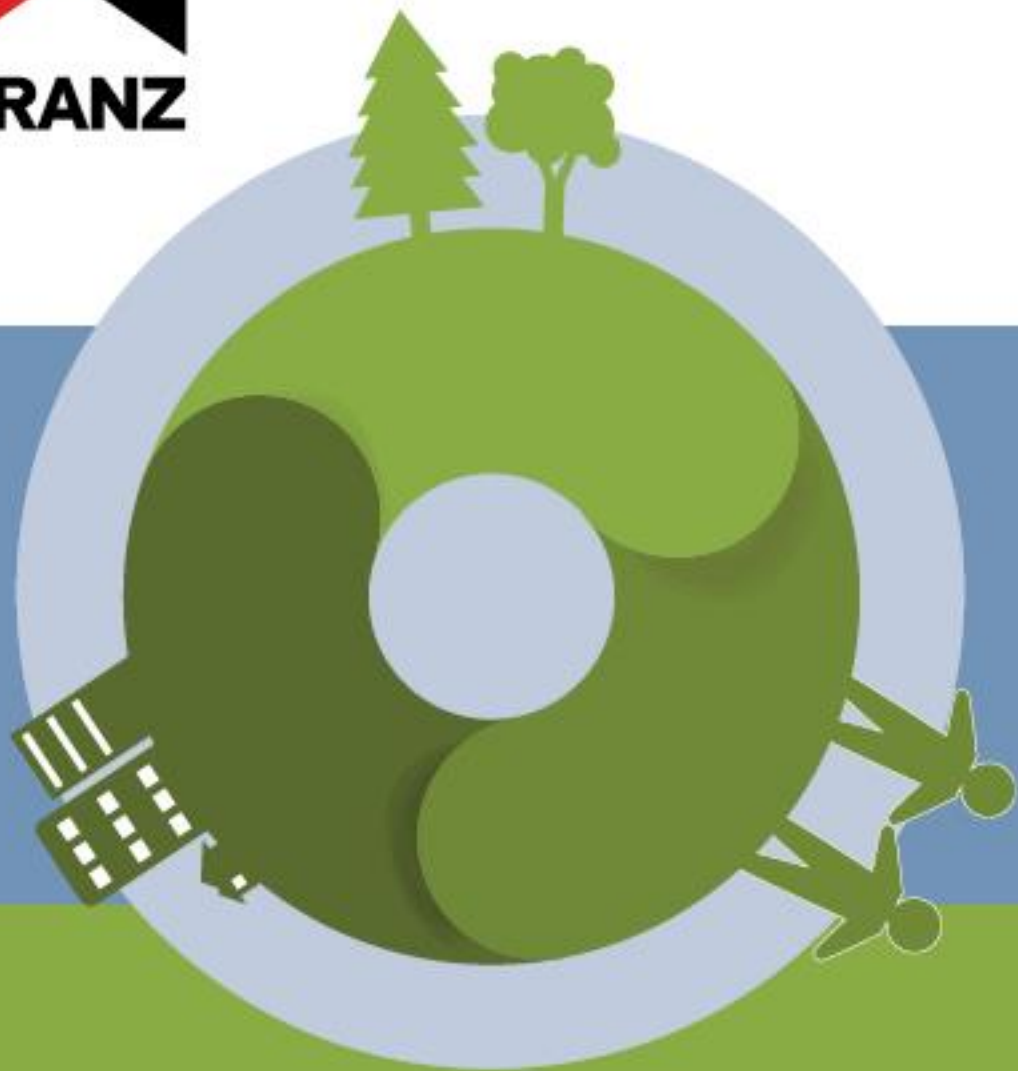




Live webinar

Towards sustainable materials



Today's webinar

- Presentation: '*Towards sustainable materials*' **Jonas Bengtsson, Edge Environment**
- Case study 1: 'Product perspective: the demand for sustainable products and what their customers are looking for' **Zarina Bazoeva, Neocrete**
- Case study 2: 'Kāinga Ora Carbon Neutral Housing Programme: Procuring Lower Carbon Buildings' **Brian Berg, Kāinga Ora**
- Q&A session
- Note:
 - The speakers will go first.
 - Questions and discussion after the speakers.
 - Place questions in the chat.
 - The slides and a recording of the webinar will be made available on the BRANZ website.

- **An imperative to act:**

- Paris Accord

- NZ Climate Change Response (Zero Carbon) Amendment Act 2019

- **An action plan:**

- Emission reduction plans

- Government Leadership through procurement

- **Industry changes are coming:**

- MBIE Building for Climate Change programme:

- Whole of Life Embodied Carbon Reduction Framework;

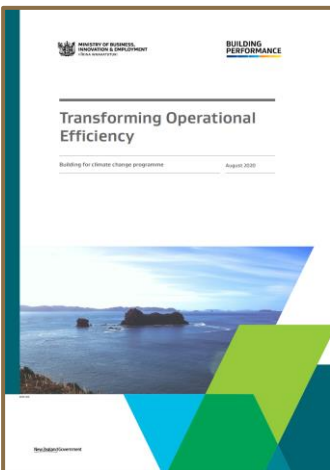
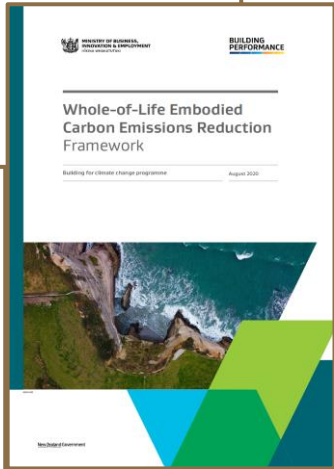
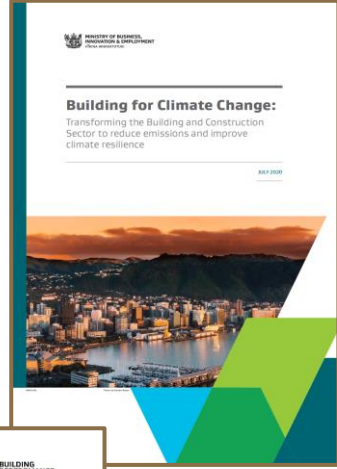
- Transforming Operational Efficiency Framework; H1 Review

- **Industry innovators:**

- NZGBC Homestar v5

- Kāinga Ora Carbon Neutral Housing Programme

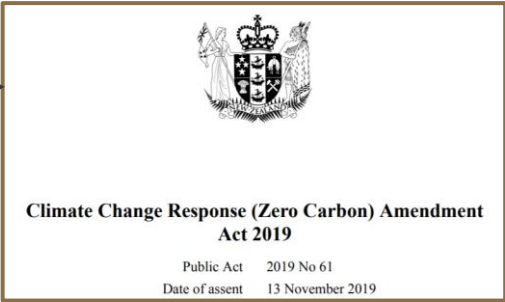




Paris Accord & NZ Climate Change Response (Zero Carbon) Amendment Act 2019

Climate Change Commission: Advice/Input into ERP

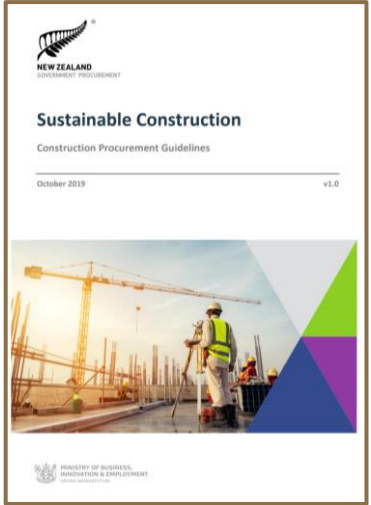
Emission Reduction Plans (ERP) (under development 2021)



MBIE Building for Climate Change Programme (MBIE BfCC): Meeting ERP

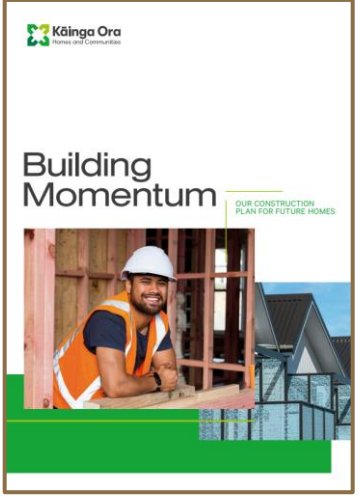
NZ Government Procurement: Accelerating MBIE BfCC

NZ Building Code Changes (current & future to deliver MBIE BfCC)

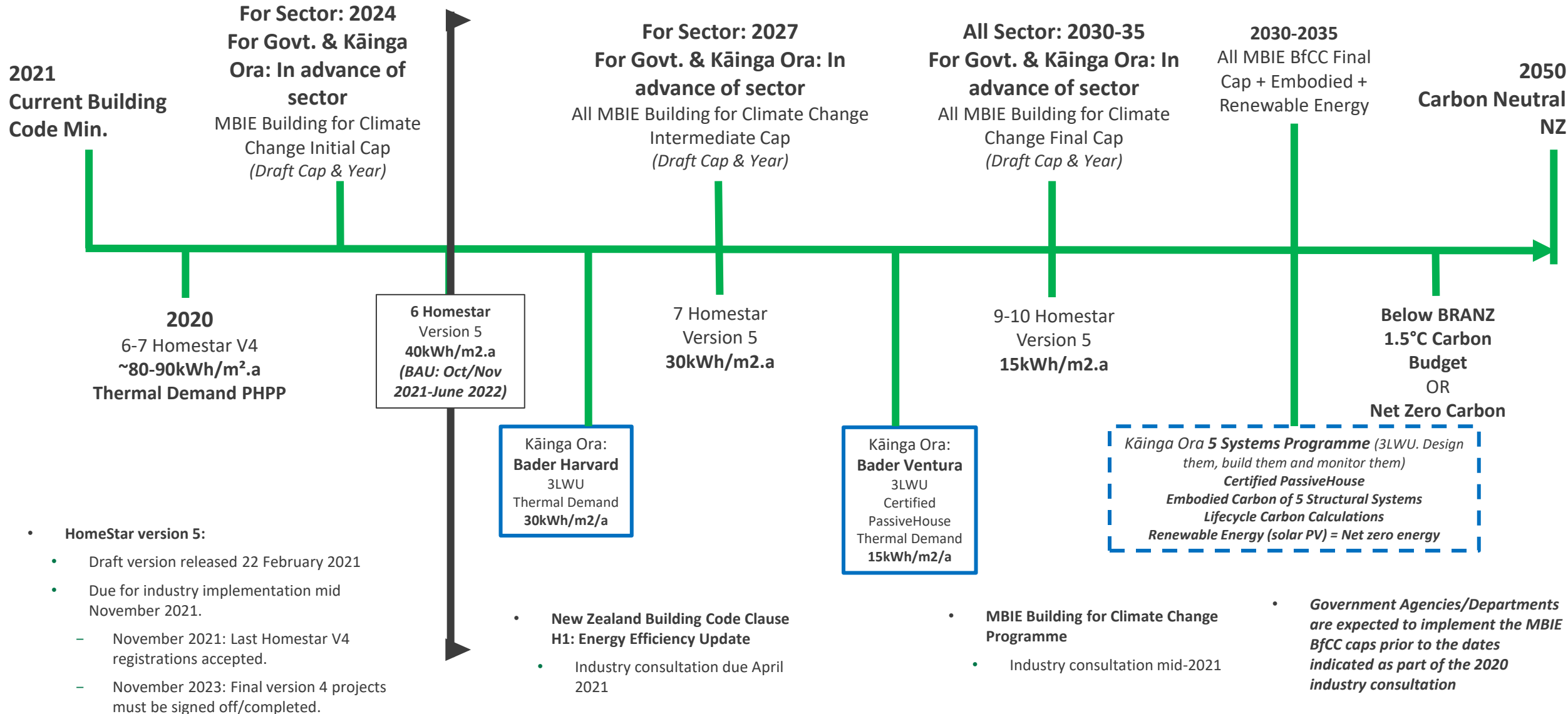


Kāinga Ora Carbon Neutral Housing Pilot Projects Underway to deliver MBIE BfCC

NZGBC Homestar version 5



An Indicative Future of the Building Construction Sector for the next 10-15 years: MBIE Building for Climate Change Programme



Jonas Bengtsson

- CEO and co-founder of Edge environment – a science-based sustainability consultancy based in Australia and with offices in the USA, Chile and Aotearoa
- A founder of the Building Product Information Platform
- Member of Living Building challenge Australia
- Vice-chair of the EPD Australasia Technical Advisory Group
- Contributor to BRANZ's early climate change research



Zarina Bazoeva

- Director and co-founder of Neocrete.
- Neocrete is a company based in Aotearoa focused on reducing the carbon footprint of concrete and improving its performance through technology and innovation.
- Zarina specialises in process design and improvement, data modelling, financial analysis, stakeholder management, and has experience in a wide range of industries, notably construction and financial services.



Brian Berg

- Manager/Lead Carbon Neutral Housing Programme, Kāinga Ora
- Kāinga Ora is Aotearoa's largest housing developer and seeks to lead industry transition to low carbon construction by walking the talk
- Brian has a background in building science especially sustainable construction
- Brian contributed to some of BRANZ's key climate change work, such as the development of the Whole of Building, Whole of Life Framework, the development of LCA Quick and carbon budget work



An aerial photograph of a city skyline at dusk. The sky is a deep blue with some light clouds. Several tall skyscrapers are visible, including a prominent one with a glass facade that reflects the sky. The city below is densely packed with buildings of various heights. The overall scene is a high-angle view of a modern urban landscape.

Towards sustainable materials

Jonas Bengtsson

What's driving interest in sustainable materials



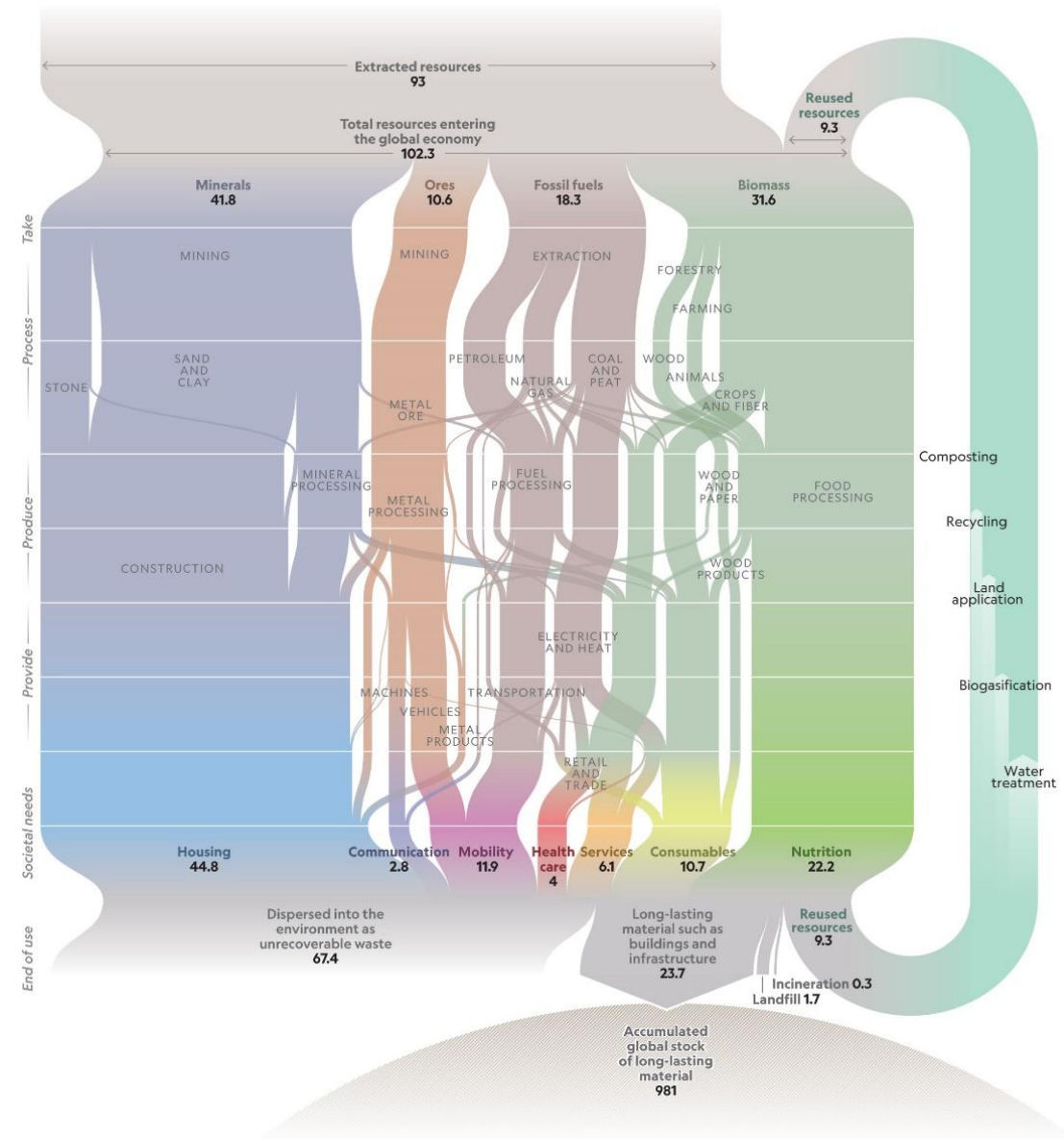
We use a lot: 100 billion tons of raw material every year

Every year we transform more than 100 billion tons of raw material into products.

Less than 25% becomes buildings, cars, or other long-lasting things.

Less than 10% cycles back into the economy.

67% go to waste



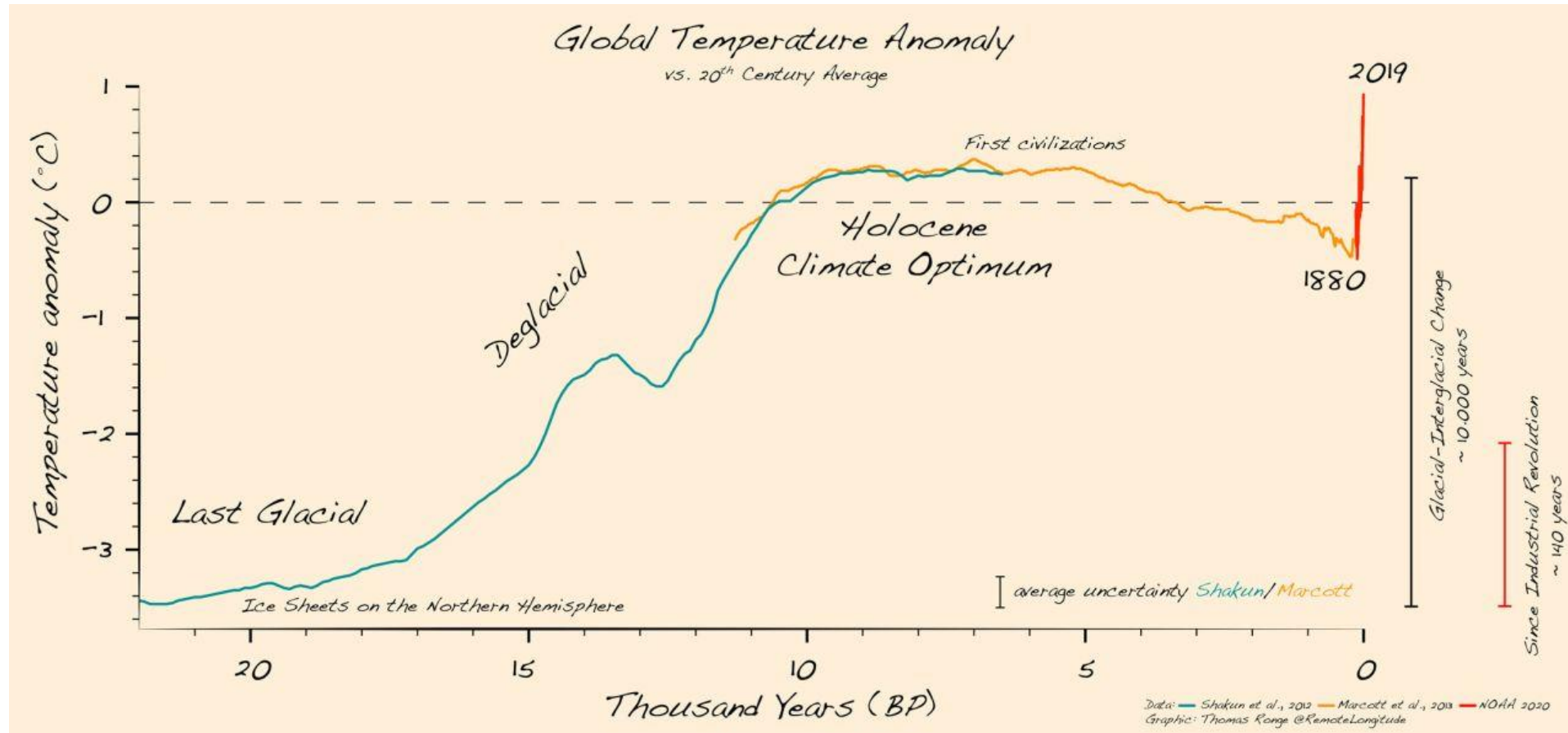
We are far from a “circular economy”
But there is opportunity in the gap



Hidden impacts in our supply chains: 40M+ in modern slavery globally



Climate change in our lifetime



Today, 10-20% of all carbon emissions are embodied in construction materials



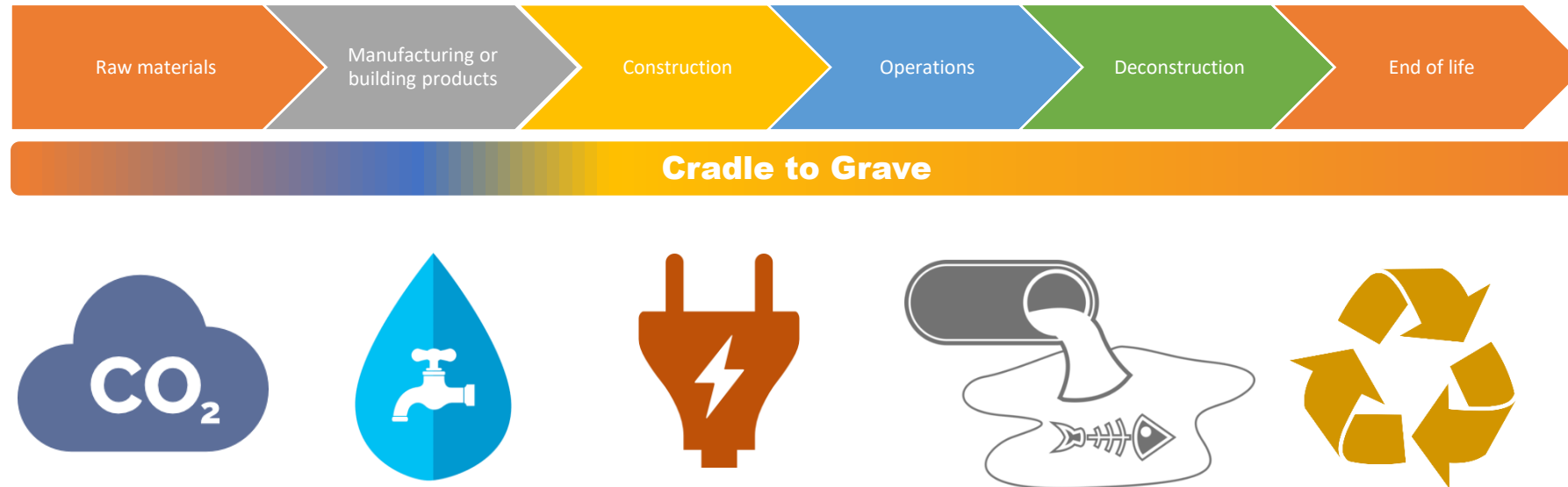
What are sustainable materials?

What are sustainable materials?

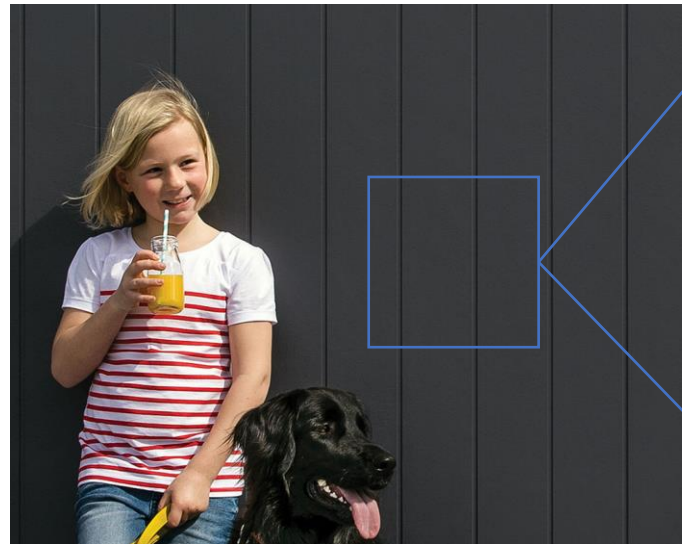
- | | |
|--|--|
| ✓ Contributes to net overall life cycle improvements (embodied and operational) | ✗ Single life cycle stage focused (100% recycled content, durable, 100% recyclable) |
| ✓ Performs and address <u>all relevant</u> impacts and risks (carbon, environment, people and economics) | ✗ Single issue focused (locally produced, plastic free, low VOC) |
| ✓ Comparisons made based on function - Works in the system (wall, roof, whole building) | ✗ Meaningless comparisons, e.g. “1 tonne of timber emits less CO ₂ than 1 tonne of steel” |
| ✓ Material agnostic – focus on optimised systems | ✗ Single material focused, e.g. “bamboo/ is always better” |
| ✓ 3 rd party verified transparency and evidence (EPDs, carbon neutral, eco-labels) | ✗ Supplier marks their own homework |
| ✓ Circular economy aligned (keep resources in use, design out waste & pollution, regenerate natural systems) | ✗ Less bad / reduced impact |

✓ Never finished: Innovation & continuous improvement

Life Cycle Assessment is a key method to quantify and compare environmental impacts



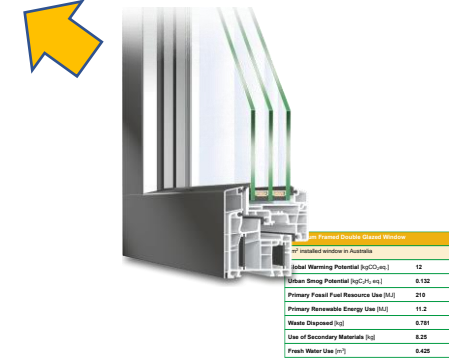
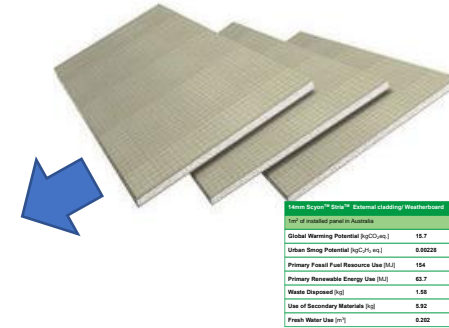
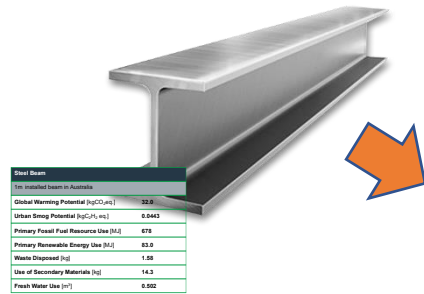
Environmental Product Declarations provide life cycle data and facts



Scyon Axon™ cladding 9mm External cladding	
1m ² of panel – Cradle to Gate	
Global Warming Potential [kgCO ₂ eq.]	6.94
Urban Smog Potential [kgC ₂ H ₂ eq.]	0.00107
Primary Fossil Fuel Resource Use [MJ]	61.9
Primary Renewable Energy Use [MJ]	44.2
Waste Disposed [kg]	0.669
Use of Secondary Materials [kg]	3.28
Fresh Water Use [m ³]	0.104

An Environmental Product Declaration, EPD, is a **registered document** that provides **relevant, verified and comparable information** about the **environmental impact** of goods and services.

EPDs combine to produce the embodied impact of buildings

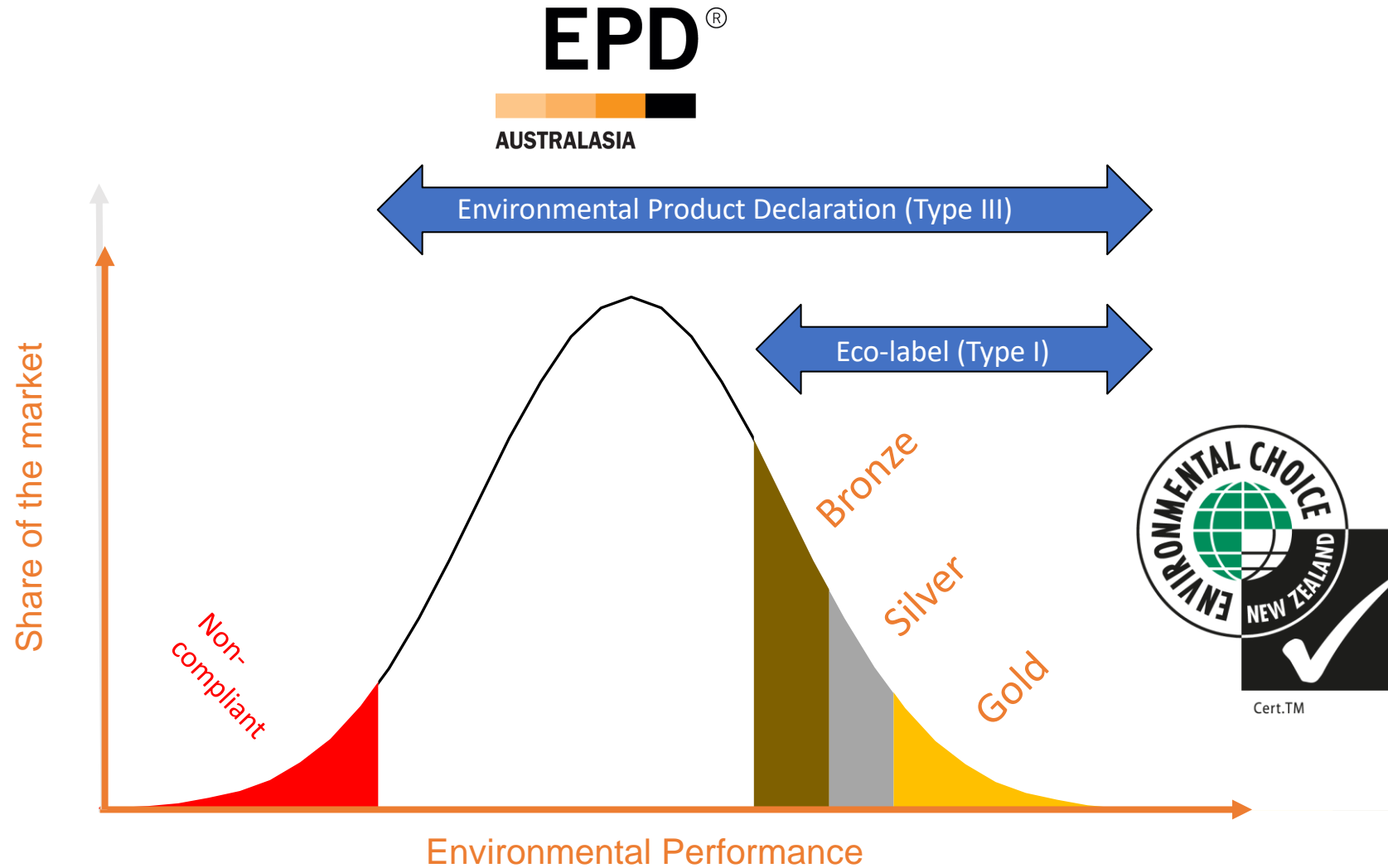


EPD[®]



AUSTRALASIA

The role of EPDs versus eco-labels



Labels and certifications recognised by Green Star [ISO 14024, ISO 14025 and EN 15804]



Cert.TM



Other labels / certifications



Declare.

Product Name Manufacturer

Final Assembly: First City, State, Country;
Second City, State, Country; Third City, State, Country
Life Expectancy: 50 Years
Embodied Carbon: # kg CO₂-eq ■
Declared Unit: # m²
End of Life Options: Recyclable (95%), Landfill (5%),
Take Back Program (Program Name/Location)

Ingredients:

Your First Component: Sustainably Sourced Ingredient;
LBC Red List Ingredient¹; Your Second Component:
LBC Watch List Priority for Inclusion: Non-Toxic Ingredient;
Undisclosed (<0.1%)²

¹LBC Temp Exception RL-009 Formaldehyde
²LBC Temp Exception RL-004var.a Proprietary Ingredients

Living Building Challenge Criteria: Compliant

I-13 Red List:

☐ LBC Red List Free **% Disclosed:** 99.9% at 100ppm
☒ LBC Red List Approved **VOC Content:** # g/L
☐ Declared

I-10 Interior Performance: CDPH Standard Method v1.2-2017
I-14 Responsible Sourcing: Product Available with FSC Chain of Custody

XXX-XXXX
EXP. 01 OCT 2021
Original Issue Date: 20XX

Third
Party
Verified

MANUFACTURER CLAIMS VERIFIED BY THIRD PARTY VERIFIED ASSESSOR
INTERNATIONAL LIVING FUTURE INSTITUTE™ living-future.org/declare

Where to find product information



EBOSS: Scope of use, limitations and building code compliance information, case studies, plus product literature like drawings, CAD and BIM, warranties, appraisals and more.

<https://www.eboss.co.nz/>



Masterspec New Zealand's leading provider of Digital Construction Information and tools for the design and construction industry.

<https://masterspec.co.nz/>



Productspect is an extensive library of New Zealand building products, including thousands of up-to-date technical files vital for the development of plans, specifications and quotes.

<https://productspec.co.nz/>



Building Product Information Rating: Find and compare building products with the right credentials and information important to you. Save time searching for products and information.

<https://BPIR.com.au/>

Green Star buildings – material focus

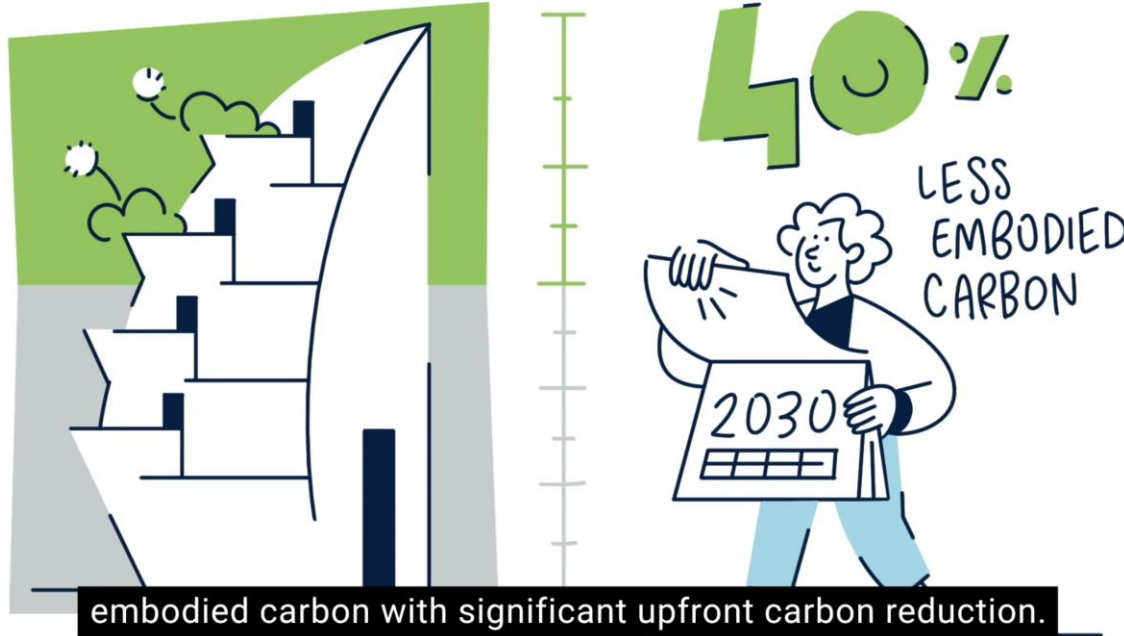


- Life Cycle Assessment credit with material focus
- Dedicated *Upfront Embodied Carbon Reduction* credit
- Incentives for products with eco-labels, EPDs and/or carbon neutral certification

Embodied carbon focus



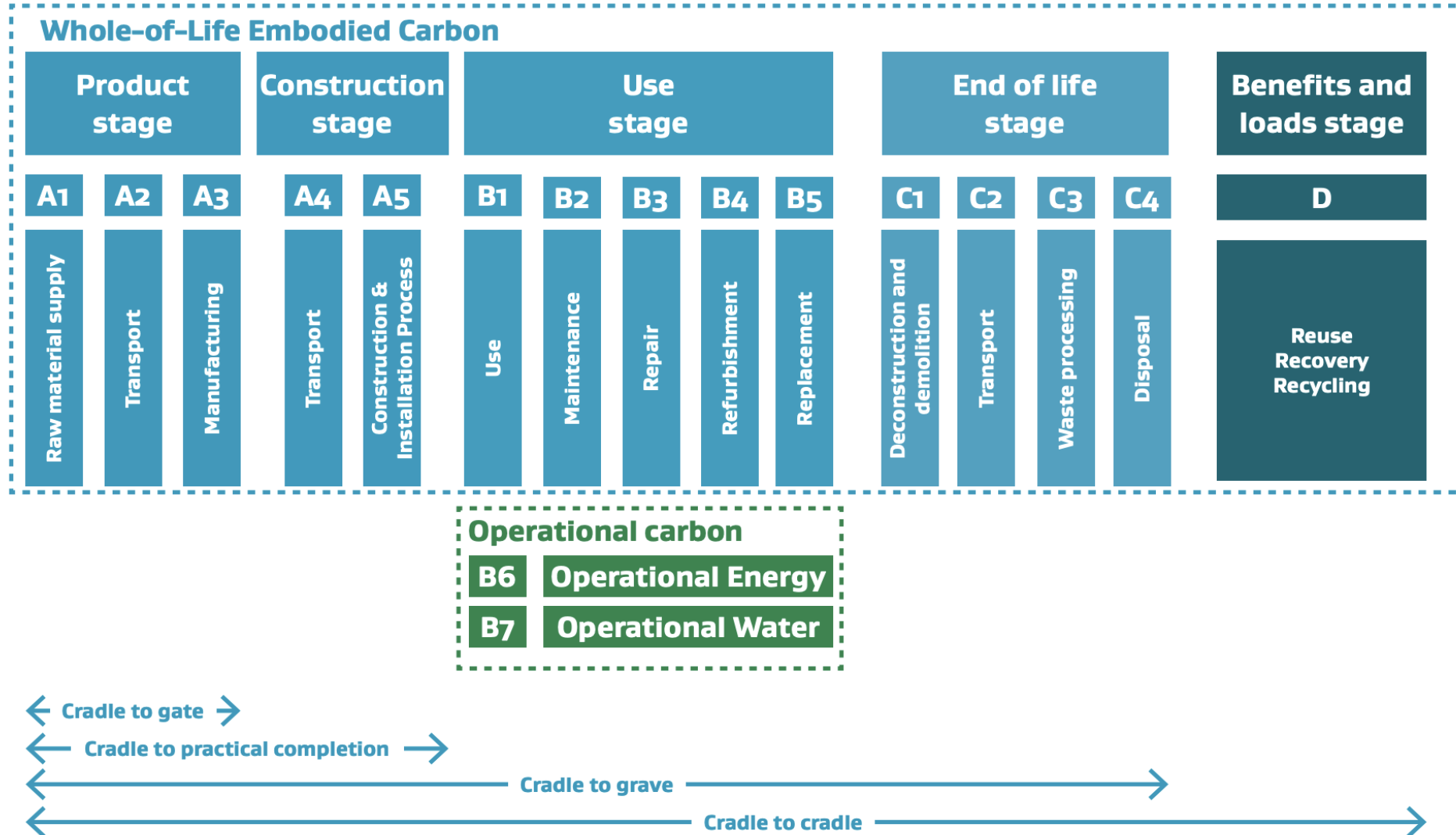
10-20% of all carbon is embodied in construction materials



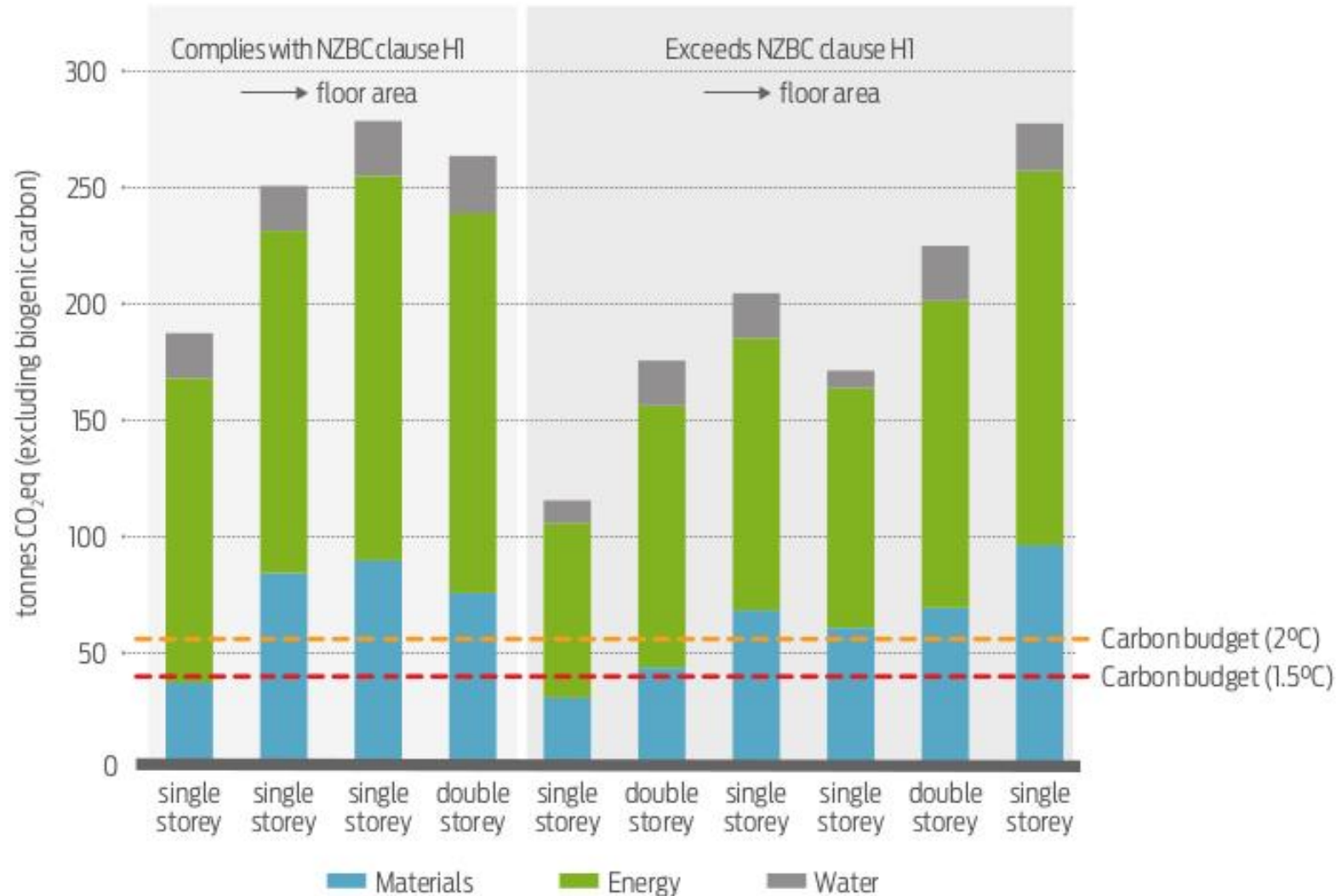
<https://www.worldgbc.org/embodied-carbon>

Ministry of Business, Innovation and Employment | Hīkina Whakatutuki is exploring Whole-of-Life Embodied Carbon Emissions Reduction Framework

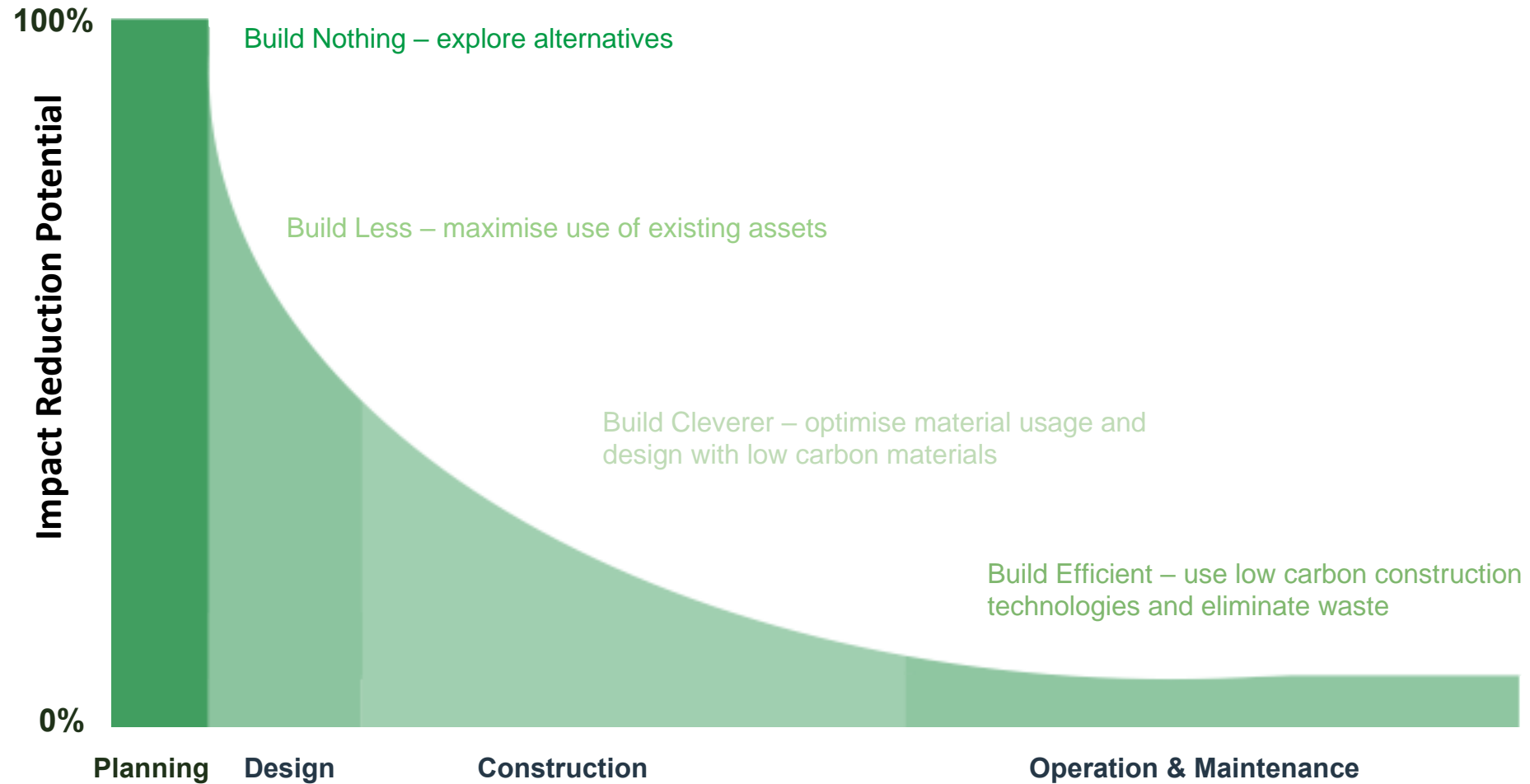
What do we mean – embodied carbon



Massey University and BRANZ carbon budget work – detached housing



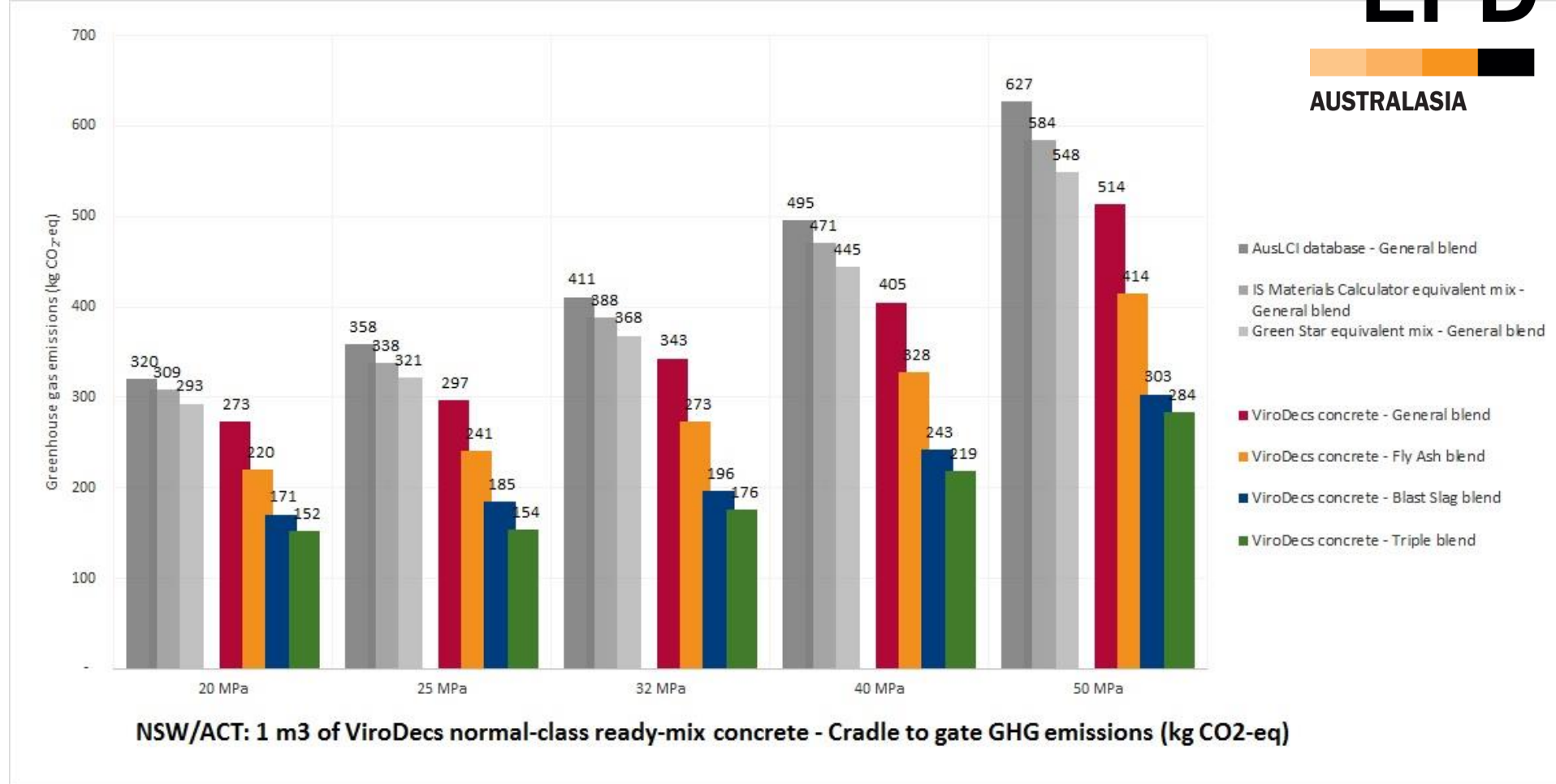
Opportunities to reduce impact



Environmental Product Declarations [ISO 14025 and EN 15804]

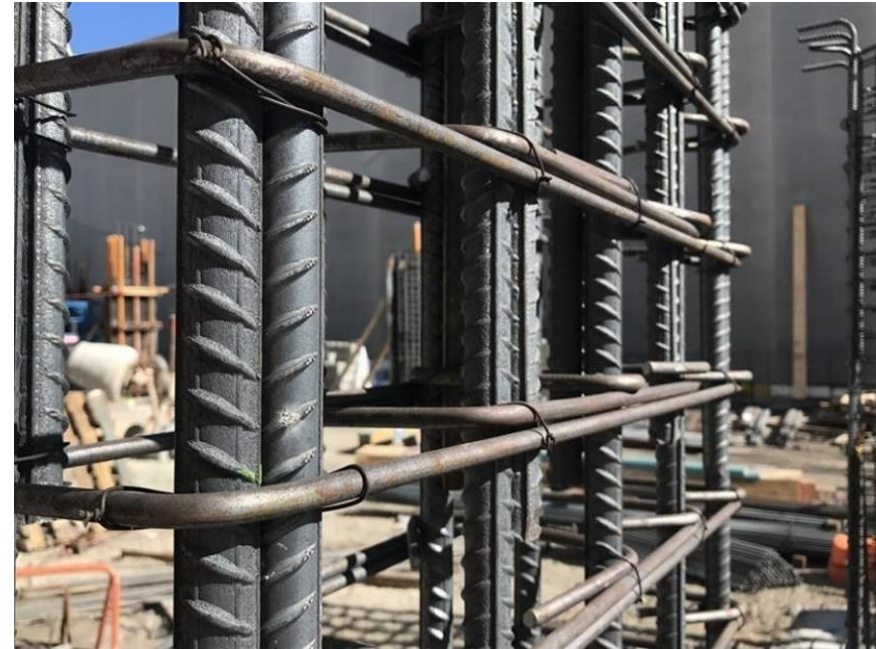
EPD[®]

AUSTRALASIA



InfraBuild's Viribar™750 high-strength steel

- 25–35% reduction in carbon emissions per tonne of fitments
- 33% reduction in mass of the fitments when compared with the equivalent 500 N fitment
- Reduced weight also makes transport, craneage and handling easier, providing environmental and health and safety benefits to the project.



La Trobe University Student Accommodation

- Innovative design, utilising cross laminated timber (CLT)
- Reducing the embodied carbon of the building by 76% or 7,550t CO₂eq when compared to a concrete benchmark.



The role of different actors



Examples of roles for actors in the value chain to address embodied carbon



Investors and assets owners: Set ambitious sustainable material targets and reporting for projects + Partner with suppliers in development of more sustainable and alternative materials



Planners / regulators: Mandate maximum/minimum thresholds, e.g. embodied carbon rates as a condition of approval



Project developers: Start at concept design phase to set project targets relating to embodied carbon and to ensure inclusion of carbon reduction initiatives throughout an asset's construction,



Designers / ESD / engineers: Consider whole-of-life implications of materials and design choices + specify low-embodied carbon materials



Building material manufacturers and suppliers: Publish EPDs and cost vs benefit analysis, address perceptions that using more sustainable materials & solutions is more expensive,



Rating tools: Continue to incentivise EPDs and reductions in embodied carbon in rated assets + publish material knowledge banks for the future



Procurement: Establish tendering criteria that evaluate, reward and drive low-carbon product/ material selection and mandate provision of EPDs / embodied carbon declarations on all high carbon intensity building products and materials.

Towards sustainable materials



Product perspective: the demand
for sustainable products

What are our customers looking for?

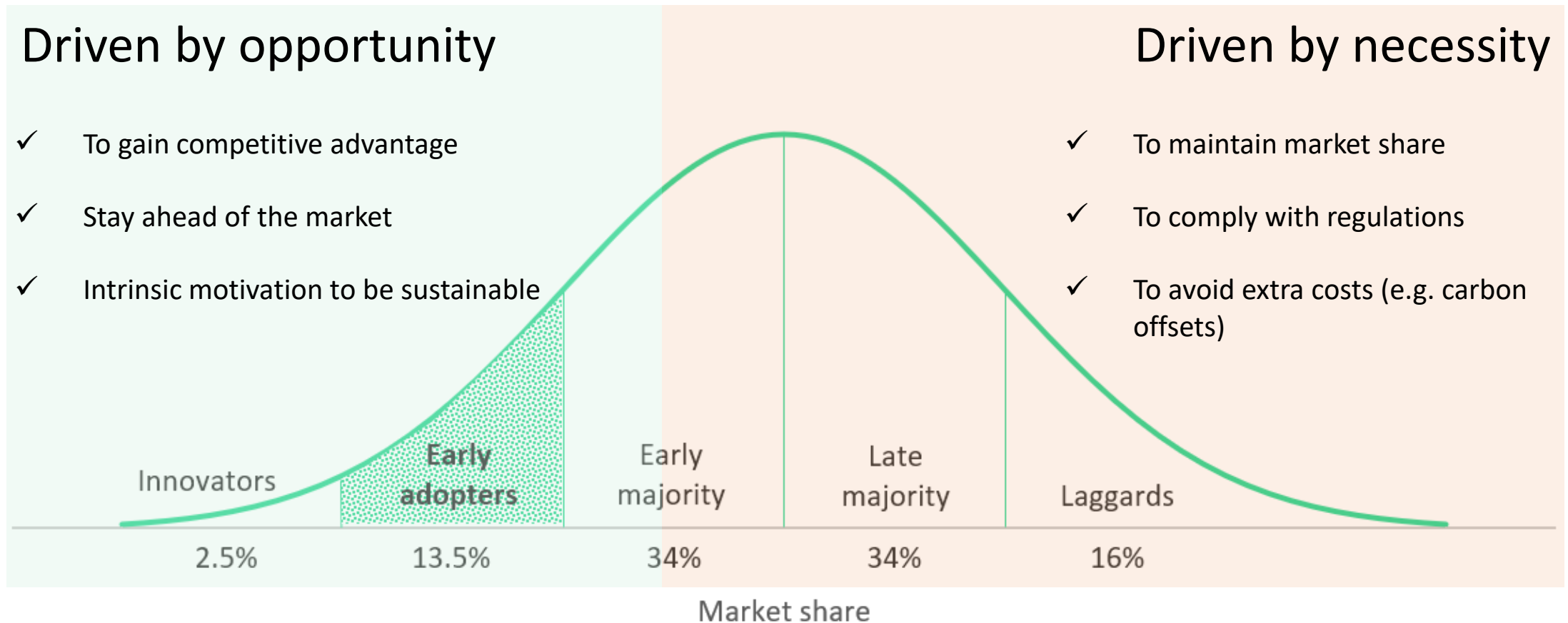
No one wants to compromise on quality

Sustainability needs to be measurable

They need to learn how they fit among all sustainable policies and initiatives



What drives the demand for sustainable building materials?



Thank you

Zarina Bazoeva
Director

021 252 8344
zarina@neocrete.co.nz



- 20-10-2021

Kāinga Ora

- Carbon Neutral Housing Programme:
- Procuring Lower Carbon Buildings
- Brian Berg
- Carbon Neutral Housing Manager
- Brian.Berg@kaingaora.govt.nz



context+

Procuring a Low Carbon Building: A Low Carbon Home is a Healthy & Dry Home

Focus Areas:

1. Reduce Operational Energy
2. Improve Occupant Comfort, Health, Wellbeing & Reduce Fuel Poverty/Energy Hardship
3. Reduce Embodied Carbon Impact of Building Materials

- **Importance:** *The homes we currently build generate about 5x too much carbon.*
- **Success Factors:** *1.5°C Carbon Budget per person, Construction & Life Cycle Costs/Benefits, Monitoring As-Built Performance of our homes.*
- **Industry Transformation:**
 - *Provide industry leadership & vision by being an informed client who knows what we want and how to do it or get it done.*
 - *Promote an industry culture change by helping to educate the industry.*
 - *Consider life cycle costs & wider/broader benefits in design & development decisions*
 - *Make evidence based decisions by implementing a monitoring/measurement & reporting of as-built & operational energy, carbon, occupant health & wellbeing for continuous improvement.*



Building Momentum

OUR CONSTRUCTION
PLAN FOR FUTURE HOMES



- An indicative future of the building construction sector for the next 10 – 15 years:
- MBIE Building for Climate Change Programme

New buildings in the construction sector are expected to meet MBIE year/cap targets as shown.
Government and Kāinga Ora are expected to meet caps ahead of sector.





Bader Ventura: First Kāinga Ora Social House to Target the Passive House (Passiv Haus) Standard.

Passed Pre-construction Review. Using Neocrete Cement Replacement for Low-Carbon Concrete



Mass Timber / Cross Laminated Timber (CLT) Research and Development Programme:

Mix of full CLT & hybrid CLT + Light Timber framing

Above Busby St, Auckland:
Hybrid CLT
7 Homestar v4.1





PRESS RELEASE: 17 INSPIRING BUILDING PROJECTS FROM ACROSS THE WORLD REVEALED FOR COP26 BUILT ENVIRONMENT VIRTUAL PAVILION

LAUNCHING 31 OCTOBER

<https://buildbetternow.co/>

Ngā Kāinga Anamata (The 5 Systems Project), Auckland, New Zealand

- Kāinga Ora
- Context Architects
- Aurecon
- Robert Bird Group
- Ortus International
- Resilio Studio
- Holmes Fires
- BRANZ



The COP26 Built Environment Virtual Pavilion has been designed and developed by the Visualisation and VR team at AECOM in collaboration with exhibition designers Install Archive.

Q & A

