





## HECC HOMESTAR EMBODIED CARBON CALCULATOR



THINK · TALK · CREATE CARBON TOOLS WEBINAR SERIES

#### Upcoming webinars

Webinar 5 Wednesday 8 June 12–1pm

LCAQuick





#### Previously

#### Carbon tools webinars

- LCAPlay
- CO<sub>2</sub>RE tool
- Life cycle assessment an overview
- Carbon Challenge Science and Solutions webinars (March 2022)
- Carbon and the New Zealand construction industry
- Compliance and calculating building carbon footprints
- Carbon challenges
- Design and build a low-carbon dwelling

www.branz.co.nz/pubs/previous-webinars/







#### About us

Sam Archer, NZGBC

Albrecht Stoecklein, Design Navigator







#### Questions

Please feel free to ask questions by using the Chat feature

We will take questions at the end of the webinar

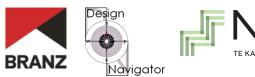




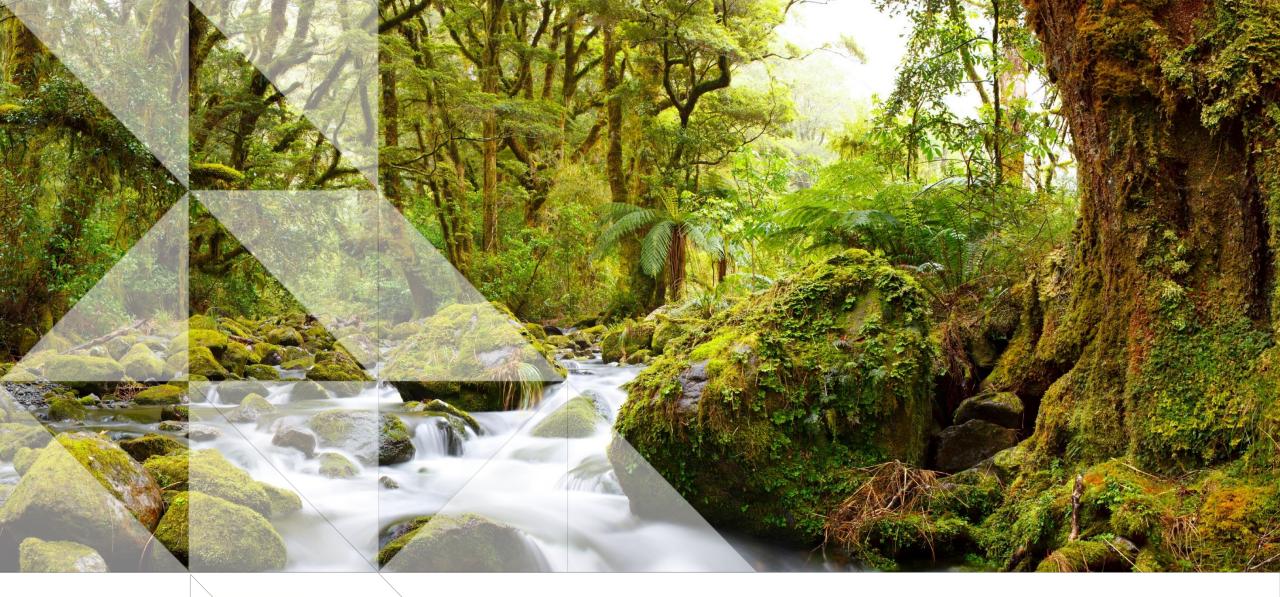
#### Programme

- Background to HECC
- HECC demonstration
- Q&A













esign







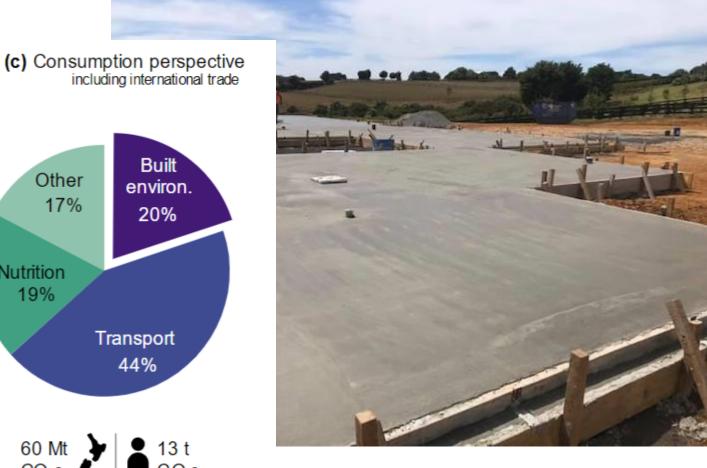
#### Nau mai, haere mai ki Aotearoa. Te kainga o Te Kaunihera Hanganga Tautaiao o Aotearoa.

H1 Introduction: Calculation Method





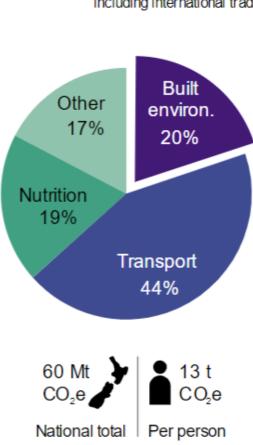
#### **Embodied carbon**



## Background

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#### Homestar v5

## Background

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#### v5 Technical Manual



Version 5.0.2 for public release Issue Date: 12 November 2021



#### Homestar v5





Version 5.0 for public release Issue Date: 25 August 2021



#### EN2: Embodied Carbon

Points Available	6					
Mandatory Minimums	8 Homestar and above: Projects must carry out a full cradle-to-cradle lifecycle assessment modules A-D of EN 15978.					
Aim	To reduce greenhouse gas emissions associated with products and materials used to construct a home.					
Project-wide	Yes	Calculator	Yes			



#### Government efforts

13 —

#### **Building for Climate Change**

	Initial Cap	Intermediate Cap	Final Cap
Operational Emissions Cap CO <sub>2</sub> -e/(m <sup>2</sup> .a) <sup>12</sup>		ll be a reporting mechanism for onal emissions from the three o	
Fossil Fuel combustion emissions <sup>13</sup> CO <sub>2</sub> -e/(m <sup>2</sup> .a)	18	9	0
Electricity Use kWh/(m².a) <sup>14</sup>	180	90	45
Thermal performance (demand) kWh/(m².a)	60	30	15
Services efficiency (delivered) kWh/ (m².a)	60	30	15
Water use l/p/d <sup>15</sup> (to be converted to m <sup>3</sup> / m <sup>2</sup> based on occupancy of the building type)	145	110	75



# The need to simplify

#### **Building for Climate Change**

Building firms grouped by new dwellings built (year to June

2017)

UNITS BUILT	NUMBER OF BUILDING COMPANIES	TOTAL NUMBER OF DWELLING UNITS BUILT	% OF ALL UNITS	AVERAGE UNITS PER BUILDER
>200	15	5,850	19%	390
101– 200	10	1,440	5%	144
51–100	40	2,800	9%	70
21–50	140	4,900	16%	35
11–20	230	3,680	12%	16
6–10	500	4,000	13%	8
1–5	3,100	7,780	26%	2.5
Totals	4,035	30,450	100%	7.5



#### ...hard to use for non LCA professional...

## Previous tools

Maxter Selection Panel: Controls of the results presented on this sheet:       Graph D: Building Material Analysis for Life Cycle Stages AI -A3, B2, B4, CI -C4, & D.         1       Select Life Cycle Impact Inductor       Select Life Cycle Stages (Nix Appled To Coph D A: AI Suges Sheet)       Select Cife Cycle Stages (Nix Appled To Coph D A: AI Suges Sheet)         1       Select Life Cycle Stage (Nix Appled To Coph D A: AI Suges Sheet)       Select Cife Cycle Stages (Nix Appled To Coph D A: AI Suges Sheet)         1       Select Results Normalisation Unix       Select Results Normalisation Unix       Select Results Normalisation Unix         3       Select Results Normalisation Unix       Select Results Normalisation Unix       Select Results Normalisation Unix         1       Select Results Normalisation Unix       Select Results Normalisation Unix       Select Results Normalisation Unix         1       Select Results Normalisation Unix       Select Results Normalisation Unix       Select Results Normalisation Unix         1       Select Results Normalisation Unix       Select Results Normalisation Unix       Select Results Normalisation Unix         1       Select Results Normalisation Unix       Select Results Normalisation Unix       Select Results Normalisation Unix         1       Select Results Normalisation Unix       Select Results Normalisation Unix       Select Results Normalisation Unix         1       Select Graph D in not controlled by selections nonel 2.	6				BUILD	DINGM	ATERIALS ANALYSIS		
Image: Coloration of the second of the se	-	Mast	er Selection Panel: Controls of the results presented on this sheet.		Gray	ph D: Buil	Iding Material Analysis for Life Cycle Stages AI-A3, B2, B	CI-C4, & D.	
Colour warming       Colour warming         Colour warming       Colour war			Select Life Cycle Impact Indicator	11					
Image: Select Life Cycle Stage (Nic Appled To Coph D A: Al Sogie Stam)         1       Select Life Cycle Stage (Nic Appled To Coph D A: Al Sogie Stam)         1       A.3.3         Select Results Normalisation Unit       Select Results Normalisation Unit         3       Select Results Normalisation Unit         3       Select Results Normalisation Unit         Absolute       Select Results Normalisation Unit         Note: Graph D is not constraided by selections somel 2.       Select Results Normalisation Unit         Absolute       Select Results Normalisation Unit         Resultation Convers, 50 MPA, Instit, sec. 100 kgln3 their institures, (PC)         Resultation Convers, 50 MPA, Instit, sec. 100 kgln3 their institures, (PC)         Resultation Convers, 50 MPA, Instit, sec. 100 kgln3 their institures, (PC)         Resultation Convers, 50 MPA, Instit, sec. 100 kgln3 their institures, (PC)         Resultation Material Analysis: EBH Objects Constaining Specified Material         Resultation Material Analysis: EBH Objects C			Global warming						•
1       Select Life Cycle Stage (Nic Applied To Graph D Ar M Sunger Sherred)         1       Ar.4.3         1       Select Life Cycle Stage (Nic Applied To Graph D Ar M Sunger Sherred)         1       Select Life Cycle Stage (Nic Applied To Graph D Ar M Sunger Sherred)         1       Select Results Normalitation Librit         1       Select Results Normalitation Librit         1       Select Results Normalitation Librit         1       Select Compt D is not controlled by selection sources, 50 Mp, institu, nor. 150 light) statil monitoring, (DPC)         Abstrait       Select Results Normalitation Librit         1       Note: Graph D is not controlled by selection sources, 50 Mp, institu, nor. 150 light) statil monitoring, (DPC)         Abstrait       Select Results Normalitation Librit         1       Note: Graph D is not controlled by selection source 2.         1       Select Results Normalitation Librit         1       Select Results Normalitation Librit         1       Select Results Normalitation Results         1 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0010</td><td></td></t<>								0010	
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transi transi	-	2	A1.43		and manager W. Mith				
Image: Select Results Normalisation Used       Select Results Normalisation Used         Absolute       Besforced concrets, 50 PMs, instatu, act. 100 Ights Insel materials(COPC)         Absolute       Besforced concrets, 50 PMs, instatu, act. 100 Ights Insel materials(COPC)         Absolute       Besforced concrets, 50 PMs, instatu, act. 100 Ights Insel materials(COPC)         Absolute       Besforced concrets, 50 PMs, instatu, act. 100 Ights Insel materials(COPC)         Almosa (south of the Second PMs, instatu, act. 100 Ights Insel materials(COPC)         Almosa (south of the Second PMs, instatu, act. 100 Ights Insel materials(COPC)         Almosa (south of the Second PMs, instatu, act. 100 Ights Insel materials(COPC)         Biseling Material Analysis: BIM Objects Containing Specified Material         Event BIM Objects Containing Specified Material         Full Expert BIM Objects Containing Specified Material         Varpert BIM Objects Containing Selected Material For Life Cycle Stage: AI-A3 is COPm, Material Inspect         Network Bind Opies Containing Selected Material For Life Cycle Stage: AI-A3 is COPm, Material Inspect         Varpert BIM Objects Containing Selected Material For Life Cycle Stage: AI-A3 is COPm, Material Inspect         Varpert BIM Objects Containing Selected Material For Life Cycle Stage: AI-A3 is COPm, Material Inspect         Varpert BIM Objects Containing Selected Material For Life Cycle Stage: AI-A3 is COPm, Material Inspect         Varpert BIM Objects Constaining Selected Material For Life Cycle S	ata 4	-		and the second states					
3       Absolute       Reforced concrete, 35 Mp, insta, ac. 155 kp/n, insta, ac. 155 k	-	100	Select Results Normalisation Unit						
Reforced concrete, 30 MS, in site, sc. 100 kg/m3 date individing, (OPC)           Almeane (and/off (a		3							
Advance (avoid of first), one of 0.02 mm), entruled for any one of 0.02 mm, instruded for any of 0.002 mm, instruded for any of 0.00				Reafor	rced concrete, 30 MPa, i		0 kg/m3 stael reinforcing, (OPO)		
Image: PR_25_71_14_5_11Auminium composite material (ACM) panet 4mm thuck         N of Total           Largest BiH Objects Containing Selected Material for Life Cycle Stage: A1-A3         kg CO2eq         Material Impact         N of Total           Largest BiH         1         Phan Table Stad Wall (000, R22, RAB Bourd, Auminum Cadding         E358-81         0.01           2         5_00mm Snel Stud Accounts: Wall (030, R22, RAB Bourd, Auminum Cadding         E358-81         0.01         1         2         0.00 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>									
Largest BH         Use part Bit Objects Containing Selected Material for Life Cycle Stage: A1-A3         leg CO2eq         Material Impact           1         99em Timber Stud Wall @000_R22_RAB Sourd_Aluminum Cluding         1351+61         0.01           2         5_00m Steel Stud Accountic Wall @350.44-88m         2851+63         0.01           3         -         0.00<00         0.00	des			ing Specified M	and the local division of the local division			taining Specified M:	iterial
Image: space of the stand with stand with the stand with the stand with the stand with t	sdes	Building	Material (ALL)	ing Specified M	•		g Material (ALI)		
Image: Point of Specified Material in other SIM Objects         Difference	stes	Building PR_25_7	Material (ALI) 1_14_5_1( Aluminium composite material (ACM) panel, 4mm thick		* N of Total	PR,25,7	g Material (ALL) 11,51,5,1,2( Aluminium (anodised finish, one side 0.02 mm), flat sheet	0.9mm BMT	N of Total
BitM         3         -         0.000-00         0.01x         4         -         0.000-00         0.00x         4         -         0.000-00         0.00x         -         4         -         0.000-00         0.00x         0		Building PR_25_7	Material (ALI) 1_14_5_1( Aluminium composite material (ACM) panel, 4mm thick BIM Objects Containing Selected Material for Life Cycle Stage: A1-A3		S of Total Material Impact	PR,25,7	g Material (ALL) 11,51,5,1,2( Aluminium (anodised finish, one side 0.02 mm), flat sheet	0.9mm BMT	N of Total Material Impa
#         5         -         0.005+00         0.07x         #         5         -         0.005+00         0.00x           Impact of Specified Material in other BIM Objects         0.002+00         0.07x         Impact of Specified Material in other CBI Objects         0.002+00         0.07x		Building PR_25_7	Material (ALI) 1_14_5_1( Aluminium composite material (ACM) panel, 4mm thick BIM Objects Containing Selected Material for Life Cycle Stage: A1-A3 I POwn Timber Stud Wall (2000_R12_RA8 Sourd_Aluminum Cledding		X of Total Material Impact 0.3%	PR(25,7	g Material (ALL) 11.51.5.1.21 Aluminium (anodised finish, one side 0.02 mm), flat sheet argest CBI Objects Containing Selected Material for Life Cycle Stage:	0.9mm BMF MI-A3 kg CO2eq 0.002+00	N of Total Material Impa 0.0%
\$         5         -         0.005+00         0.07x           Impact of Specified Material in other BIM Objects         0.005+00         0.07x	ters	Building PR_25_7 Largest	Material (ALI) 1_14_5_1( Aluminium composite material (ACM) panel, 4mm thick BIM Objects Containing Selected Material for Life Cycle Stage: A1-A3 I POwn Timber Stud Wall (2000_R12_RA8 Sourd_Aluminum Cledding	* lig CO2rq 2355(=31 2855(=31	S of Total     Material Impact     0.3%	PR(25,7	g Material (ALL) 11.51.5.1.21 Aluminium (anodised finish, one side 0.02 mm), flat sheet argest CBI Objects Containing Selected Material for Life Cycle Stage:	0.9mm BMT NI-A3 kg CO2eq 0.002+00 0.002+00	N of Total Matorial Impa 0.0% 0.0%
Impact of Specified Material in other BIM Objects 0.002+00 0.073 Impact of Specified Material in other CBI Objects 0.002+00 0.073	ters	Building PR_25_7 Largest	Material (ALI) 1_14_5_1( Aluminium composite material (ACM) panel, 4mm thick BIM Objects Containing Selected Material for Life Cycle Stage: A1-A3 I POwn Timber Stud Wall (2000_R12_RA8 Sourd_Aluminum Cledding	• kg CO2eq 335(=0) 285(=0) 0.005=00	N of Total Material Impact 0.3% 0.3% 0.0%	PR(25,7	g Material (ALL) 11.51.5.1.21 Aluminium (anodised finish, one side 0.02 mm), flat sheet argest CBI Objects Containing Selected Material for Life Cycle Stage:	0.9mm BMT 0.002+00 0.002+00 0.002+00	N of Total     Material Iropa     0.02     0.02     0.02
	ters	Building PR_25_7 Largest	Material (ALI) 1_14_5_1( Aluminium composite material (ACM) panel, 4mm thick BIM Objects Containing Selected Material for Life Cycle Stage: A1-A3 1 99mm Timber Stud Wal @600_R22_RAB Sound_Aluminium Cladding 2 Ex_90mm Steel Stud Accounts: Wal @350.4.4.8.8m 3 - 4 -	kg CO2×q 1155(=0) 2255(=0) 0.000(=00 0.000(=00	S of Total     Material Impact     0.3%     0.3%     0.0%     0.0%     0.0%	Rating CB1	Material (ALL)     T_51_5_1_2( Aluminium (anodised finish, one side 0.02 mm), flat sheet     argest CBI Objects Containing Selected Material for Life Cycle Stage:     1     2     -     3     -     4     -	0.9mm EMT kg CO2eq 0.002+00 0.002+00 0.002+00 0.002+00	% of Total           Material Impa           0.0%           0.0%           0.0%           0.0%           0.0%
	ters	Building PR_25_7 Largest	Material (ALI) 1_14_5_1( Aluminium composite material (ACM) panel, 4mm thick BIM Objects Containing Selected Material for Life Cycle Stage: A1-A3 I PRem Timber Stud Wal @600_R22_RAB Sound_Aluminium Cladding Ex_90men Steel Stud Accounts: Wall @350.4.4-8.8m 3 - 4 - 5 -	kg CO2eq 1555-00 2555-00 0.002-00 0.002-00 0.002-00	X of Total     Material Impact     0.3%     0.3%     0.0%     0.0%     0.0%	Rating CB1	p Material (ALL) T.51,5_1,2[ Aluminium (anodised finish, one side 0.02 mm), flat sheet argest CBI Objects Containing Selected Material for Life Cycle Stage:           1         -           2         -           3         -           4         -           5         -	0.9mm BMT kg CO2eq 0.000 +000 0.000 +000 0.000 +00 0.000 +00	% of Total           Material Impa           0.03           0.03           0.03           0.03           0.03           0.03           0.03           0.03           0.03           0.03           0.03           0.03
	ters	Building PR_25_7 Largest	Material (ALI) 1_14_5_1( Aluminium composite material (ACM) panel, 4mm thick BIM Objects Containing Selected Material for Life Cycle Stage: A1-A3 1 90mm Timber Stud Wall (2000_R22_RA8 Sound_Aluminium Cladding 2 Ex_90mm Sociel Stud Accountic Wall (2030 4.4-8.8m 3 - 4 - 5 - impact of Specified Material in other BIM Objects	* kg CO2xq 2355-80 2555-80 0.002+00 0.002+00 0.002+00	X of Total     Material Impact     0.03     0.03     0.03     0.03     0.03     0.03     0.03     0.03	Rating CB1	g Material (ALS) 1.51.5.1.2 Aluminium Janodised Enrish, one side 0.02 mm), Bat sheet argest CBI Objects Containing Selected Material for Life Cycle Stages 1. 2. 3. 4. 5. Impact of Specified Material in other C	0.5mm EMF  I-A3  Bg CO2eq  0.000 0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.00	% of Total           Material Impa           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%           0.0%
	ters	Building PR_25_7 Largest	Material (ALI) 1_14_5_1( Aluminium composite material (ACM) panel, 4mm thick BIM Objects Containing Selected Material for Life Cycle Stage: A1-A3 I PRem Timber Stud Wal @600_R22_RAB Sound_Aluminium Cladding Ex_90men Steel Stud Accounts: Wall @350.4.4-8.8m 3 - 4 - 5 -	* kg CO2xq 2355-80 2555-80 0.002+00 0.002+00 0.002+00	X of Total     Material Impact     0.03     0.03     0.03     0.03     0.03     0.03     0.03     0.03	Top Ranking CB1	g Material (ALS) 1.51.5.1.2) Aluminium Janodised finish, one side 0.02 mml, flat sheet argest CBI Objects Containing Selected Material for Life Cycle Stages 1. 2. 3. 4. 5. Impact of Specified Material is other CO Table E: CBI Material Analysis: Materials Within	0.5mm EMF  I-A3  Bg CO2eq  0.000 0.000  0.000  0.000  0.000  0.000  0.000  0.000  0.00	% of Total           Material Impa           0.02           0.03           0.05           0.05           0.05           0.05           0.05           0.05           0.05           0.05           0.05           0.05
Precat concrete, usedy 2000031 CBI Building Object (ALI)	tes £6IM	Building PR_25_7 Largest	Material (ALI) 1.14, 5, 11 Aluminium composite material (ACM) panel, 4min thick BIH Objects Containing Selected Material for Life Cycle Stage: A1-A3 1 POnin Timber Stud Wal (2000_R22_RA8 Sourd_Aluminium Cladding 2 Ex_90min Steel Stud Accountic Wall (2030 4.4-8.5min 3 - 4 - 5 - Impact of Specified Material in other BIM Objects Graph E: CBI Object Analysis for Life Cycle Stages A1-4	* kg CO2xq 2355-80 2555-80 0.002+00 0.002+00 0.002+00	X of Total     Material Impact     0.3%     0.0%	Top Ranking CB1	g Material (ALS) 1-51.5_1.2 (Aluminium Janodised Emish, one side 0.02 mm), Eat sheet regest CBI Objects Containing Selected Material for Life Cycle Stages 1 - 2 - 3 - 4 - 5 - Impact of Specified Material is other CI Table E: CBI Material Analysis: Materials Within ding Object (ALL)	0.5mm EMF I-A3 Bg CO2eq 0.000	X of Total     Material Impac     0.0%     0.0%     0.0%     0.0%     0.0%     0.0%     0.0%     0.0%     0.0%
Pricast concrete, supply 7090031 CBi Building Object (ALI) CBi Building Object (ALI) CBi Building Object (ALI) CBi Codes 3121 in situ concrete, structural V N of Total	tes £6IM	Building PR_25_7 Largest	Material (ALI) 1.14, 5, 11 Aluminium composite material (ACM) panel, 4min thick BIH Objects Containing Selected Material for Life Cycle Stage: A1-A3      Pown Timber Stud Wal (2000_R22_RA8 Board_Aluminum Cladding     Ex_90mm Sneel Stud Accounts: Wall (2030 4.4-8.8m     i         inpact of Specified Material in other BIM Objects      Graph E: CBI Object Analysis for Life Cycle Stages A1-4      Precast concrete, supply	* kg CO2xq 2555-80 0.000-000-00 0.000-000-00 0.000-000-000-000-000-000-000-000-000-0	X of Total     Material Impact     0.3%     0.0%	Top Ranking CB1	g Material (ALL) TI_51_5_1_2? Aluminium Janodised finish, one side 0.02 mm), flat sheet argest CBI Objects Containing Selected Material for Life Cycle Stages 1 - 2 - 3 - 4 - 5 - Impact of Specified Material is other C Table E: CBI Material Analysis: Materials Within ding Object (ALL) odes 3123 In situ concrete, structural	0.9mm EMF I-A3 Bg CO2eq 0.000+00 0.000+00 0.000+00 0.000+00 0.000+00 C05jects 0.000+00 Specified CBI Objec	No of Total Material Impac 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%
Precast concrete, supply 20000001 (ALI) CBI Building Object (ALI) CBI Code: 3121 In situ concrete, structural Structural steel 119003.24 CBI Code: 3121 In situ concrete, structural Largest Contributing Materials in Selected CBI Object for Life Cycle Stage: AI-A3 kg CO2eq Material Imp	tes £6IM	Building PR_25_7 Largest	Material (ALI) 1.14, 5, 11 Aluminium composite material (ACM) panel, 4min thick BIH Objects Containing Selected Material for Life Cycle Stage: A1-A3      Pown Timber Stud Wal (2000_R22_RA8 Board_Aluminum Cladding     Ex_90mm Sneel Stud Accountic Wall (2030 4.4-8.8m     i         for a study of the study	* kg CO2xq 2555-80 0.000-000-00 0.000-000-00 0.000-000-000-000-000-000-000-000-000-0	X of Total     Material Impact     0.3%     0.0%	Top Ranking CB1	g Material (ALS) TI_51_5_1_2() Aluminium Janodised finish, one side 0.02 mm), flat sheet argest CBI Objects Containing Selected Material for Life Cycle Stages 1 - 2 - 3 - 4 - 5 - Impact of Specified Material is other C Table E: CBI Material Analysis: Materials Within ding Object (ALI) odes 3123 In situ concrete, structural st Costributing Materials in Selected CBI Object for Life Cycle Stages	0.9mm EMF I-A3 Bg CO2eq 0.000	N of Total     Material Impac     0.0%
Precast concrete, stepply       7000031         In situ concrete, structural       312454-02         Structural steel       11902.24         Profiled metal sheet reaction       9000.30	tes £6IM	Building PR_25_7 Largest	Material (ALI) 1.14 (5, 1) Aluminium composite material (ACM) panel, 4min thick BIH Objects Containing Selected Material for Life Cycle Stage: A1-A3  Phen Tinber Stud Wal ((600, R22, RAB Sourd, Aluminium Cladding Ex_90min Steel Stud Accountic Wall ((350 4.4-8.5m)  Example of Specified Material in other BIM Object  Frecast concrete, supply In situ concrete, structural Structural steel  119023.24	* kg CO2xq 2555-80 0.000-000-00 0.000-000-00 0.000-000-000-000-000-000-000-000-000-0	X of Total     Material Impact     0.3%     0.0%	Top Ranking CB1	g Material (ALL) TI_51_5_1_2 () Aluminium Janodised finish, one side 0.02 mm), flat sheet argest CBI Objects Containing Selected Material for Life Cycle Stages 1 - 2 - 3 - 4 - 5 - Impact of Specified Material is other C Table E: CBI Material Analysis: Materials Within ding Object (ALL) odes 3123 In situ concrete, structural st Contributing Materials in Selected CBI Object for Life Cycle Stages 1 Reinforced concrete, 25 MPs, in-situ, inc. 100 kg/m3 stael reinforcing, (0	0.9mm EMF I-A3 Bg CO2eq 0.000	N of Total     Material Impac     0.0%
Precast concrete, supply In situ concrete, structural Structural steel     31264-02       CBI Godis     3121       In situ concrete, structural Structural steel     31264-02       V     N of Total Largest Contributing Materials in Selected CBI Object for Life Cycle Stage: AI-A3     Sg CO2eq       Material Imp       1     Reinforced concrete, 25 MPs, in-situ, inc. 100 ligits) steel reinforcing (OPC)     100005	ELS BIM	Building PR_25_7 Largest	Material (ALI) 1.14 (5, 1) Aluminium composite material (ACM) panel, 4min thick BIH Objects Containing Selected Material for Life Cycle Stage: A1-A3  Pown Tinber Stud Wall (9600_R22_RA8 Sourd_Aluminum Cladding  Ex_90min Steel Stud Accountic Wall (9350 44-8.8mi  a  -  Expect of Specified Material in other BIM Object  Frecast concrete, supply In situ concrete, structural Structural steel  Profiled metal sheet roofing  90306.88	* kg CO2xq 2555-80 0.000-000-00 0.000-000-00 0.000-000-000-000-000-000-000-000-000-0	X of Total     Material Impact     0.3%     0.0%	Top Ranking CB1	g Material (ALL) TI_51_5_1_21 Aluminium Janodised Enish, one side 0.02 mm), Eat sheet argest CBI Objects Containing Selected Material for Life Cycle Stages 1 - 2 - 3 - 4 - 5 - Impact of Specified Material in other C Table E: CBI Material Analysis: Materials Within ding Object (ALL) ode: 3123 In situ concrete, structural st Contributing Materials in Selected CBI Object for Life Cycle Stages 1 Rainforced concrete, 25 MPs, in situ, inc. 100 kg/m3 stael reinforcing, ( 2 Rainforced concrete, 30 MPs, in situ, inc. 50 kg/m3 stael reinforcing, (	0.9mm EMF I-A3 Bg CO2eq 0.000	X of Total Material Iropas 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%

5 Sand

1.80E+02

0.0%

0.0

15 —

#### At the material level...



C	$\begin{array}{c c} & \bullet \\ aste \\ \bullet \\ \bullet \\ \end{array} \end{array} \xrightarrow{\bullet} \\ B \\ I \\ \blacksquare \\ B \\ I \\ \blacksquare \\ I \\ I$	E = ≫ ~ cb E = ← → E ↔ ~		al Format as Cell y * Table * Styles Styles	e 🖂 2	∑ ~ A Z Z Sort & Find & Filter ~ Select ~ Editing	Analyze Data Analysis Sensitivit
C1	$\downarrow$ $\downarrow$ $\downarrow$ $\times$ $\checkmark$ $f_x$						
	A	D	E	F	G	н	
1 2 3	Green Star Embodied Carbon Calculator Substructure						
4	Category	Material type	Matching material	Amount Unit	Source		Waste % (input) W
5	Slabs	Concrete	Reinforced concrete, 50 MPa, in-si	15 tonn	ne		15%
6	Piles						
7	Retaining Walls						
8	Other						
8 9 10 11							
10							
12							
16 13							
14							
14 15 16							

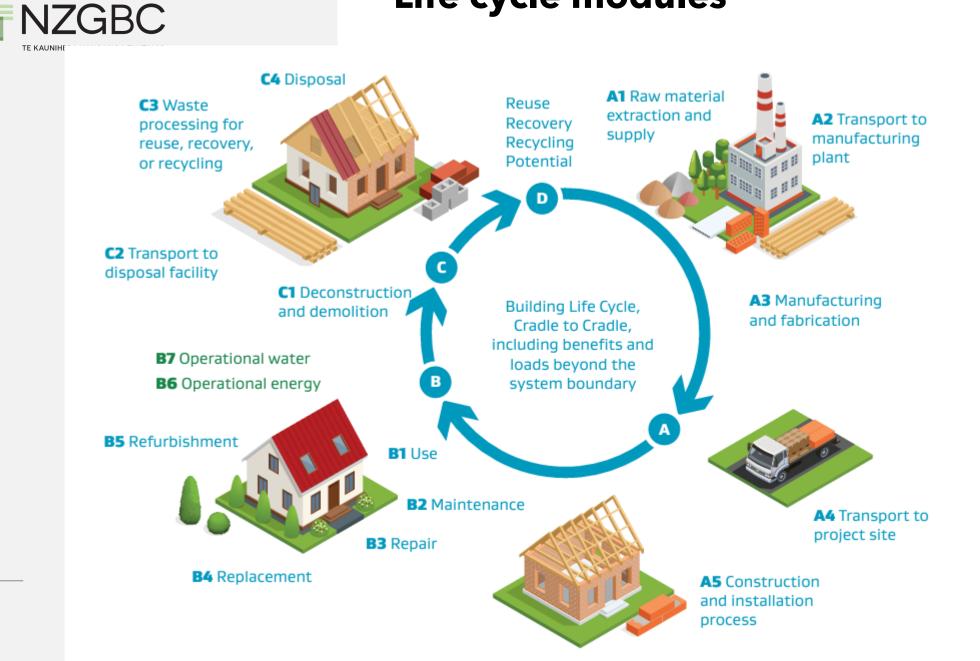


#### At the assembly level...

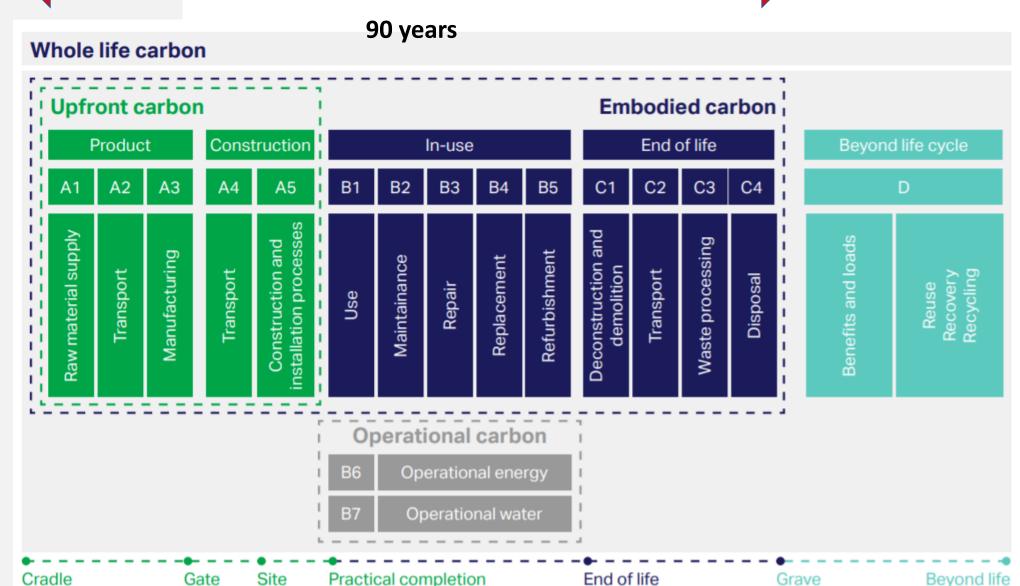
Roofs
Climate Change impact

**3,426** kg CO<sub>2</sub> eq

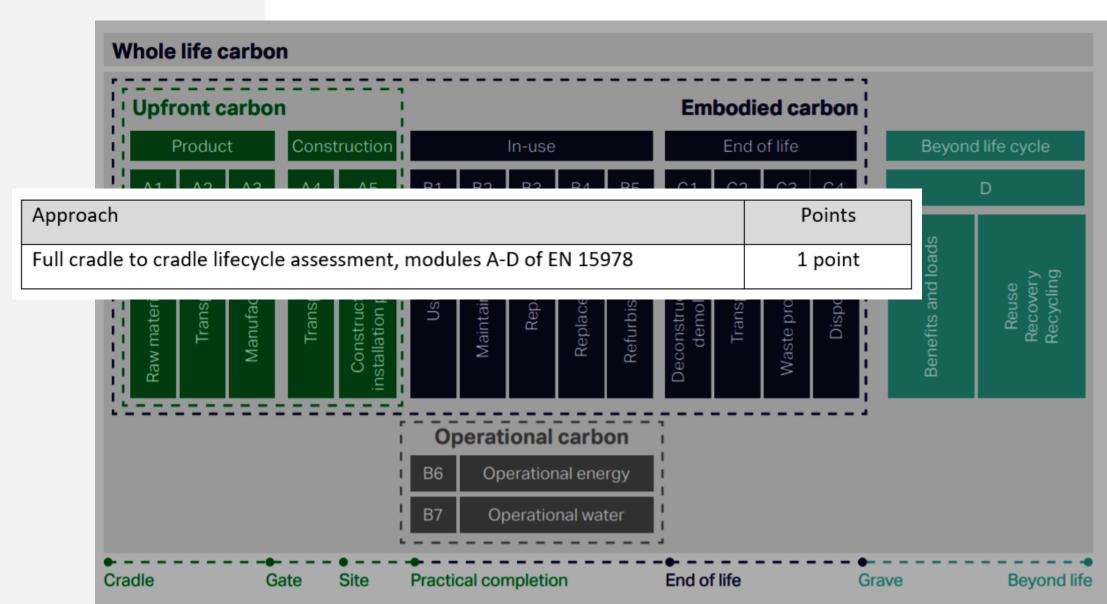
ID	Element Name	Туре	Description	Option	<i>Area</i> [ <i>m</i> <sup>2</sup> ]
R1	Roof 1	Profiled steel	Low slope timber-framed, 190 mm rafters and battens	70 x 35 mm timber battens, insulation	100
R2	Roof 2		Pitched timber-f	ramed roof – R 3.3	
R3	Roof 3		corrugated iron cla 90 mm bottom ch		
R4	Roof 4		chord spacing 900 insulation with R-v		-
	17 —		Note that an insu of R 3.5 is require to get a roof R-va	ed in this example	













Kāinga pai ke atu, tūturi

#### **Upfront emissions**

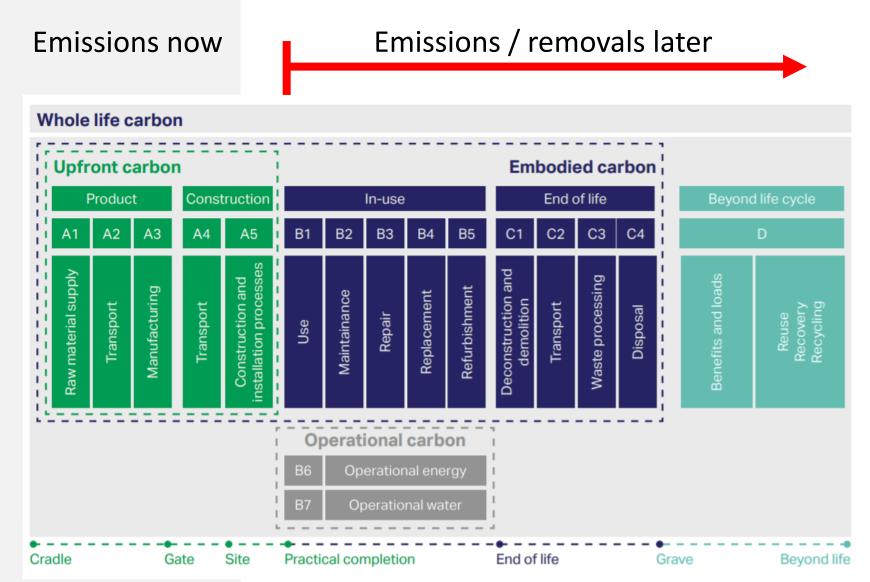
• Points awarded for reduction in upfront emissions (A1-A5)

	Percentage increase on emissions target	Materials and construction stage (A1-A5) emissions: kg.CO <sub>2</sub> -e/m <sup>2</sup>	Points
ka hon	<160%	156	1 point
v5 Technical M	<120%	132	2 points
	<80%	108	3 points
	<40%	84	4 points
Version 5.0 Issue Date:	NZ residential carbon budget required to limit global warming to 1.5°C.	60	5 points



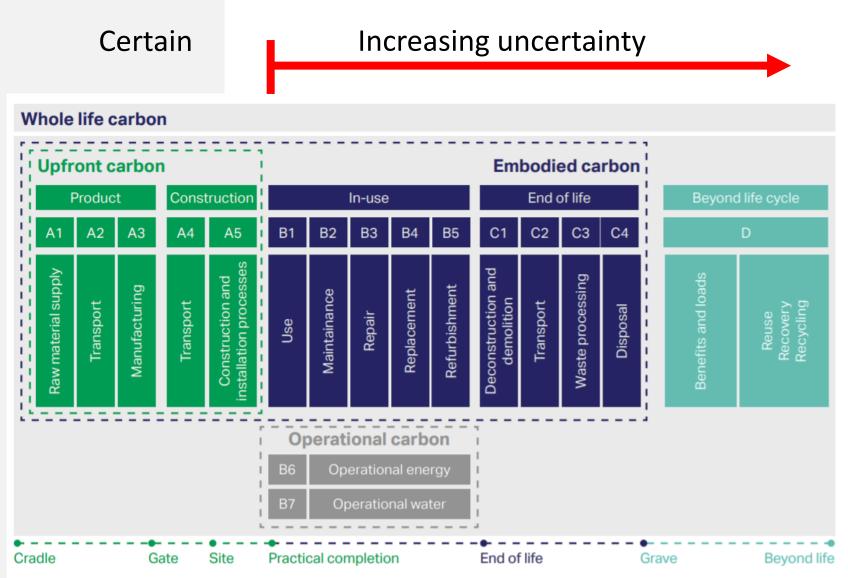
22

#### Why focus on upfront emissions?





#### Why focus on upfront emissions?

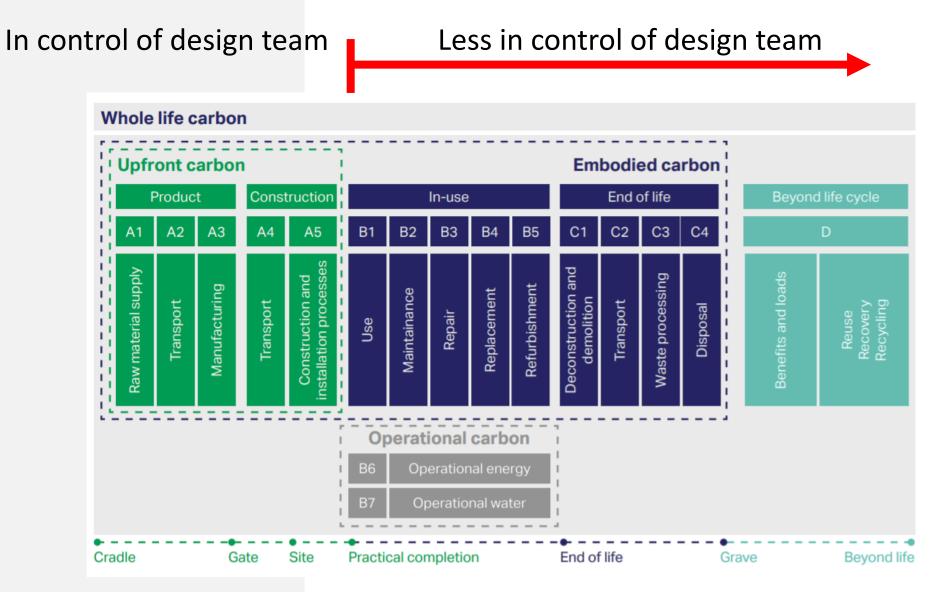


23 -

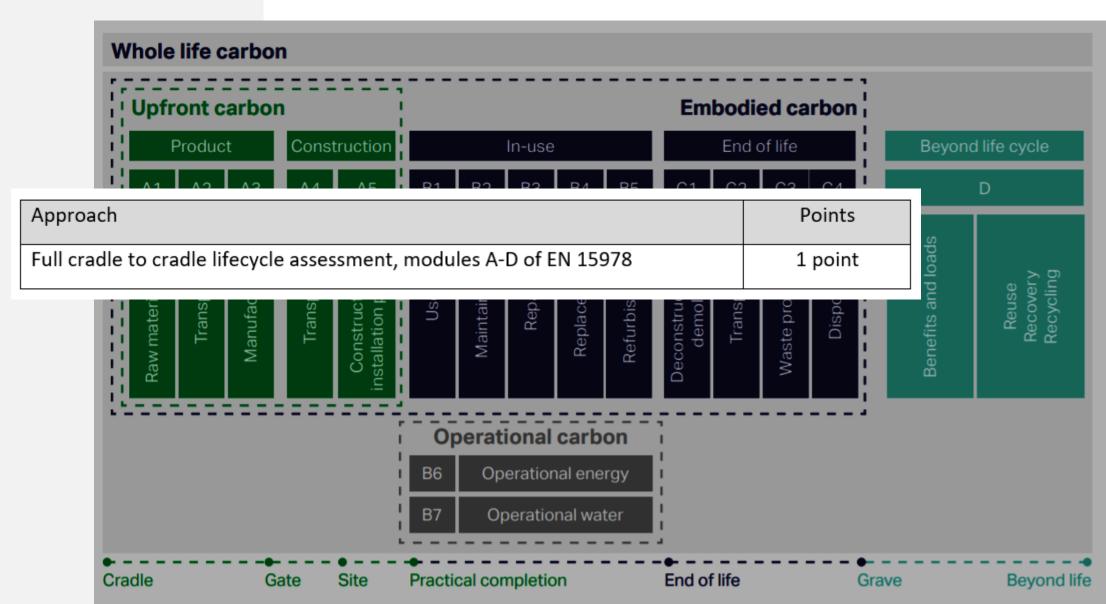


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#### Why focus on upfront emissions?

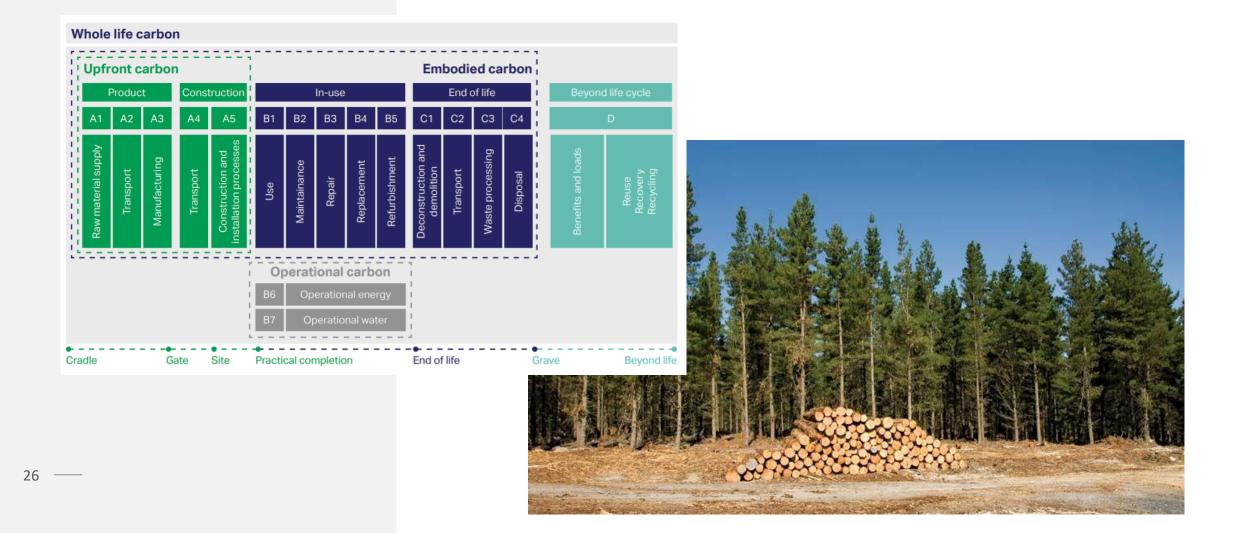








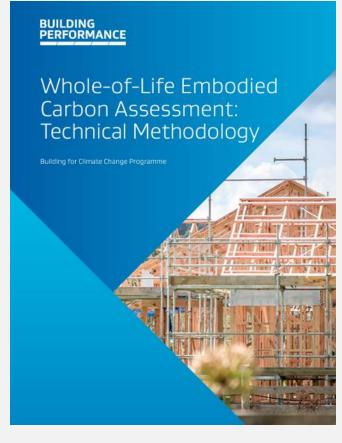
#### **Biogenic carbon**

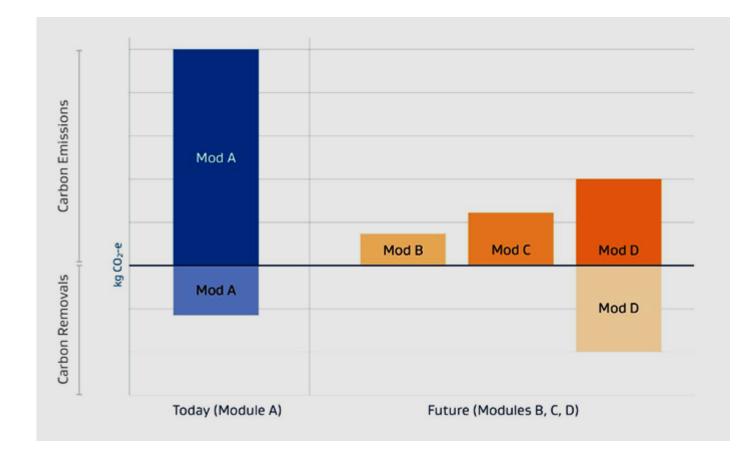




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#### **MBIE reporting framework**



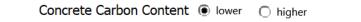




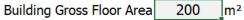
**The Calculator** 

#### **Summary Sheet**

#### **Options**



External Walls



Roofs

#### Results

Total Climate Change Impact (A1-A5) Climate Change Impact Intensity

<b>32,949</b> kg CO <sub>2</sub> eq	
<b>165</b> kg CO <sub>2</sub> eq/m <sup>2</sup>	

	Climate Change [kg CO2 eq]							
	A1-A5	В	С	D	Total			
Roofs	6,852	6,554	1,597	-2,808	12,196			
External Walls	2,506	3,628	2,165	-638	7,661			
Internal Walls	642	934	740	-95	2,222			
Windows	5,524	11,215	84	-4,002	12,821			
Ground Floors	13,087	0	1,601	-944	13,744			
Midfloors	0	0	0	0	0			
Floor Coverings	3,138	29,008	1,006	0	33,152			
PV	1,200	30	40	-100	1,170			
Total	32,949	51,370	7,233	- 8,587	82,965			

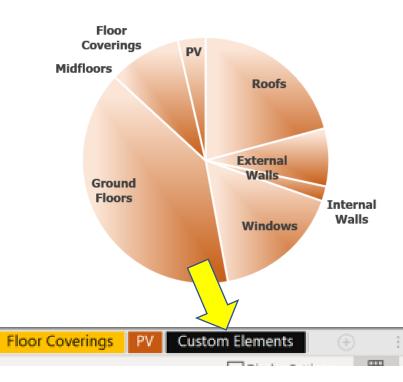
Windows

Internal Walls

Ground Floors

Midfloors





Summary



#### Updates...

+ Environmental Product Declaration

For ready-mixed concrete



In accordance with ISO 14025 and EN 15804+A1 for

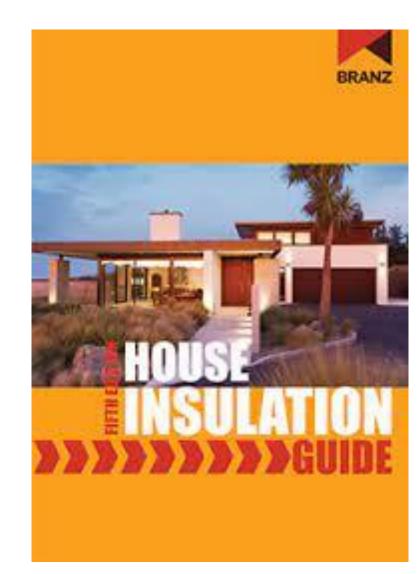
#### FIRTH CERTIFIED READY-MIXED CONCRETE

Programme EPD Australiana, www.epd-australiana.com Programme SPD Australiana Lod EPD registration number 5-P-02030 Publicem data 80,002,020 Valid unel. 80,002,020 Geographical scope GEPD New Zealand



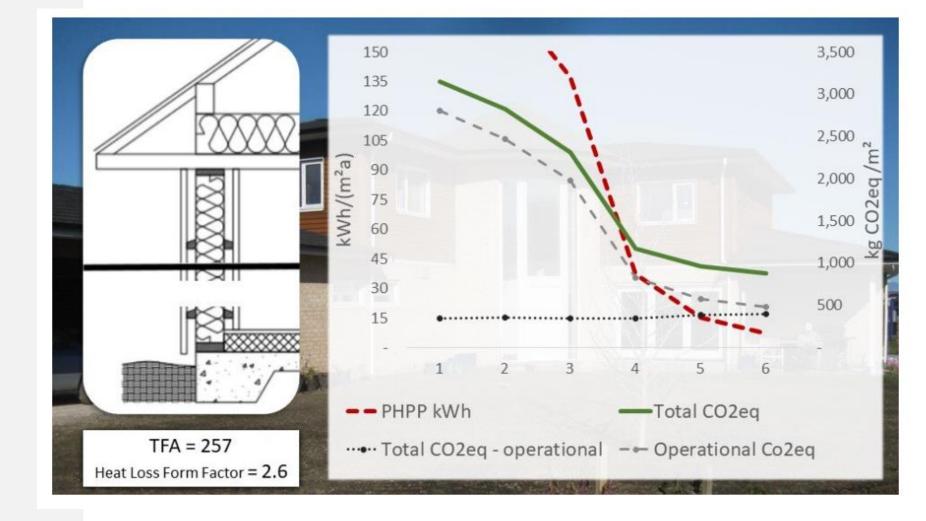
Firth

SEPTEMBER 2000





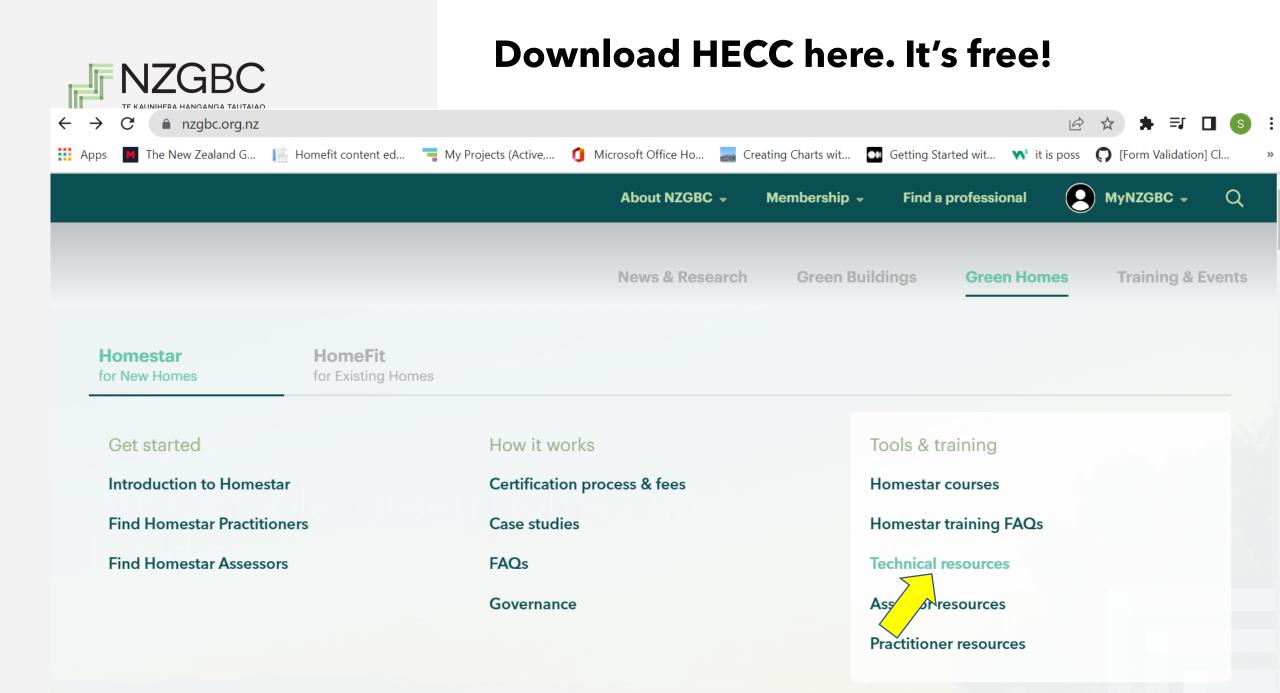
## What about the full life cycle?





## **Correlation between R-value and embodied emissions...**







#### All homes and buildings in Aotearoa

#### green and sustainable, making

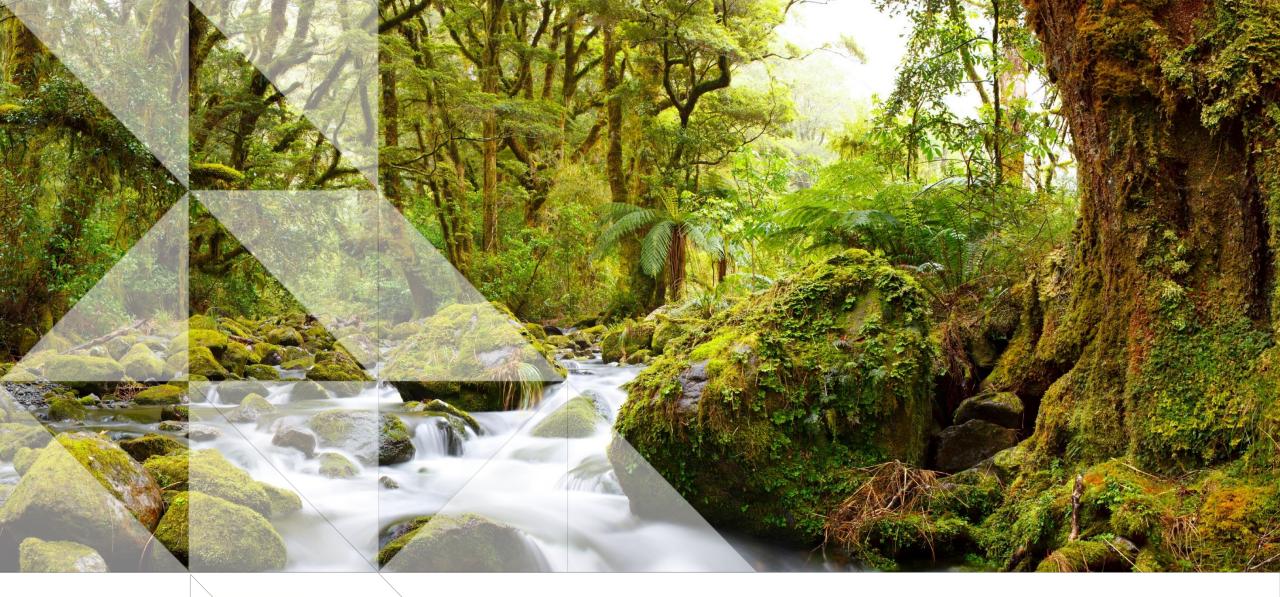
#### healthier, happier New Zealanders.















Design



