CONSTRUCTION MATERIALS: BALANCING COST AND CARBON CHOICES ON PROJECTS

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29th February 2024

AGENDA

Construction materials: balancing cost and carbon choices on projects

- Why do we need to do it?
- How can we do it?
- Panel Q+A

BALANCING COST AND CARBON: WHY?

40% of global greenhouse gas (GHG) emissions come from built environment and, if left unchecked, they're predicted to double by 2050

We know we need to change and decarbonise, but we also need to understand the cost impacts of lower carbon options

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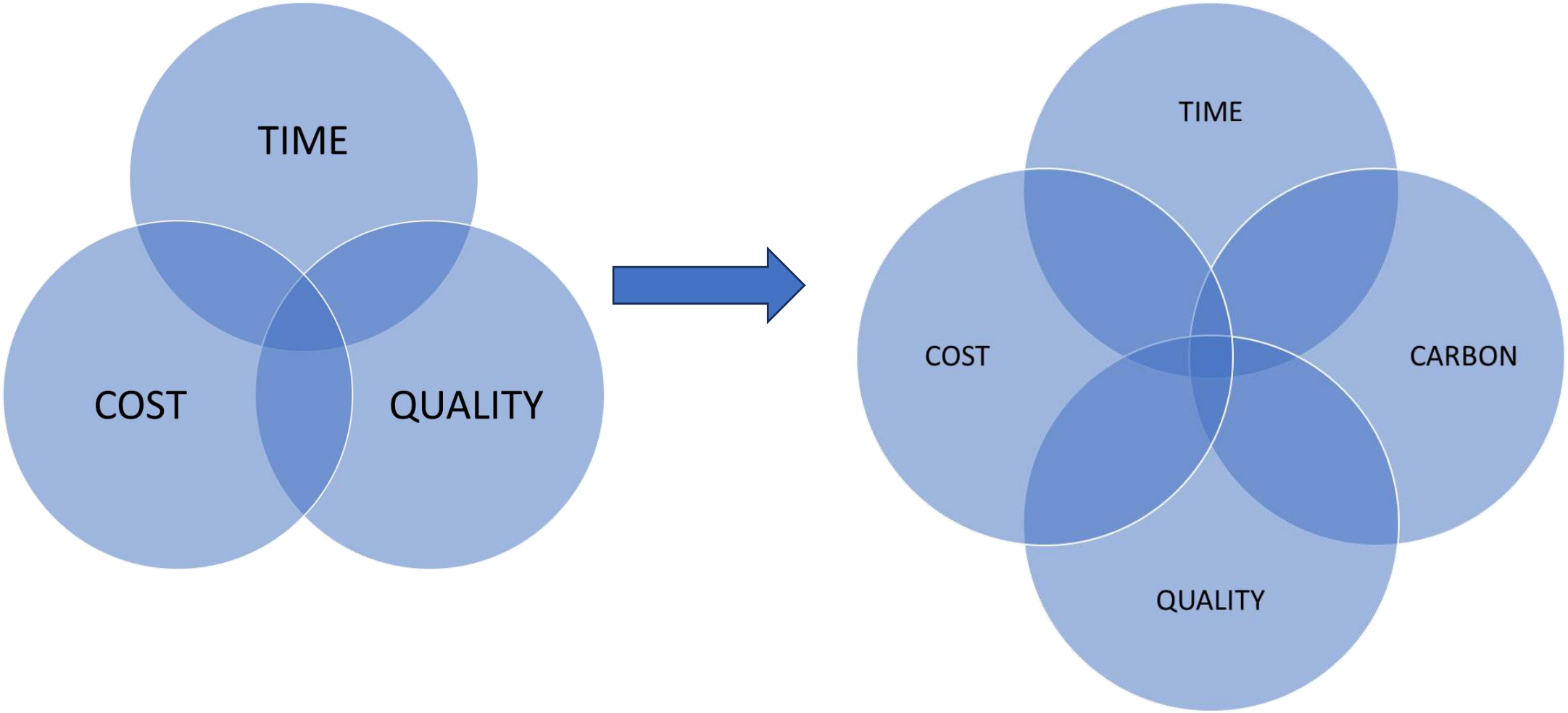
BALANCING COST AND CARBON: WHY?



THE CARBON DATA CHALLENGE – DATA AVAILABILITY

- We don’t have a rich history of carbon data
- And we don’t understand it or relate to it quite in the same way as say, costs
- EPDs are the best source of this data and we do not have a comprehensive set for all of the construction materials we use

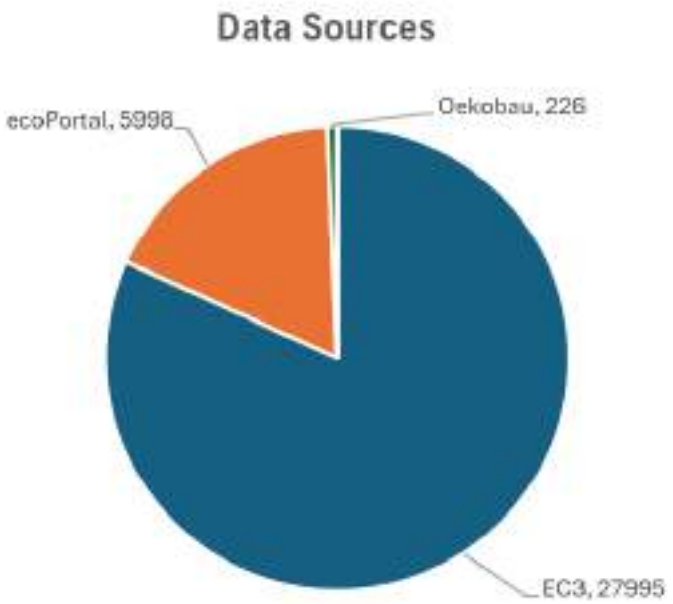
In the main we have three main challenges:

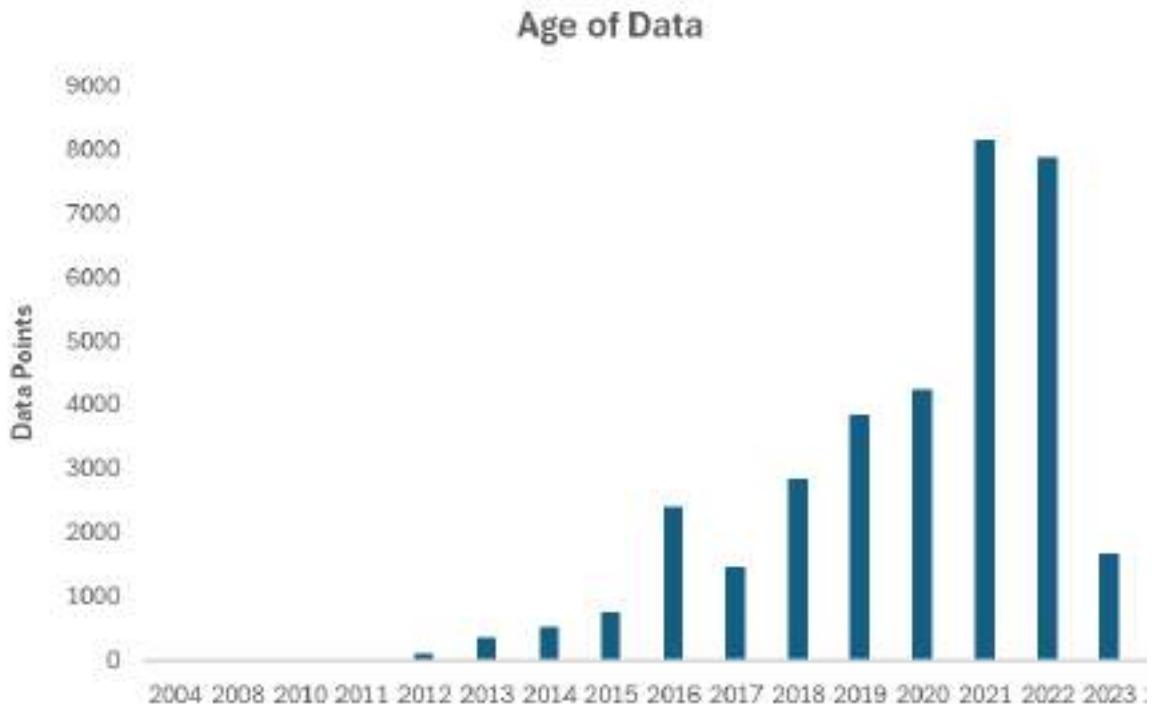
- Data Availability
- Data Quality
- Data Volatility

THE CARBON DATA CHALLENGE – AVAILABILITY OF DATA

- We do not have a comprehensive set for all of the construction materials we use
- The good news is it is getting better
- We currently hold 34,000 product LCA's / EPD's

BECD
Built Environment Carbon Database





Analysis provided by Circular Ecology

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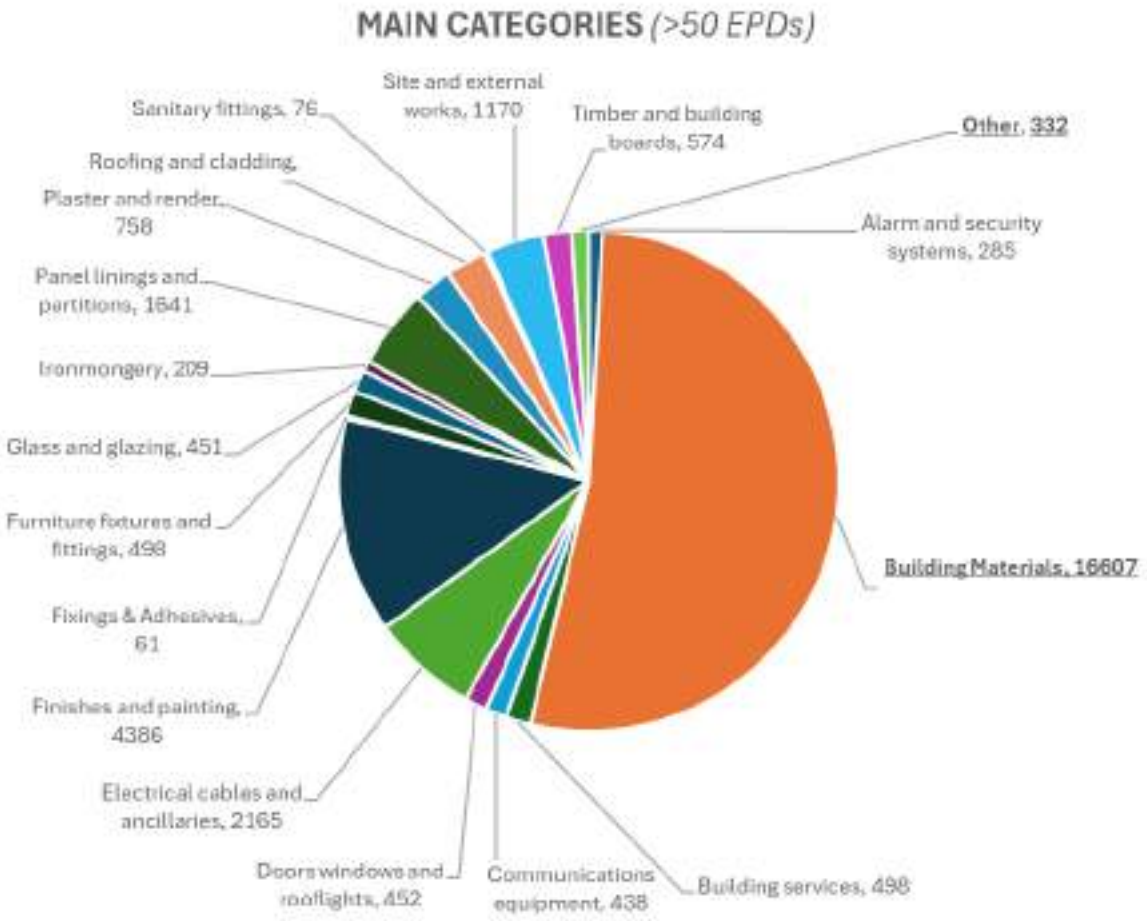
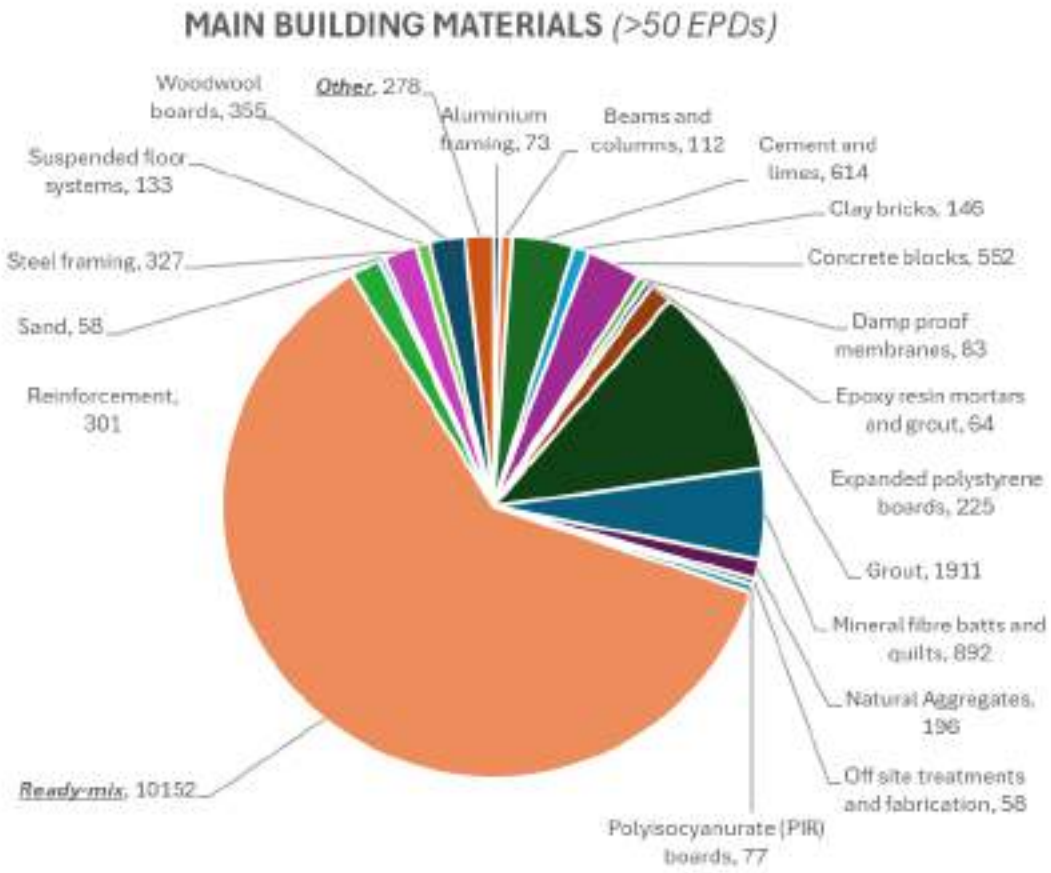
THE CARBON DATA CHALLENGE – AVAILABILITY OF DATA

Aligned to a BCIS classification system….





THE CARBON DATA CHALLENGE – DATA QUALITY

What have we noticed from the data so far:

- Even mandated fields are not always completed
- Assumptions made within EPDs are often inconsistent
- Although verified by a third party – the levels of verification appears to depend on the experience of the verifier
- Sometimes the source provider has attempted to change the functional unit (often inconsistently)
- Sometimes the data is uncertainty adjusted, so doesn't always match the EPD
- BUT the biggest challenge is the inconsistency of data (units of measure)

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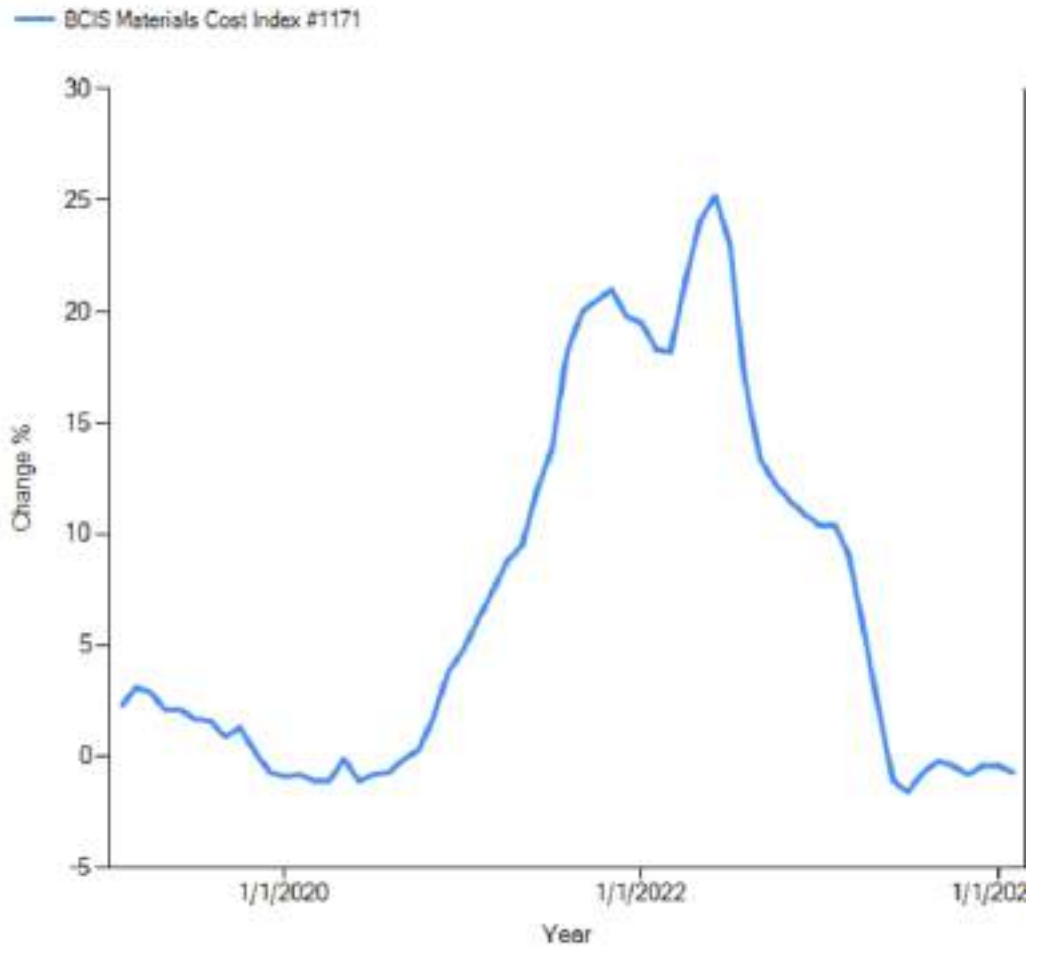
THE CARBON DATA CHALLENGE – DATA VOLATILITY

Costs of materials are volatile

To a lesser extent, so is carbon data

- Manufacturers change processes
- Decarbonisation of the grid
- EPD's expire and can be revised
- Sample sizes are rapidly changing

Making sure you are using the right data is going to become increasingly important



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BALANCING COST AND CARBON: HOW?

- Everyone in the industry should be doing their part to reduce emissions
- The most efficient way to balance cost and carbon is to link carbon measurement into existing measurement processes that already happen on construction projects. i.e. Cost estimating, reporting and control

The challenge

Aside from the carbon data challenges already discussed:

- The carbon standard is complicated and an extra thing to balance
- Carbon numbers aren't widely understood
- The units of measure for carbon data are often different – so they need to be converted

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Challenges of working with EPDs

- Sonya Dancheva

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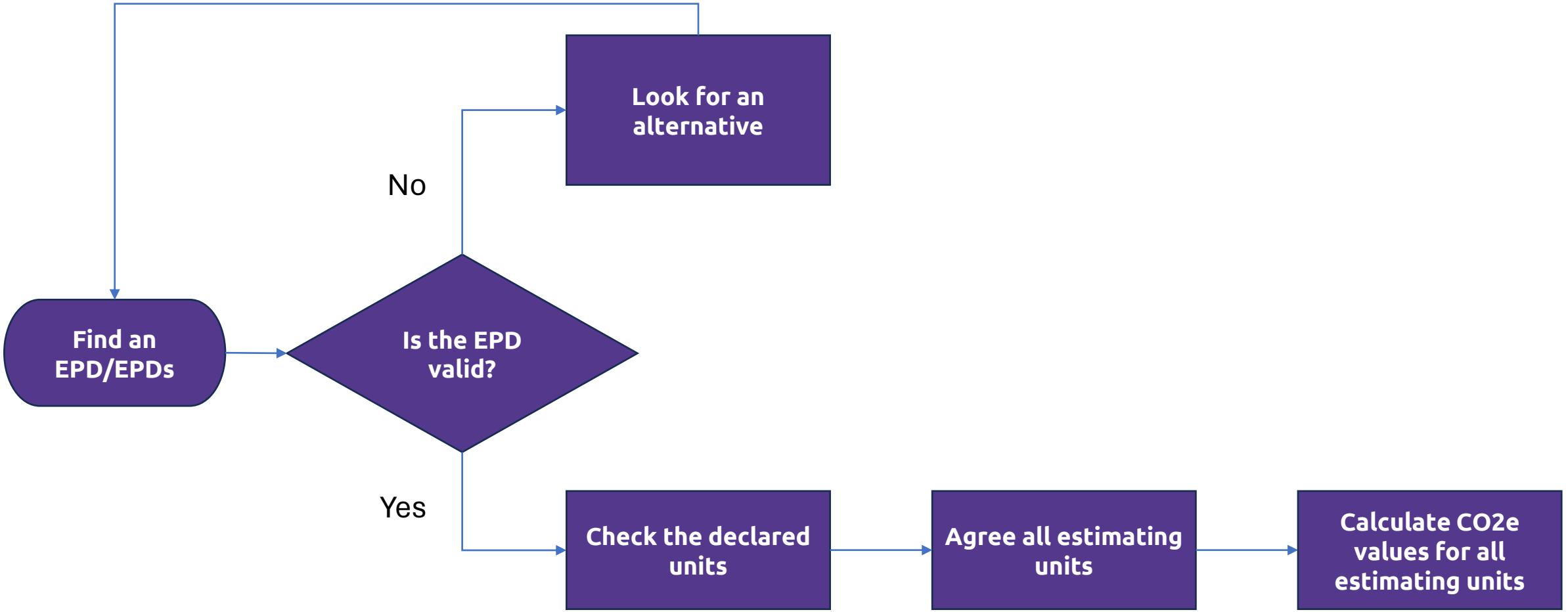
Carbon workflow for estimating

sterling-dcs.com



What is involved in converting carbon data to the same units as costing would use?

EPDs are not always declared in the same units as we need in our estimating BoQ/rates = m2 > Procurement process = Number

Declared unit for cavity blocks is 1990kg CO2e per m^3.

Estimators use measures such as m^2.
Therefore, 100mm blocks
= 105 blocks per m3.
= 10/blocks/m2
Equates to 188.25 kg/m2

Product Name
Standard Solid Concrete Block Products
Standard Cavity Concrete Block Products
High Strength 13N Solid Concrete Block Products
High Strength 13N Cavity Concrete Block Products
Aristocrat Concrete Block Products

Calculate for each product in the EPD as required.

* CO2e – stands for all contributors to that figure, not only carbon

The BCIS Cost and Carbon Materials Database

Neil Barnett

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Cost and Carbon Materials Database

100 mm Kingspan Kooltherm K7 insulation

Glass fibre loft insulation, 100 mm thick (1.16 x 9.2 m roll)

PIR Polyisocyanurate general purpose foam sheet insulation, 100 mm thick

General

Supply price description	100 mm Kingspan Kooltherm K7 insulation	Glass fibre loft insulation, 100 mm thick (1.16 x 9.2 m roll)	PIR Polyisocyanurate general purpose foam sheet insulation, 100 mm thick
BCIS classification	Sheet foam insulation	Mineral fibre batts and quilts	Polyisocyanurate (PIR) boards
Uniclass classification	Pr_25_71_63_59	Pr_25_57_06_34	Pr_80_77_76_65
BCIS unit of measure	m2	roll	m2

Cost data

Material cost	26.07	15.8	20.47

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PROJECT COSTS

INDICES + INSIGHTS

LIFE CYCLE COST

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GETTING STARTED

SUBMIT DATA

ABOUT

Materials

Note: Use the search box below to search for a material directly or browse using the BCIS Material Classification.

BCIS Material Classification


Aggregates


Architectural metalwork


Builders metalwork


Building Chemicals


Building services


Cement based materials


Chimneys and fireplaces


Concrete accessories


Disposal systems


Doors windows and rooflights


Epoxy resin mortars and grout


Finishes and painting


Fixings & Adhesives


Furniture fixtures and fittings


Glass and glazing


Insulation


Ironmongery


Lifts escalators conveyors and hoists

BCIS


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Furniture fixtures and fittings


Glass and glazing

ongery


Lifts escalators conveyors and hoists


Masonry


Mouldings edgings and trims


Panel linings and partitions


Plaster and render


Prefabricated structures


Proofing and jointing


Roofing and cladding


Sanitary fittings


Site and external works


Stair components


Stairs and balustrades


Structural metalwork


Structural precast concrete


Timber and building boards


Underground drainage and services


Vermin control

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ABOUT

Home > Materials

Materials

Note: Use the search box below to search for a material directly or browse using the BCIS Material Classification.

insulation

Insulation for 22 mm copper pipe, 13 mm thick - class 0

Insulation for 15 mm copper pipe, 13 mm thick - class 0

Byelaw 30 **insulation** kit for cold water roof cistern, 227 litres

Byelaw 30 **insulation** kit for cold water roof cistern, 91 litres

PIR Polyisocyanurate general purpose foam sheet **insulation**, 165mm thick

PIR Polyisocyanurate general purpose foam sheet **insulation**, 140 mm thick

PIR Polyisocyanurate general purpose foam sheet **insulation**, 110mm thick

9 mm Lightweight **insulation** panels, a polystyrene hard foam for the electric under wood heating foil system

Insulation and mesh adhesive (base coat render)

PVCu starter track for solid wall **insulation** system, 100-160 mm

GlassFibre **insulation** quilt 170 mm thick, 6.25 m2

Doors windows and rooflights | Epoxy resin mortars and grout | Finishes and painting | Fixings & Adhesives | Furniture fixtures and fittings | Glass and glazing | Insulation | Ironmongery | Lifts escalators conveyors and hoists

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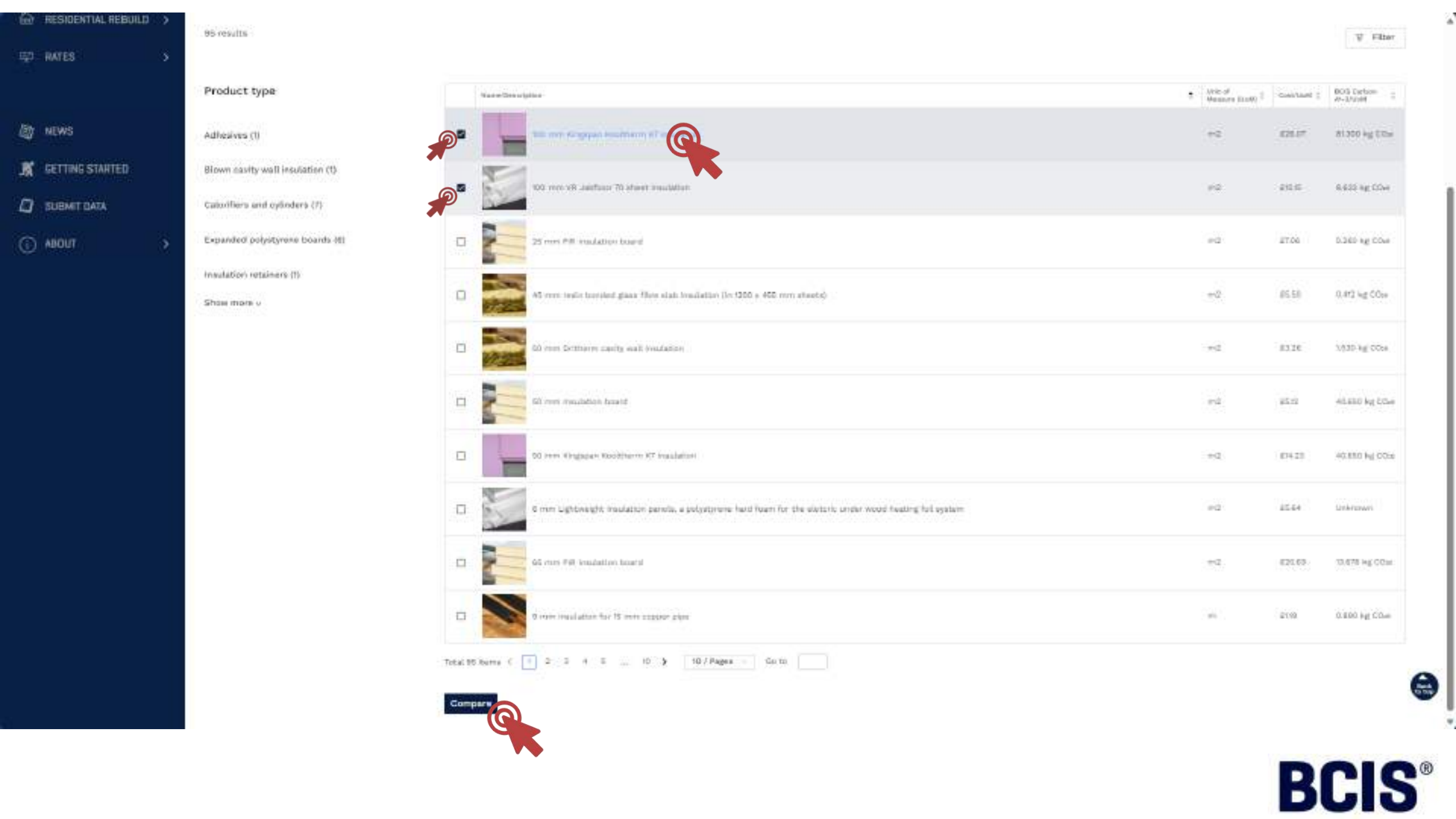
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95 results
Filter
Product type
Adhesives (1)
Blown cavity wall insulation (1)
Calorifiers and cylinders (7)
Expanded polystyrene boards (6)
Insulation retainers (1)
Show more
Name/Description
Unit of Measure (UoM)
Cost/UoM
BCIS Carbon
Total 95 items
10 / Pages
Go to
Compare
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Materials

« Back to product type

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100 mm Kingspan Kooltherm K7 insulation

100 mm VR Jabfloor 70 sheet insulation

Cavity wall insulation 100 mm mineral wool batt (thermal conductivity 0.037 W/mK)

Flat roof insulation Kingspan Thermaroof TR20 100 mm thick

General

	100 mm Kingspan Kooltherm K7 insulation	100 mm VR Jabfloor 70 sheet insulation	Cavity wall insulation 100 mm mineral wool batt (thermal conductivity 0.037 W/mK)	Flat roof insulation Kingspan Thermaroof TR20 100 mm thick
Supply price description				
BCIS classification	Ma_001_040_010	Ma_001_040_003	Ma_001_040_006	Ma_001_040_015
Uniclass classification	Pr_25_71_63_59	Pr_25_31_48_28	Pr_25_57_06_53	Pr_25_31_28_93
BCIS unit of measure	m2	m2	m2	m2

Cost data

Material cost	26.07	15.35	7.06	33.73
Past 12 months inflation %	1.64	1.64	1.64	1.64
Future 12 months inflation (forecast) %	2.5	2.5	2.5	2.5
Cost location (Country and/or Region)	UK Average	UK Average	UK Average	UK Average
Currency	GBP	GBP	GBP	GBP
Cost base date	2024-01-01	2024-01-01	2024-01-01	2024-01-01

Representative carbon data

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Future 12 months inflation (forecast) %	2.0	2.0	2.0	2.0
Cost location (Country and/or Region)	UK Average	UK Average	UK Average	UK Average
Currency	GBP	GBP	GBP	GBP
Cost base date	2024-01-01	2024-01-01	2024-01-01	2024-01-01

Representative carbon data

LCA name	Knotherm 97	Therma◆ TF70	Glass mineral wool insulation ? 0.033-0.032 W/mK	Therma TR30 / Therma◆◆ TF40
BECD dataset UID	BA49EF53-7341-42CB-CC49-08DC1C313CA1	BDCCB686-40EA-4D1E-0042-08DC1C313CA1	3F66F7E4-9A0A-49BD-7A4E-08DC1C313CA1	F4BFFD8C-A240-4B1D-CE7A-08DC1C313CA1
URL link to LCA file	https://epdata.bca-data.com/resource/processes/BA49EF53-7341-42CB-CC49-08DC1C313CA1?version=00.01.000	https://epdata.bca-data.com/resource/processes/BDCCB686-40EA-4D1E-0042-08DC1C313CA1?version=00.01.000	https://xxd.co/x/3n48fv@	https://epdata.bca-data.com/resource/processes/F4BFFD8C-A240-4B1D-CE7A-08DC1C313CA1?version=00.01.000
Recorded carbon value (A1-3)	8.13	10.36	3.06	10.12
LCA recorded UoM	m2	m2	m2	m2
LCA base unit conversion, divide by	0.01	0.72	0.1	0.72
BCIS target unit conversion, multiply by	0.1	0.1	0.1	0.1
BCIS converted carbon value (A1-3)	81.3	8.633333	3.06	8.433333
Life expectancy (Years)	--	--	30	--
Mass of declared unit (kg)	4	--	2.8	--
Manufacturer	Kingspan Insulation	Kingspan Insulation	Knauf Insulation	Kingspan Insulation
Country of origin	NL	BEB	UK	BEB
Factory location	--	--	Stafford Road, Saint Helen's	--
LCA date	2019-01-01	2023-01-01	2020-01-22	2022-01-01
Expiry date	2024-01-01	2028-01-01	2024-12-22	2028-01-01
	Carbon data feedback	Carbon data feedback	Carbon data feedback	Carbon data feedback

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IBU.data

Collapse all sections | Close

Process Data set: Kooltherm S7 (en) en de

- Process information

Key Data Set Information		
Location	NL	
Reference year	2019	
Name	Kooltherm S7	
Use advice for data set	Scope: The insulation material Kooltherm, is produced by Kingspan Insulation B.V. at the manufacturing facility in Tiel, the Netherlands. A glass tissue based facing is autoheisively bonded to the insulation core during manufacture. System boundary: The following processes are included in the A1-A3 production stage of Kooltherm: Manufacture of preliminary products (Resin, additives, blowing agent) - Transportation of raw materials and preliminary products to the plant	- Manufacturing process in the plant including energy, water consumption, disposal of residual materials and consideration of direct VOC emissions to air - Manufacture and transport of packaging materials. The following processes are included in the C3 and D stage of Kooltherm: - End of life scenario (incineration in a waste incineration plant with energy recuperation)
Technical purpose of product or process	Due to its high insulating value the Kooltherm S7 is suitable for use as insulation for tiled or slated pitched warm roofs.	
Classification	Class name: Hierarchy level • OEKOBAU.DAT: 2.5.01 Dämmstoffe / Phenolharz-Hartschaum (PF) / PF-Platten • IBUCategories: 02 Bauprodukte / Wärmedämmungsprodukte / Dämmstoffe aus Schaumkunststoffen	
General comment on data set	The Kingspan Kooltherm ® S7 is a rigid thermoset cellular insulation material faced on both sides with a glass tissue based facing. The product is available in variable thicknesses from 20mm up to 200mm. This EPD covers one of the most commonly	sold thickness of 100mm with an R-value of 5,0 m² K/W.
Copyright	Yes	
Owner of data set	Kingspan Insulation	
Quantitative reference		
Reference flow(s)	1 m², 100mm Dicke - 1.0 * 1.0 qm (Area)	
Material properties of the reference flow	• conversion factor [mass/declared unit]: 4.0 - • gross density: 40.0 kg/m^3 • grammage: 4.0 kg/m^2 • layer thickness: 0.1 m	
Time representativeness		
Data set valid until	2024	

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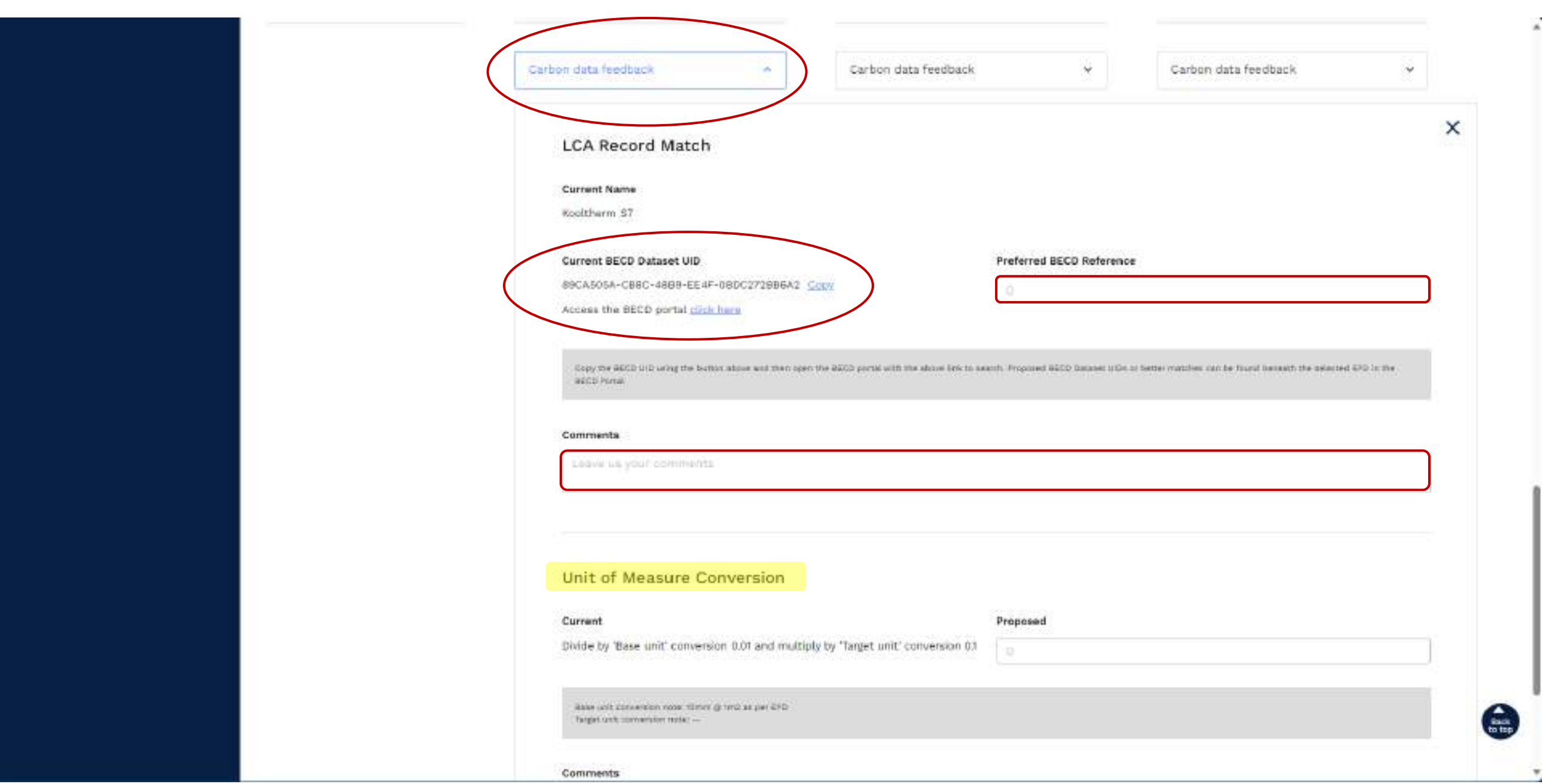
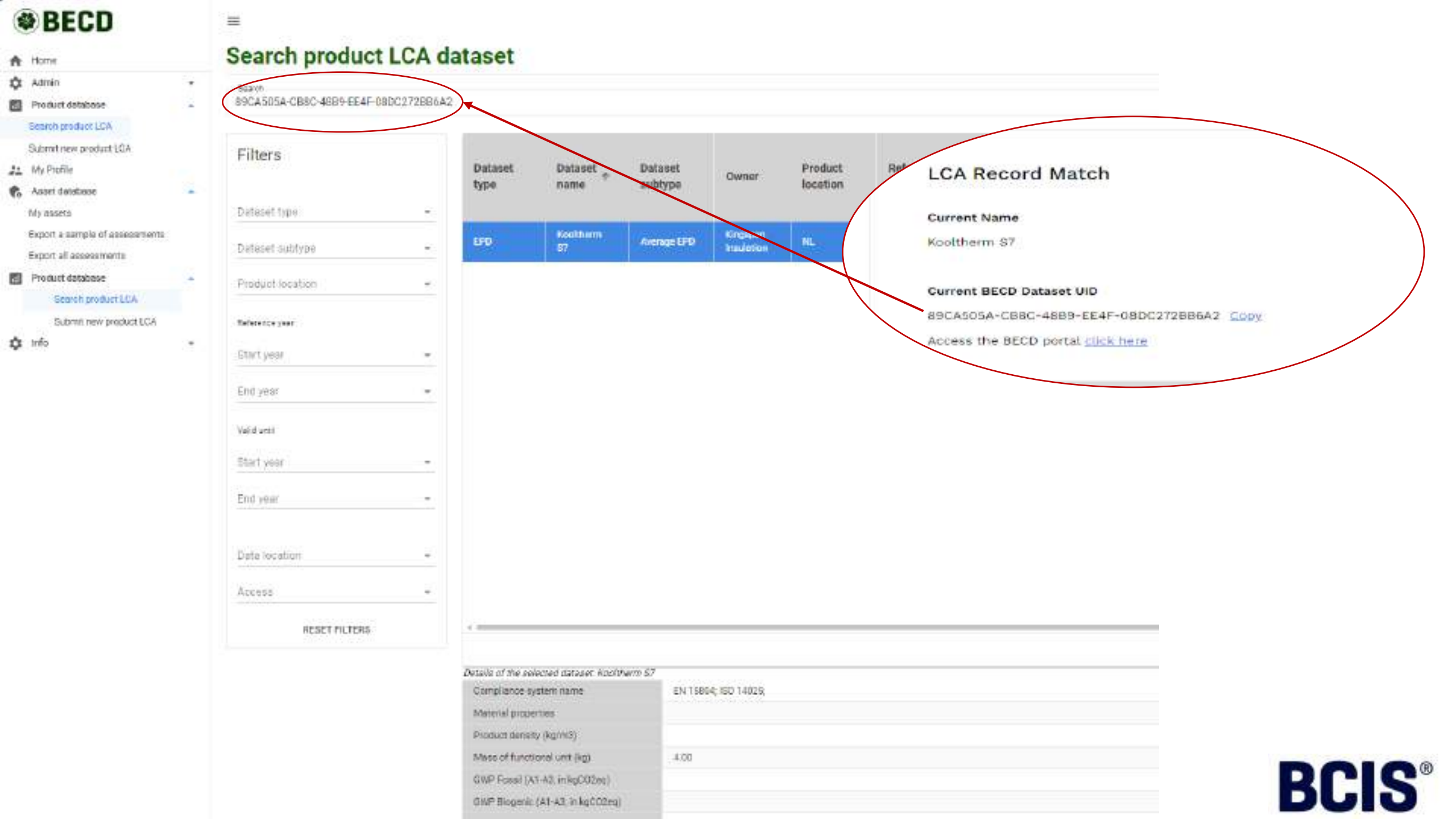

Carbon data feedback
Carbon data feedback
Carbon data feedback
LCA Record Match
Current Name
Kooltherm S7
Current BECD Dataset UID
89CA505A-CB8C-48B9-EE4F-08DC272BB6A2 Copy
Access the BECD portal click here
Preferred BECD Reference
Comments
Leave us your comments
Unit of Measure Conversion
Current
Divide by 'Base unit' conversion 0.01 and multiply by 'Target unit' conversion 0.1
Proposed
Comments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Home
Admin
Product database
Search product LCA
Submit new product LCA
My Profile
Asset database
My assets
Export a sample of assessments
Export all assessments
Product database
Search product LCA
Submit new product LCA
Info
Search product LCA dataset
Search
89CA505A-CB8C-48B9-EE4F-08DC272BB6A2
Filters
Dataset type
Dataset subtype
Product location
Reference year
Start year
End year
Valid until
Start year
End year
Data location
Access
RESET FILTERS
Dataset type
Dataset name
Dataset subtype
Owner
Product location
EPD
Kooltherm S7
Average EPD
NL
LCA Record Match
Current Name
Kooltherm S7
Current BECD Dataset UID
89CA505A-CB8C-48B9-EE4F-08DC272BB6A2 Copy
Access the BECD portal click here
Details of the selected dataset: Kooltherm S7
Compliance system name
EN 15804; ISO 14025
Material properties
Product density (kg/m3)
Mass of functional unit (kg)
4.00
GWP Fossil (A1-A3; in kgCO2eq)
GWP Biogenic (A1-A3; in kgCO2eq)
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Cost and Carbon Materials Database

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100 mm VR Jabfloor 70 sheet insulation

Cavity wall insulation 100 mm mineral wool batt (thermal conductivity 0.037 W/mK)

General

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ulation 100 mm
batt (thermal
0.037 W/mK)

Flat roof insulation Kingspan Thermaroof TR20 100 mm thick

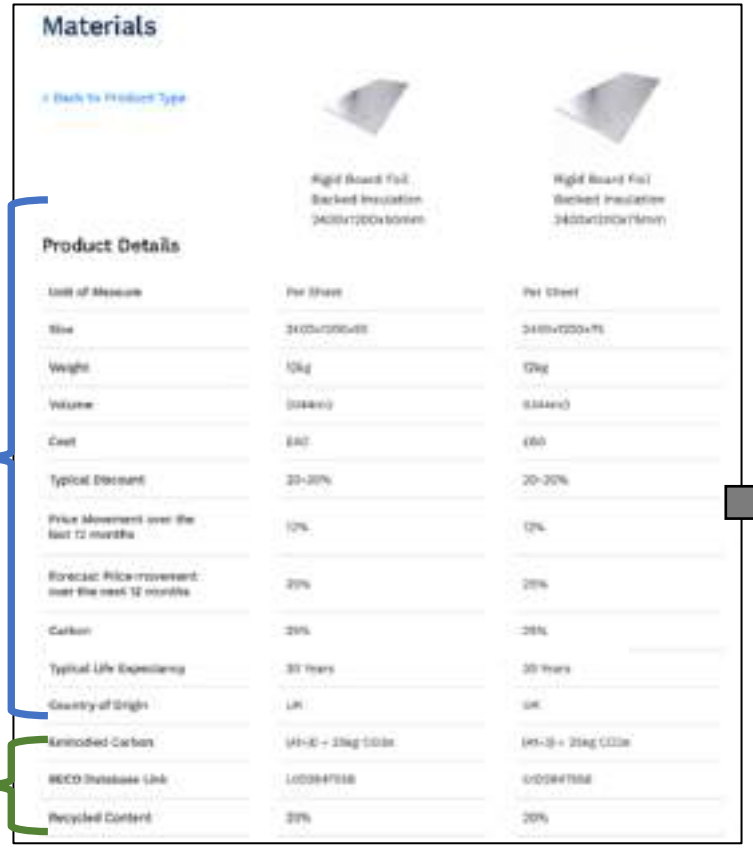
mineral wool batt
W/mK)

Flat roof insulation Kingspan Thermaroof TR20 100 mm thick

A sneak preview of what’s to come...

BCIS – SNEAK PREVIEW

COST AND CARBON MATERIALS DATABASE



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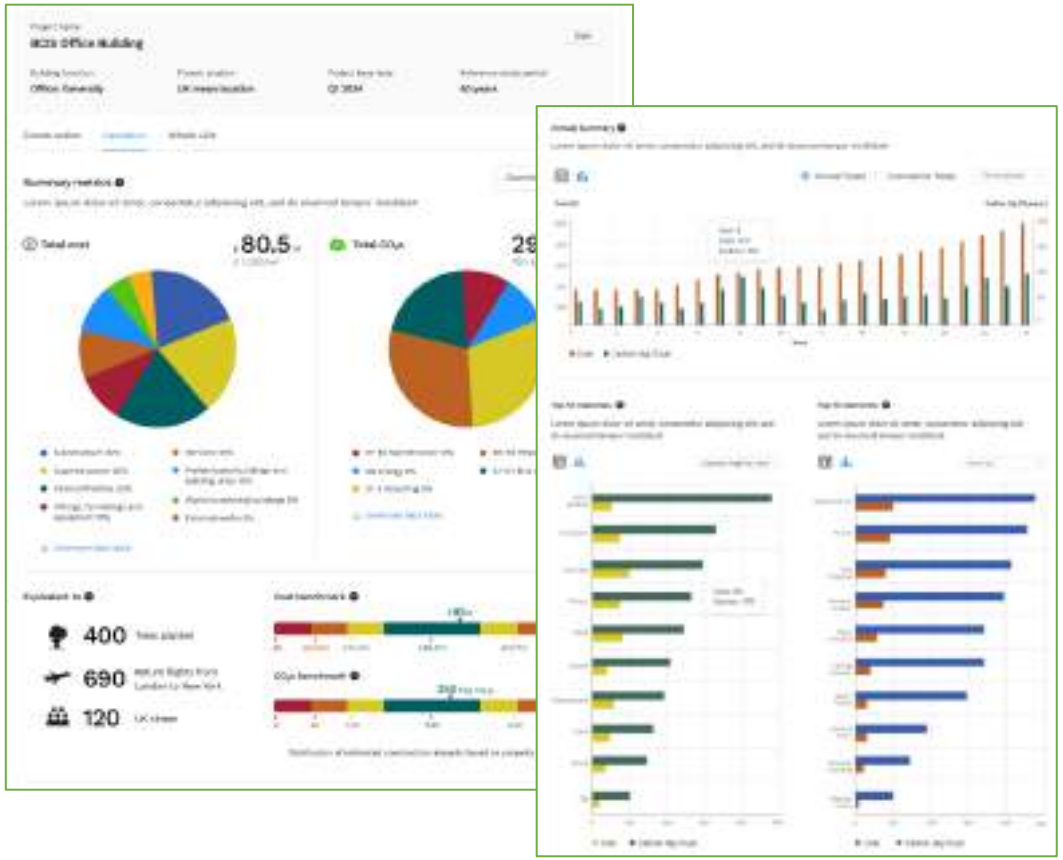
BECD
Built Environment Carbon Database

LIFE CYCLE COST AND CARBON CALCULATOR

ALIGNS COST AND CARBON MEASUREMENT AND REPORTING – MAKING IT MUCH EASIER
PRODUCE COST AND/OR CARBON COMPLIANT REPORTS USING BCIS AND BECD DATA



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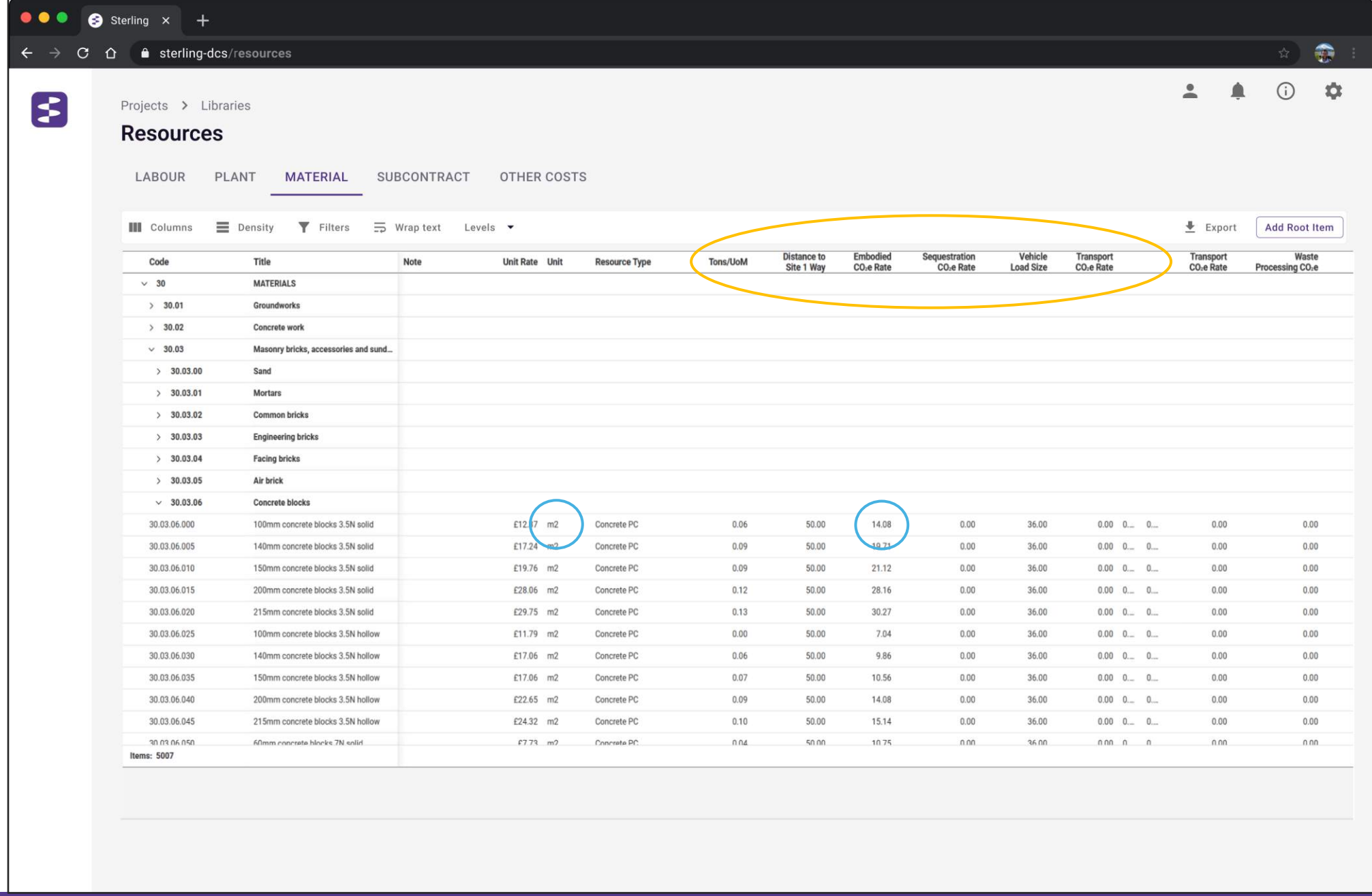
BCIS – SNEAK PREVIEW

The BCIS data, the one source of truth, will also fuel other software products when you need that extra functionality….

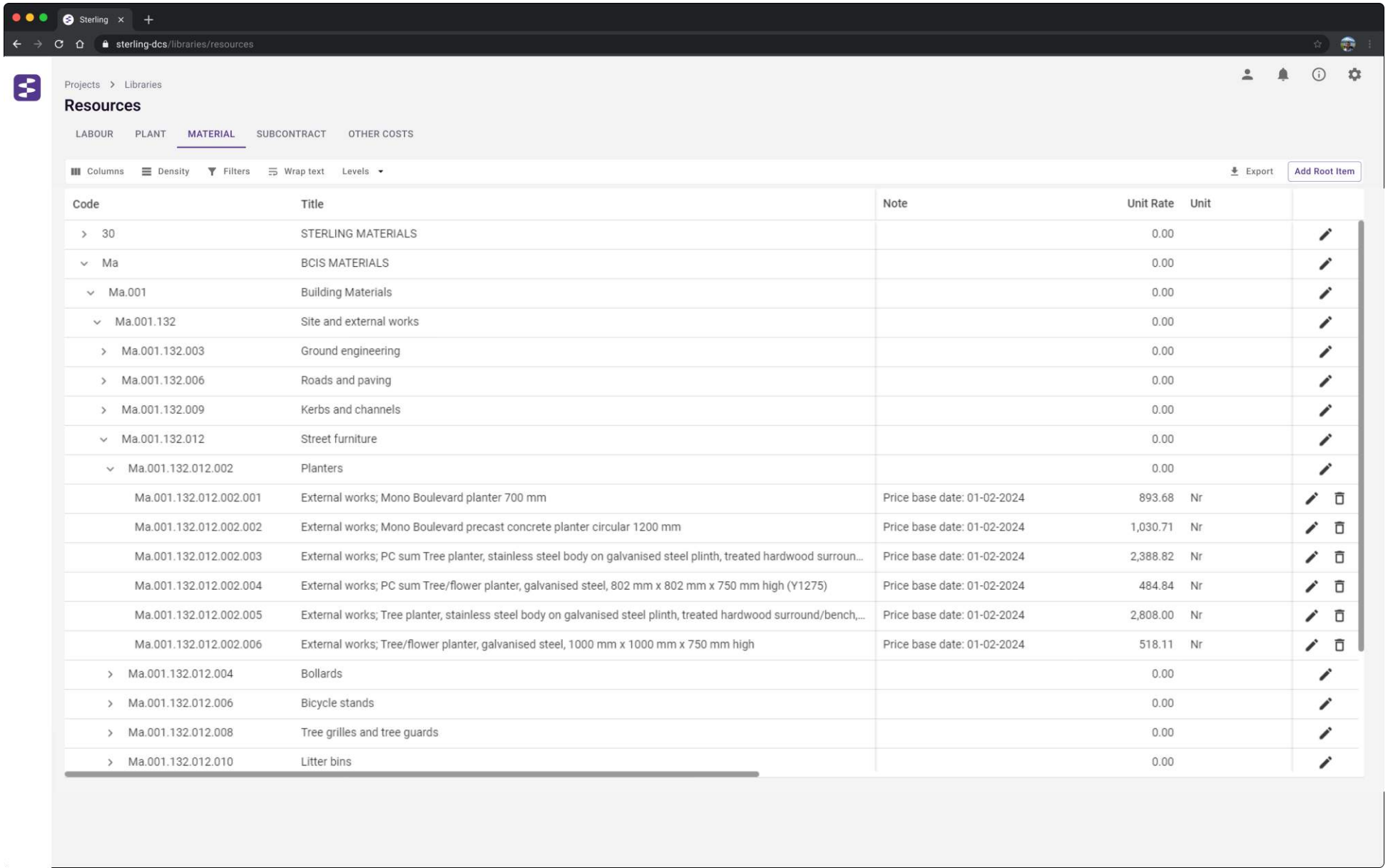
Viewed within Sterling

A1-A3

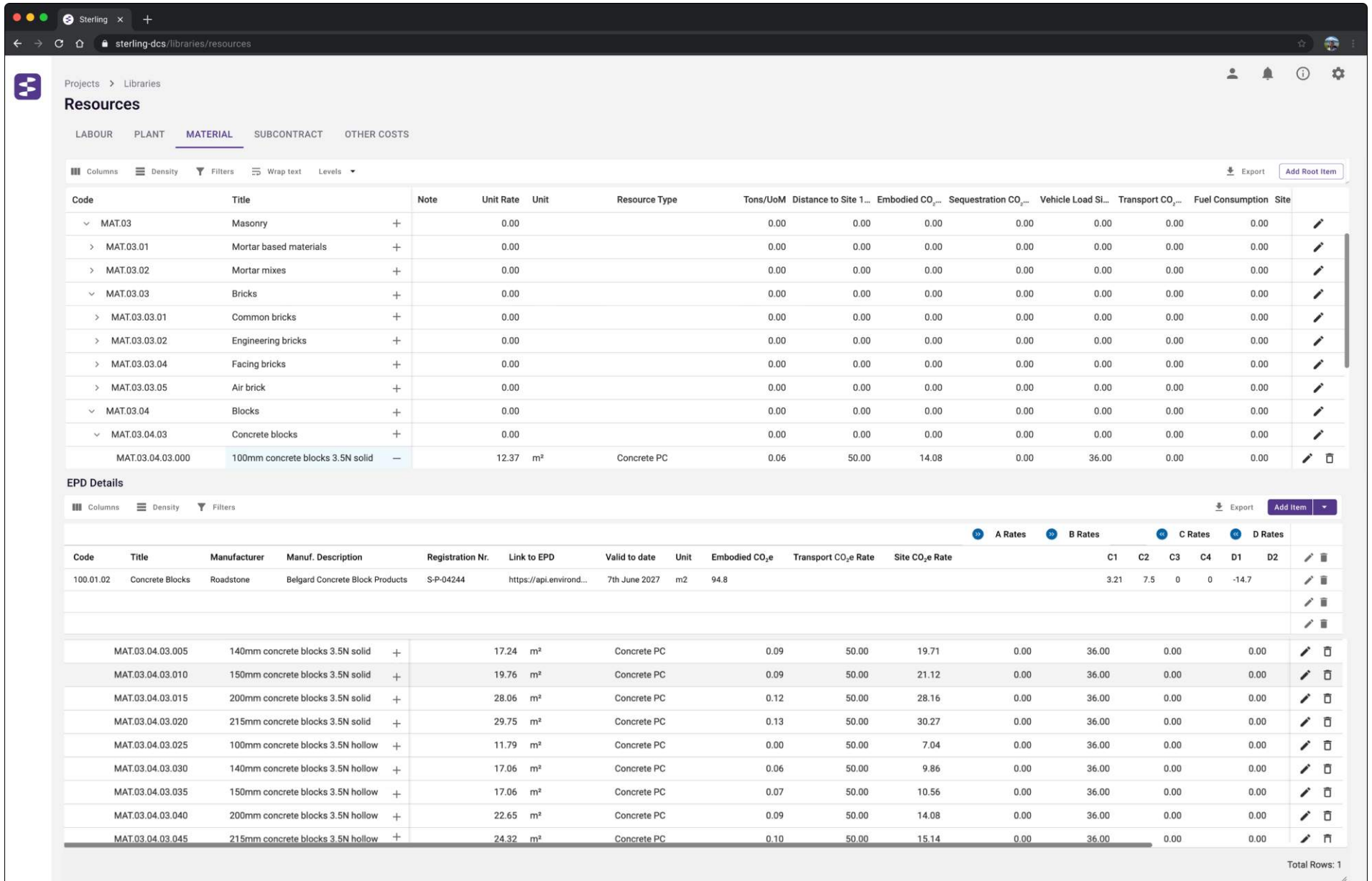
A4

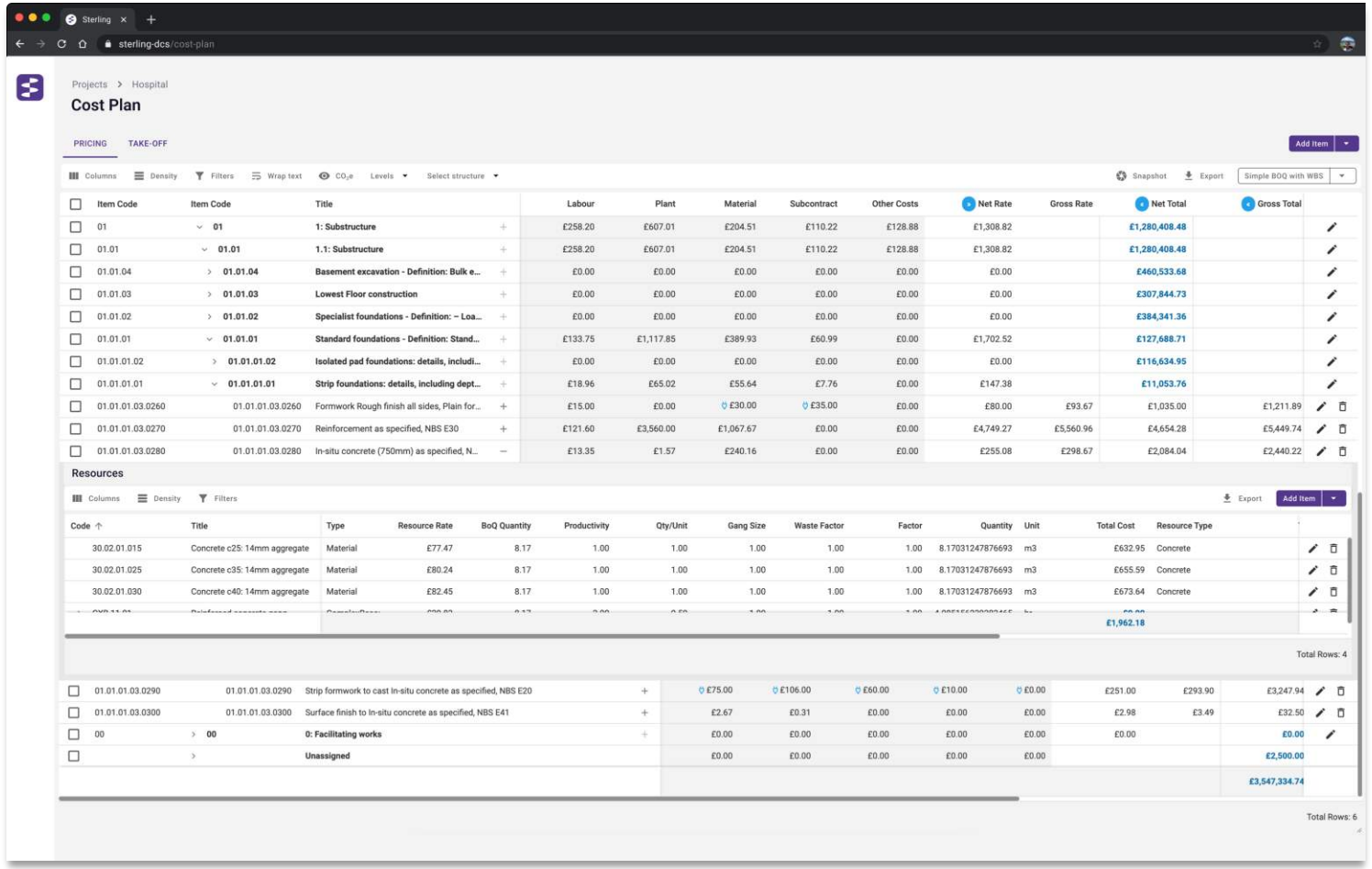


BCIS Cost and Carbon Materials Library



Resources with EPD link and carbon calculator





Thank You

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QUICK SUMMARY AND QUESTIONS

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Unlocking Data

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This webinar is now over. Thank you for joining!