

A Global Building Data Initiative

for Reducing Resource Use and Embodied Carbon

Open Building Data Platform Launch

February 26th 2025

Moderation



David Ruggiero

Head of the Concrete Behaviour and Structural
Design Laboratory *EPFL*
Chair of the Joint Committee *GLOBE*
Consensus

Event Agenda

- **4:00 PM** - Opening remarks (*5 min*)
- **4:05 PM** - **Keynote:** The race to reduce WLC emissions of buildings globally (*15 min*)
- **4:20 PM** - **Presentation & Demo:** OpenBDF and Open Building Data Platform (*25 min*)
- **4:45 PM** - **Panel Discussion** and **Q&A** Session (*40 min*)
- **5:25 PM** - Closing remarks (*5 min*)
- **5:30 PM** - End

Keynote

The race to reduce WLC emissions of buildings globally



Dima Khoury
Buildings Breakthrough Facilitator
GlobalABC & UNEP



Global Alliance
for Buildings and
Construction

Global Alliance for Buildings and Construction (GlobalABC)

The race to reduce whole life cycle
emissions of buildings globally

February 2025

The GlobalABC



Global Alliance
for Buildings and
Construction

Founded at COP21, hosted by UNEP, the Global Alliance for Buildings and Construction (GlobalABC) is the leading global platform for all buildings stakeholders committed to a common vision towards ***A zero-emission, efficient and resilient buildings and construction sector.***



GlobalABC highlights



339 Members*

incl. 42 countries



Global Alliance
for Buildings and
Construction

*As of June 2024

Governance

17 Steering Committee Members

5 Constituencies

7 Assemblies
Dubai, Helsinki, Nice,
Ottawa, Virtual



Vision

Towards a zero-emission, efficient,
and resilient buildings and
construction sector for all



Emission Goals

- Halving buildings emissions by 2030
- Decarbonizing buildings along their lifecycle by 2050

Flagships



- Buildings-GSR
- Roadmaps
- COP Buildings Pavilion
- Buildings Breakthrough

Key activities



- Materials report, online hub
- Buildings and Climate Global Forum
- NDCs
- Mitigation Work Programme
- MPGCA
- BuildingToCOP

10 Hubs/Action groups

- **Hubs:** Adaptation, Clean Heat, Data, Finance, Market Transformation, Materials
- **Action groups:** Higher Education Institutions, Passive Cooling, Subnational, Sufficiency

Global Alliance for Buildings and Construction (GlobalABC)

Global advocate and catalyst for action: Deep collaboration; high-level international events, incl. COPs; national alliances; building passports.



Trusted platform to set targets and track progress: Through the annual Global Status Report for Buildings and Construction; UNFCCC-MPGCA Human Settlements Pathway; SURGe initiative.



Support countries in setting priorities and measures based on their context: Through building decarbonization roadmaps; Buildings Breakthrough; NDC frontrunner criteria and tool.

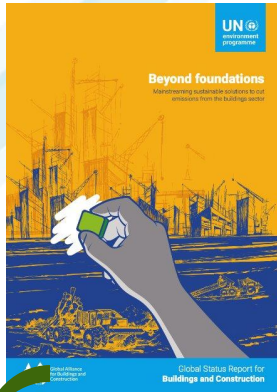


Support the private sector transition with priorities and strategies: Through Market Transformation hub, Finance hub, MPGCA, BuildingtoCOP Coalition.



BUILDING TO COP 28

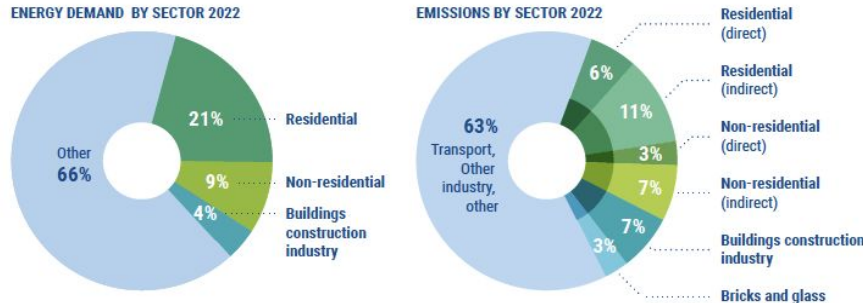
Buildings-GSR



Eighth edition of this annual snapshot on the progress of the buildings and construction sector globally towards achieving the Paris Agreement goals:

- An update on the drivers of **CO₂ emissions and energy** demand globally,
- Status of **policies, finance, and key actions** that support a zero-emission, efficient, and resilient buildings and construction sector,
- An updated method and **findings of the global Building Climate Tracker**

Figure 1 Share of buildings in total final energy consumptions in 2022 (left) and share of buildings in global energy and process emissions in 2022 (right)



(Source: IEA 2023a. Adapted from 'Tracking Clean Energy Progress')

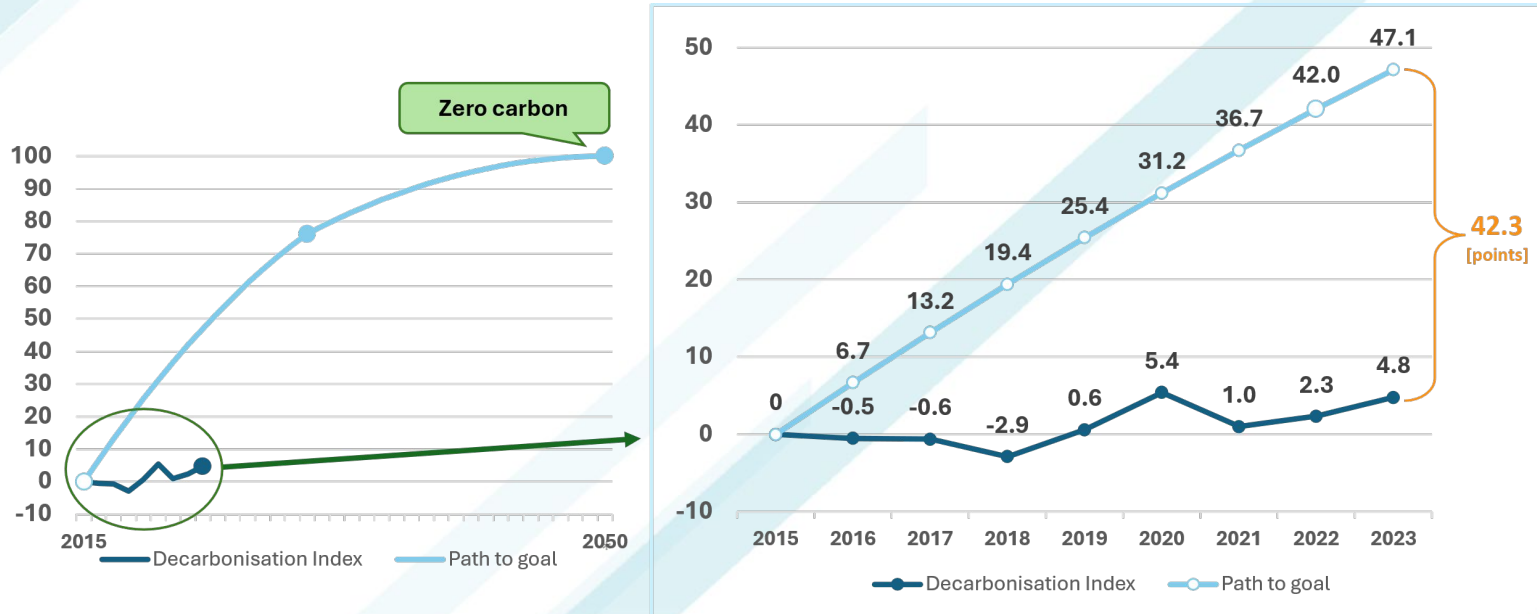
Notes: Buildings construction industry refers to materials used in construction, including concrete, steel and aluminium. Other materials shown separately.

In 2023 the sector's emissions stood at 34%, while energy consumption accounted for around 34% of global demand

Growing global buildings and construction emissions and slowing investments and policy efforts highlight we are not on track.



GBCT decarbonisation index. Left: Reference path until 2050. Right: Zoom in for the 2015-2023 period



*The path to goal corresponds to the weighted aggregation of the path to goal for all the indicators multiplied by the CO₂ emissions indicator. Each year, the path to goal is updated to the latest information available and may adjust baseline numbers.

Source: Adapted by the Buildings Performance Institute Europe (BPIE) 2024.

The Moment to Act is Now



Global Alliance
for Buildings and
Construction

"Energy efficiency and decarbonization measures in buildings could contribute over 6.5Gt CO2 reductions in annual emissions by 2040"

(World Energy Outlook, 2020)

"Building sector mitigation policies can reduce greenhouse gas (GHG) emissions by up to 90% in developed countries and up to 80% in developing countries and lift up to 2.8 billion people in developing countries out of energy poverty"

(IPCC, 2022)

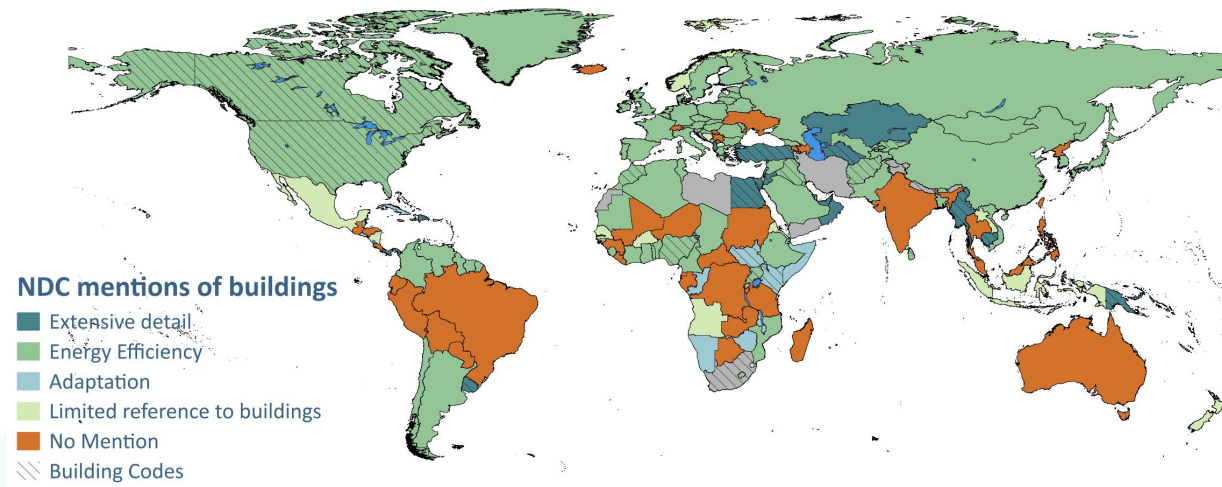
KEY MESSAGE:

Most NDCs include building sector targets, but few offer detailed policies, timelines, or financial plans for implementation

In 2023, **38 parties updated their NDCs**, with around 80% of NDCs citing actions for the buildings and construction sector, and **19 NDCs having extensive details**.

Since the 2023 GSR, three parties adjust or update their NDCs, **Panama, Madagascar and Namibia**.

NDC 3.0 will need to incorporate deeper integration of net-zero strategies for the building and construction sector through adopting **Building Codes and Standards**.

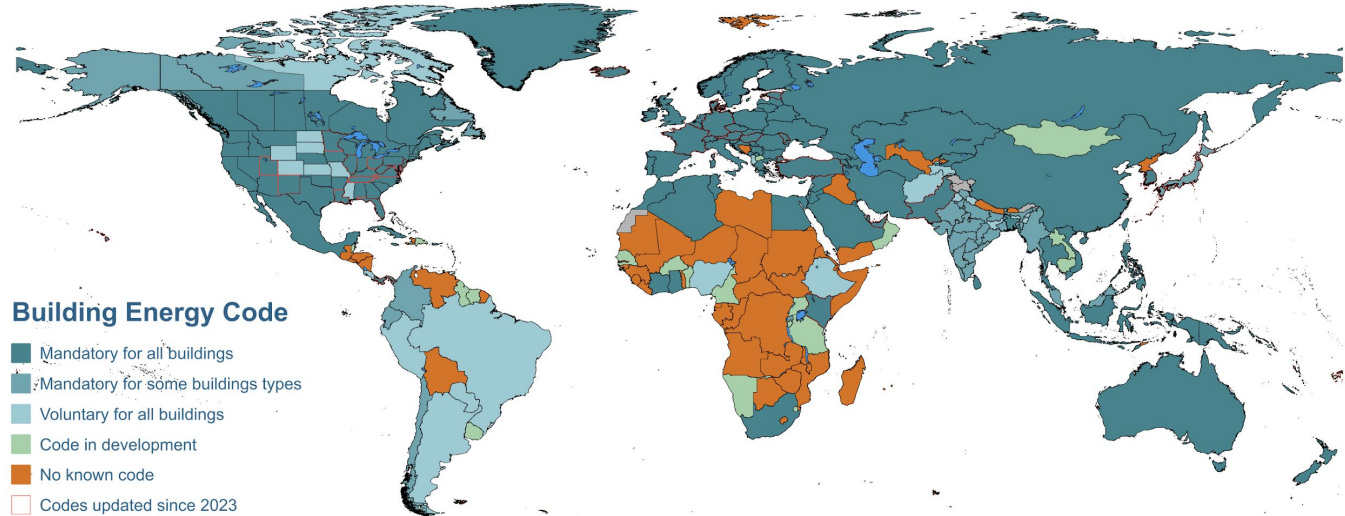


This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city, or area.

KEY MESSAGE:

While over 90 countries have mandatory building energy codes for all or some buildings, few of them are aligned to net zero carbon.

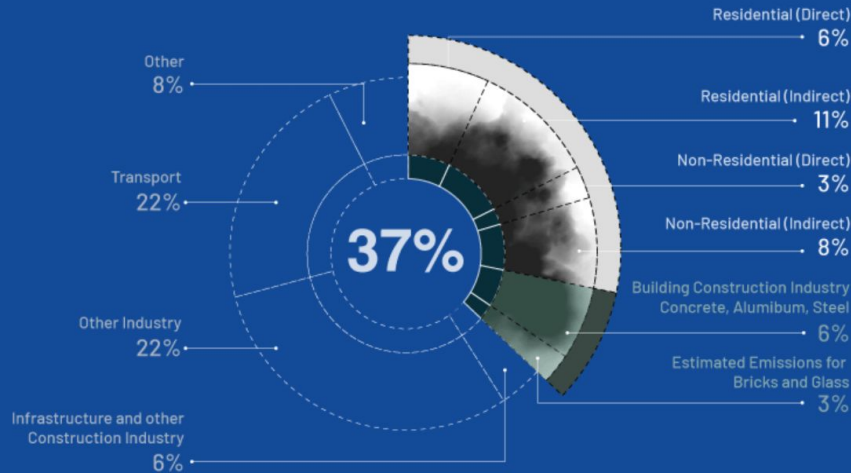
- In 2023, there were **83 countries with mandatory building energy codes** for all buildings, and a further 7 with mandatory for some buildings.
- 14 countries and sub-national jurisdictions have **updated their codes since 2024**
- Few countries have net zero carbon building codes, with France having mandatory requirements, while others such as Canada, USA have voluntary standards.



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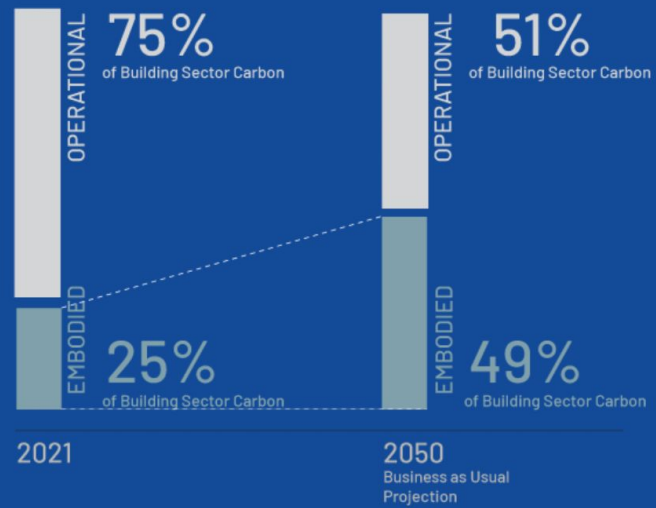
Whole Life Cycle approach

Global Share of Buildings and Construction CO₂ Emissions, 2021

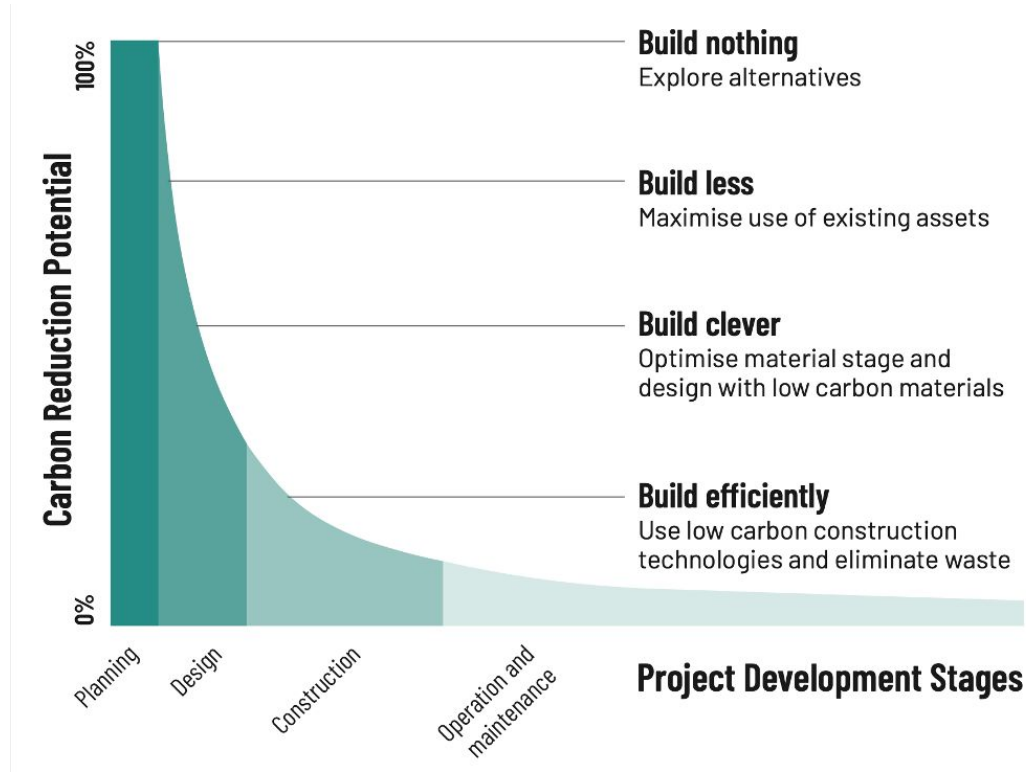


Projected Contributions from Embodied and Operational Carbon within the Building Sector

From Current to 2050 with Business as Usual Projections

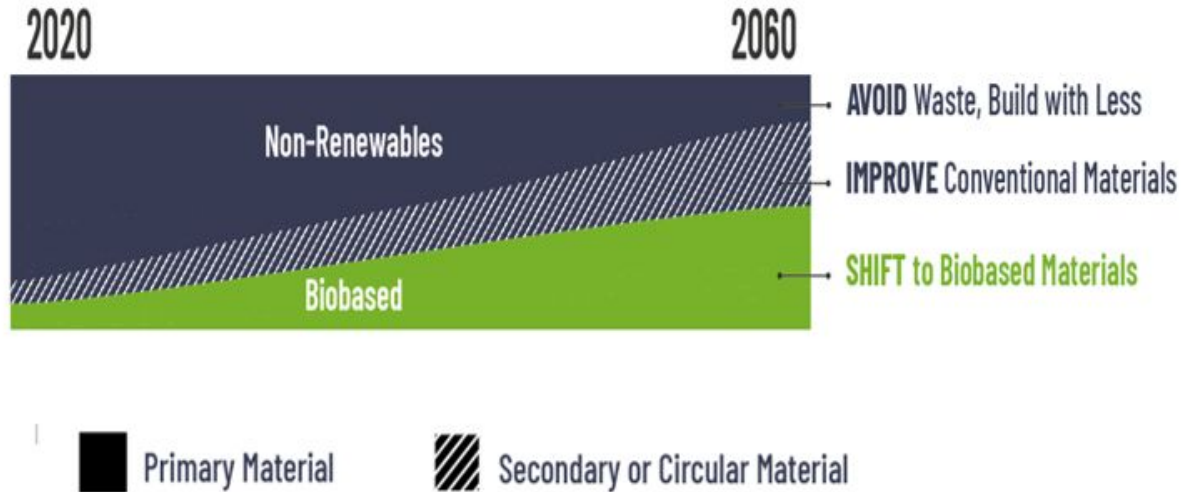


OPPORTUNITIES TO REDUCE CARBON IN EACH STAGE OF PROJECT DEVELOPMENT

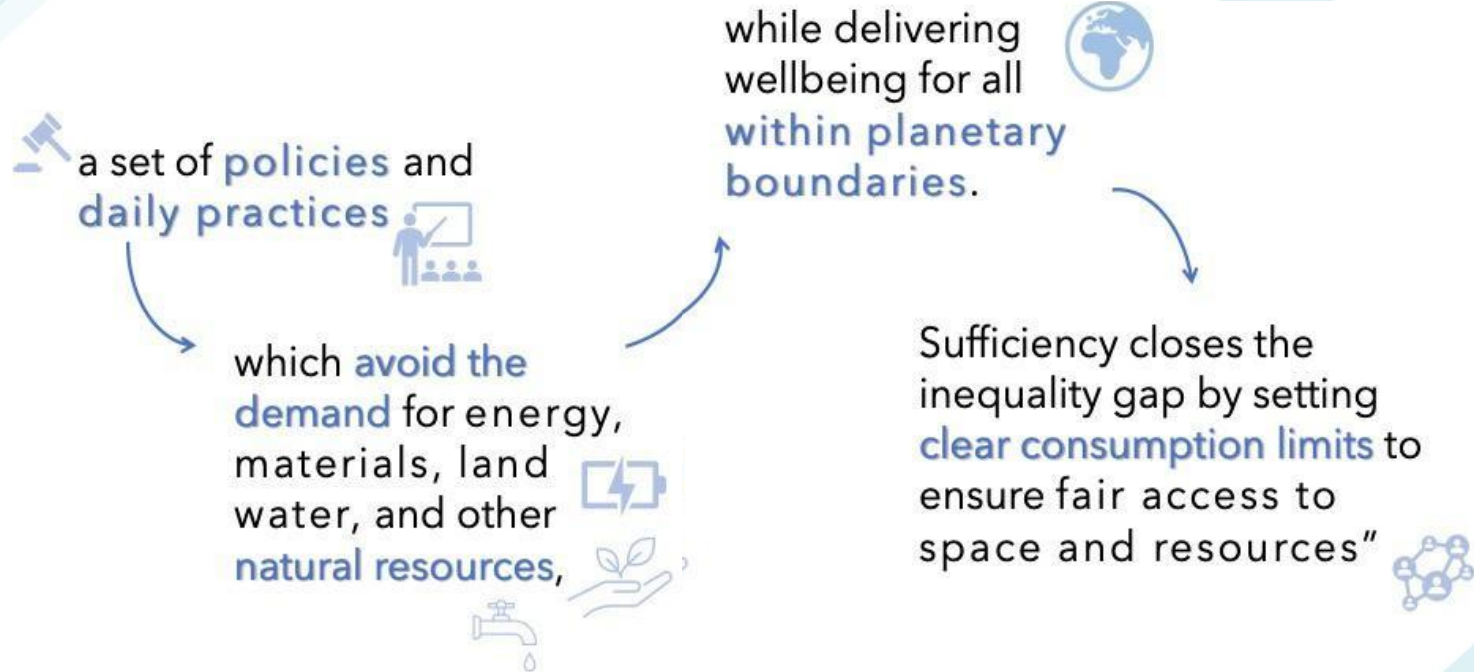


The potential to avoid embodied carbon is greatest during the planning and design phases. Source: HM Treasury 2013; World Green Building Council 2019.

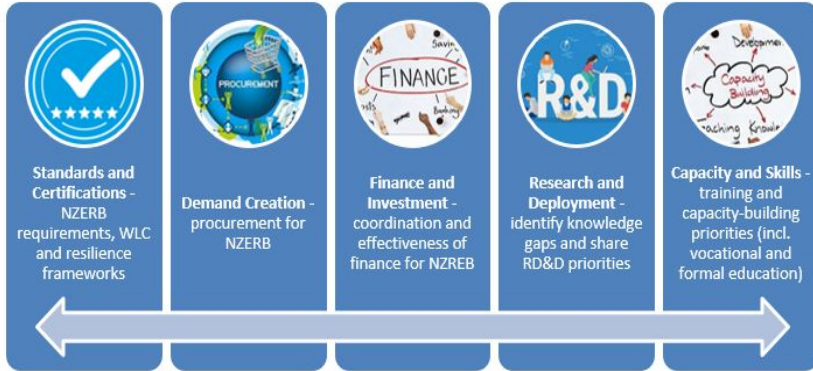
Applying the Avoid-Shift-Improve Framework will result in a change of the mix of building materials.



Sufficiency for buildings



The GlobalABC Paving the way for radical collaboration



Buildings Breakthrough

- Launched at COP28 UAE
- **Target:** *Near-zero emission and resilient buildings are the new normal by 2030.*
- Co-led by France and the Kingdom of Morocco coordinated by GlobalABC
- Endorsed by **29 countries, the E.C** and 34 global organisations/initiatives



Buildings and Climate Global Forum

March 2024, Paris, France

Building on momentum from the Buildings Breakthrough launch

- Ministerial Declaration – **Declaration de Chaillot**
- Launch of **Buildings Breakthrough Priority Actions**
- Launch of the **Market Transformation Action Agenda**

Buildings Breakthrough



Global Alliance
for Buildings and
Construction

Priority International actions

Standard & Certifications

- Develop a qualitative definition for “near-zero emissions and resilient buildings”, establish building-level principles, and reference existing measurement frameworks to guide implementation across different regional contexts.

Demand Creation

- Advance sustainable and circular public procurement through the Global Framework for Action, with the aim to offer technical support to governments to implement the framework.

Finance & Investment

- Support EMDEs in expanding international financial and technical assistance, including blended finance, policy support, local capacity-building, project pipelines, and data gaps.

Research & Deployment

- Identify knowledge gaps, and share RD&D priorities and leverage existing networks, and work through these to gather expertise and additional country members.

Capacity & Skills

- Identify training priorities, strengthen institutional capacities, and share resources globally. Focus on building code compliance, integrating NZERB principles into education, training, and accreditation frameworks.

[Global Alliance for Buildings and Construction \(GlobalABC\)](#)

Progress / Key COP30 Outputs

- Consultation on definition
- NZERB report, including guidelines & policy recommendations

- Global Framework for Action launched
- Mobilise support for implementation

- Stakeholder consultation on to define priority activities
- Mapping of finance tools, country finance roadmaps

- Blueprint for Deployment Solutions and Technologies for the Buildings & Construction Sector
- Catalog of Solutions

- Interim report on key institutional and personnel needs for NZERBs
- Completing report and creating an online portal with priority existing resources

Global Alliance for Buildings and Construction

Join us!

Find out more:

www.globalabc.org

global.abc@un.org

Presentation & demo

GBDI Open Building Data Platform



Martin Röck
Executive Director GBDI
Founder *RISE Labs* & Researcher *KU Leuven*

A Global Building Data Initiative

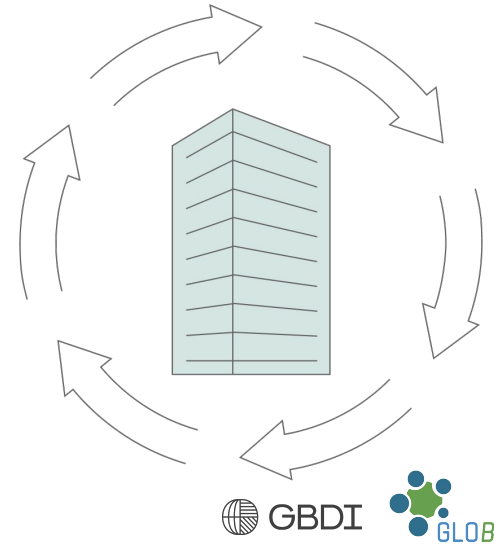
for Reducing Resource Use and Embodied Carbon

Open Building Data Platform Online Launch

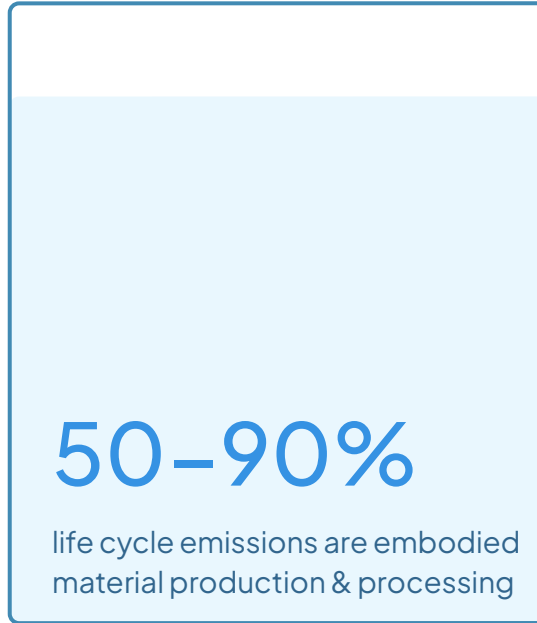
February 26th 2025

Context

Whole Life Cycle GHG Emissions



Global Challenge of Embodied Emissions



Types of GHG emissions of buildings



Extract, transport and manufacture

Transport, construct and install

Use phase: maintain, replace, renovate

Use phase: operate

Deconstruct, post-process



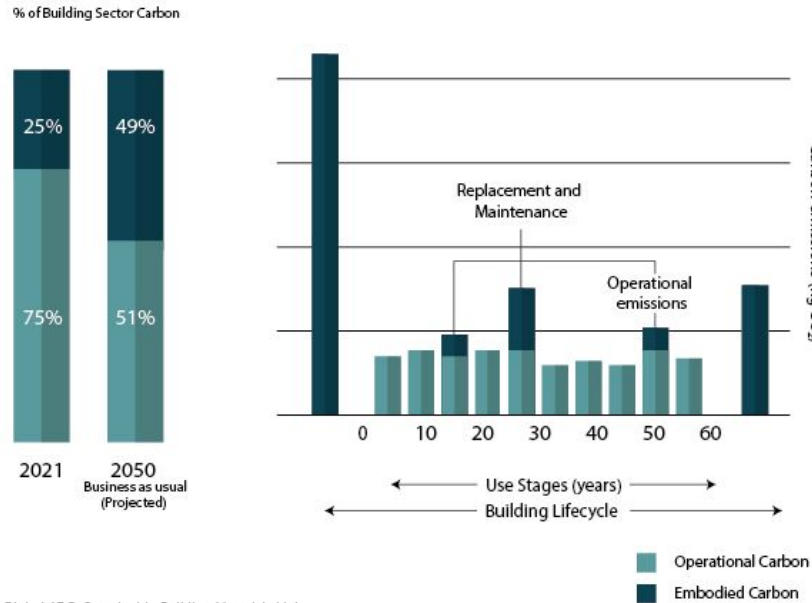
Embodied carbon

Emissions from material production and processing, transport

Operational carbon

Emissions from energy, water use, mobility

Embodied vs. operational carbon emissions



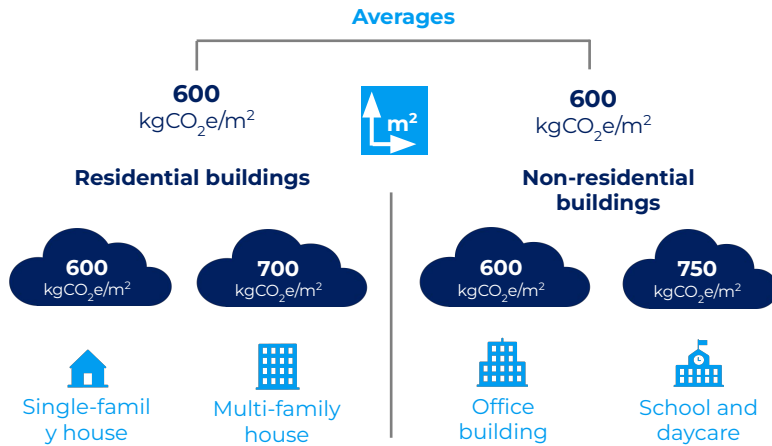
Source: Global ABC: Sustainable Building Materials Hub

- **With more energy-efficient buildings**, share of embodied carbon emissions increases
- **Absolute embodied carbon increased** due to complexity, but also inefficiency, overdesign
- **Significant embodied emissions are upfront**: carbon released now, before the building is used
- **Reducing embodied emissions now** → reducing effects of climate change more quickly

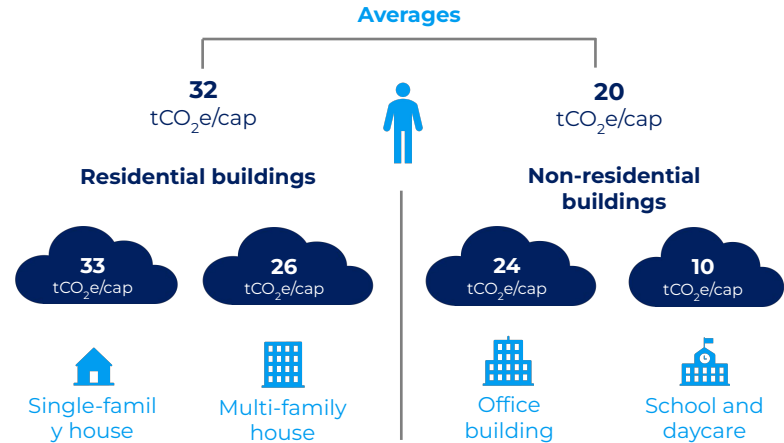
[1] GlobalABC Building Materials Hub, <https://globalabc.org/sustainable-materials-hub/home>
[2] Röck M, Ruschi, Mendes Saade M, Balouktsi M, Nygaard Rasmussen F, Birgisdottir H, Frischknecht R, Habert C, Lützkendorf T, Passer A. Embodied CHG Emissions of Buildings – The Hidden Challenge for Effective Climate Change Mitigation. Applied Energy, 2020. <https://doi.org/10.1016/j.apenergy.2019.114107>

Embodied carbon benchmarks (baseline)

Life cycle embodied carbon
per square meter (m²)
In kg of CO₂e per m²

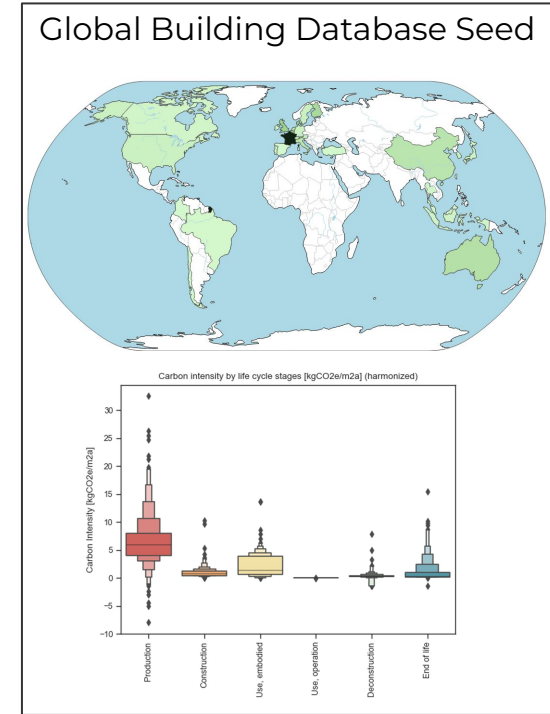
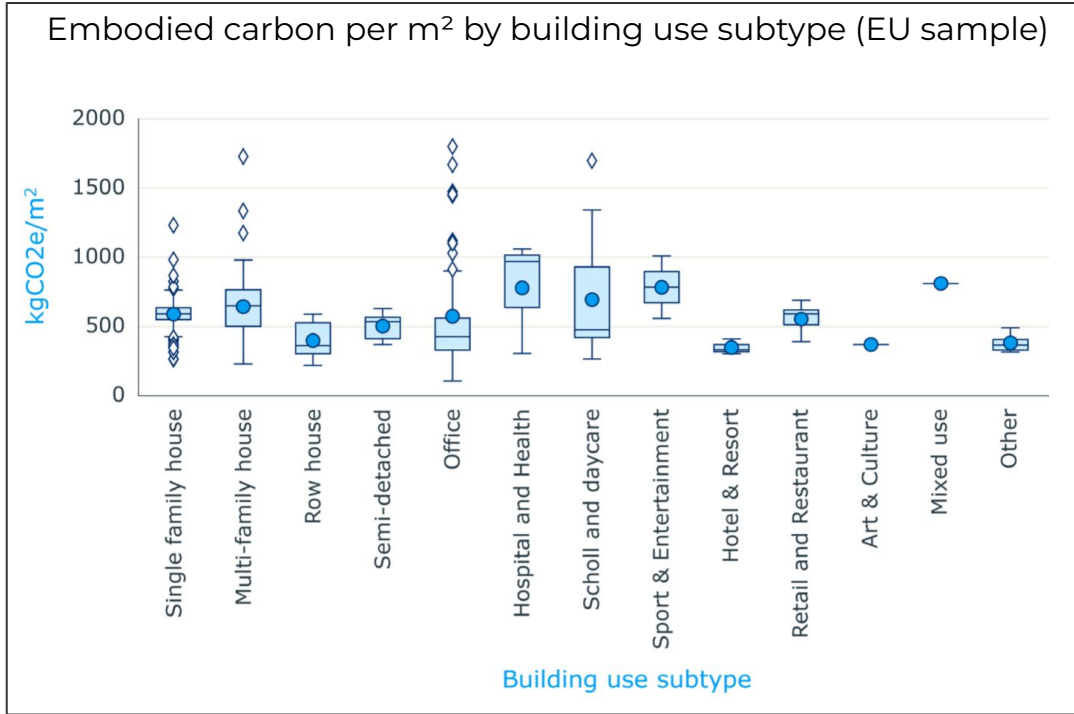


Life cycle embodied carbon
per capita (cap)
In ton of CO₂e per cap



Röck M, et al. Benchmarking whole life embodied carbon of buildings at scale: data-driven baseline analysis for buildings across Europe. Informed by Röck M, et al. Towards Embodied Carbon Benchmarks for Buildings in Europe - #2. Setting the Baseline: A Bottom-up Approach, 2022. <https://zenodo.org/record/5895051>

Towards Global WLC Data Compilation



Röck M, et al. Benchmarking whole life embodied carbon of buildings at scale: data-driven baseline analysis for buildings across Europe. Informed by Röck M, et al. Towards Embodied Carbon Benchmarks for Buildings in Europe – #2 Setting the Baseline: A Bottom-up Approach. 2022. <https://zenodo.org/record/5695051>
 Röck M, et al. 'Global Buildings Database Seed on Whole Life Carbon Emissions, Energy Performance, and Material Intensity (GBDB CarbenMats)'. Zenodo, 2024. <https://doi.org/10.5281/zenodo.13222041>

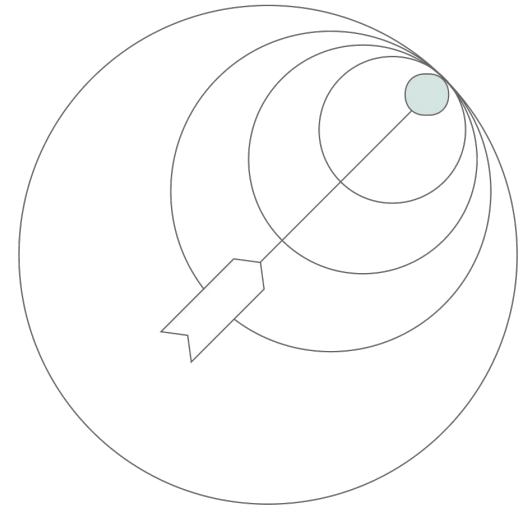
Better Data, Better Design, Better Buildings



- **50–75% reduction of emissions from materials is possible today^[1,2]**
- **Reducing embodied emissions at scale – Avoid / Shift / Improve^[2]**
- **Better building data needed to understand and reduce emissions**
- **Problem: Data is inconsistent, scarce, fragmented across tools**

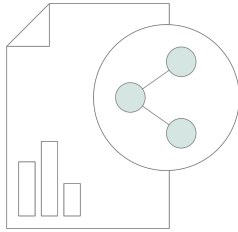
GBDI

Mission and goals

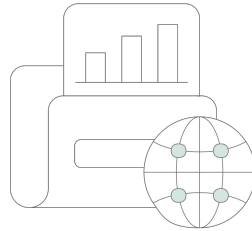


Global Building Data Initiative (GBDI)

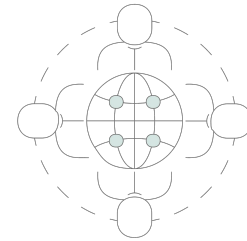
GBDI leverages **open building data** to inform **industry and policy action** for reducing **resource use, embodied and whole life carbon (WLC)**.



Coordinated, scalable,
open data protocol to align
global exchange



Open-source platform for
data management and
analytics



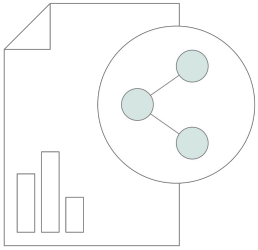
Global network and
capacity building, focus
on **Global South**

GBDI Timeline

1. **Design and Development of Methods and Tools for the GBDI**
 - Open Data Protocol: Open Building Data Format (openBDF) for global data exchange
 - Open Data Platform: Open Building Data Platform for data collection and analysis
 - Stakeholders: Global network of WLC pioneers, practitioners, policy makers
2. **Global roll-out, WLC Benchmarks, Effective Reduction Strategies**
3. **WLC Target Pathways: Monitoring, Reporting, Verification (MVR)**

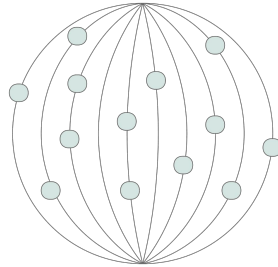


OpenBDF - Open Building Data Format



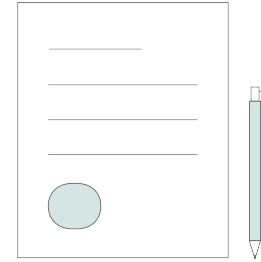
OPEN

- Open building data protocol
- Interoperability via open interfaces
- Free and easy to use with your tools



GLOBAL

- Common language for exchange
- Aligned with leading initiatives
- Flexibility in level of complexity



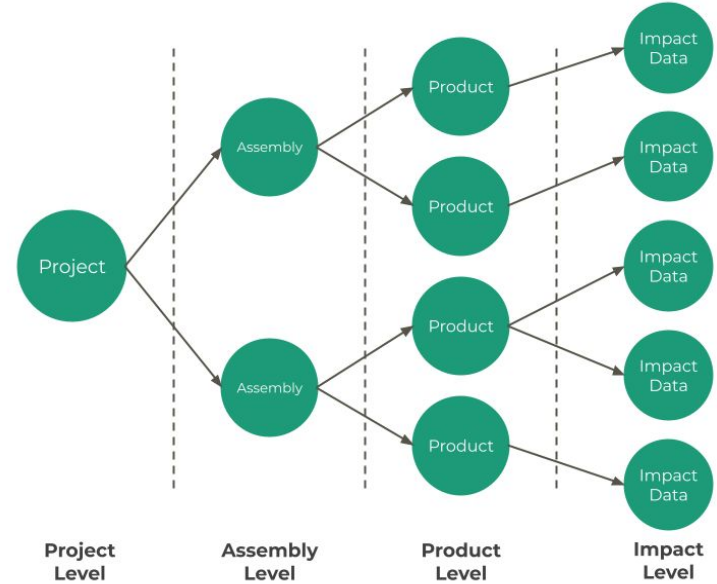
DOCUMENTED

- Clear technical documentation
- Scalable attributes and options
- Versatile code (Python, JSON)

OpenBDF - Data Structure

Open Building Data Format (OpenBDF)

- Developed in partnership with **GLOBE taskforce**
- **Life cycle material and energy** use in buildings
- Aligned with **ECHO, SLICE, GBDB CarbEnMats**
- **Modular structure** for flexibility of application
- Adopting a **LCAx open source** development



OpenBDF - You can use it today!

Open Data, Better Planet

Design resilient buildings with better environmental performance.
Develop effective decarbonization strategies and climate policy.
Improve resource use and decrease service life cycle emissions.
Manage your building portfolio carbon footprint.

~42% of global CO2 emissions are from buildings (including commercial and residential).

50-90% of new buildings will be equipped with smart meters.

75% of new buildings will be equipped with smart meters.

Better buildings

GBDI's mission is to empower industry leaders and policy-makers with data-driven insights on how to improve the built environment. We provide the data, tools, and expertise to help define individual best practices, identify effective strategies, and implement meaningful programs to drive concrete decarbonization action.

Better Decisions

Our data empowers strategic planning and decision-making for better buildings. We provide the data and expertise to help define individual best practices, identify effective strategies, and implement meaningful programs to drive concrete decarbonization action.

Better Materials

Our data empowers strategic planning and decision-making for better buildings. We provide the data and expertise to help define individual best practices, identify effective strategies, and implement meaningful programs to drive concrete decarbonization action.

Better Design

Our data empowers strategic planning and decision-making for better buildings. We provide the data and expertise to help define individual best practices, identify effective strategies, and implement meaningful programs to drive concrete decarbonization action.

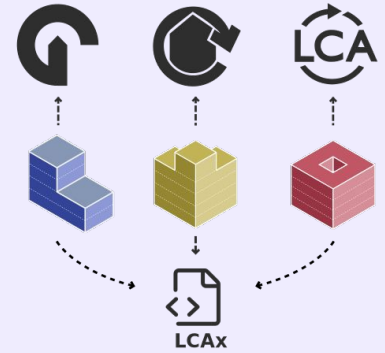
Protocol

Guidance on how to generate and use OpenBDF in your data or tool

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Schema

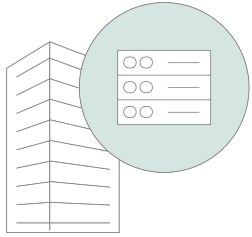
Definition of attribute sets and options, open and extensible



Integrations

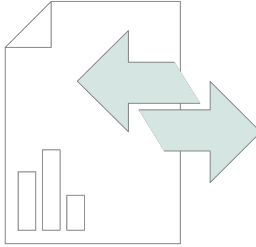
Technical integration using LCAx flexible codebase (Python, JSON)

It's alive! Open Building Data Platform



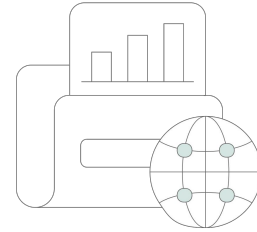
DECENTRAL

- Federated information architecture
- Retain data ownership and control
- Data management and analytics



OPEN API

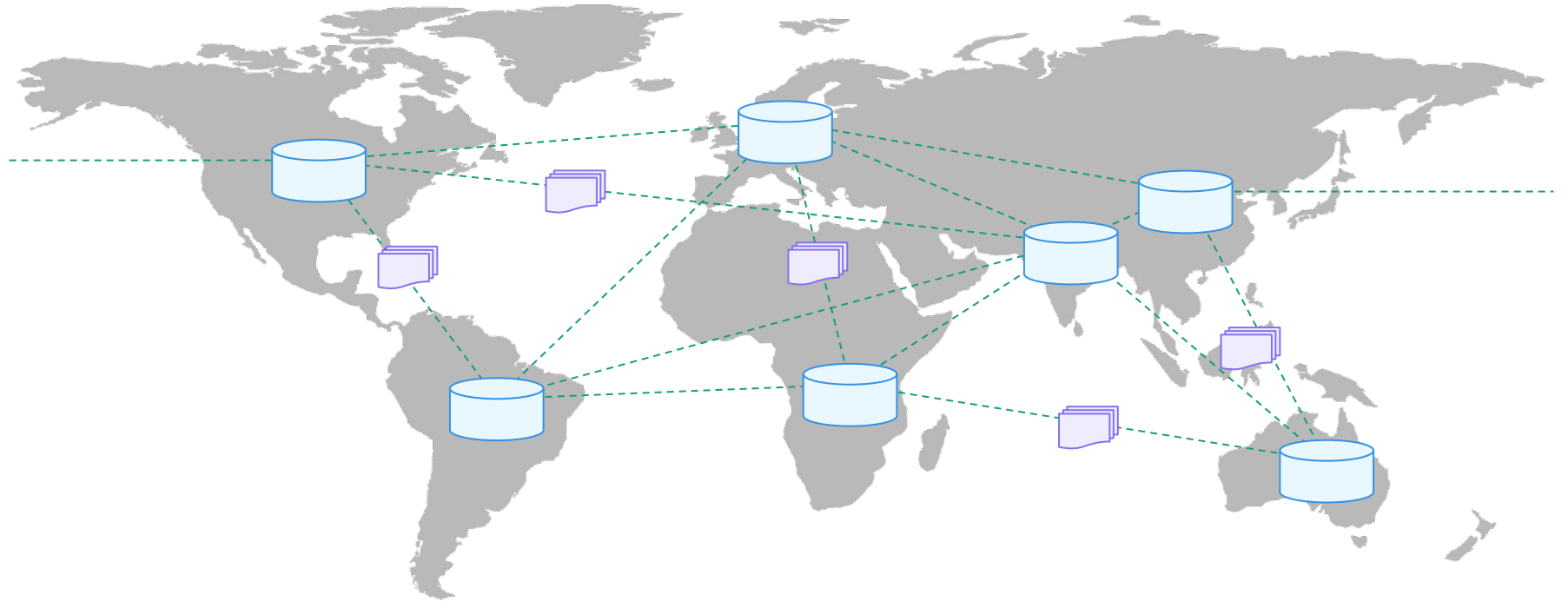
- Open API for custom integrations
- Enables database communication
- Supports exchange, benchmarking



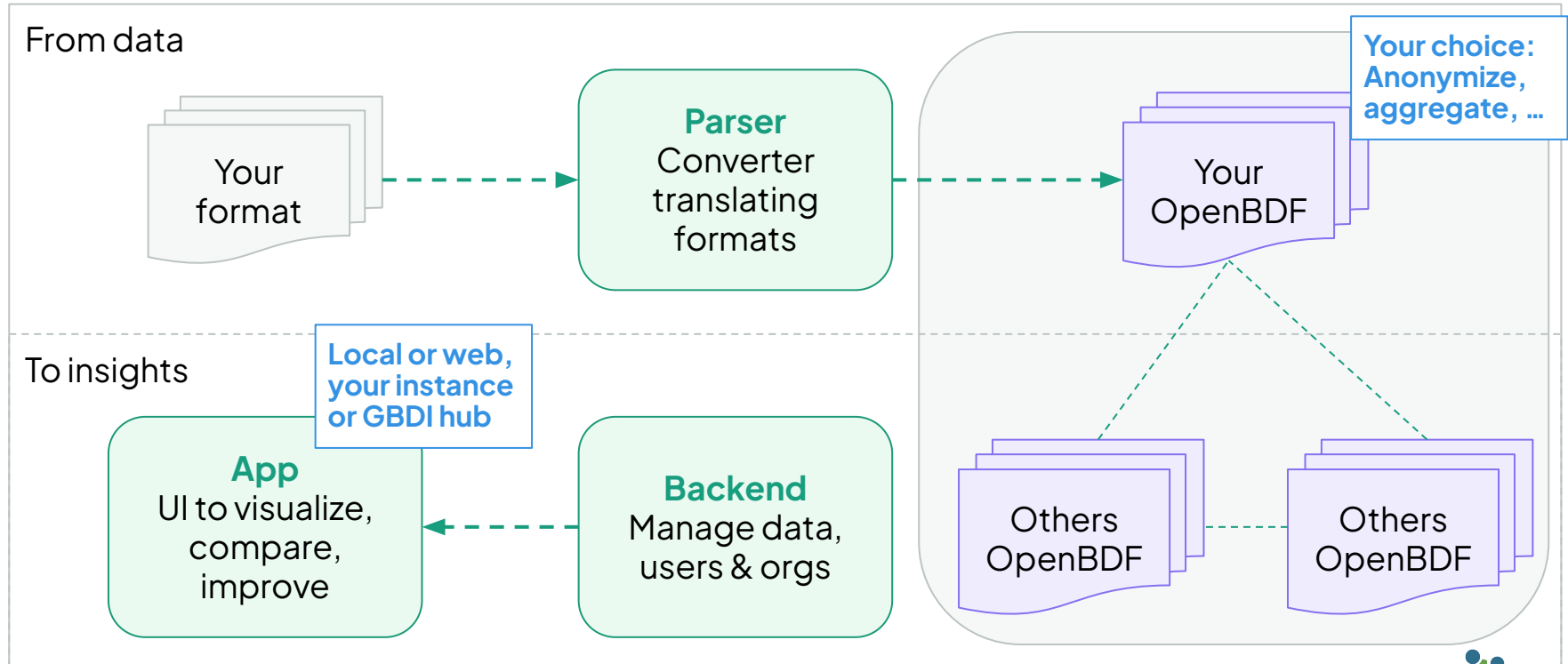
OPEN SOURCE

- Joint development of core function
- Customizable local instances
- Code on Github (Apache 2.0)

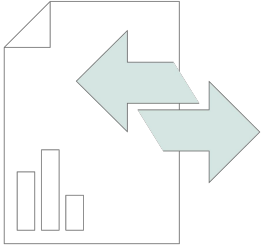
Federated Information with open APIs



Your data, insights via a common language

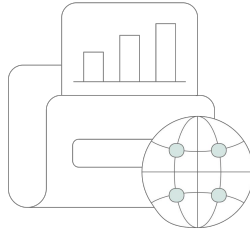


Your data, shared effort, open partnerships



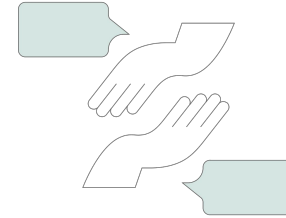
CONVERTERS

- Existing parsers for key formats (ECHO, PANDA, SLiCE, ...)
- Open source, collaborative
- Adaptable to your format



SAMPLE DATA

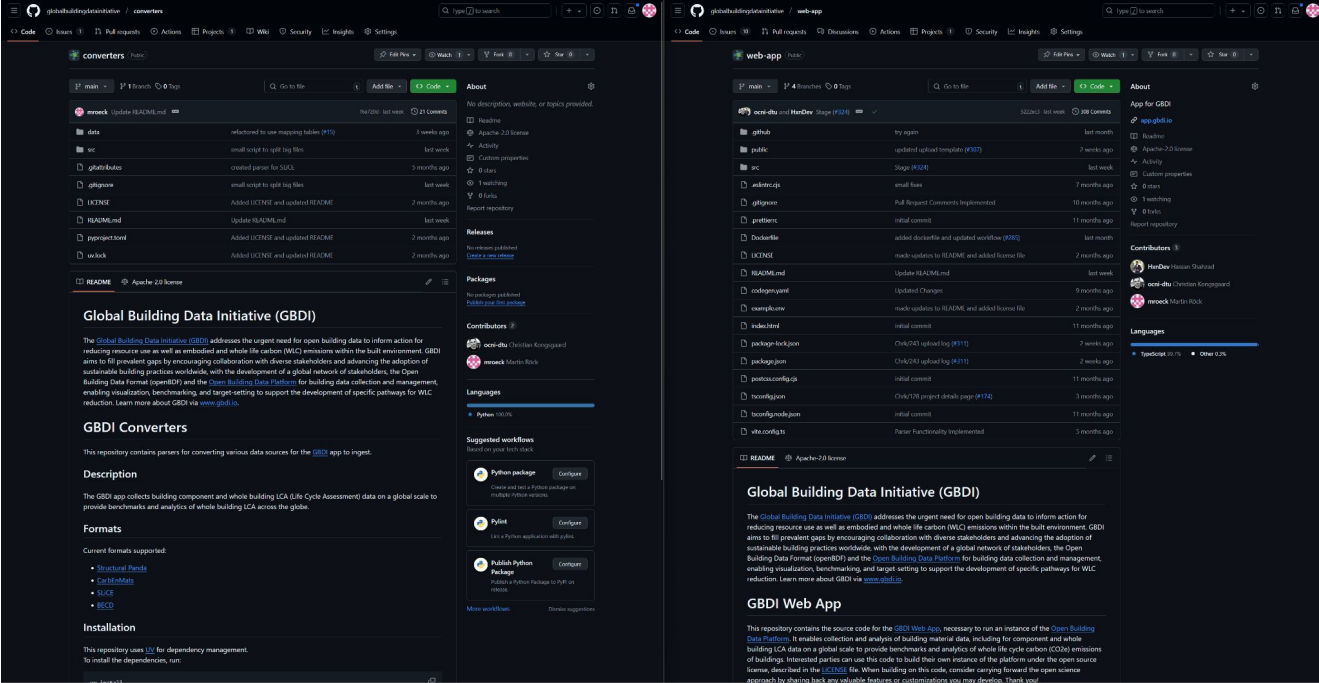
- 1.000 sample cases in platform
- E.g. from policy research (SLiCE) & meta-analyses (CarbEnMats)
- Goal: 10.000 cases by 2026



PARTNERSHIPS

- **Ongoing:** Brazil (USP), SE Asia (ALCBT), Global (ARUP, ODI)
- **Upcoming:** India (IITD), China (CABR), Global (IFC EDGE), ...

Ready now! Open Source Development



@globalbuildingdatainitiative

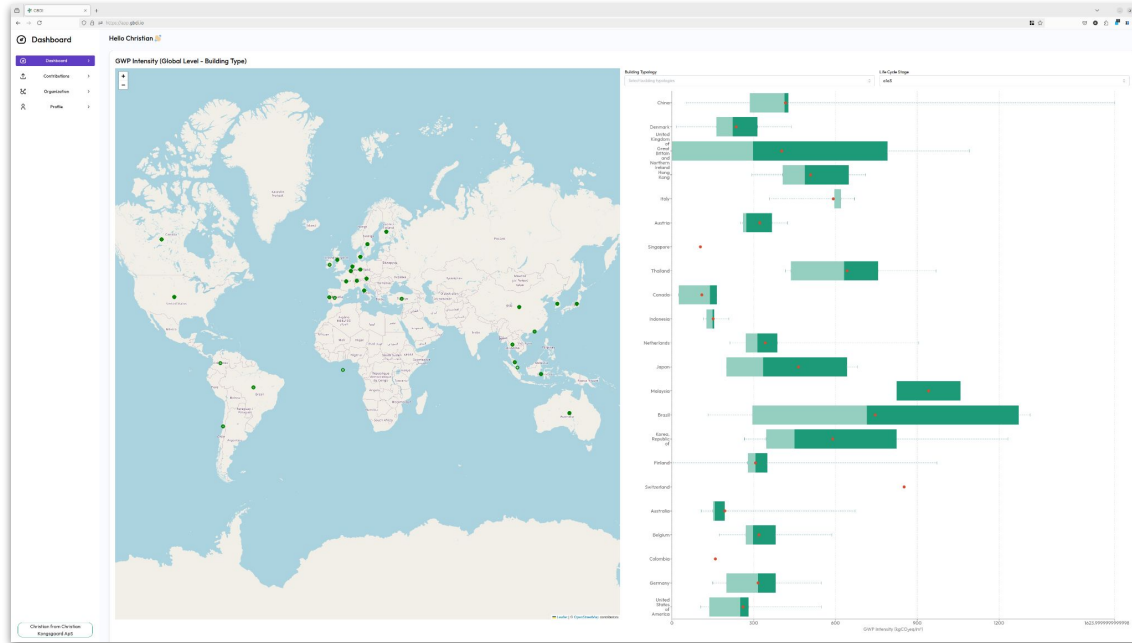


Platform: Data management and analytics

Ready

In progress

Planned



Features

User Management

Dashboard View

Benchmarking

Portfolio Overview

Characteristics

Hotspot analysis

Calculation Engine

Reduction Strategies

Demonstration



Global Building Data Initiative

Panel discussion

Panel discussion, Q&A session



Will Arnold

Head of Climate Action
IStructE



Vanderley John

Professor of Building Materials, Department
of Construction Engineering, *USP*
Initiating member, *GLOBE*
Advisor, *GBDI*



Dietram Oppelt

Managing director
Asia Low Carbon Buildings
Transition ALCBT, HEAT



Nigel Tonks

Sustainable Development
Director
ARUP



Ommid Saberi

Global Lead Green and
Resilient Buildings
IFC



Anil Sawhney

Head of Sustainability
RICS



Karen Scrivener

Head of Laboratory of Construction
Materials, *EPFL*
Project Director, *LC3*
Initiating member, *GLOBE*
Chief Advisor, *GBDI*



Dima Khoury - Keynote

Facilitator for the Buildings
Breakthrough
GlobalABC & UNEP



Martin Röck - Presenter

Executive Director, *RISE*
Executive Director, *GBDI*



David Ruggiero - Moderator

Head of the Concrete Behaviour and
Structural Design Laboratory, *EPFL*
Chair, *GLOBE Consensus*

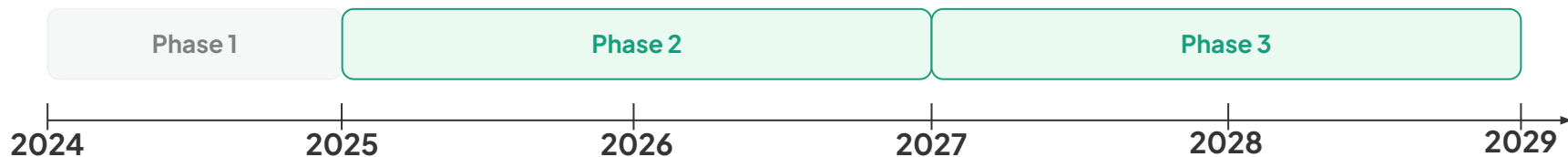
GBDI Timeline

1. Design and Development of Methods and Tools for the GBDI

- Stakeholders: Global network of WLC pioneers, practitioners, policy makers
- Data Protocol: Open building data format (openBDF)
- Open App: Open building data hub for data collection and analysis

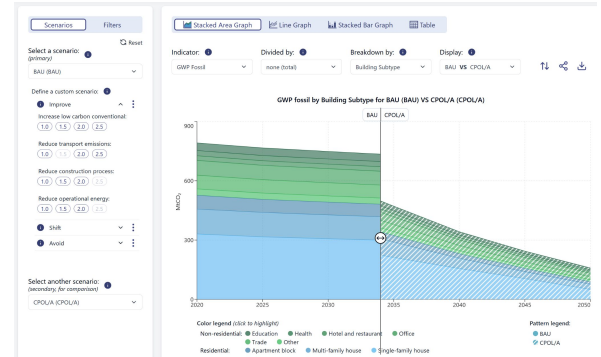
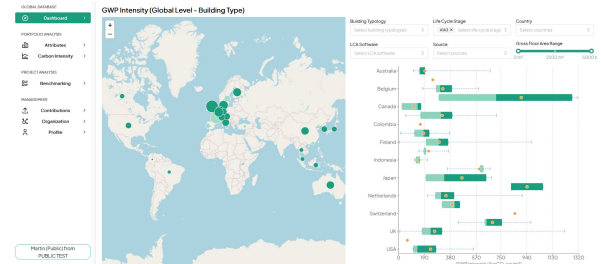
2. Global roll-out, WLC Benchmarks, Effective Reduction Strategies

3. WLC Target Pathways: Monitoring, Reporting, Verification (MVR)

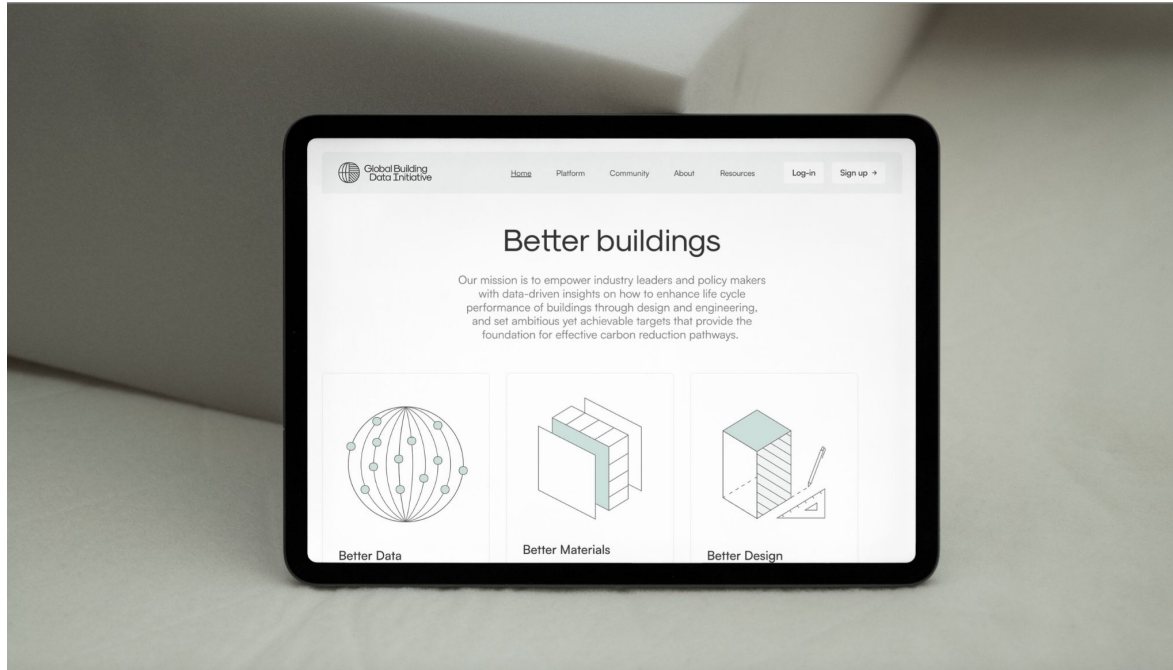


Global Tracker for Whole Life Carbon

- **Understand Emissions:**
 - Differentiate and quantify embodied and operational emissions of buildings.
- **Map Emissions Trajectories**
 - Analyse how emissions evolve globally and regionally 2025–2050.
- **Assess Data Quality**
 - Evaluate and improve data reliability for robust, actionable insights.
- **Develop a Tracking Tool**
 - Track WLC emissions in built environment, progress toward climate goals.
- **Foster Global Ambition**
 - Support international efforts to reduce emissions, considering regional contexts and supporting a just decarbonisation.



GBDI – Join the community!



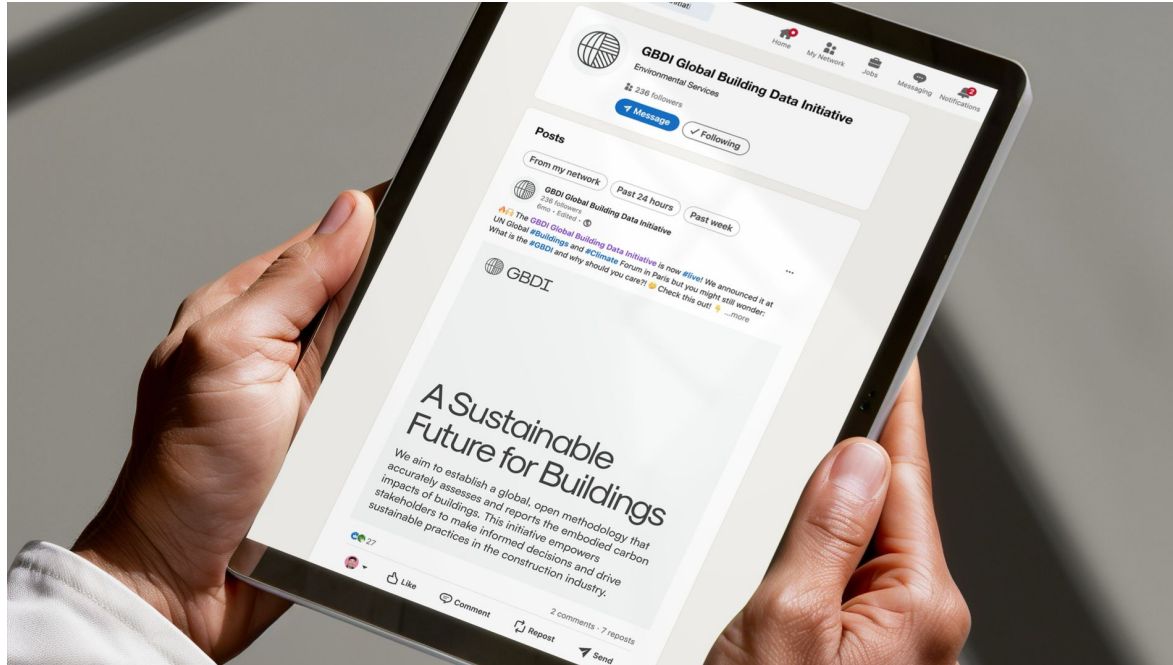
Ways to get involved

- **Mailing list** – Stay up to date
- **Expert group** – Share knowledge
- **Data partners** – Co-develop the open data model, participate in exchange
- **Project partners** – Joint projects to shape future development of GBDI

Get going at
<https://gbdi.io/>



GBDI - Join the community!



Follow us on social media

- LinkedIn
- Bluesky

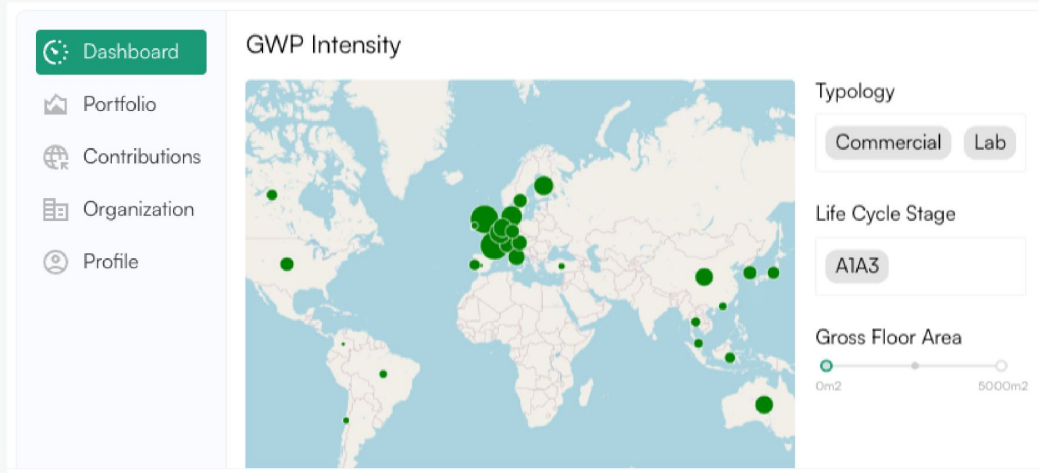
LinkedIn



Bluesky



GBDI - Join the community!



Use Open Building Data Platform

- Openly accessible upon signing up
- Free to use, no hidden fees – try it!
- 1'000+ public sample cases already
- Use your own data, start comparing
- Open API to connect your workflows

Direct link
<http://app.gbdi.io>



A Global Building Data Initiative

for Reducing Resource Use and Embodied Carbon

Open Building Data Platform Online Launch

February 26th 2025