Ooni Streamlined Energy and Carbon Reporting (SECR) 2022

Methodology and Assumptions

This explains the methodology and assumptions used as part of calculating Ooni's Scope 1, Scope 2, and partial Scope 3 footprint for 2022. The numbers can be found in Ooni's 2022 Impact Report and Streamlined Energy and Carbon Reporting (SECR) section of the group accounts.

Scope 1 – Natural gas

Calculated for UK Ooni Park and Bonn.
No mains gas use at the US Austin office or UK Lomond House office.
Ooni Park: two gas meters, monthly readings taken across the year.

Assumptions

- Due to limited data available for the Bonn office, it has been assumed that the intensity of natural gas usage (kWh/ft^2) there will mirror that of Ooni Park's unit 5.
- In 2021, it was assumed that the US office had mains gas. From recent conversations with our US office coordinator, it seems that neither of the US offices used in 2022 had mains gas. Hence the 2021 natural gas total was retrospectively updated (from 21.62 to 12.17 tCO2e).
- In 2021, the net calorific value (CV) had been used as the conversion factor. As per guidance from "UK Greenhouse Gas Conversion Factors – Common Queries about the Greenhouse Gas Conversion Tool" (page 3), the gross CV has been used for 2022.
- In August 2022, we took an office space in a shared office block in Melbourne. Only three Ooni team members worked there for the entire year. Data regarding floor space and direct energy has not arrived as yet. Therefore Melbourne has not been included in this reporting.

Data sources

- Natural gas UK – DEFRA GHG Conversion Factors 2022 – Fuels: Natural Gas (Gross CV)
- Natural gas Germany – page 48

In 2021, it was assumed that the US office had mains gas. Upon further investigation combined with a mid-year move to a new US office space, it transpired that neither US office had mains gas. This explains the decrease in natural gas tCO2e from 2021 to 2022. The net CV conversion factor was used for 2021's figures.In 2022, after consulting UK Environmental Reporting Guidelines methodology was corrected to use a gross CV conversion factor for natural gas.

Scope 1 – Testing fuels

Calculated for – UK Ooni Park office only.
Data is from regular audits of fuels used in Ooni Park workshop and staff oven use (ie, lunches).

Assumptions

- **Oxygen –** volume of liquid oxygen has been estimated as weight in kg, assuming one litre of liquid Oxygen weight 1.1417kg.
- **Propane –** conversion of kWh to kg based on 13.99.
- **Weld gas –** this was Hobbyweld 5, which is made up of 93% Argon, 5% Carbon Dioxide, 2% Oxygen. See website here. This was split into each part and the associated kgCO2e calculated with the relevant conversion factor (CF).
- **Lumpwood charcoal** was assumed to have the same environmental impact as 'wood logs' within the DEFRA Greenhouse Gas Conversion Factors (2022).
- **Premium Assorted Oak Pack** is an Ooni product, Weight (boxed): 11kg (24.2lb). Comprised of:
    - 25% of box – Ooni Premium Hardwood 13cm (5") (13cm) Oak Log.
    - 25% – bespoke-sized Ooni Premium Hardwood 10cm (4") Oak Chunks.
    - 50% – Ooni Premium Hardwood 20cm (8") Oak Logs.
- **Premium Natural Firestarters** were assumed to have the same environmental impact as 'Wood Chips' within the DEFRA Greenhouse Gas Conversion Factors (2022).

Data sources

- **Propane –** DEFRA 2022, Fuels, kWh Net CV.
- **Oxygen –** Used the same CF as in 2021 (0.41). Winnipeg.ca emissions factors Oxygen liquid kgCO2e/unit. This data does not seem to be peer reviewed, however, this greenhouse gas conversion factor lies within the range referenced by Viriny et al. (2021) regarding the global warming potential associated with a tank of liquid oxygen (0.26 – 0.55kg/kg).
- **Argon –** page 19 of Reimink, H. & Maciel, F. (2021) CO2 Data Collection, User Guide, version 10. This source was trusted as the oxygen CF referenced in this paper also fell within the range suggested by the Viriny paper (see Oxygen above).
- **Weld gas**
    - **Argon –** see above.
    - **CO_2 –** assumed as 1.
    - **O_2 –** see Oxygen above.
- **For all solid wood fuels,** the net calorific value (CV) factor was used as per the methodology used by our consultant in 2021, as per the Forest Research "Typical calorific values of fuels" webpage, and as per the Land Energy recommendation here.
- **Hardwood and beechwood pellets –** *DEFRA 2022: Bioenergy – Wood pellets*
- **Charcoal birch –** *DEFRA 2022: Bioenergy – Wood logs*
- **All Wood Logs (oak logs, lekto heat logs, luxury wood birch crate kiln dried) –** *DEFRA 2022: Bioenergy – Wood logs*
- **Firestarters –** *DEFRA 2022: Bioenergy* – Wood chips

kWh calculations

To convert the testing fuels from their different units (tCO2e, kg, L) into kWh, an average was used of two methods; "reverse kgCO2e" and "kWh/kg".

"reverse kgCO2e" – was working back from the tCO2e already calculated, using the kg CO2e per unit (kWh) as listed in the DEFRA conversion factors.

"kWh/kg" – was calculated using the mass (kg) of fuel used and the kWh/kg factors found below:

- Pellets and logs (excl. Lekto)
- Charcoal birch
- Lekto heat logs

An average was then taken of both these methods.

kWh conversions could not be found for Oxygen, Argon and Weld Gas. They have been left in tCO2e.

These testing fuels were only calculated for UK Ooni Park, as this is the only office with a workshop on site. However, these fuels are also used for staff oven usage and lunches, which had been minimal at the Austin and Bonn offices, but is now increasing as staff numbers grow. Going forward, processes are being set up to ensure these fuels are being recorded in Austin, Bonn and the new UK Lomond House office for 2023.

Scope 1 – Refrigerants

Calculated for UK Ooni Park, Austin and Bonn offices.
A full inventory of all fridges, freezer and AC units was taken across the above offices.
A hybrid of the screening method and lifecycle stage method was used.

Assumptions

UK Ooni Park:

- Calculations were done following the methodology instructed in the UK Gov Environmental Reporting Guidelines (Annex C, page 101), ie for installation, operation, and disposal.
    - **Installations –** all new fridges, freezers, and AC units were assumed pre-charged and therefore not within Ooni's reporting boundary.
    - **Operation –** this was the main calculation, following the default annual leak rates prescribed in the Reporting guidelines Annex C.
    - **Disposal –** no units were disposed of in 2022.
    - **Top-ups –** there were no recorded top-ups in 2022.
- There are no AC units in the Bonn office; in 2021 it had been assumed that there were, hence the retrospective change of the 2021 Refrigerant total (from 96.03 to 91.28 tonnes).
- No data available for the Melbourne office.
- No data was available for the Austin office AC units, so estimates were made using square footage and Broxburn unit 5 AC tCO2e/ft². It was assumed that the environmental impact of refrigerants per ft² of Austin mirrored that of Broxburn.

Data sources

- Labels on fridges, freezers and AC units for refrigerant type and charge capacity.
- Qualitative data on installation date from office coordinators.
- GWP of each refrigerant was either from the label on the unit or from *"DEFRA 2022 – Refrigerants & other"*.

2021 recharges and method

In 2021, three AC units in our UK Ooni Park office were recharged. This was carried out onsite by a service contractor. One was a large recharge of 19.4kg of R140a, thus leading to a large attributed tCO2e for refrigerants in relation to 2022, when there was no servicing or top-ups. The carbon associated with refrigerants in 2021 was calculated from these three recharges and the estimated equivalencies using "refrigerant tCO2e/ft²" for Austin and Bonn only. The annual leak rate method was not used, fridges and freezers not included and it was incorrectly assumed that the Bonn office had AC units. The 2021 data has been amended to omit the Bonn office portion, but not re-worked to include the annual leak rate methodology.

Scope 2 – Electricity

Calculated for UK Lomond House, UK Ooni Park, Bonn and Austin offices.
Ooni Park, Lomond House - many different meters, monthly readings taken across the year.

Assumptions

- Due to limited data available for both the Bonn and Austin offices, it has been assumed that the intensity of electricity usage mirrors that of Ooni Park's unit 5 (main office space). Again, direct energy data from UK Ooni Park unit 5 was used to provide an electricity kWh/ft² usage and applied to the square footage of the Bonn office and Austin office (which moved to a new space in August – High Brew Jan-Aug 2022, then Springdale late Aug-Dec 2022).
- **Ooni Park:** Bulb – three units of unit 5, 6 and 1A have been used by Ooni since before 2022. These are all on a renewable electricity tariff with Bulb. According to Bulb's website, "In 2021-22 we supplied all our members with wind, solar and hydro power. Solar 4%, Wind 96%."
    - To account for the environmental impact of this renewable electricity consumption, the proportion of kWh per renewable generation method was calculated (ie 96% of kWh with the offshore wind CF, whilst 4% of kWh with solar CF). It was assumed that the wind % was offshore rather than onshore.
- **Ooni Park –** at various dates throughout 2022, Ooni became the occupant of additional Ooni Park units (Bishopsgate Business Park). These are listed below. Around these dates, they came under our energy use reporting. These units were previously used by a variety of different businesses and thus have various sub-meters and different utility providers (EDF, E-ON, OPUS, SSE). The conversion of these units has been done at the non-renewable UK grid electricity CF.
- **Lomond House –** this new office is with Ecotricity on a 100% renewable electricity tariff. Their mix was reported as 81.98% offshore wind, 11.42% onshore wind, 5.22% solar wind, 1.13% hydro and 0.26% crop-fed anaerobic digestion (AD). Excluding crop fed AD (as it was <1%), these proportions were calculated in line with the Lomond House kWh. See their website for fuel mix.

Data sources

- **Electricity UK, Location-based –** *DEFRA 2022: Electricity UK*
- **Electricity UK, Market-based:**
    - **Offshore wind –** Schlömer S., T. Bruckner, L. Fulton, E. Hertwich, A. McKinnon, D. Perczyk, J. Roy, R. Schaeffer, R. Sims, P. Smith, and R. Wiser, 2014: Annex III: Technology-specific cost and performance parameters. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (page 7/1335 *– Table A.iii.2 "Emissions of selected electricity supply technologies (gCO2eq/kWh)" – Wind offshore: Lifecycle emissions-Median)*
    - **Onshore wind –** (see above for full reference) *Wind onshore: Lifecycle emissions-Median*
    - **Solar –** (see above for full reference) *Solar PV-Utility-Lifecycle emissions-Median*
    - **Hydro –** (see above for full reference) Hydropower:Lifecycle emissions-Median
    - **Non-renewable grid UK –** DEFRA 2022: *UK Electricity* (kWh/kg CO2e per unit)
- **Electricity Germany (Bonn) –** used the Electricity Map App to determine the carbon intensity per kWh of electricity consumption in Germany. Taken as of Dec 2022 (0.553kg/kWh).
- **Electricity USA (Austin) –** EPA Greenhouse Gas Equivalencies calculator.

Additional notes

Location-based calculations are displayed as default. However, both Bulb and Ecotricity purchase Renewable Energy Guarantees of Origin (REGO) certificates for each unit of renewable electricity that Ooni as a customer consumed, so this verifies the sale of renewable electricity.

Scope 3 – Fuels-and-Energy-Related-Activities (FERA)

This is the calculation of the Scope 3 well-to-tank emissions associated with the combustion of testing fuels, natural gas and the consumption of electricity.

The total weight of testing fuels, total natural gas kWh and the total kWh electricity consumed was multiplied by the relevant WTT conversion factors.

Assumptions

- **Charcoal** was assumed to have the same WTT environmental impact as 'wood logs'.
- **Firestarters** were assumed to have the same environmental impact as 'wood chips'.
- **Natural gas –** it was assumed that the WTT conversion factors associated with the consumption of natural gas in Austin and Bonn would be consistent with those applied to the UK Broxburn office.
- **Electricity –** it was assumed that the WTT conversion factors associated with the consumption of electricity in Austin and Bonn would be consistent with those applied to the UK offices.

Data sources

F-E-R-A TESTING FUELS

- **Propane –** *DEFRA 2022: WTT-Fuels.*
- **Oxygen –** could not achieve.
- **Argon –** could not achieve.
- **Weld gas –** could not achieve.
- **Pellets –** *DEFRA 2022: WTT-Bioenergy, Wood pellets.*
- **Charcoal –** *DEFRA 2022: WTT-Bioenergy, Wood logs.*
- **Wood logs –** *DEFRA 2022: WTT-Bioenergy, Wood logs.*
- **Firestarters –** *DEFRA 2022: WTT-Bioenergy, Wood chips.*

F-E-R-A NATURAL GAS

- **Natural gas –** *DEFRA 2022: WTT-Fuels, Natural Gas, Gross CV.*

F-E-R-A ELECTRICITY (location-based)

- **Extraction, refining and processing of primary fuels** before their use in electricity generation – *DEFRA 2022: WTT – UK electricity (generation).*
- **Generation losses –** *DEFRA 2022: WTT – UK electricity – WTT – UK electricity (T&D).*
- **Grid losses** (the energy loss in getting the electricity from the power plant to the organisations that purchase it) – *DEFRA 2022: Transmission and distribution – T&D – UK electricity.*

FERA

Scope 3 – Waste

Calculated for UK Ooni Park, Austin and Bonn offices.

This data was derived from waste management provider reports for the UK Ooni Park office. The data was split into general waste, mixed recycling, food waste, scrap metal as well as energy from waste residual waste. This dataset also included the percentage of each waste stream which goes to and is diverted from landfill.

Landfilled and landfill-diverted weight of each waste stream was calculated and these weights were multiplied by the relevant greenhouse gas conversion factors.

UK Lomond House was not included as the Ooni team did not use it and therefore generate waste until 2023. Melbourne office was not included due to lack of data availability.

Assumptions

- Due to limited data available for Bonn and Austin, it has been assumed that the intensity of waste production usage (kWh/ft^2) of the Bonn office will mirror that of Ooni Park's unit 5.
- Food waste – ENVA website *"The food waste that we collect is directed to either a fully permitted in-vessel composting or anaerobic digestion facility, where it is used to produce a soil improver product to PAS100 standard, as well as recover energy".* The food waste conversion factor used was 8.911 (this is the value for both the anaerobic digestion and composting).

Data sources

- General waste landfill diversion – *DEFRA (2022): Waste disposal – Commercial and industrial waste – combustion.*
- Mixed recycling landfill diversion – *DEFRA (2022): Waste disposal – Average figures for Plastic, Metal and Paper closed-loop recycling/combustion .*
- Food waste – *DEFRA (2022): Waste disposal – Organic: mixed food and garden waste – Anaerobic digestion and Composting.*
- Scrap metal landfill diversion – *DEFRA (2022): Waste disposal – Metal: scrap metal closed-loop recycling/combustion.*
- Energy-from-waste landfilling – *DEFRA (2022): Waste disposal – Commercial and industrial waste landfill figures.*

Scope 3 – Business travel

The carbon from business travel is calculated on an ongoing basis, using a dataset of original location, destination, no. passengers, single/return journey, method of travel, and travel class.

The distance of each journey (including whether it was a return or single journey) was calculated and then this distance was multiplied by the number of passengers undertaking this journey to achieve the passenger.kms.

The passenger.km of each journey was then multiplied by the relevant greenhouse gas conversion factor, including WTT environmental impact.

Assumptions

- Road – it is assumed that all road travel was in an average-sized car fuelled by petrol, according to DEFRA conversion factors (2022).
- Shanghai airport – when "Shanghai" was listed, it was assumed this meant Shanghai Pudong airport.
- Flight distances – distance was taken in km and calculated using www.airmilescalculator.com.
- Rail distances – calculated using information from Google searches. For China the main site used was www.travelchinaguide.com.
- Road distances – calculated using origin and destination in Google maps and first result taken.

Data sources

Air Travel

- DEFRA 2022: "Business travel-air" and "WTT – business travel – air". All factors included Radiative Forcing (RF) and WTT. Variations of class *(average passenger, economy, premium economy, business, first) and flight haul (domestic to/from UK, short-haul to/from UK-typically to Europe up to 3700km, long-haul to/from UK typically non-Europe over 3700km, international to/from non-UK).*

Rail Travel

- **UK:** *DEFRA 2022: "Business travel-land" & "WTT – pass vehs & travel – land". Includes WTT emissions. National rail.*
- **International:** *DEFRA 2022: "Business travel-land" & "WTT – pass vehs & travel – land". Includes WTT emissions. International rail.*
- **China:** Wang, Chen & Fujiyama (2015). Figures retrieved for emission factors per passenger.km on rail transit in Shanghai.

Road Travel

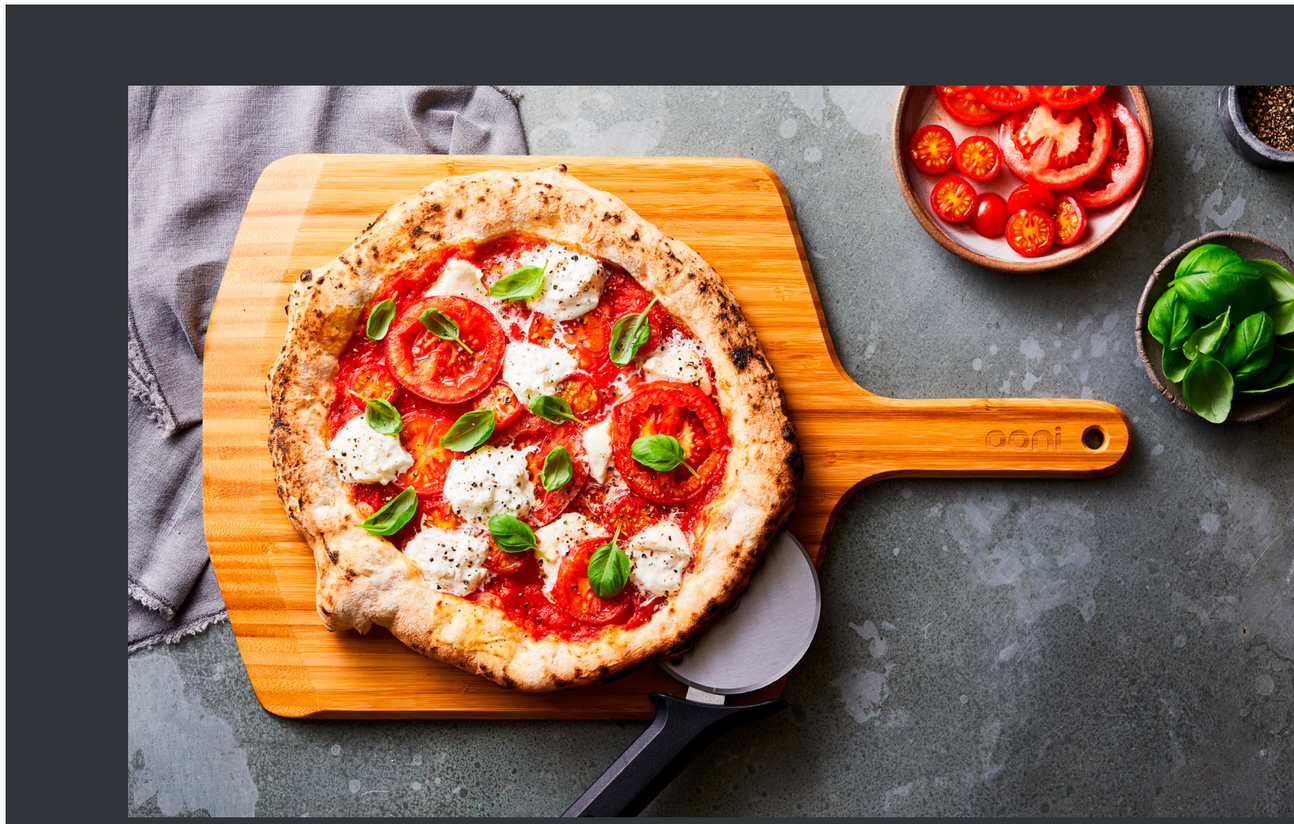
- **All:** *DEFRA 2022: "Business travel-land" & "WTT – pass vehs & travel – land". Includes WTT emissions. Car (by size), Average size, km, petrol-fuelled.*

Scope 3 – Employee commuting

Due to time and data availability, this category was calculated using estimates.

Employee commuting had previously been calculated in 2021 using an employee survey and the distance-based method alongside "*DEFRA Greenhouse Gas Conversion Factors (2021): Passenger Vehicles & WTT – pass vehs & travel – land"*. For the 2022 employee commuting total, the 2021 data was used to get a tCO2e/employee/month which was then multiplied by month-on-month employee numbers in 2022.

Similar to 2021, the majority of the company (excluding the product team) were mostly remote in 2022.



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