



ICE Database: ICE V4.0 Launch Webinar

28th November 2024

Your Presenters Today

Dr Craig Jones

Director

- Original author of the ICE database
- 20 years' experience of embodied carbon assessment
- Founder of Circular Ecology

Jon Burrow

Head of Carbon Accounting

- Oversight for the development of ICE V4.0
- Over a decade's experience in carbon footprints
- Expertise in developing Carbon Reduction Strategies for organisations

Contents

- Background and Introduction
- Journey to date
- Overview of ICE Version 4
 - What's new
 - Analysis approach
 - Challenges
 - Data Quality Framework
 - Future updates
- Accessing the ICE Database
 - Registration and Terms of Use
- New Supporter System for the ICE Database
- Q&A



Background & Introduction

Circular Ecology – Introduction



Environmental consultancy, founded in 2013

Hosts the Inventory of Carbon & Energy (ICE) database

- Free embodied carbon database for materials
- Trusted by over 50,000 professionals globally

Offer a range environmental services:

- Organisational Carbon Footprints, Scope 1, 2 & 3
- Product Carbon Footprints
- Whole-Life Embodied Carbon Assessments for Construction Projects
- Life Cycle Assessments (LCA)
- Net Zero Carbon Strategy
- Verification and Peer Review
- Online E-Learning Training Courses
- Carbon Offsetting and Tree Planting
- Carbon Footprint Database (library) Development



Our Mission Statement

***“Making a difference together
Towards a more sustainable future”***

Five Core Values:



Impactful



Community



Quality



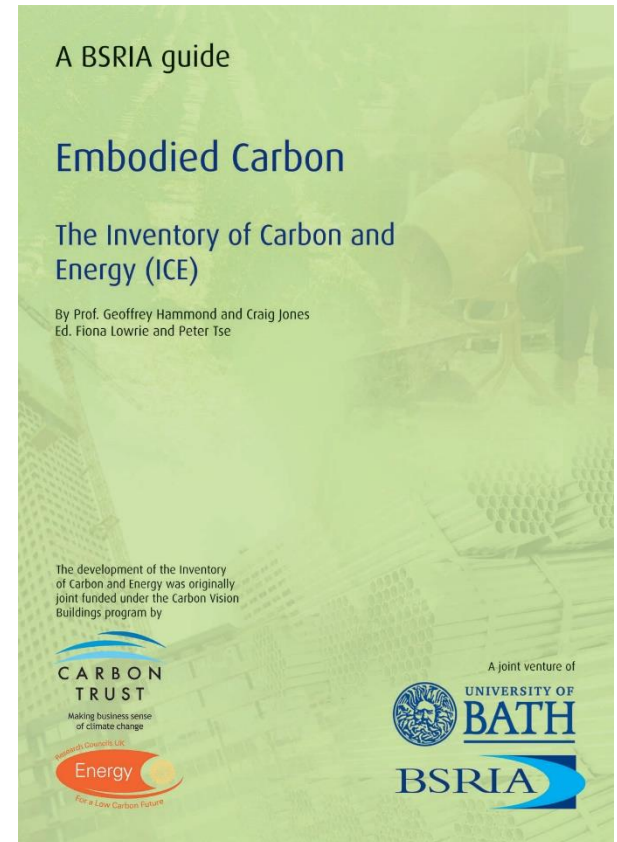
Ethical



Continuous Improvement

The Inventory of Carbon & Energy (ICE)

- An **embodied energy and carbon database** for building materials
 - First version 2005 released by Dr Craig Jones and Professor Geoff Hammond, University of Bath
- Data for over 200 materials
 - Primarily for Construction Materials
- Over 50,000 worldwide users
- BSRIA hardcopy published in January 2011
- Excel version free to download from www.circularecology.com/ice-database.html



Journey to Date – Net Zero Flow

- Latest version ICE V3 (2019)
- In 2021 we had a part funded research grant from Innovate UK
 - A project called “Net Zero Flow”, led by xbim
 - Aimed to align BIM with embodied carbon modelling
- Part of the project allowed us to collect embodied carbon data for the ICE database
 - We doubled the size of the background ICE dataset size
 - Despite data needing to be extracted manually from pdf EPDs
 - Digital EPDs started to come out in notable quantities towards the end of this project
 - We also put in place the foundations for a team to update the database
 - Although over the short 9-month project duration, we didn’t have the resource to complete the analysis and cleansing of the data
 - Which is a time consuming and important part of the process
- Further funding would be needed to fund a database update...

Journey to Date – BCIS Funding

- In 2023, we obtained the further funding needed to update the ICE Database
 - Sponsored by BCIS (bcis.co.uk)

BCIS

- Circular Ecology were also appointed as the consultants to prepare embodied carbon data for the BECD database for products
- Built Environment Carbon Database (BECD) - www.becd.co.uk



Journey to Date – BECD Data

- The BECD product database currently contains data for over 28,000 materials and products
 - Compiled from digital EPDs, Primarily from:
 - EC3
 - Ecoportal
- This has become an important data source for the ICE Database
- The source data is taken from digital EPD file formats
- However, it still takes a lot of time for analysing, cleansing and categorisation of the data

Updating the ICE Database

- Previous version ICE V3 (2019)
 - Half of the data was still ICE V2.1 (2011)
 - The landscape has also changed significantly, even since 2019
 - The ICE Database was very much in need of an update
- The focus of ICE V4.0 has been to update much of the ICE V2 data
- In the next part of this webinar, we will provide insights into ICE V4.0



Author Acknowledgements

**Circular Ecology
Current Authors:**

Jon Burrow (Oversight), Dr Craig Jones (QA), Sophie Vernon (Project Manager), Joe Rouse (Analytics), Charlie Zhu (Analytics), Vaishnavi Unnad, Kit Wickens, Thomas Relph, Liam Seprini, Edwin Lowe.

Previous Contributors:

W. Garner, J. Pearce, K. Dävé, B. Sodagar, M. Brill, A. Ranathungage.

ICE V4.0 Key Funders

BCIS





ICE V4.0 Launch

ICE V4.0 Launch

ICE V4.0 database available from **Friday 29th November 2024**

Today's insights:

- Updates to carbon data for selected materials
- Data analysis insights – process, changes, challenges
- Updated DQI Framework for new material profiles
- Further webinars on latest updates if there is interest -
 - Possible webinars on material profiles & data insights
 - Possibility of paid ICE analytics webinar series in 2025

ICE V4.0 Background

- ICE V4.0 - updates build on previous ICE V3.0 (2019)
- Carbon (A1-3) database for approx. 600 material types
- Published carbon data can come from -
 - i. individual source references (e.g., industry LCAs)
 - ii. averages of collected data
 - iii. calculated values
- Supplementary info provided alongside carbon values
- Individual DQI scores applied to support practical use
- "Machine Readable" version of ICE V4.0 also available

Updates for ICE V4.0

Material Profiles

Includes updates for -

- Cement / Concrete
- Ceramics
- Insulation
- Paint
- Plaster
- Rubber
- Steel
- Timber (CLT, Glulam)
- Vinyl

Other Updates

- Fixes made to ICE machine readable version
- "Misc" ICE V2.0 category data now removed
- Updated Terms of Use, registration process and contributions initiative.

Note – data not yet updated from V3.0 is still available to view in V4.0.

V4.0 Analysis - Challenges



Material Appropriateness - EPDs can cover more complex products made from several different materials (e.g., Insulation vs. Cladding)




Accounting differences – data from different reporting methodologies, boundaries, and standards (e.g., Stone)



Unclear / Missing Data - Key data can be missing from EPDs e.g., biogenic carbon (e.g., linoleum)

V4.0 Analysis – Data Cleansing Process



How confident are we that the dataset fairly represents the material we are profiling?

Identify possible erroneous entries from data sources e.g., EPDs



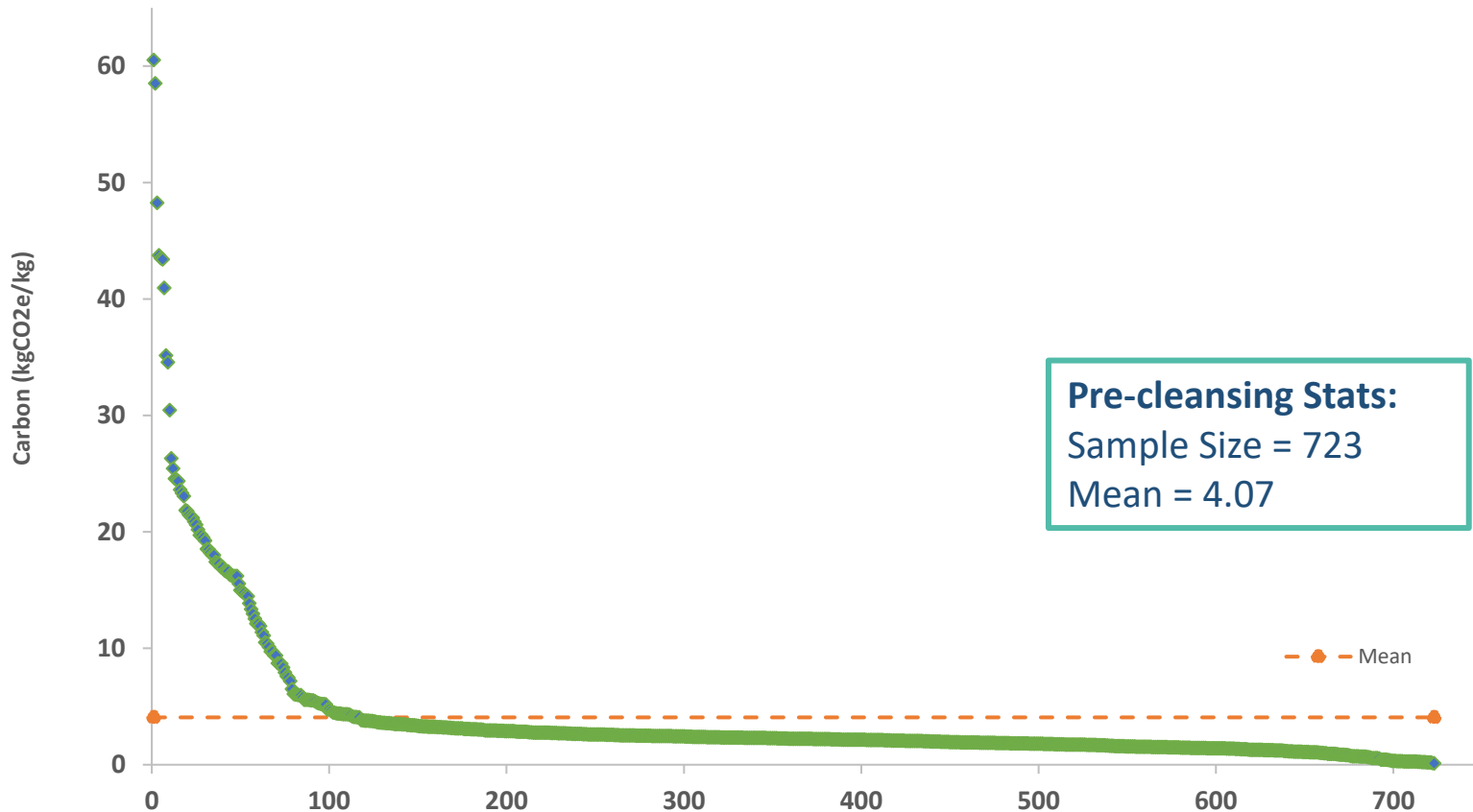
Analyse identified data points for appropriateness and accuracy



Remove any unresolved or problematic data points from the sample

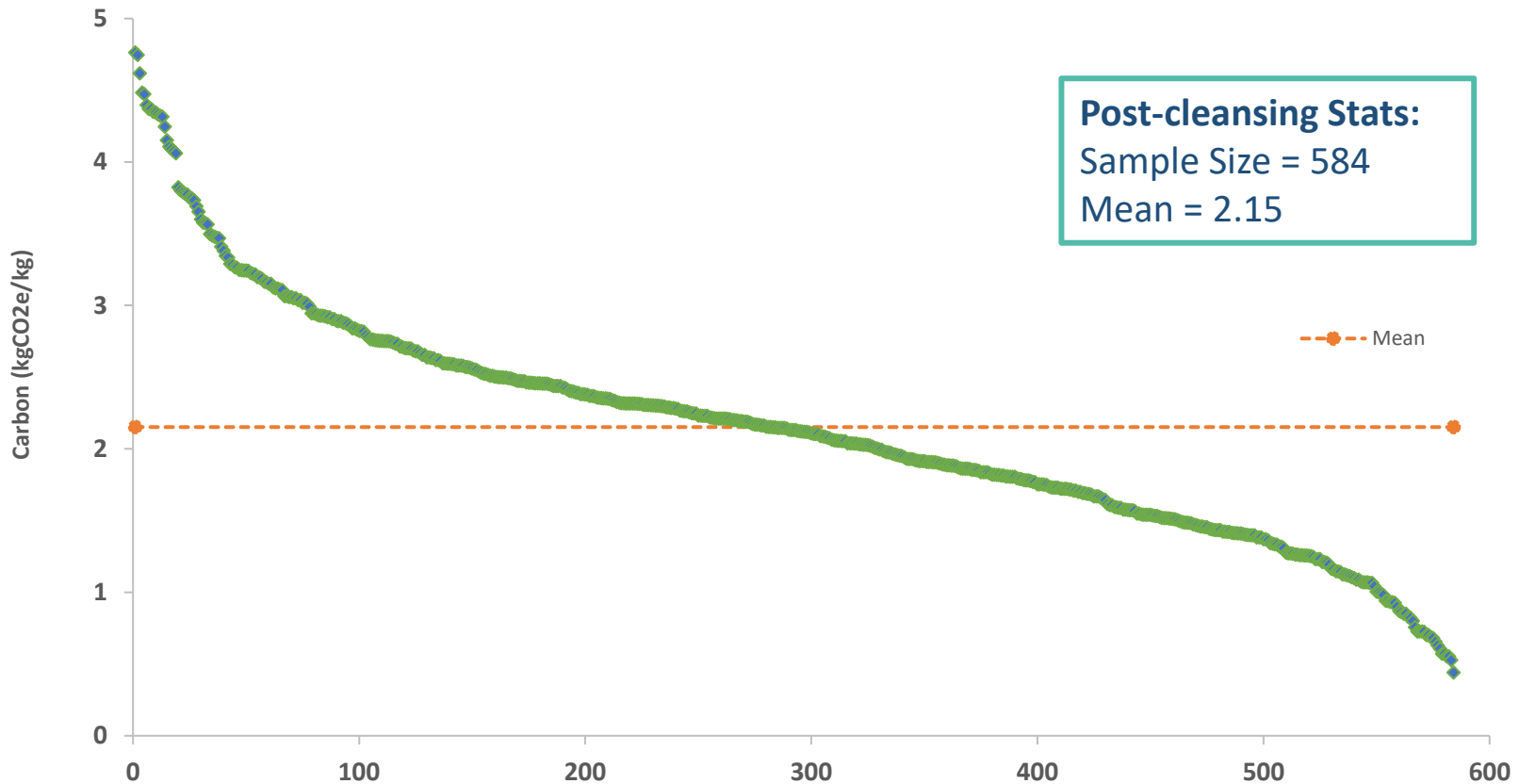
V4.0 Analysis – Data Cleansing Process

Paint, Waterborne - Before Cleansing

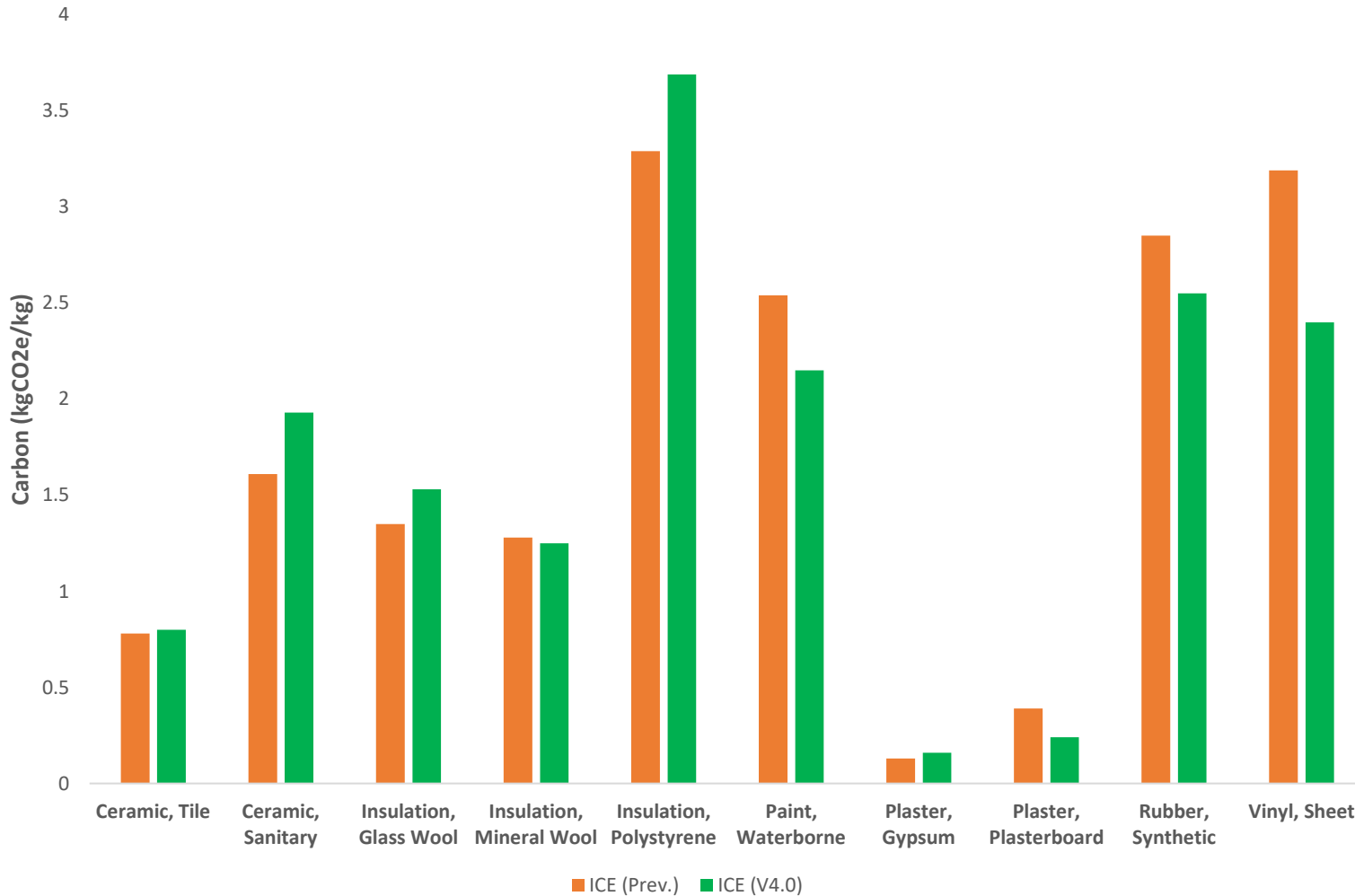


V4.0 Analysis – Data Cleansing Process

Paint, Waterborne - After Cleansing



V4.0 Analysis – Comparisons



Data Quality Index (DQI) Updates

Previous DQI Scoring:

DQIs -

- Method Compatibility
- Assurance
- Temporal Correlation
- Geographical Compatibility
- Transparency
- Sample Size

New DQI Scoring:

Core DQIs -

- Method Compatibility
- Assurance
- Temporal Correlation
- Geographical Compatibility
- Transparency

50% Weighting



Category Average DQIs -

- Population (Sample Size)
- Precision
- Analytical Approach

50% Weighting

All DQI scores are applied as a single % score to each individual material factor

Future Material Profile Updates –

Pending Funding for Further Revisions

Material categories that could benefit from future updates:

- **Timber**
- **Plastics**
- Aggregates
- Aluminium
- Copper
- Glass
- others...



Other ICE Database Changes

Other Changes to the ICE Database

- The ICE Database needs more support to continue updating and improving the data
- Updates happened too infrequently, in 2011, 2019 and now 2024
- The landscape over this timeline has changed immeasurably
- More frequent updates are required
- There are various areas of the database that would benefit from being updated
- We also have access to large amounts of data for future updates and have put in place strong systems and processes
- We are well placed to deliver updates, but funding will be required
- In order to help raise more funding for future development and maintenance of the database, some changes are being made
- Whilst keeping the database as a free resource

ICE Registration & Terms of Use



ICE is now available in two forms, Educational and Advanced (inc. machine readable). Both remain free.

If you wish to use the ICE Database for Non-Educational use you must now register (annually) as a user when submitting the download form.



Registration is and will remain free.

Registration can be completed at the same time as downloading the Advanced copy of the ICE Database

<https://circularecology.com/embodied-carbon-footprint-database.html>

ICE Registration & Terms of Use



Registration will last for 12 months after which users will need to re-register for the following period. **Registration is and will remain free.**



Users will also need to complete an Impact survey annually. This process allows us to see how and where ICE is being used. **Giving us a much better sense of the impact of the ICE Database** throughout the industry and how we can improve.



It also **encourages supporting the future development and maintenance** of the database. We have developed a new ICE Supporter System (more on that later).

ICE Registration & Terms of Use



The ICE Database hasn't been updated enough and some of the data had become particularly old.



Therefore, to encourage more frequent updates, we are placing on each version of ICE a **3 year period of validity** for non-educational use on published versions of the ICE Database.

This is separate to the need to register every year for permission to use for non-educational use.



If the ICE Database isn't updated for a period of **3 years**, the only permitted use will be for educational purposes.

Educational and Non-Educational Use



Educational Use: Learning, teaching, academic research, free training courses, self interest.



Non-Educational Use: Any commercial uses, non-academic research, consultancy, software, tools, apps, platforms, ...etc (non-exhaustive list).

New ICE Database Supporter System

Introduction of our **ICE Supporter System**



- Recognition of **financial** and **data** contributors in the ICE database and across our media & website
- Contribution tiers for both standard and key supporters
- Contributions are key to helping us maintain and update ICE whilst remaining free
- <https://circularecology.com/ice-supporter-system.html>

Supporter System:

- ★ ★ ★ ★ ★ – Pioneer
- ★ ★ ★ ★ – Innovator
- ★ ★ ★ – Activator
- ★ ★ – Enabler
- ★ – Contributor
- Supporters

ICE Database Supporters V3 & V4

BCIS

Heathrow
Making every journey better

UKRI  **Innovate
UK**

 **Environment
Agency**

 **RAIL
SAFETY AND
STANDARDS
BOARD**

love every drop
anglianwater 

**circular
ecology** 

Support However You Can



Share **where the ICE Database can be downloaded** from with your networks



Complete our **annual impact survey** to inform us how you use ICE and how we can **continue to provide impactful resources** in the future



Share with your networks **how you use the ICE Database** in projects, tools and research



Calculate and share the **carbon savings made through using the ICE Database** in projects, carbon estimating, etc.



Invite us to collaborate on research grant funding applications (Innovate UK, Horizon...etc), part funded research can be an important part of updating the ICE Database

Scaling Carbon Reduction Initiative (SCRI)

Launch of our **Scaling Carbon Reductions Initiative (SCRI)**

- A key part of our purpose is to release impactful work, to enable scaling carbon reductions
- We will be diverting a specified amount from some of our sales into the SCRI
- Funds will be used to develop free data, tools and resources
 - All funds will be used for ICE Database until at least June 2025, aiming to get all the data up to date
- Publication of an annual impact report disclosing the amount raised and use of funds
- <https://circularecology.com/scaling-carbon-reductions-initiative.html>

Contributions are key to helping us maintain and update the ICE Database, whilst remaining as a free resource



Scaling Carbon Reduction Initiative (SCRI)

Products that make a contribution to our **Scaling Carbon Reductions Initiative (SCRI)**

- **e-learning training courses** – 66.67% of ex. VAT sales diverted until June 25
 - Intro to carbon footprinting
 - Intro to Life Cycle Assessment
 - Intermediate embodied carbon in construction
 - [under development] Sustainability 101 training course
 - <https://circularecology.com/training.html>
- **Carbon offset credits** - £1 ex. VAT per tCO2e offset
 - <https://circularecology.com/product-category/carbon-offset>
- **Tree planting packs**
 - To be added to website soon
 - Costs £100 ex. VAT to plant 100 trees, 25% ex VAT diverted (exchange rate dependant)



750,000 Trees Planted!

- Circular Ecology are an official partner with Eden: People+Planet
 - formerly Eden Reforestation Projects
- We have embedded tree planting into all of our activities
 - All consultancy projects have a specified amount of trees planted
 - 4 trees per tCO2e of carbon offset credits are also planted, in addition to the offsets
- We are now a Forest level Partner (2nd highest tier)
 - <https://www.eden-plus.org/partners>
- If we reach 1 million trees in 2025, that alone would fund enough for an ICE database update on several key materials



Summary

- ICE V4.0 launch - aiming for **Friday 29th Nov 2024**
- Updated data for 6 material profiles
- Put in place a lot of internal processes, systems and have considerable data to use for future updates
- Users are required to register annually for permission to use for non-educational use, registration is and will remain free
- Updated terms of use will be on our website
- Further funding needed for more regular future updates
- New ICE Database supporter system
- Circular Ecology Scaling Carbon Reduction Initiative, aiming to raise funds for free data and tools
- With your support, we can achieve more regular maintenance & improvements to the ICE database



Thank You

BCIS

&

The Circular Ecology Team