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Measuring Whole Life Carbon in the Built Environment

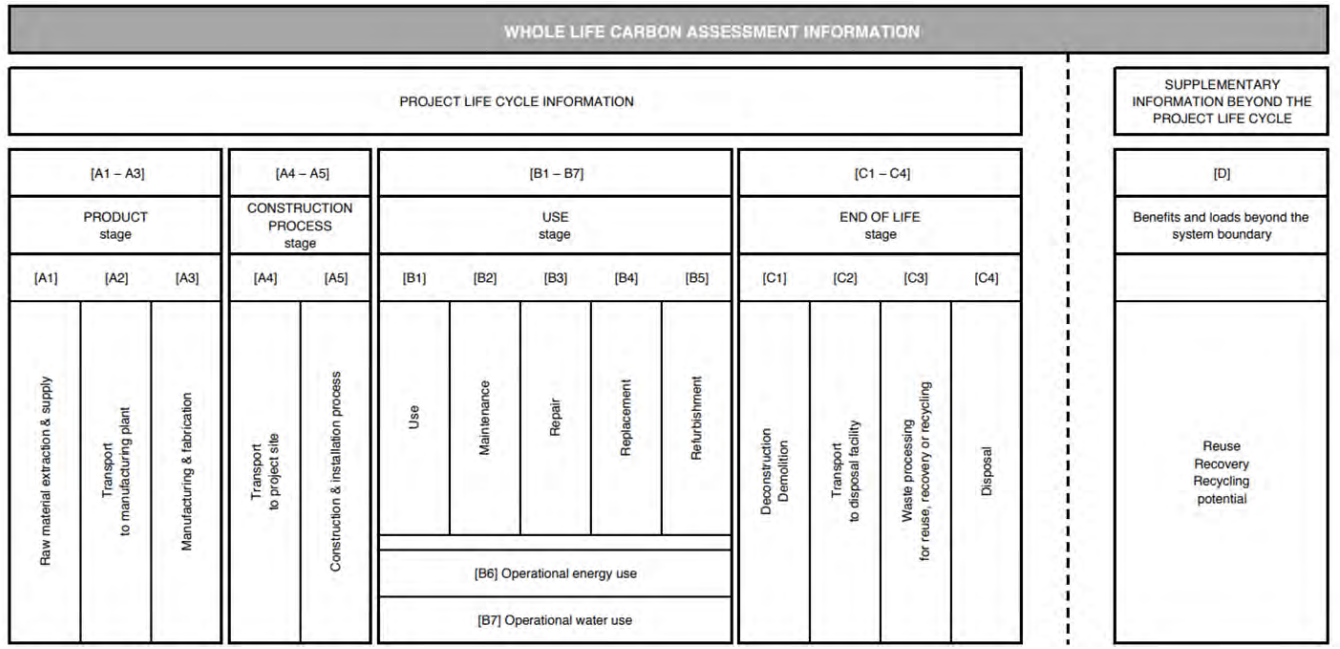
Part 2: The Data

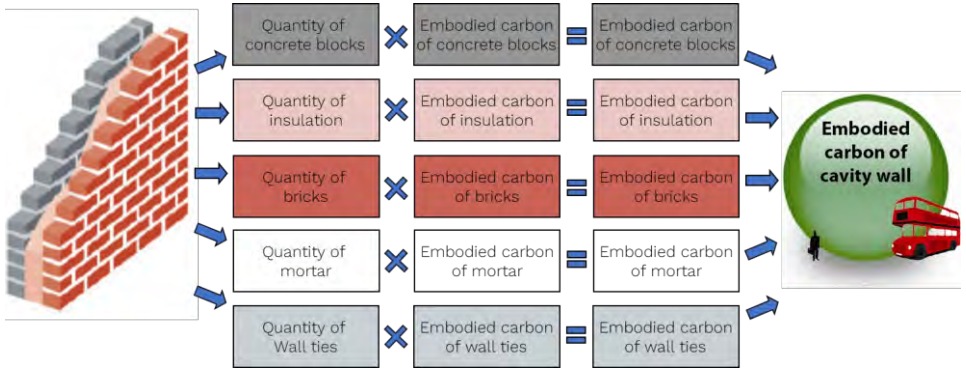
James Fiske

February 2023

BECD
Built Environment Carbon Database

RECAP – Part 1 – Available on BCIS.co.uk





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THE CARBON DATA CHALLENGE

Unlike for costs, we **do not have**

a rich history of carbon data

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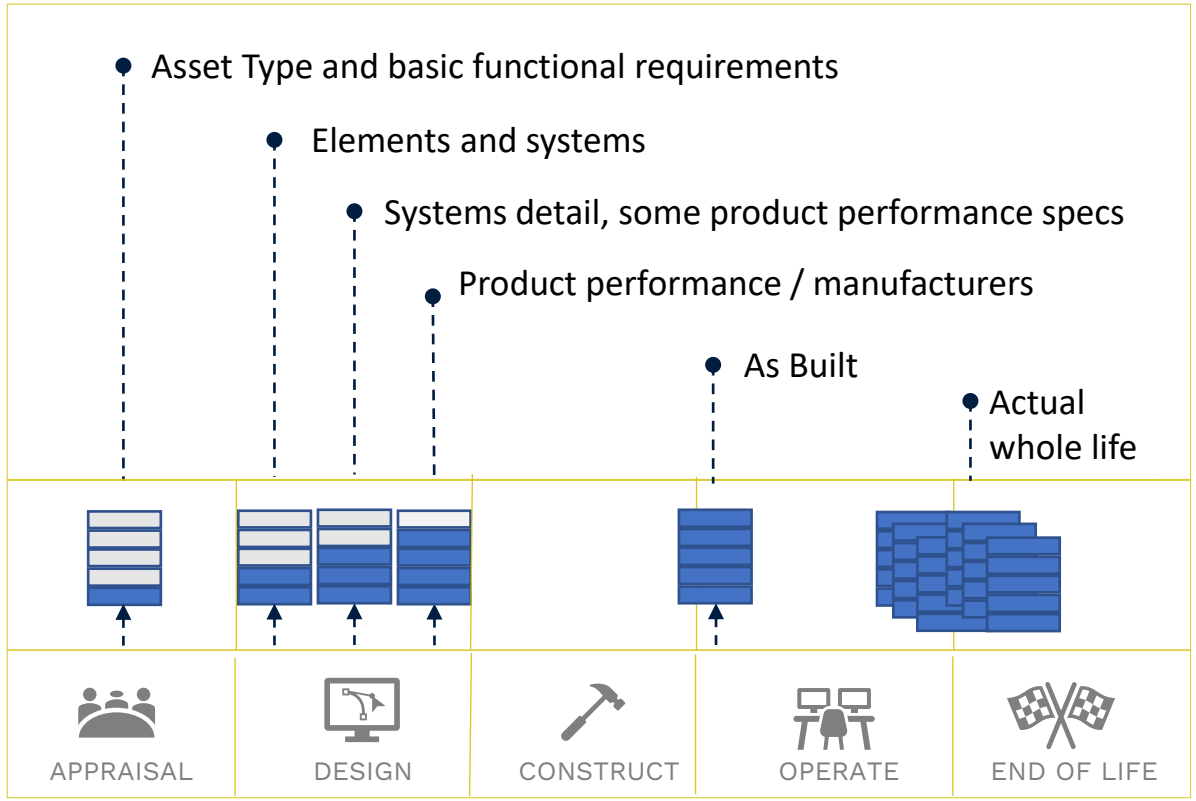
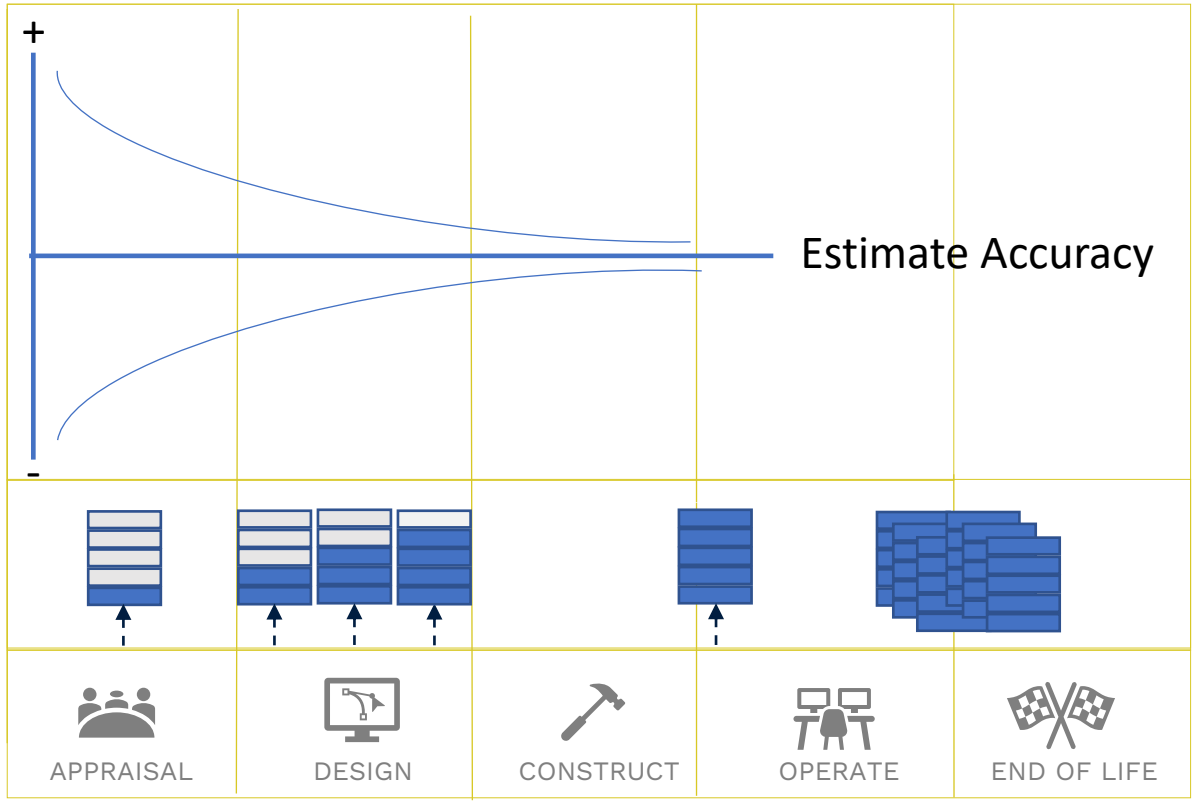
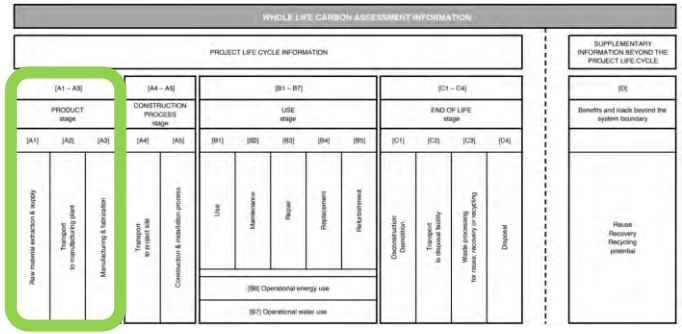
CARBON DATA

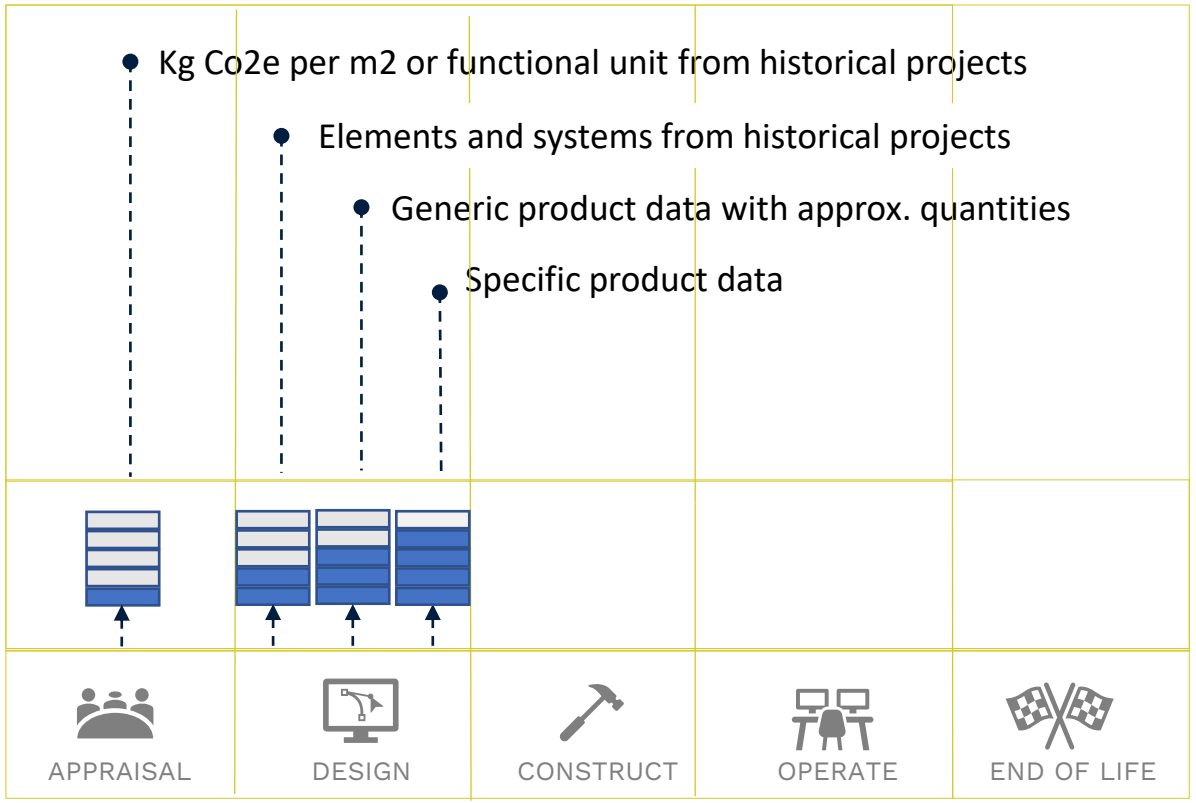

Asset Type and basic functional requirements
Elements and systems
Systems detail, some product performance specs
Product performance / manufacturers
As Built
Actual whole life
APPRAISAL
DESIGN
CONSTRUCT
OPERATE
END OF LIFE

CARBON DATA

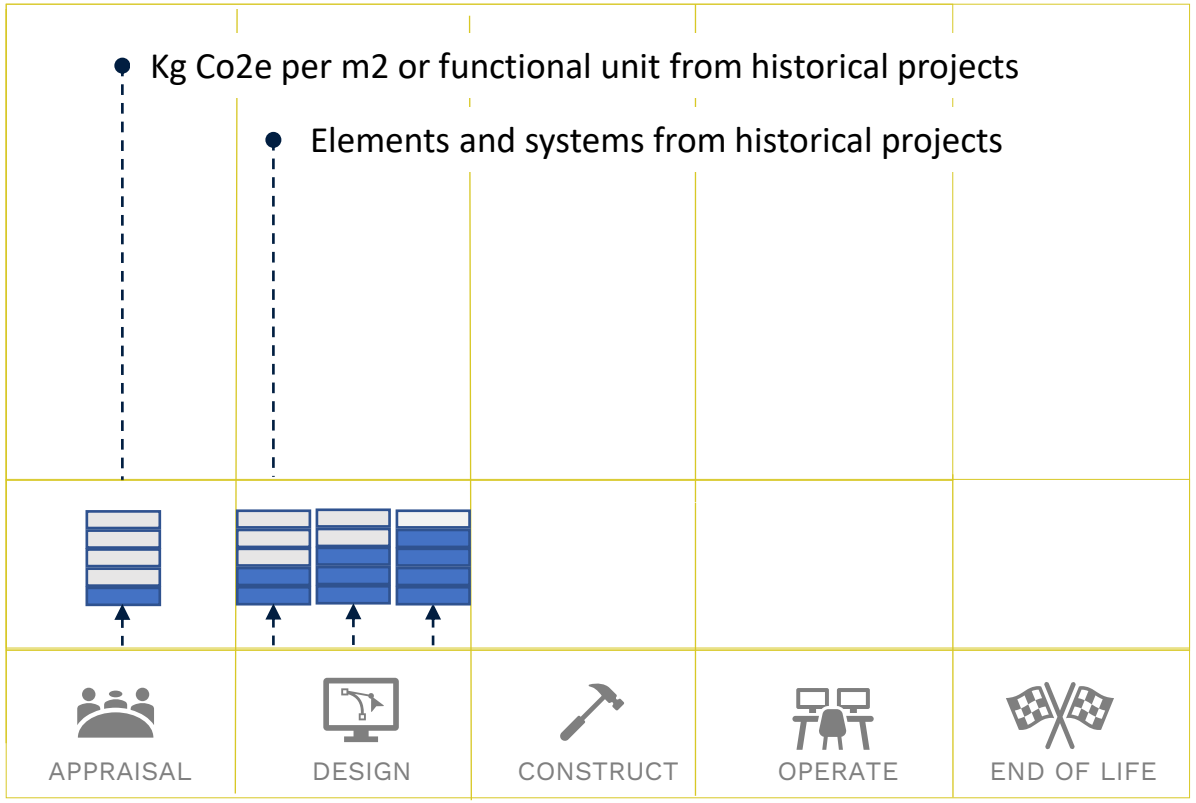

+
-
Estimate Accuracy
APPRAISAL
DESIGN
CONSTRUCT
OPERATE
END OF LIFE

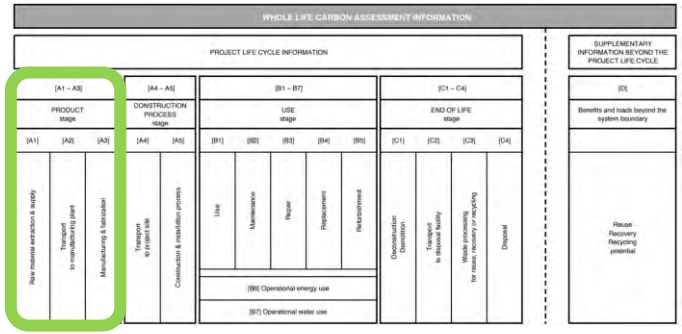
CARBON DATA


WHOLE LIFE CARBON ASSESSMENT INFORMATION
PROJECT LIFE CYCLE INFORMATION
SUPPLEMENTARY INFORMATION BEYOND THE PROJECT LIFE CYCLE
[A1 – A3]
PRODUCT stage
[A1]
[A2]
[A3]
Raw material extraction & supply
Transport to manufacturing plant
Manufacturing & fabrication
[A4 – A5]
CONSTRUCTION PROCESS stage
[A4]
[A5]
Transport to project site
Construction & installation process
[B1 – B7]
USE stage
[B1]
[B2]
[B3]
[B4]
[B5]
Use
Maintenance
Repair
Replacement
Refurbishment
[B6] Operational energy use
[B7] Operational water use
[C1 – C4]
END OF LIFE stage
[C1]
[C2]
[C3]
[C4]
Deconstruction Demolition
Transport to disposal facility
Waste processing for reuse, recovery or recycling
Disposal
[D]
Benefits and loads beyond the system boundary
Reuse
Recovery
Recycling
potential


Kg Co2e per m2 or functional unit from historical projects
Elements and systems from historical projects
Generic product data with approx. quantities
Specific product data
APPRAISAL
DESIGN
CONSTRUCT
OPERATE
END OF LIFE

CARBON DATA





- RICS Buildings Carbon Database
- Various industry guidance e.g. RICS, LETI, IstructE etc.
- Commercial Software (e.g. One Click LCA)
- Research

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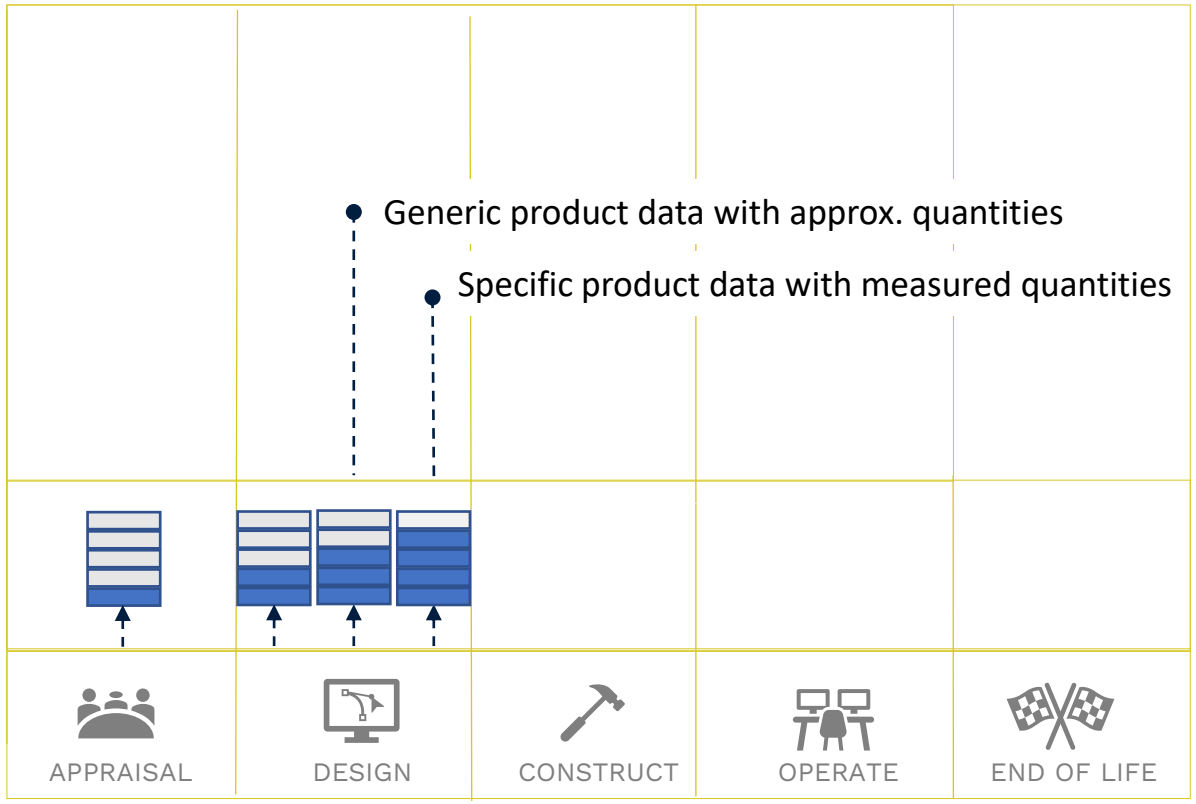
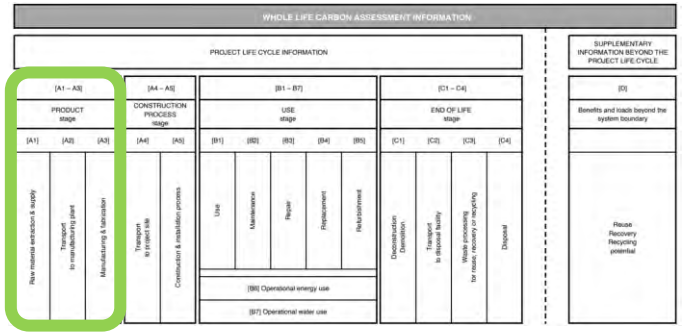
CARBON DATA





Product Emissions

- EPDs / Unverified EPDs / other LCA's/ Estimates
- Available in many different places (BRE/ ICE Database / commercial software etc)

Quantities

- BCIS Schedule of rates
- Project material schedules / Bills

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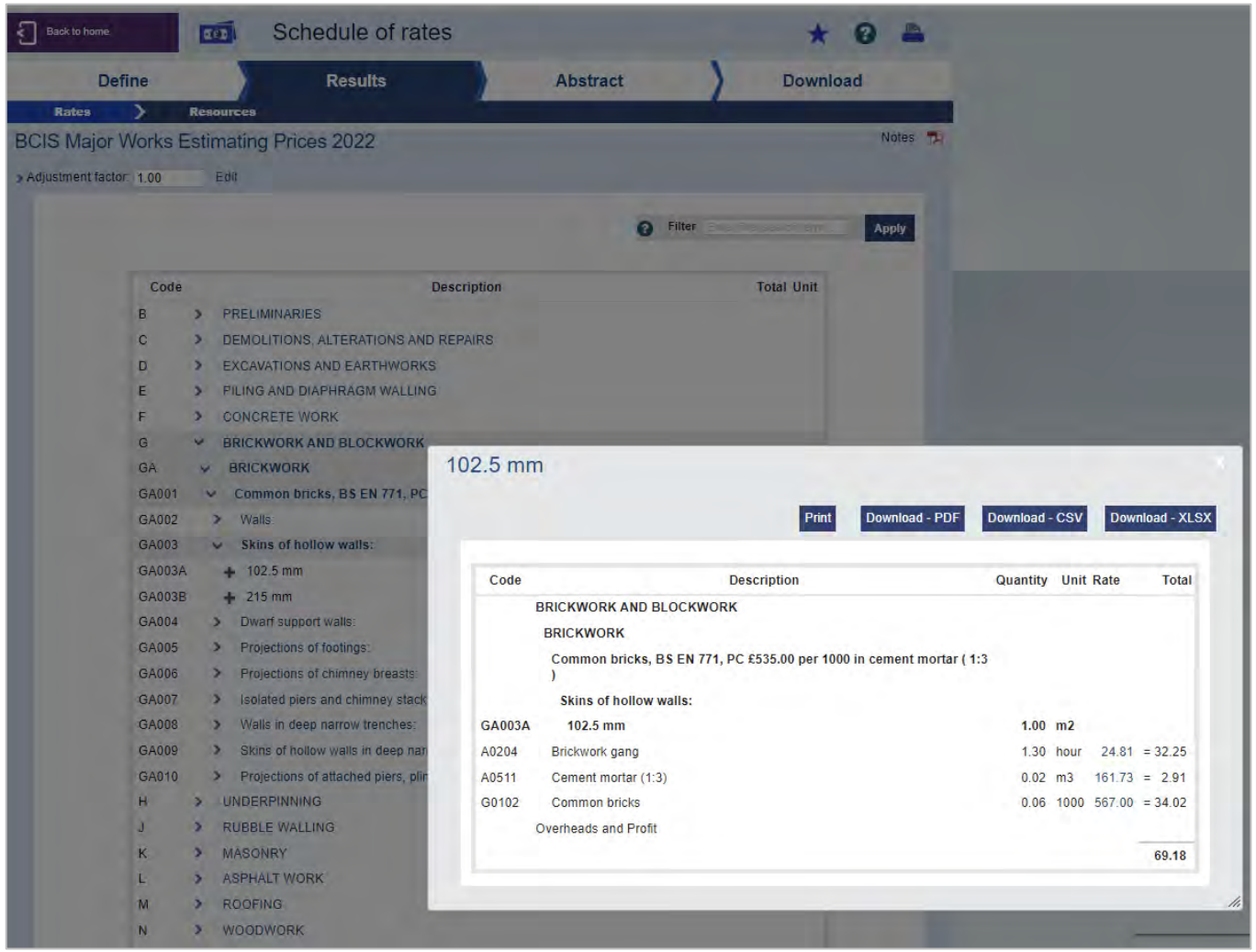
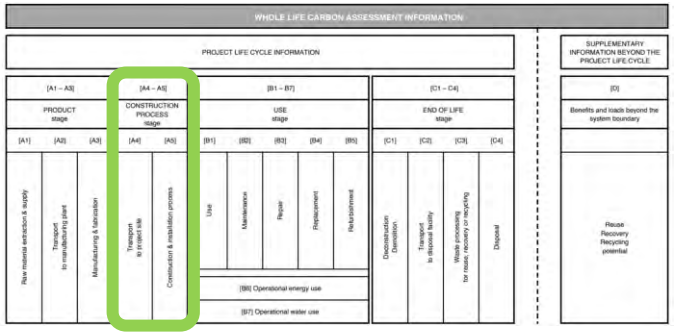


BCIS Schedule of Rates gives you:

- Quantities of materials

CARBON DATA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CONSTRUCTION PROCESS stage
[B1 – B7]
USE stage
[C1 – C4]
END OF LIFE stage
[D]
Benefits and loads beyond the system boundary
[A1]
[A2]
[A3]
[A4]
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[B1]
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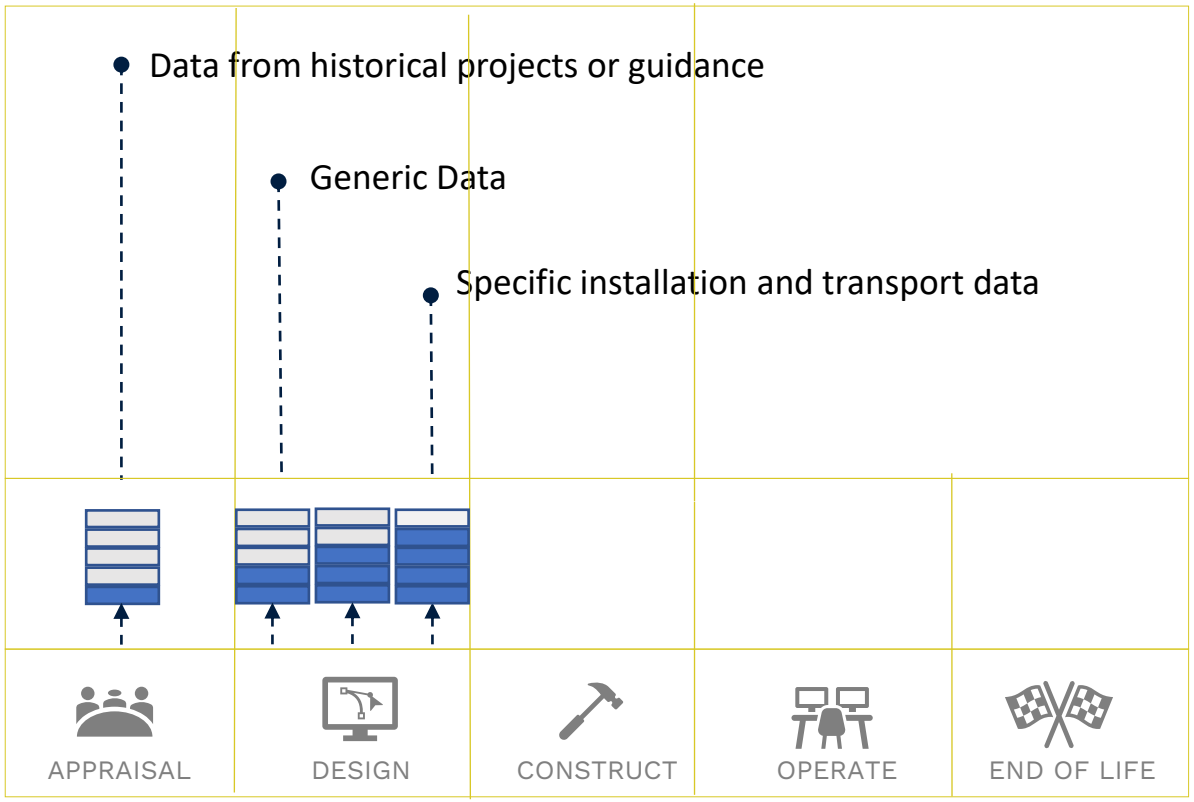
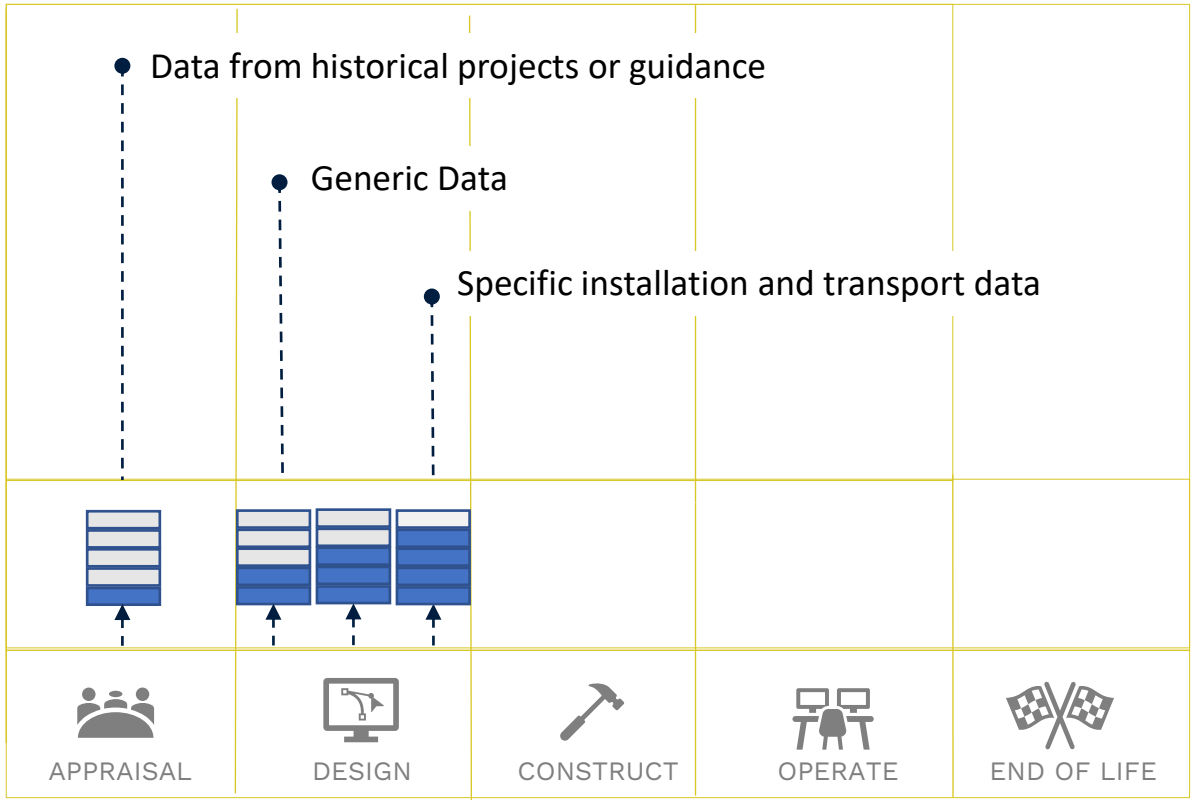
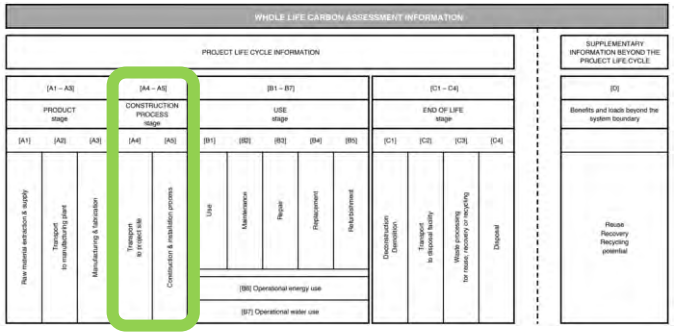

Data from historical projects or guidance
Generic Data
Specific installation and transport data
APPRAISAL
DESIGN
CONSTRUCT
OPERATE
END OF LIFE

CARBON DATA





Construction and Installation

- Averages from RICS PS
- BCIS Schedules
- Project activity schedules / Bills

Transport

- Averages from RICS PS
- Known transport calculations

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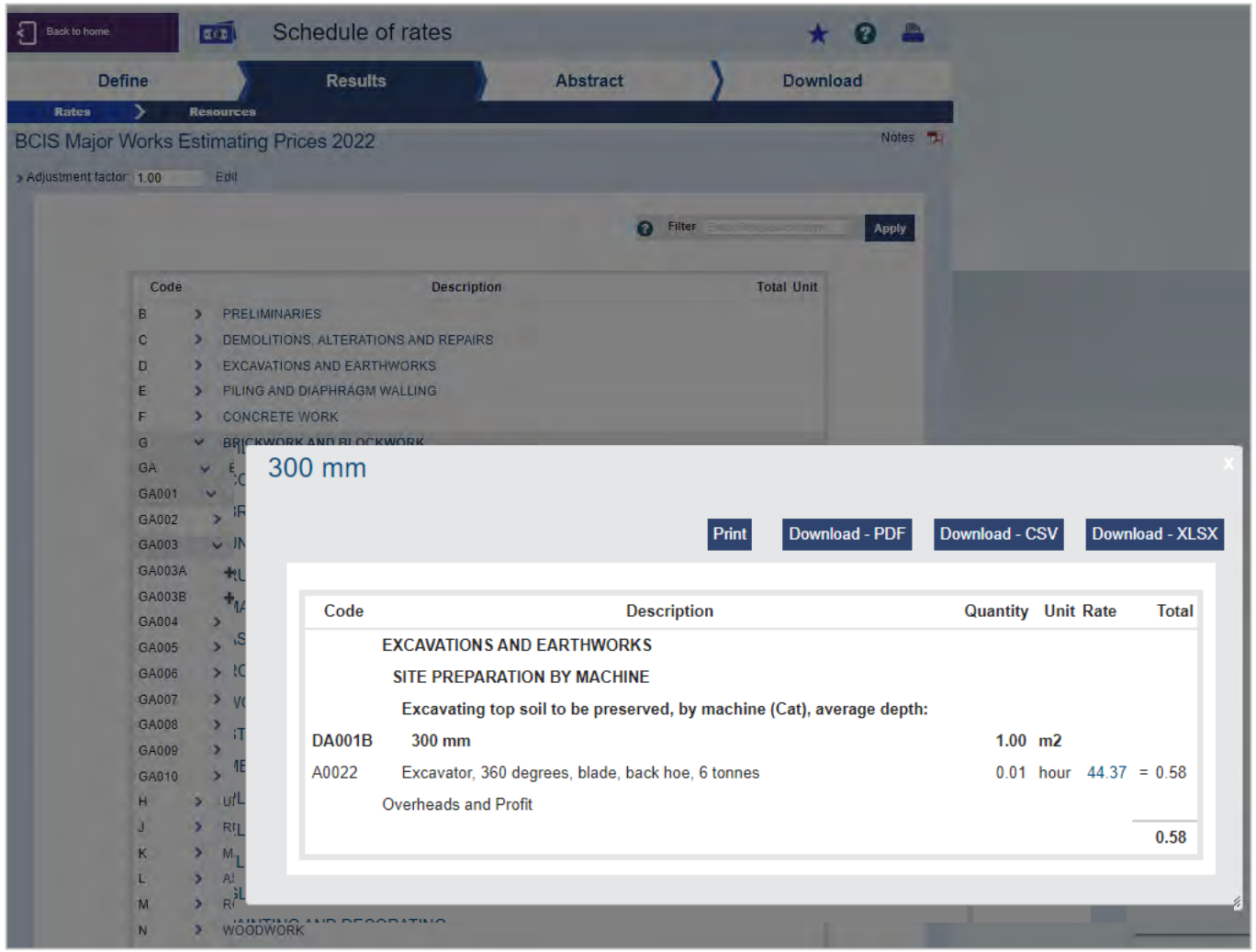
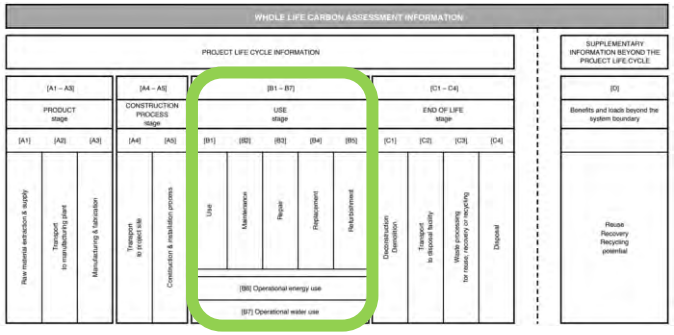


BCIS Schedule of Rates gives you:

- On-site plant usage

CARBON DATA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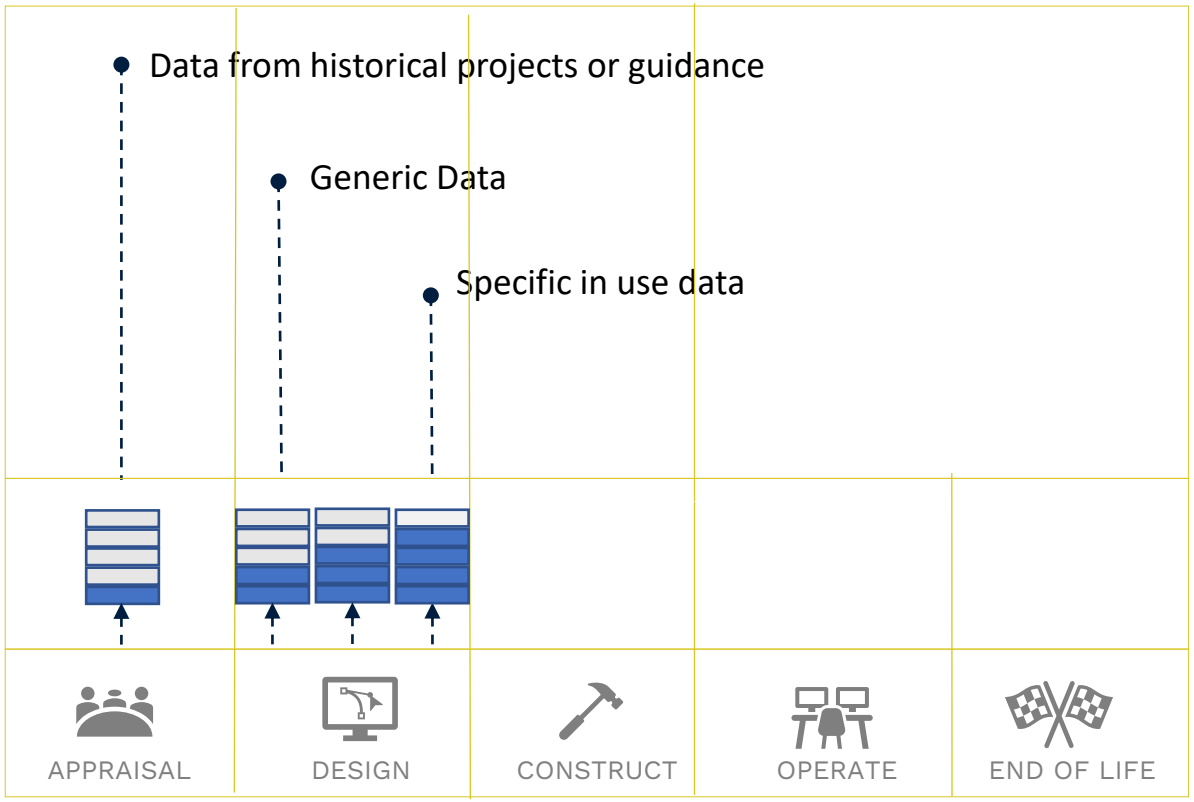
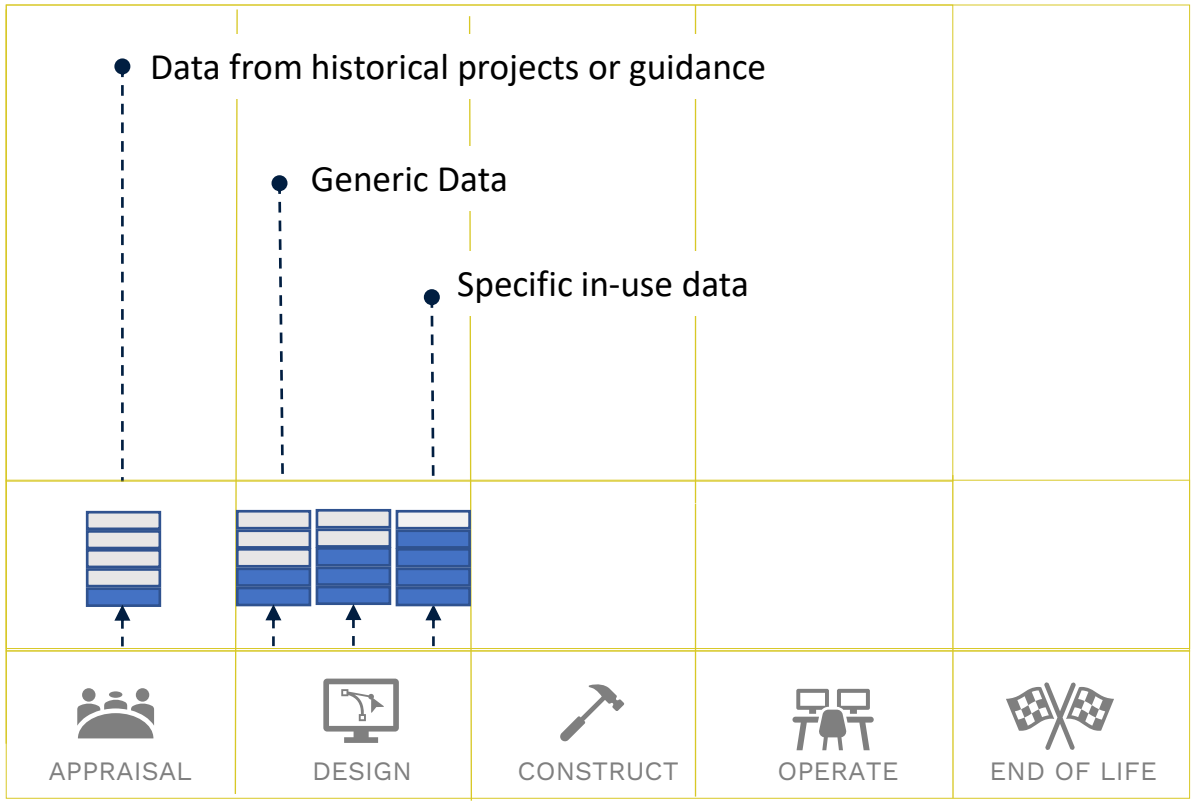
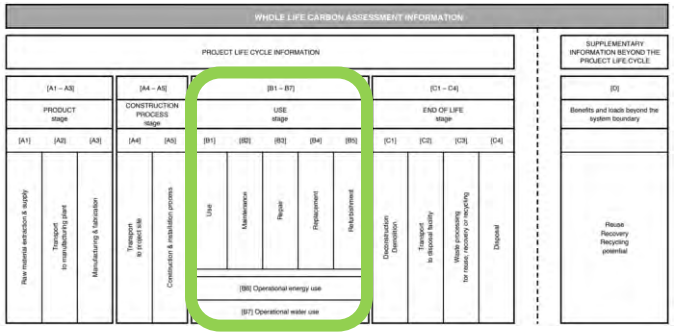

Data from historical projects or guidance
Generic Data
Specific in use data
APPRAISAL
DESIGN
CONSTRUCT
OPERATE
END OF LIFE

CARBON DATA





- Operational Energy
- What maintenance / replacement / repair / refurb activities need to be done over the life of the project
- How often they need to be done
- Quantities of materials
- Product emissions of materials
- Disposal, Installation, transport

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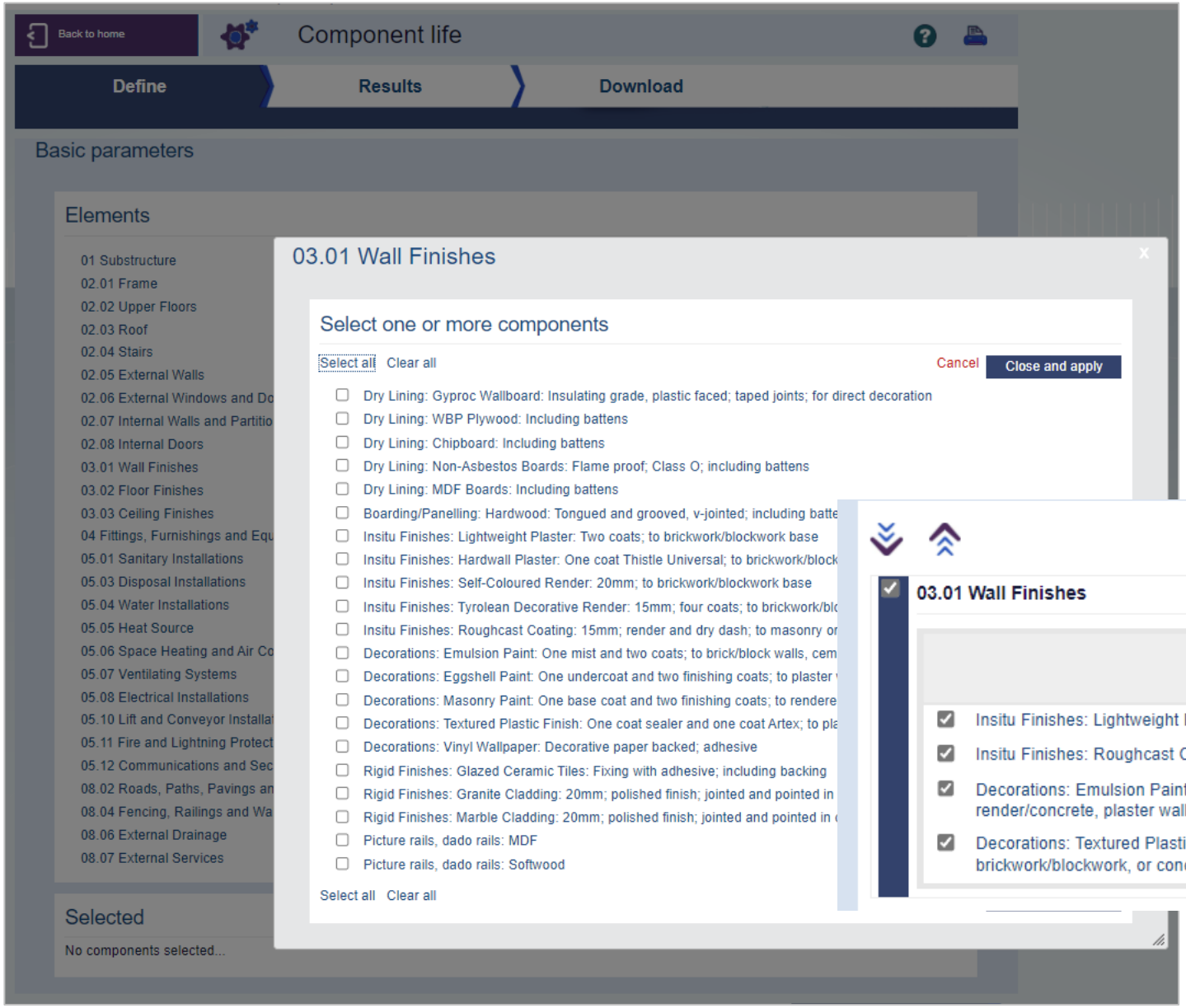

BCIS Component Life gives you:

- Frequency of replacements

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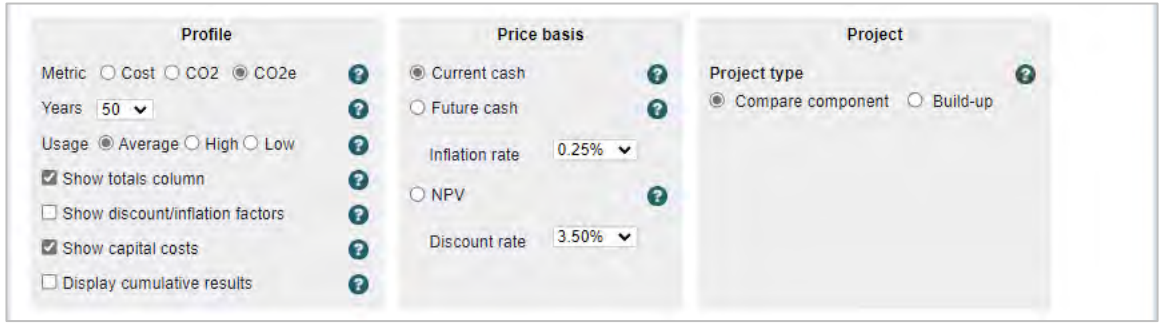

Code	Description	Quantity	Unit
2.5.7.1	**Curtain walling system; extruded powder coated aluminium; insulated spandrel panels; double glazed vision...**	**20,000.00**	**m²**

Activity Class	Activity	Time Unit	Average Usage	High Usage	Low Usage
Asset replacement	Remove Existing and Replace With New	Year	42	30	57
Cleaning	General Cleaning	Week	52	24	78
Inspection	Inspection	Year	5	3	7
Planned maintenance	Repair Joints	Year	5	3	7
Reactive maintenance	Allowance for Reactive Maintenance	Year	5	3	7

5.6.7.1	**Air handling unit; with motorised damper and bag and panel filters, heating and cooling coils, supply fan...**	**1.00**	**nr**

Activity Class	Activity	Time Unit	Average Usage	High Usage	Low Usage
Asset replacement	Remove Existing and Replace With New	Year	20	15	25
Inspection	Inspection	Year	1	1	2
Reactive maintenance	Allowance for Reactive Maintenance	Year	5	3	7

5.6.7.4	**Air handling unit; with motorised damper and bag and panel filters, heating and cooling coils, supply fan...**	**1.00**	**nr**

Activity Class	Activity	Time Unit	Average Usage	High Usage	Low Usage
Asset replacement	Remove Existing and Replace With New	Year	20	15	25
Inspection	Inspection	Year	1	1	2
Reactive maintenance	Allowance for Reactive Maintenance	Year	5	3	7

5.10.1.1	**Traction; machine room less; standard finish; 630 kg; 8 person; 1.0 m/s; serving: 2 floors**	**1.00**	**nr**

Activity Class	Activity	Time Unit	Average Usage	High Usage	Low Usage
Asset replacement	Remove Existing and Replace With New	Year	25	20	40
Cleaning	Clean Lift	Week	4	2	8
Inspection	Inspection	Year	1	1	2
Reactive maintenance	Allowance for Reactive Maintenance	Year	5	3	7

Components: CO2e (kg)

Year	2.5.7.1	5.6.7.1	5.6.7.4	5.10.1.1
Capital	2,448,181.34	1,683.16	4,971.19	12,558.03
1	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00
20	0.00	1,683.16	4,971.19	0.00
21	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	12,558.03
26	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00

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BECD

Built Environment Carbon Database

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BACKGROUND

BECD

Built Environment Carbon Database

The Built Environment Carbon Database is an industry initiative led by a consortium of UK-based professional bodies and organisations:

bre, CARBON TRUST, CIBSE, IStructE, RIBA, RICS, CIOB, ice Institution of Civil Engineers, UK GBC, BCIS

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BACKGROUND

BECD
Built Environment Carbon Database

- Autumn 2020: RICS and Arup conducted a workshop with industry representatives to determine the industry needs
- Spring 2021: RICS convened major UK professional bodies and organisations to collaborate on an industry-led database of emissions for the UK built environment

OBJECTIVES

Establishing the official UK repository for whole-life carbon data on the built environment

- Harmonise and streamline reporting of carbon assessment
- Increase availability of free data
- Increase transparency and data quality
- Align with and strengthen the RICS PS on WLC (2017 and 2023) and Net Zero Carbon Buildings Standard

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CONCEPT

BECD
Built Environment Carbon Database

- A data repository, not at an assessment tool
- Capable to import/export data from/to existing software applications
- Basic account (free) to report and retrieve carbon data
- Pro account (paid) for advanced filtering and benchmarking
- Raw data will always be free to access

2 separate database sections:

- Assets (i.e. projects)
  - Buildings and infrastructure
  - Embodied and operational carbon
- Products
  - Environmental Products Declarations (EPD)
  - Other product Life Cycle Assessments (LCA)

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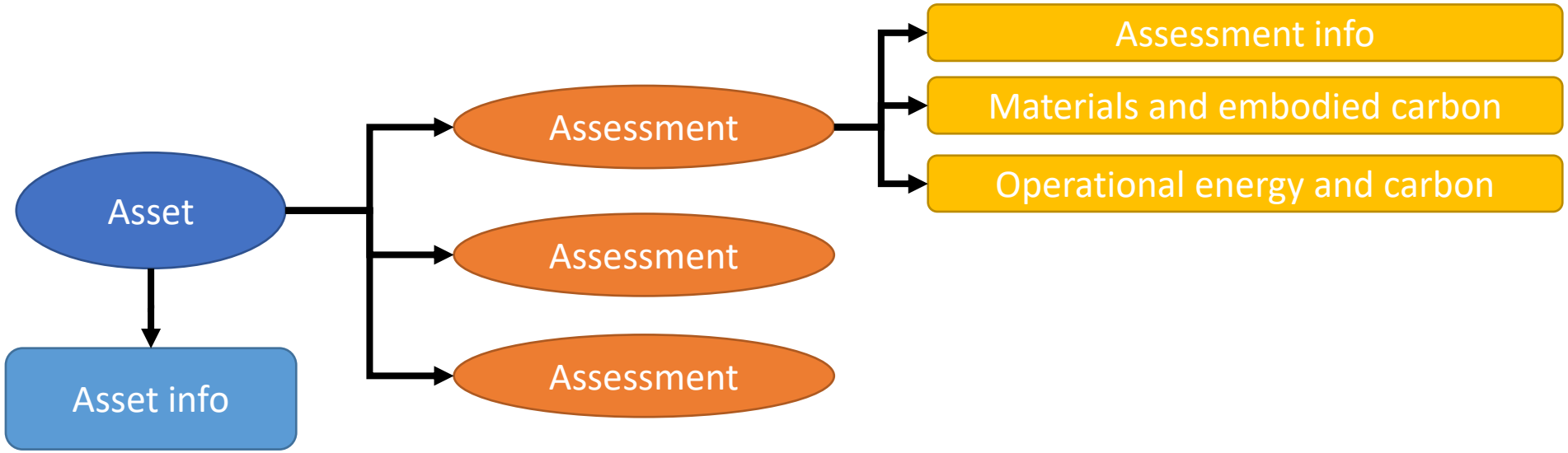
ASSET SECTION

- Embodied and/or operational carbon
- Project stage tracking
- Manual and semi-automated data input
- Project sharing among users
- Project analysis and comparison
- Data export



PRODUCT SECTION

- A catalogue of existing LCAs for construction products
- Basic information about each LCA record
- Search records & filter function
- Data input function
- Bringing together different sources
    - EcoPortal EPDs
    - Other EPDs
    - ICE database benchmarks
    - Academic LCAs
    - Professional LCAs
    - Paid databases

TIMELINE

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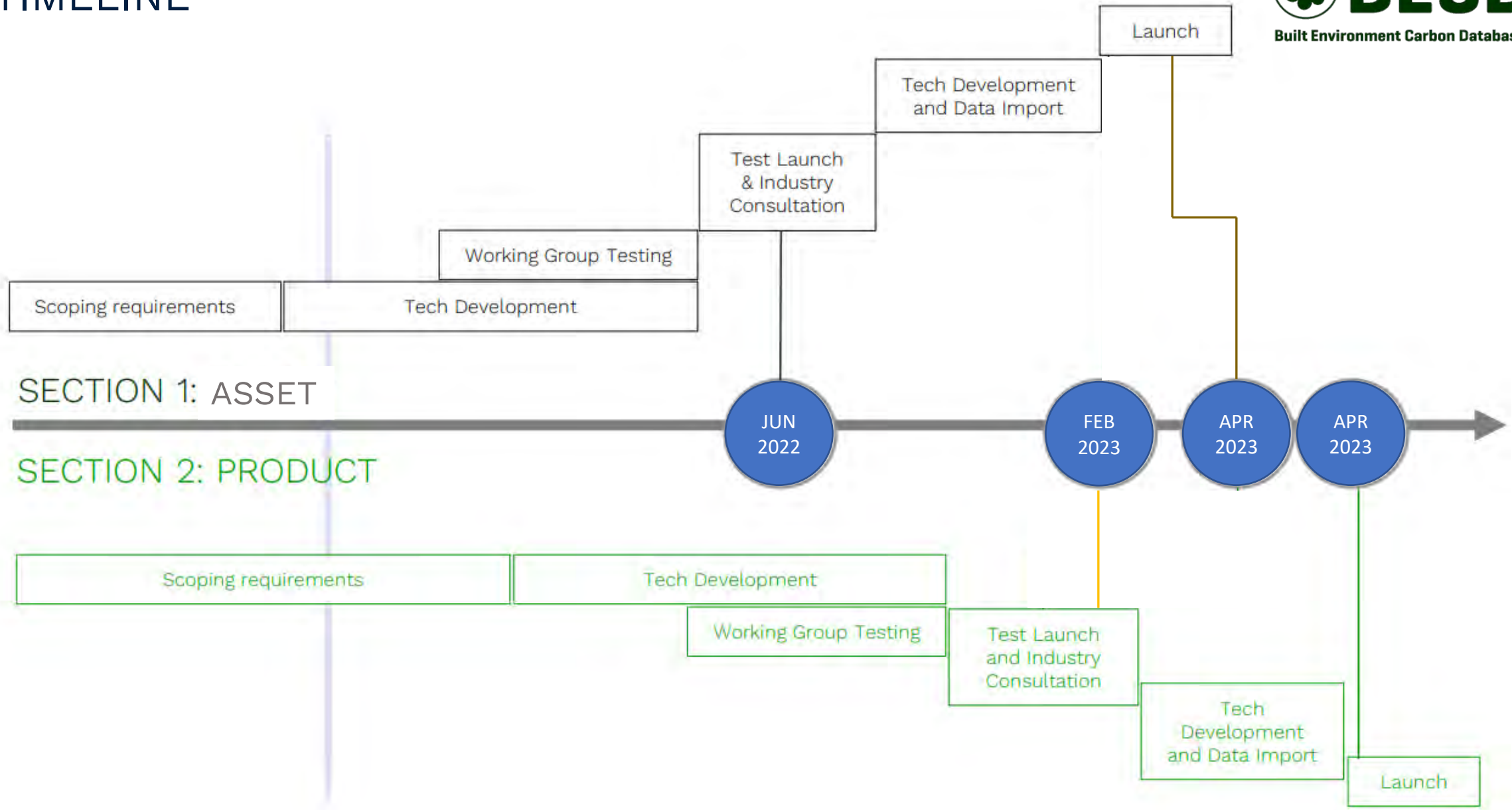
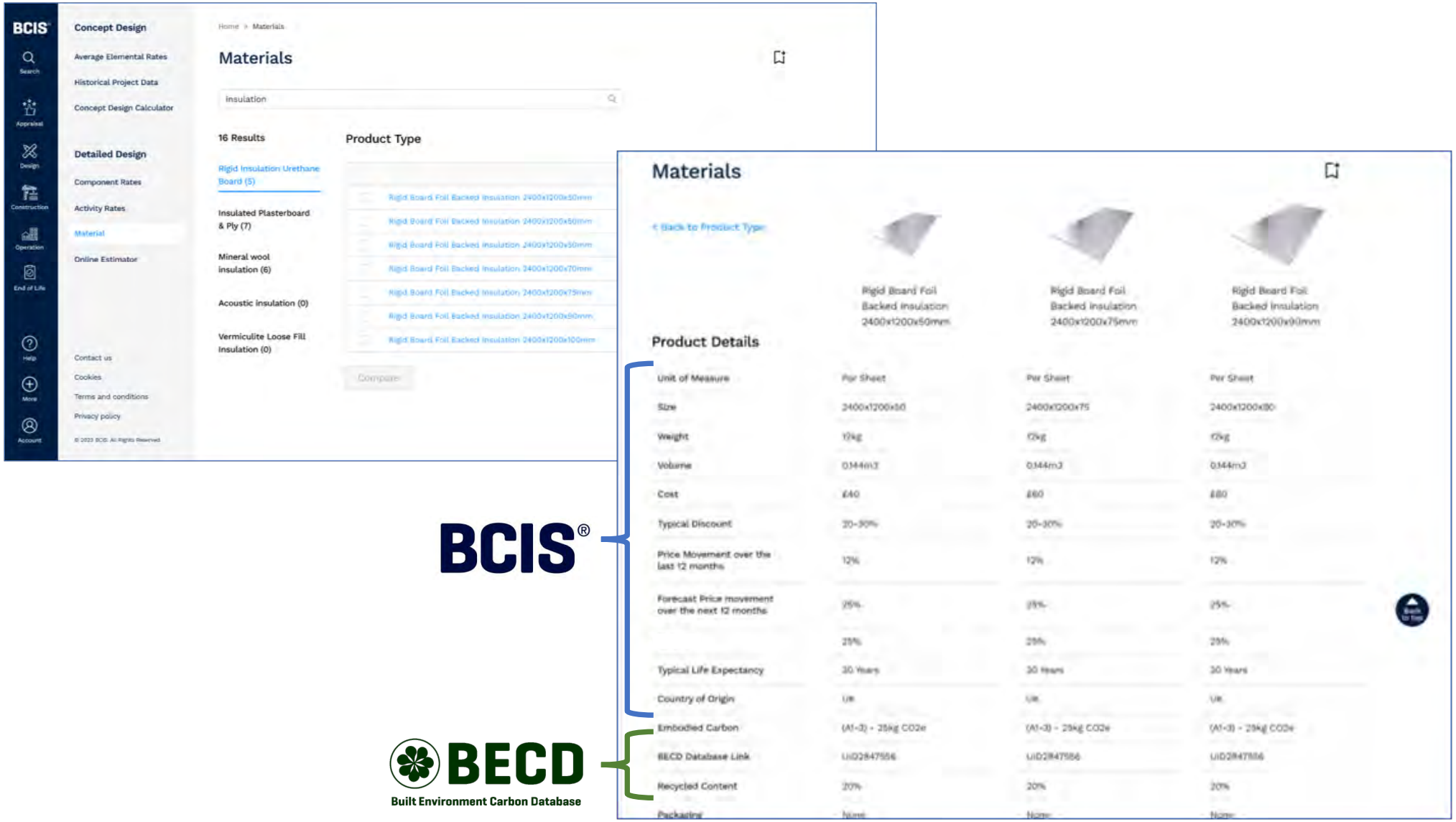
Built Environment Carbon Database





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SUMMARY

We are in the **biggest fight of our lives** and we all need to **be doing something about it**

Guidance on how to measure the impacts of design choices is available as discussed in the first part of our webinar series

Consistent available data is essential. The data is building and will be available in BCIS and BECD

Aligning cost and carbon measurement and reporting is the focus of our next webinar – later this year

More data will help sharing, learning and driving future improvement

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