



Greenhouse Gas Emission Accounting at Crystallise – part 1

©Crystallise Limited
2022
www.crystallise.com

William Letton – Consultant for R&D

What and why?

Crystallise is estimating its carbon footprint in order to identify which activities contribute the most. These could then be used as targets for reducing environmental impact.

How?

The **Greenhouse Gas (GHG) Protocol** provides reporting standards primarily aimed at larger companies¹. Crystallise is small and almost all work is now home-based. The **EcoAct Homeworking Emissions Whitepaper 2020** provides additional guidance².

The EcoAct Whitepaper provides base case models for **electricity, heating, and cooling emissions** as a result of homeworking for the UK and USA², with cooling emissions (air conditioning) assumed to be absent in UK homes. Below are shown the resulting estimates. In the following tables, homeworking hours and employee numbers are specific to Crystallise, but the other parameters are taken either from the EcoAct base model or the GHG emissions calculation tool.

| Electricity | Parameter | Estimate source | Value |
|-------------|---|--------------------|--------|
| | Homeworking per annum (hours) | Crystallise | 1589 |
| | Homeworking employees (count) | | 22 |
| | Individual workstation wattage (W) | Ecoact base model | 140 |
| | Individual lighting wattage (W) | | 10.00 |
| | Individual annual energy (kWh) | | 238.35 |
| | Grid Average GHG emissions factor (kgCO ₂ e/kWh) | GHG emissions tool | 0.38 |
| | Total annual energy (kWh) | NA | 5,244 |
| | Total emissions (kgCO ₂ e) | | 1,998 |

| Heating | Parameter | Estimate source | Value |
|---------------------------------------|--|--------------------|--------|
| | Annual homeworking hours per homeworker (hours) | Crystallise | 1589 |
| | Total homeworkers (count) | | 22 |
| | Proportion of homeworking hours with heating per year | EcoAct base model | 0.5 |
| | Proportion of workers that would have had at least one household member at home all day anyway | | 0.33 |
| | Energy use per hour of heating (kW) | | 5.08 |
| | Grid Average GHG emissions factor (kgCO ₂ e/kWh) | GHG emissions tool | 0.18 |
| | Annual excess heating energy use per homeworker (kW) | NA | 2,689 |
| | Annual excess heating energy use total (kW) | | 59,160 |
| Total emissions (kgCO ₂ e) | 10,722 | | |

What do we see?

The results suggest that **extra heating** due to homeworking is responsible for around **10 tonnes of carbon dioxide equivalent emissions per year**, while **extra electricity usage is responsible for around 2 tonnes**.

However, the output is very **sensitive to the assumptions**, particularly how employees heat their homes and how much.

What next?

The next step is to assess **how applicable** the EcoAct base case model parameter assumptions are to Crystallise employees. Enhanced data collection, as recommended in the whitepaper, will then allow us to refine the estimates. The **model can then be extended** to include additional considerations, such as emissions due to conference travel.

References

- Greenhouse Gas Protocol, World Resources Institute, accessed 15th November 2021, <https://ghgprotocol.org/ghg-emissions-calculation-tool>
- Homeworking emissions whitepaper, Ecoact, accessed 24th November 2021, <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>