Qflow

DASHBOARD INSIGHTS

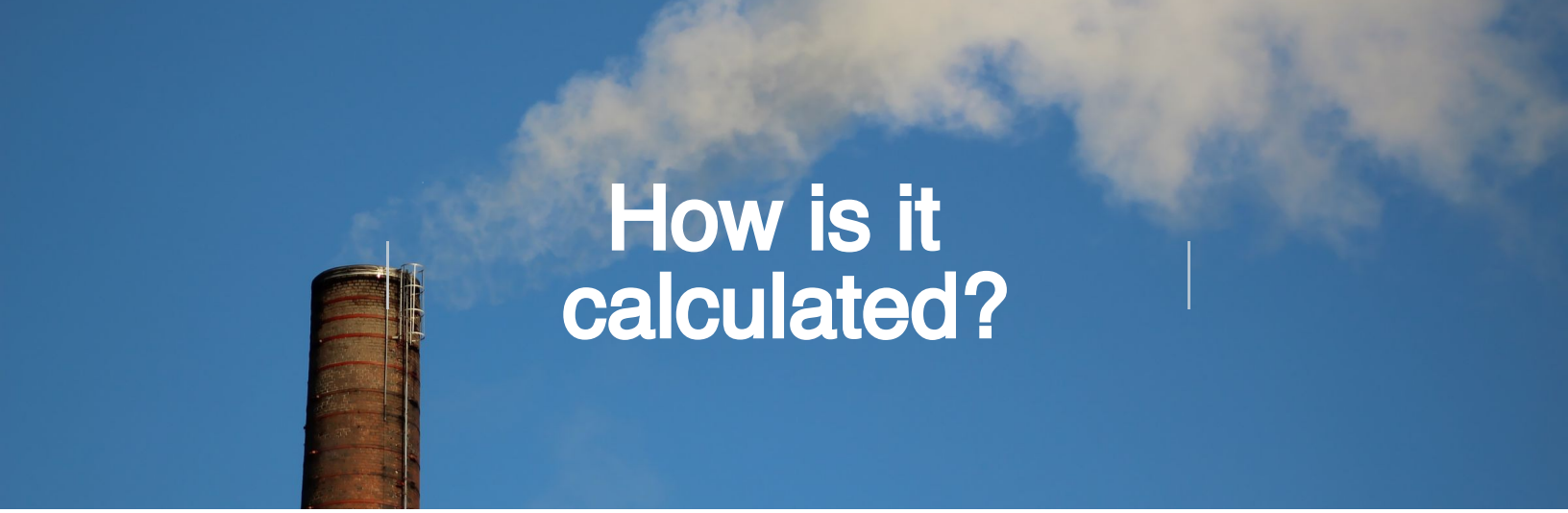
Carbon - Explained

Updated 25th August 2023

What is the carbon dashboard?

Many organisations are starting to look at their carbon emissions across Scope 1, 2 and 3. It is often difficult to get hold of data for Scope 3 emissions for material and waste emissions in particular, and this is where Qflow can help.

Given Qflow already collects data on the quantities of materials and waste consumed, we thought we'd make it easier for you to calculate carbon for these items as well. The carbon dashboard reflects this, allowing ways to track these Scope 3 emissions, which can be fed into other carbon reports for your organisation, to give you the full carbon picture.



How is it calculated?

Qflow calculates the carbon associated with:

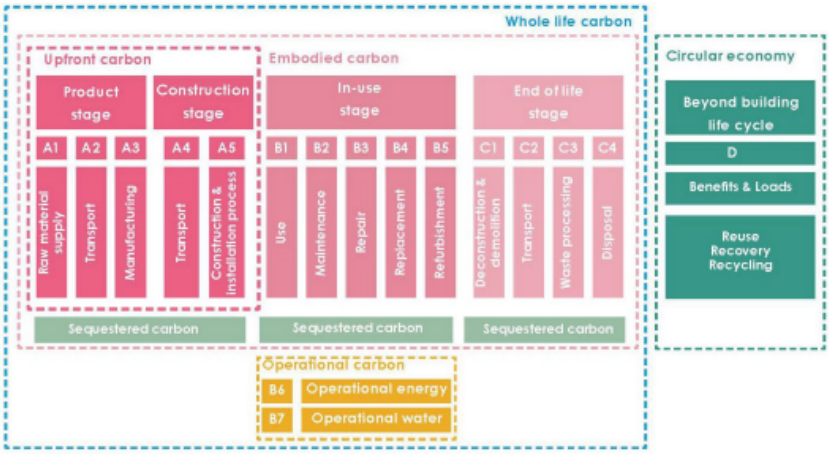
- **Materials/products** going into your construction project A1-A3 upfront carbon
- **Waste recovery** for items going out of your construction project A5 upfront carbon
- **Transport emissions** associated with the movement of **materials** from the dispatch address to your construction project A4 upfront carbon
- **Transport emissions** associated with the removal of **waste** to transfer or destination facilities A5 upfront carbon
- **Fuel** being delivered to site A5 upfront carbon

We have outlined the areas of the whole life carbon assessment (as defined in BS EN 15978:2011 and as used within the RICS Professional Statement for the UK) that we believe each of these components refers to, in blue above. This should be used in conjunction with work from your sustainability or carbon specialist, who is responsible for collating data for the total carbon footprint across your organisation.

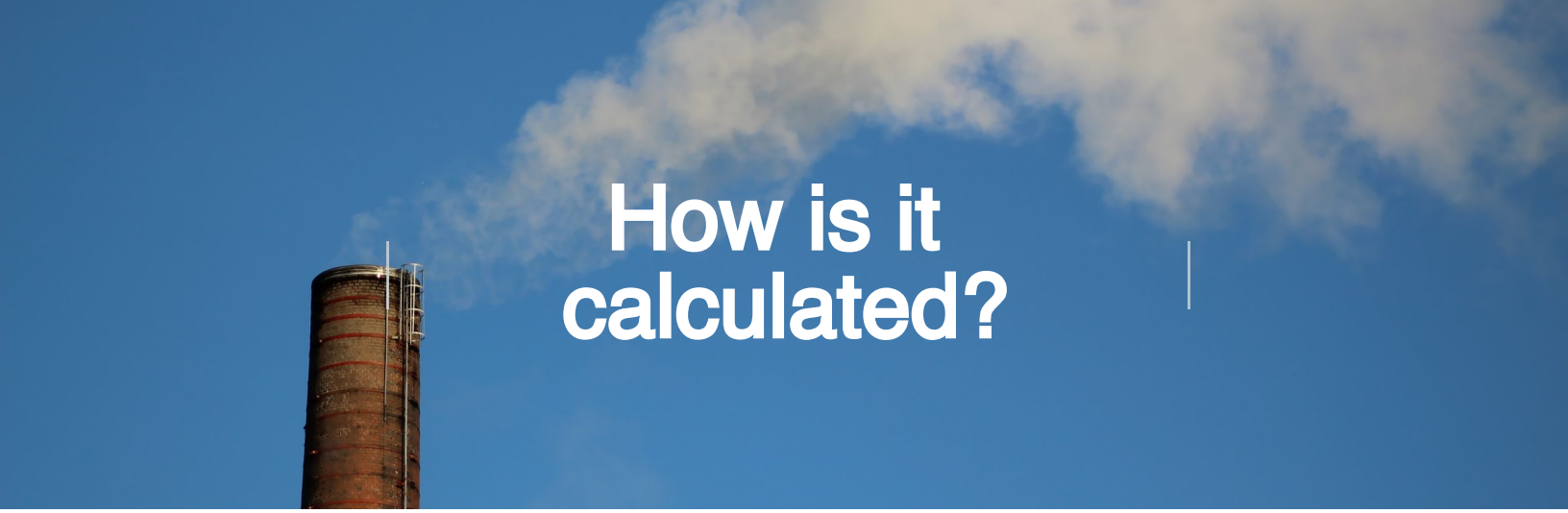
The equation for calculating carbon is relatively simple, which is:

Activity x Carbon emission factor = Total emissions

E.g. volume of concrete used (m3) x kgCO2e/m3 concrete, or, kilometres travelled by lorry x kgCO2e/km. These carbon factors can be generic or product specific, and are found either from industry databases or technical product data (Environmental Product Declarations).



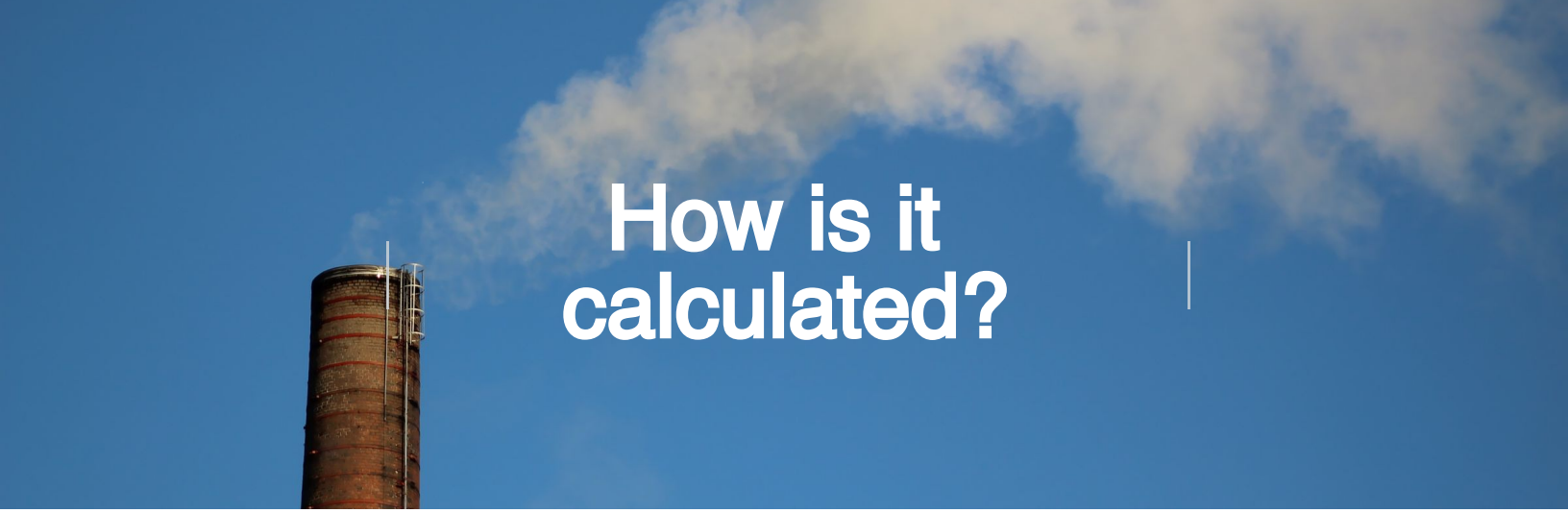
LETI Whole Life Carbon One Pager. Available here



How is it calculated?

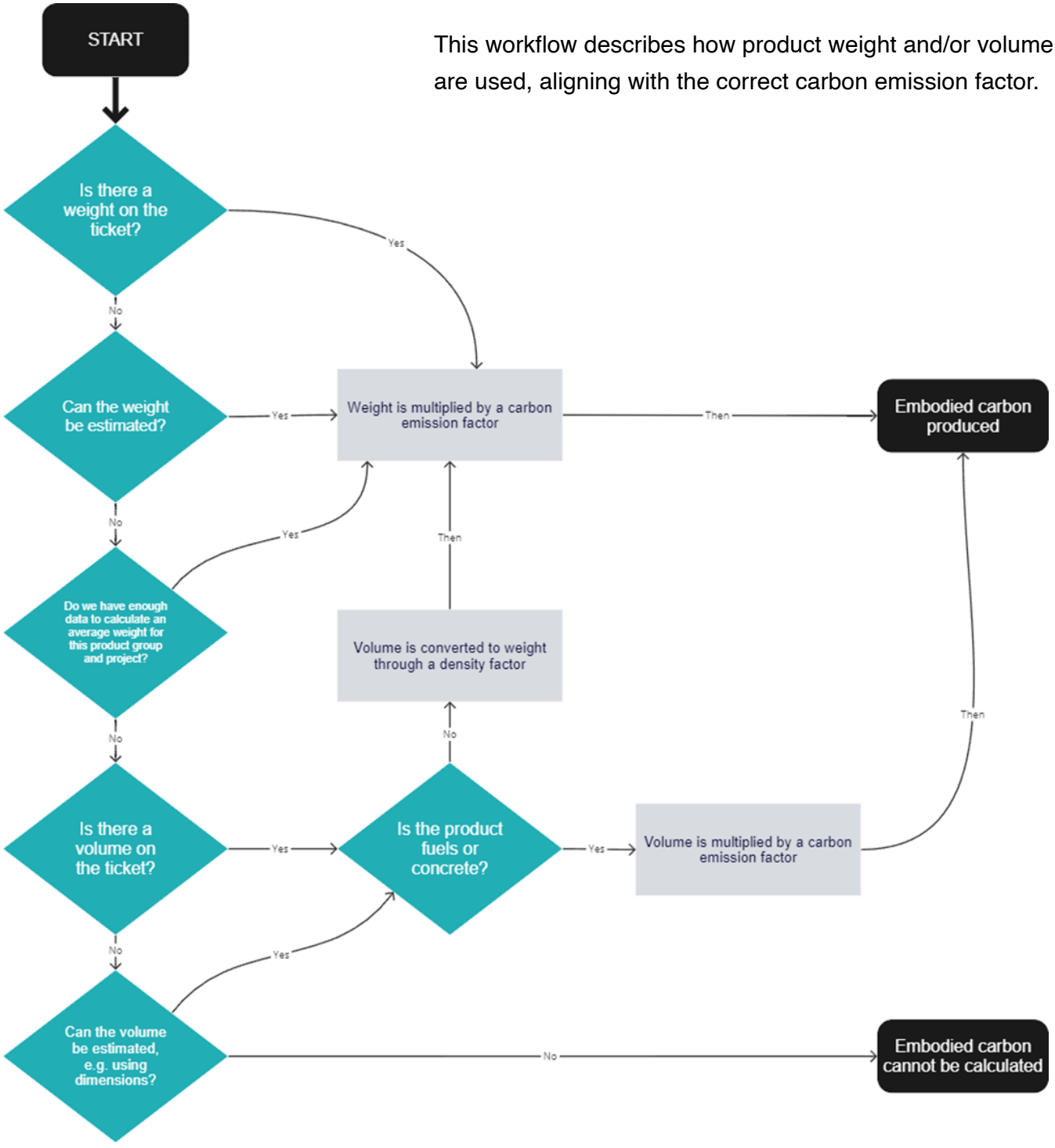
For products

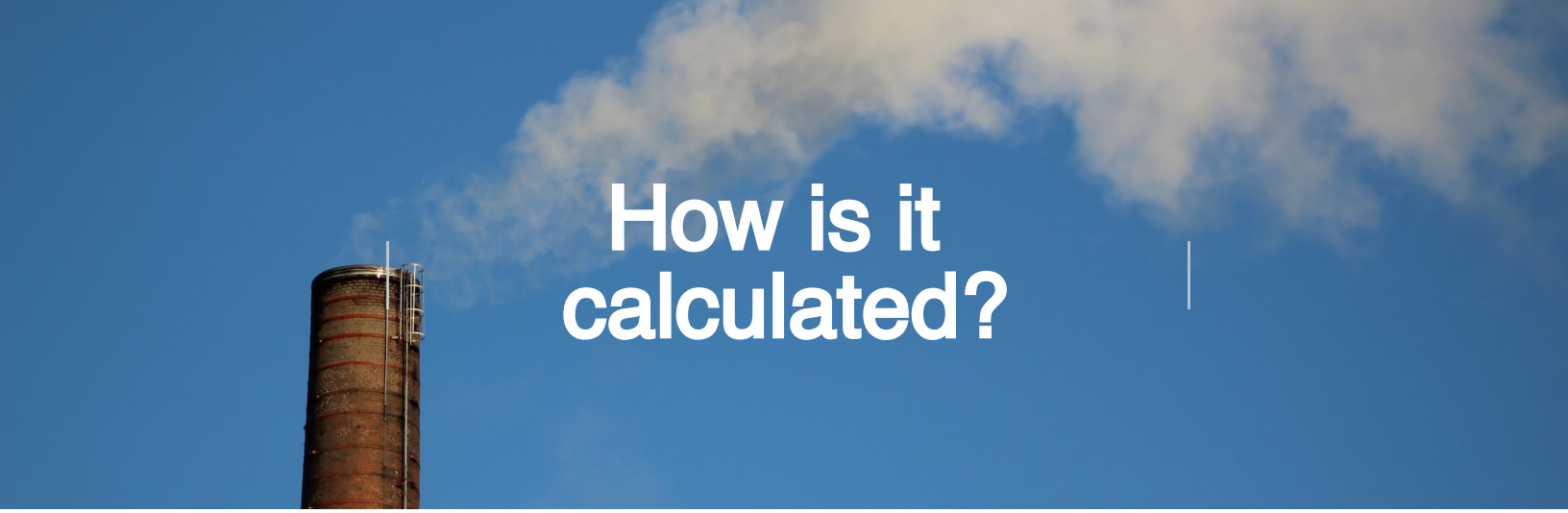
- The workflow (included on the following page) describes when weight or volume are used to calculate the embodied carbon.
- In cases where there isn't a corresponding carbon emission factor for a weight or volume based metric, we use density conversion factors, before applying the relevant carbon emission factor. All density conversion factors used are included in Appendix B.
- We use The Inventory of Carbon and Energy ("ICE database") for the majority of carbon conversion factors. All carbon factors used are included in Appendix A.
- For rebar, the conversion factor was sourced from the Institute of Structural Engineers.
- These are industry standard carbon conversion factors and commonly used in carbon assessments.
- We currently calculate embodied carbon for key construction items. Your dashboard may contain embodied carbon for additional product groups to those listed below; these will be clearly marked:
    - Aggregate
    - Bricks & Blocks
    - Concrete (in-situ and pre-cast)
    - Fuels
    - Insulation
    - Plasterboard
    - Rebar
    - Structural Steel
    - Timber



How is it calculated?

This workflow describes how product weight and/or volume are used, aligning with the correct carbon emission factor.





How is it calculated?

For transport

- Qflow calculates the distance between the material dispatch address and the site location, to estimate the delivery transport emissions. This is done using shortest routes on the Google Maps API.
- Qflow calculates the distance between the site location and the waste disposal facility to estimate the waste transport emissions. This is done using shortest routes on the Google Maps API.
- Using this distance, the BEIS GHG conversion factors are used to calculate the carbon associated with these vehicle movements.

For waste

- Qflow calculates the waste recovery by connecting with the Environment Agency database (see guidance document on Waste Hierarchy for further details). This gives the % disposal, recovery, recycling etc, associated with waste movements from the construction site.
- The BEIS GHG conversion factors are used to calculate the carbon associated with these waste processes.

FAQs

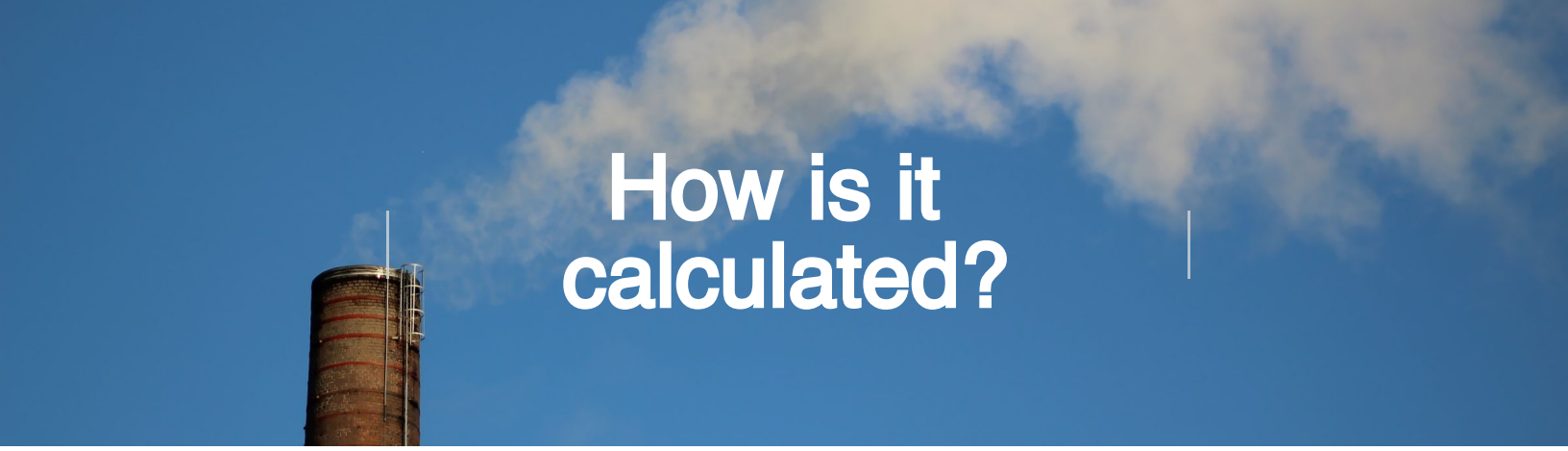
Can Qflow use EPDs to calculate my product carbon?

- It is something we're looking into. However for now, to use specific EPDs, we recommend sending the Qflow data into a third party tool, such as OneClickLCA, EC3, or Cercula (we can also look at others, depending on what you're using across the business). Within these tools, data on the quantity of materials from Qflow can be matched with specific EPDs to calculate carbon. This can be done via our API.

How can I use this data to track my performance against the LETI targets?

- The LETI targets have been produced to standardise performance and reporting scopes to meet IPCC recommendations for urgent emissions reductions. The paper sets out a rating system that can be used to track the urgent performance improvements needed from now until 2030. These targets align both RIBA and LETI embodied carbon targets. In the Qflow Dashboards, there is a table outlining the kgCO2/m2 GIA of your project(s). This is split between the transport, product and waste emissions, as aligned with various sections of upfront carbon, A1-A5. These fields can be used to compare against the LETI benchmarks, to understand project performance. We recommend speaking directly with your Qflow Customer Success Manager to go into further detail on the LETI targets.

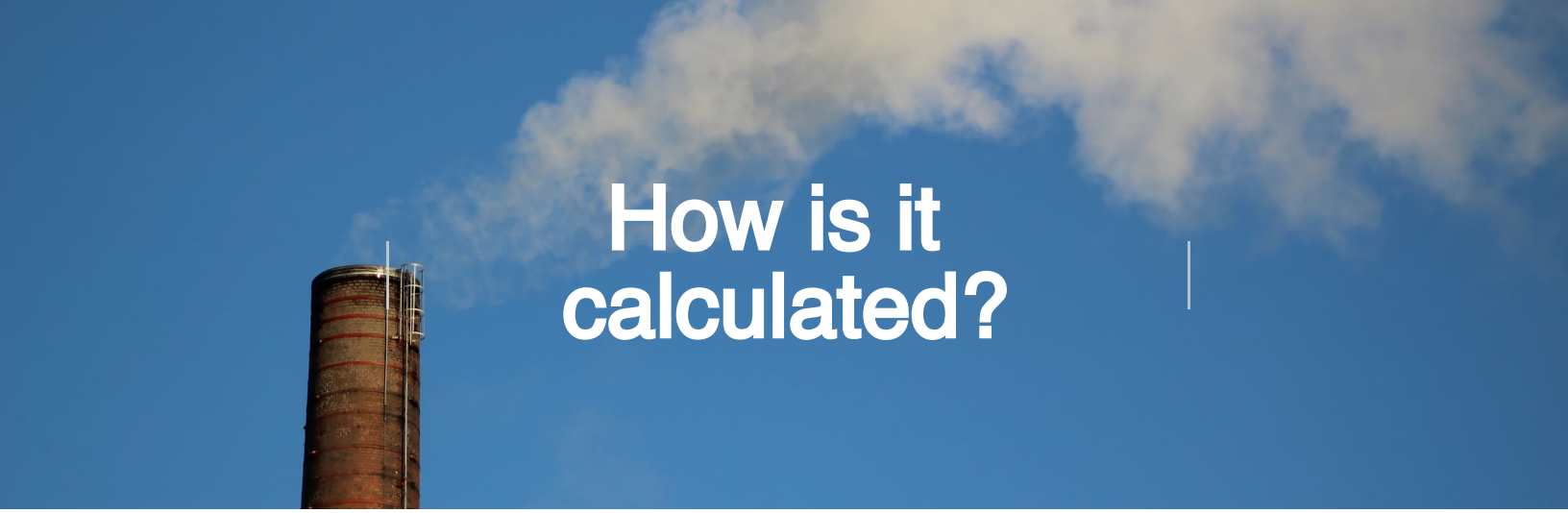
Disclaimer: The Qflow dashboard(s) aims to provide the most accurate reflection of carbon emissions based on data captured through the Qflow product. We have outlined our methodology and sources used in this document, for transparency with our users. However, we are not a carbon consultancy or qualified carbon specialists, therefore it is important to consider this data in context with other carbon data sources used across the organisation, as well as within your wider reporting frameworks.



How is it calculated?

Appendix A - Carbon conversion factors

Product Group	Carbon Conversion Factor	Unit	Specific Product	Source	Cell Reference
Aggregate	0.00746964547373303	kgCO2e/kg	Aggregates and sand, general, mixture of land won, marine, secondary and recycled, bulk, loose	ICE DB V3.0	F21
Bricks and Blocks	0.213	kgCO2e/kg	Clay brick, one brick, 215x65x102.5mm, average brick weighs 2.13kg	ICE DB V3.0	F126
Cement and Mortar	0.8321103996	kgCO2e/kg	Average UK additions. Mixture taken from average UK sector cement EPD. 86.1% clinker, 0.04% ggbs, 3.4% fly ash, 4.8% gypsum, 5.1% limestone, 0.56% MACs	ICE DB V3.0	F188
Concrete	0.103361344537815	kgCO2e/kg	Average UK concreet mix produced by BRMCA. Mix is 200kg CEM I, 95kg ggbs, 15kg fly ash, 1915kg aggregate, 139kg water, 1.55kg admixture	ICE DB V3.0	F286
Concrete (in situ)	0.103361344537815	kgCO2e/kg	Average UK concreet mix produced by BRMCA. Mix is 200kg CEM I, 95kg ggbs, 15kg fly ash, 1915kg aggregate, 139kg water, 1.55kg admixture	ICE DB V3.0	F286
Concrete (pre-cast)	0.148232920593403	kgCO2e/kg	Ordinary Prtland Cement concrete - CEM I based with total cementious content of 300kg per m3	ICE DB V3.0	H485
Fuels	2.7	kgCO2e/L	Diesel (100% mineral diesel)	BEIS GHG conversion factors 2022	E76 (Fuels tab)
Insulation	1.28	kgCO2e/kg	Mineral wool	ICE DB V3.0	G721
Material movements	0.00746964547373303	kgCO2e/kg	Aggregates and sand, general, mixture of land won, marine, secondary and recycled, bulk, loose	ICE DB V3.0	F21
Metal	2.46	kgCO2e/kg	World average steel. A flat sheet rolled on hot rolling mill, typical thickness between 2-20mm, max width is 1860mm.	ICE DB V3.0	F892
Plasterboard	0.39	kgCO2e/kg	General plasterboard	ICE DB V3.0	F824
Plastic	3.31	kgCO2e/kg	General plastic. 35.6MJ/kg feedstock energy (included). Determined by the average use of each type of plastic used in the European construction industry	ICE DB V3.0	F830
Rebar	0.684	kgCO2e/kg	Steel reinforcement bars. Adjusted to UK BRC EPD, from IStructE pdf Table 2	iStructE, A brief guide to calualating embodied carbon, 2020	Table 2
Structural steel	2.13	kgCO2e/kg	Steel, global seamless tube.	ICE DB V3.0	F900
Timber	0.492826142868722	kgCO2e/kg	Average of all timber data, no carbon storage	ICE DB V3.0	F926
Timber-based	0.492826142868722	kgCO2e/kg	Average of all timber data, no carbon storage	ICE DB V3.0	F926
Concrete	246	kgCO2e/m3	In-Situ, General	ICE DB V3.0	F286
Concrete (in situ)	246	kgCO2e/m3	In-Situ, General	ICE DB V3.0	F286
Concrete (pre-cast)	353	kgCO2e/m3	Concrete - Ordinary Portland Cement (OPC) concrete - CEM I based - with total cementitious content of 300 kg per m3 of concrete	ICE DB V3.0	H485



How is it calculated?

Appendix B - Density conversion factors

Product Group	Density Conversion Factor (tonnes/m3)	Source
Aggregate	2.240	ICE: tab Aggregates_sand, average of cells J602-J604
Bricks & Blocks	1.703333333	ICE: tab Clay_Bricks, average of cells J602-J613
Cement and Mortar	1.219166667	ICE: tab Cement_and_mortar. Average of cells J595-J606
Insulation	0.07	Knauf Insulation: average of 60-80kg/m3
Timber & Timber-based	0.6012045455	ICE: tab Timber, average of cells J602-J645
Plasterboard	0.8	British Gypsum: average of 600 and 1000 kg/m3 (converted)
Plastic	0.9	Polypropylene taken as representative
Metal, Rebar & Structural Steel	7.883333333	ICE: tab Steel, average of cells J593-J595

If you have any questions, please don't hesitate to reach out to your Customer Success Manager, or at support@qualisflow.com