reporting mechanisms.

### Home working conditions

It is important that we minimise emissions where we can, but we need to be mindful of living conditions such as space available for work, caring responsibilities, and other needs. Office spaces should be heated to 18-21 degrees Celsius and light levels should be between 200 to 500 lux depending on work undertaken. People may have underlying conditions that require higher temperatures in their workspace.

Working from home is likely to increase utility bills and you may wish to offer a small financial contribution to bills where working from home is required. There is [UK Government advice available](#) about appropriate reimbursements and tax limits for this.

These should all be considered when using this guide.

### Typical working from home footprints

From our own calculations internally to Creative Carbon Scotland and a little wider sector research on home heating<sup>1</sup>, home electricity use<sup>2</sup> and average UK usage<sup>3</sup> we've come up with an average utility use for a Full time Equivalent (FTE) home worker which you can use to estimate and report emissions for working from home.

Emissions source	Average 'standard' use per FTE day	Average 'standard' use per FTE working year	Annual kgCO <sub>2</sub> e for average standard use
Electricity	1.5 kWh	345 kWh	78 kgCO <sub>2</sub> e
Gas	2.8 kWh	644 kWh	118 kgCO <sub>2</sub> e
Water	0.05 m <sup>3</sup>	11 m <sup>3</sup>	4 kgCO <sub>2</sub> e
<b>Average annual carbon footprint from 1 FTE working from home</b>			<b>200 kgCO<sub>2</sub>e</b>

Table 1 - This assumes a working area of around 9m<sup>2</sup> and a FTE of 230 working days per year of 7.5 hours and uses the [UK government 2023 emissions factors](#).

<sup>1</sup> <https://www.greenmatch.co.uk/green-energy/central-heating-capacity#:~:text=The%20first%20and%20the%20easiest,a%2010%20kWh%20boiler%20type.>

<sup>2</sup> Lighting source: <https://insights.regencylighting.com/kw-vs-kwh-how-much-energy-is-my-lighting-using>

<sup>3</sup> <https://smarterbusiness.co.uk/blogs/average-gas-electricity-usage-uk/>

Although there is a variation between individual workers it seems a realistic and appropriate approach to use an average figure per FTE where you are reporting for a number of staff working from home.

If you wish to measure emissions more precisely so you can work to reduce them, you should collate information from each staff member working from home, listing IT equipment used, proportion of the home used as office space and annual heating bills. For reporting purposes, we ask for the total kWh for your organisation from electricity and gas and m3 of water.

## Measuring your office footprint

For your office, it is always best to try to **obtain figures on utility use from your building manager**, so we ask you to report those.

## Home or office working? – implications and considerations for carbon footprints

For comparison with working from home, the table below shows typical gas and electricity usage figures for micro businesses in the UK (up to 10 employees).<sup>4</sup> Assuming 10 desks, we can estimate an annual FTE footprint for very modest office accommodation. Many office buildings with lifts, air conditioning and catering facilities can have significantly higher footprints per desk.

Utility	Low end usage (kWh) Annual	High end usage (kWh) Annual	Estimated Annual FTE (kWh)	Estimated Annual kgCO <sub>2</sub> e
Electricity	5000	15000	500-1500	112-337
Gas	10000	n/a	1000	183
<b>Typical annual carbon footprint for 1 FTE in small office</b>				<b>295-520</b>

Table 2 Note water usage is not provided but is likely to be similar to usage for home working. These calculations use the [UK government 2023 emissions factors](#).

The figures shown above, based on our estimates show that while the working from home footprint is slightly smaller than an office footprint, the difference is not large. There is likely to be a significant range of 'footprints per desk' with either way of working such that there is an overlap between home and office working. Recent experience has shown that the most significant reduction in emissions as a result of working from home stems from reduced commuting where most journeys exceed a few miles.

Despite this there is also scope for significant emissions reductions in both settings and it is useful to consider the factors, small and large, which provide opportunities to mitigate energy use while still providing a comfortable workspace when deciding on the best workplace.

Factor	Home working	Office working
<b>Heating</b>	Working from a home office will usually require a space which is heated in the employee's home. The additional heating required will vary depending on <ul style="list-style-type: none"> <li>Efficiency of the building (UK domestic properties are notoriously poorly insulated)</li> </ul>	Heating required per desk in traditional offices can vary by a factor of 2 or more depending on: <ul style="list-style-type: none"> <li>Efficiency of the building insulation</li> <li>Heating and ventilation system</li> <li>Occupancy of the building</li> </ul>

<sup>4</sup> <https://smarterbusiness.co.uk/blogs/average-gas-electricity-usage-uk/>

	<ul style="list-style-type: none"> <li>• What heating controls are available</li> <li>• The space used in the home</li> <li>• Presence of other occupants</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of social spaces e.g catering facilities</li> </ul>
<b>Heating mitigation</b>	<ul style="list-style-type: none"> <li>• Minimise space being heated e.g. use zoned heating control systems to concentrate heating on areas in use.</li> <li>• Insulate and draught proof working space</li> </ul>	<ul style="list-style-type: none"> <li>• Select energy efficient office space</li> <li>• Select office size to suit occupancy</li> <li>• Maintain and/or upgrade heating and ventilation systems</li> <li>•</li> </ul>
<b>Electricity use</b>	<p>The home office space will require additional electricity use for lighting, kitchen and IT equipment and possibly heating. This will vary depending on:</p> <ul style="list-style-type: none"> <li>• Availability of natural light</li> <li>• Efficiency of lighting</li> <li>• IT equipment used (viewing devices; additional equipment e.g. monitors, printers, speakers, phones, storage devices)</li> <li>• Any electric heating</li> <li>• Kitchen equipment (kettle, microwave, cooker)</li> </ul>	<p>Office spaces require electricity for lighting, IT equipment, infrastructure such as lifts and catering equipment. Ventilation and heating require fans and pumps. Purpose built offices typically require air conditioning which is particularly energy intensive while smaller office spaces in older buildings require more heating in winter but suffer less overheating in summer</p>
<b>Electricity mitigation</b>	<ul style="list-style-type: none"> <li>• Install low energy LED bulbs</li> <li>• Maximise use of daylight</li> <li>• Use only essential IT equipment</li> <li>• Optimise use of cooking equipment (e.g don't overfill kettles)</li> <li>• If used, electric heating should be thermostatically controlled</li> </ul>	<ul style="list-style-type: none"> <li>• Install low energy LED lighting;</li> <li>• Choose office space with good daylighting;</li> <li>• Optimise heating and cooling controls</li> </ul>
<b>Housekeeping and behaviour</b>	<ul style="list-style-type: none"> <li>• Switch off lights and equipment when not in use e.g. switch off chargers</li> <li>• Turn down thermostat if space not in use</li> </ul>	<ul style="list-style-type: none"> <li>• Switch off all IT equipment at the end of the day</li> <li>• Turn down thermostat rather than open windows if too hot</li> <li>• Use stairs instead of lifts if possible</li> </ul>
<b>Commuting</b>	n/a	Where possible walk or cycle and for longer distances use public transport where available

Note that when reporting your organisation's emissions, travel emissions from commuting are not included although we always welcome and commend organisations' encouragement of more sustainable commuting as this influences the bigger picture. We're also not including waste as remote working is assumed to be paperless by default.

## **Advice on home energy use**

Advice on home energy use is available from the following organisations:

- [Home Energy Scotland](#) exists to help people in Scotland create warmer homes, reduce their energy bills, and lower their carbon footprint.
- [Energy Saving Trust](#) primarily provide energy efficiency advice for organisations but also have useful resources about energy efficiency at home.
- [Zero Waste Scotland](#) also have useful guides and resources that go beyond energy saving.