Updating the numbers behind the environmental claims of the Australian timber industry

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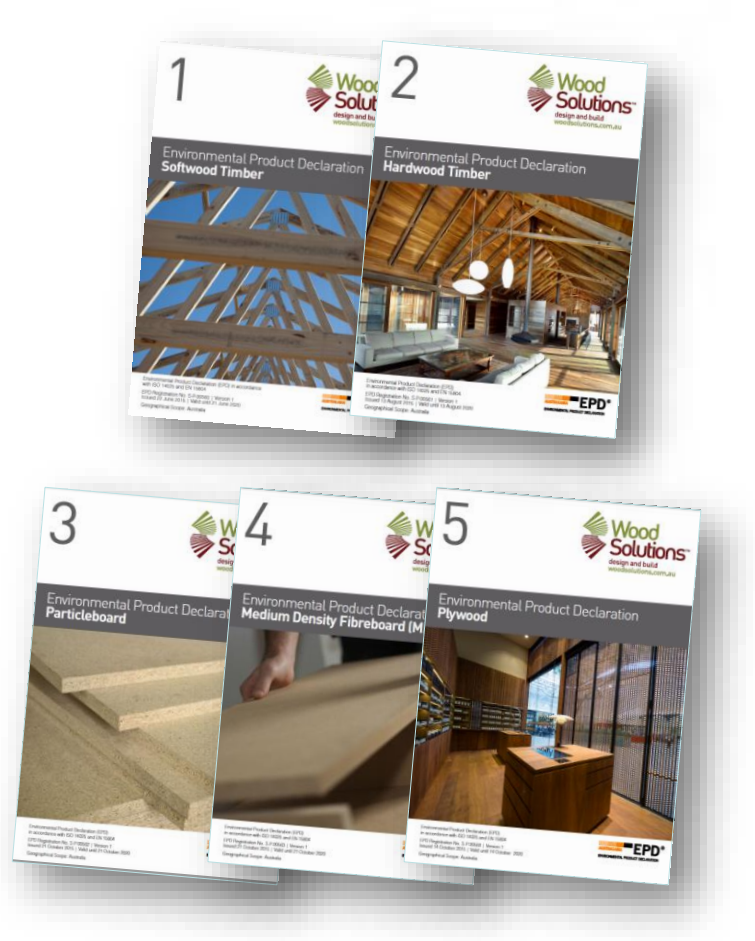
The problem

- Use of wood not getting sufficient credit in green building rating schemes
- Incorrect assumptions resulting in poor life cycle assessment results
- Industry making old, unverified or very vague environmental claims (or hesitant to make any claims)
- No source of credible numbers – adds risk for decision makers
- Policy makers confused by competing materials sector agendas

Environmental Product Declarations (EPDs) for Australian timber products

- 5 independently verified EPDs:
  - Sawn softwood
  - Sawn hardwood
  - Particleboard
  - Medium Density Fibreboard
  - Plywood
- Green Star compliant
- Freely available via www.epd-australasia.com & www.woodsolutions.com.au



Timeline

2006

- Life Cycle Inventory (LCI) for Australian Wood Products
- Author: CSIRO
- Study finalised 2009, but based on data from 2005/06

2015

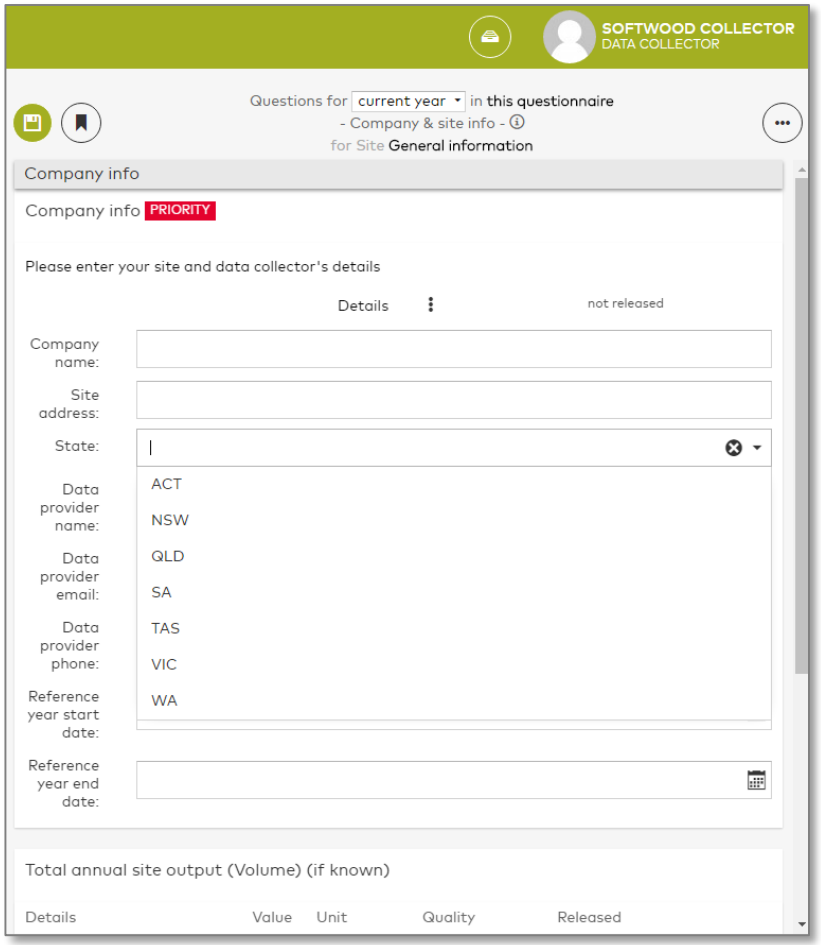
- Environmental Product Declarations (EPDs)
- Author: TDA (Stephen Mitchell) + thinkstep
- Valid 5 years, but data must be <10 years old

2017

- LCI/EPD Update
- New round of data collection based primarily on 2015/16
- Ensures EPDs see out there 5+ year validity

Progress update on data collection

- Data collection well underway
- Focus so far has been on processors
- 31 sites have log in details already
- Next step is forestry



WHAT'S IN AN EPD?

Industry and product description

Table 3: Structural grades of seasoned sawn softwood and availability. Source: WPV 2009

Typical species	Stress grade	Supply
Radiata Pine, Hoop Pine, Slash Pine, Maritime Pine, Caribbean Pine	F5	Readily available
	F7	Available from selected suppliers
	MGP10	Readily available
	MGP12	Available from selected suppliers
	MGP15	Available from selected suppliers

Table 4: Structural seasoned softwood - available sizes. Source: WPV 2009.

Breadth (mm)	Depth (mm)					
	42	70	90	120	140	190
35	X	Y	Y	Y	Y	Y
45		Y	Y	Y	Y	Y
90			X			

Key: X = Available from selected suppliers; Y = Readily available

Image courtesy of Timberlink Australia

Image courtesy of Timberlink Australia

Description of the Australian Sawn Softwood Industry

The Australian sawn softwood manufacturing industry is an important contributor to the Australian economy – particularly to the regional economies where many producers are based. The overall contribution of the wood products industries to the Australian GDP in 2010-11 was 0.59% (or $8.3 billion added value) (ABARES 2013). In 2012-13 Australian softwood industry produced 3.8 million cubic metres of sawn timber products (ABARES 2014) across 61 different facilities (Gavran *et al.* 2014).

The distribution of softwood mills by state is included in Table 1. Production is dominated by large sawmills, 20 of which have an input capacity greater than 100,000 m^3 of softwood sawlogs per year.

Table 1: Softwood sawmills by Australian state

NSW[a]	Vic.	Qld	SA	WA[b]	Tas.	Aust.
14	11	16	14	3	3	61

a Includes ACT
b Includes Northern Territory. Source: Gavran et al. 2014

Environmental data

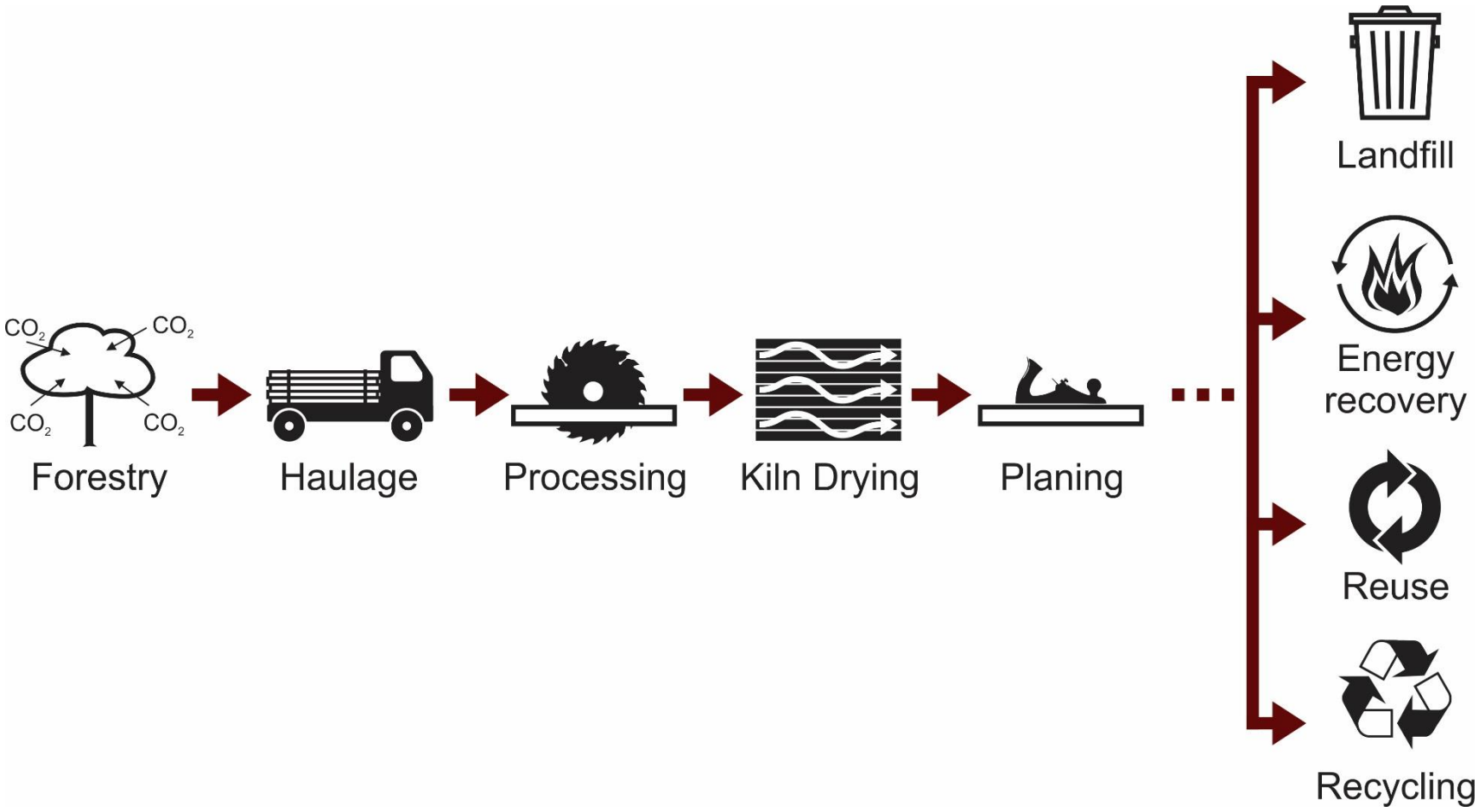
Table 5: Environmental impacts, 1 m^3 of sawn, kiln-dried softwood.

	Production	Landfill (typical)	Landfill (NGA)	Energy recovery	Recycling
Parameter [Unit]	**A1-A3**	**C4**	**C4**	**C3**	**C3**
GWPIB [kg CO_2-eq.]	-6.89E+02	6.12E+01	7.49E+02	9.06E+02	9.06E+02
GWPEB [kg CO_2-eq.]	2.12E+02	6.04E+01	5.45E+02	5.62E+00	5.62E+00
ODP [kg CFC11-eq.]	3.49E-09	5.26E-10	5.26E-10	1.78E-10	1.78E-10
AP [kg SO_2-eq.]	1.05E+00	1.83E-01	2.28E-01	8.91E-01	3.57E-02
EP [kg PO_4^{3-}-eq.]	3.05E-01	2.32E-02	3.45E-02	1.79E-01	8.45E-03
POCP [kg C_2H_4-eq.]	5.77E-01	1.68E-02	1.51E-01	9.54E-02	3.78E-03
ADPE [kg Sb-eq.]	3.65E-05	1.12E-05	1.13E-05	9.40E-08	9.40E-08
ADPF [MJ]	2.45E+03	8.42E+02	8.42E+02	7.24E+01	7.24E+01

Table 6: Environmental impacts, 1 m^3 of dressed, kiln-dried softwood.

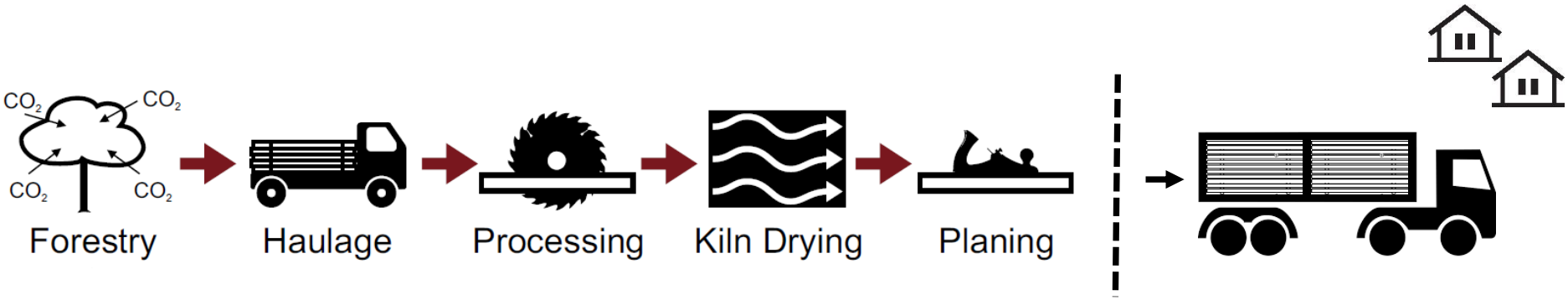
	Production	Landfill (typical)	Landfill (NGA)	Energy recovery	Recycling
Parameter [Unit]	**A1-A3**	**C4**	**C4**	**C3**	**C3**
GWPIB [kg CO_2-eq.]	-6.31E+02	6.12E+01	7.49E+02	9.06E+02	9.06E+02
GWPEB [kg CO_2-eq.]	2.69E+02	6.04E+01	5.45E+02	5.62E+00	5.62E+00
ODP [kg CFC11-eq.]	4.23E-09	5.26E-10	5.26E-10	1.78E-10	1.78E-10
AP [kg SO_2-eq.]	1.33E+00	1.83E-01	2.28E-01	8.91E-01	3.57E-02
EP [kg PO_4^{3-}-eq.]	3.65E-01	2.32E-02	3.45E-02	1.79E-01	8.45E-03
POCP [kg C_2H_4-eq.]	5.43E-01	1.68E-02	1.51E-01	9.54E-02	3.78E-03
ADPE [kg Sb-eq.]	4.31E-05	1.12E-05	1.13E-05	9.40E-08	9.40E-08
ADPF [MJ]	3.11E+03	8.42E+02	8.42E+02	7.24E+01	7.24E+01

Covers production and end-of-life



Carbon footprint

1m³ dressed, kiln-dried Australian softwood

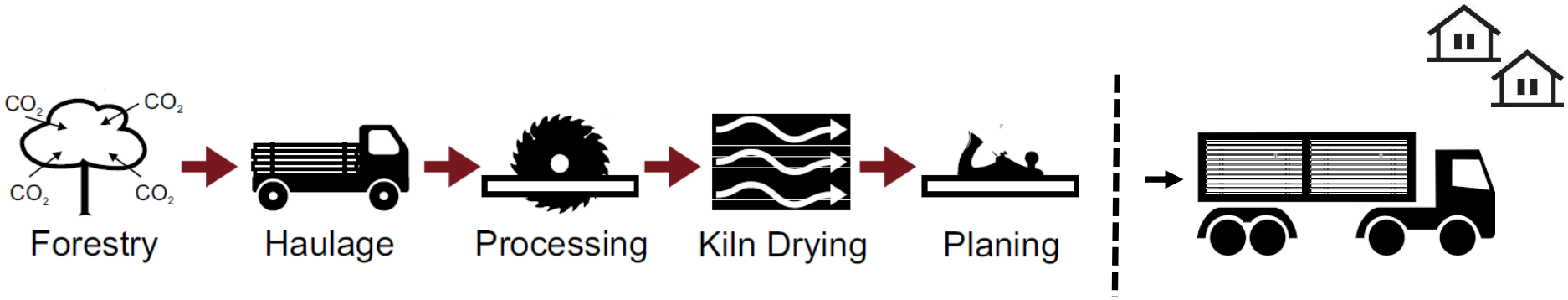


-631 kg CO_2e

Units: kg CO_2 equivalent

Carbon footprint

1m³ dressed, kiln-dried Australian hardwood



-670 kg CO_2e

Units: kg CO_2 equivalent

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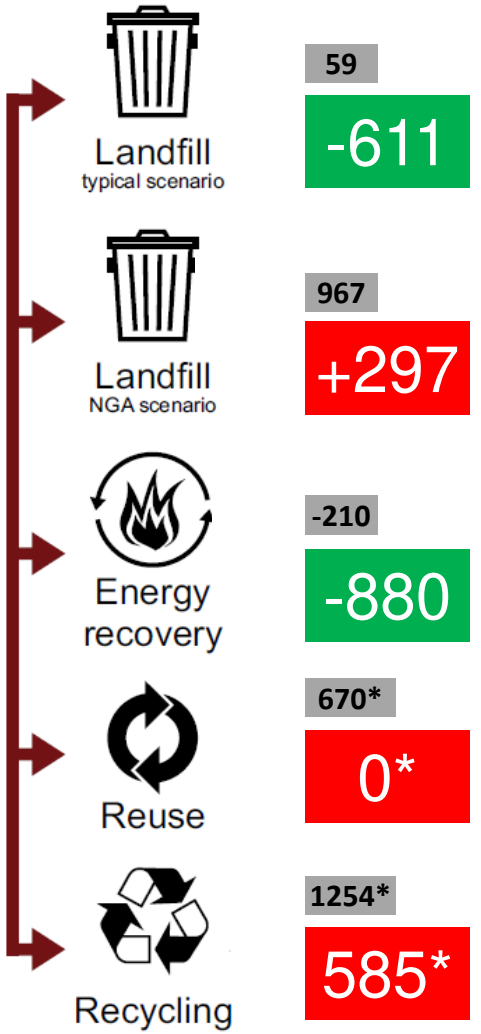
Carbon footprint

End-of-Life – 1m3 dressed KD hardwood



These EPDs set the record straight on carbon emissions of timber at end-of-life – particularly for landfill

* Carbon not released under recycling and reuse but passed on to next product

Units: kg CO_2 equivalent

Carbon footprint
Australian wood panels

	PB (melamine) 2400 x 1200 x 18mm	MDF (melamine) 2400 x 1200 x 18mm	Plywood formwork 2400 x 1200 x 17mm
Sequestration	**-42.9**	**-51.8**	**-42.9**
Forestry	5.5	1.1	4.0
Resin & wax	7.7	11.2	9.0
Manufacture, overlay	19.4	32.4	14.3
Subtotal (factory gate)	**-10.3**	**-7.2**	**-15.7**
End-of-life (typical landfill)	5.2	4.3	4.9
Total (cradle to grave)	**-5.1**	**-2.9**	**-10.8**

Units: kg CO_2 equivalent

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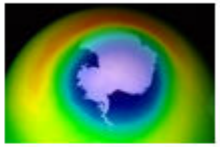
Environmental Indicators

Global Warming Potential (GWP) → Climate Change
A measure of greenhouse gas emissions, such as carbon dioxide and methane. These emissions increase absorption of radiation emitted by the earth, intensifying the natural greenhouse effect. Contributions to GWP can come from either fossil or biogenic sources, e.g. burning fossil fuels or burning wood. GWP is reported both including biogenic carbon (GWPIB) and excluding biogenic carbon (GWPEB).

Ozone Depletion Potential (ODP) → Ozone Hole
A measure of air emissions that contribute to the depletion of the stratospheric ozone layer, causing higher levels of ultraviolet B (UVB) to reach the earth's surface with detrimental effects on humans, animals and plants.



Acidification Potential (AP) → Acid Rain
A measure of emissions that cause acidifying effects to the environment. Acidification potential is a measure of a molecule's capacity to increase the hydrogen ion (H^+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline and the deterioration of building materials.

Eutrophication Potential (EP) → Algal Blooms
A measure of nutrient enrichment that may cause an undesirable shift in species composition and elevated biomass production in both aquatic and terrestrial ecosystems. It includes potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N) and phosphorus (P).

Photochemical Ozone Creation Potential (POCP) → Algal Blooms
A measure of emissions of precursors that contribute to ground level smog formation (mainly ozone O_3), produced by the reaction of VOCs and carbon monoxide in the presence of nitrogen oxides under the influence of UV light. Ground level ozone may be harmful to human and ecosystem health and may also damage crops.

Abiotic Depletion Potential → Resource Consumption
The consumption of non-renewable resources leads to a decrease in the future availability of the functions supplied by these resources. Depletion of mineral resource elements (ADPE) and non-renewable fossil energy resources (ADPF) are reported separately.

THE BUSINESS CASE

Business case

- Add credible numbers to industry campaigns
- Add credible numbers for specifiers' decisions
- Challenging people on numbers rather than qualitative comparisons.

Business case

- Help timber producers gain market share in commercial markets
- Recognised by Green Star along with eco-labels
- Independently verified - backs up environmental claims in marketing
- Private and Govt. procurement.

Business case: Other materials

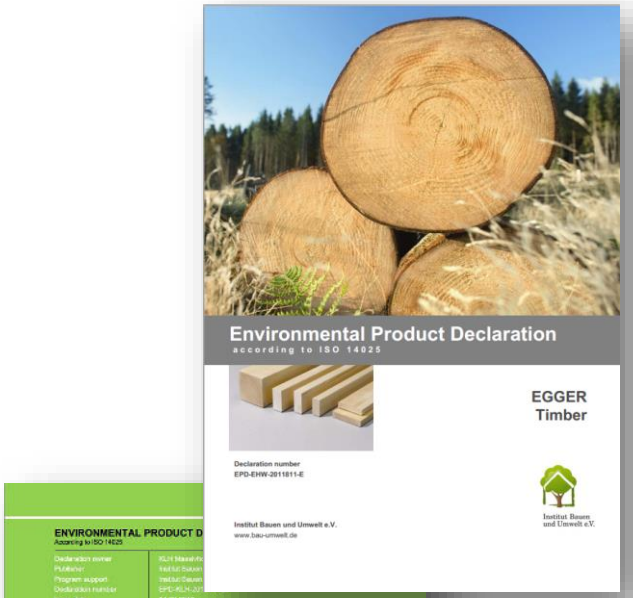
"In a crowded market, we need to be able to clearly articulate why we are the best choice for customers."
Jane Mansfield, Sustainability Manager, Asaleo Care

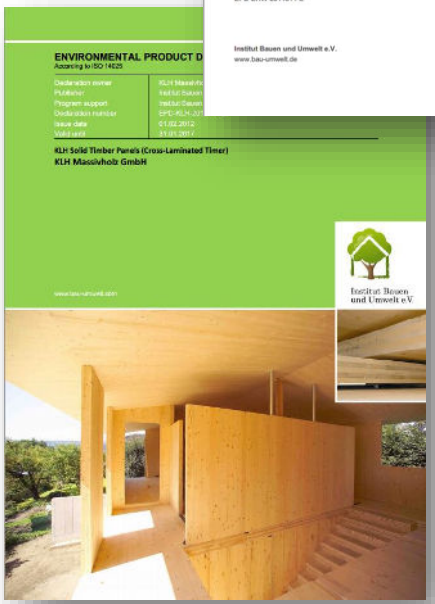
"Kingspan prides itself on its environmentally responsible approach to business."
Dr Mark Tatam, Technical Manager, Kingspan Insulated Panels

"The perception of plastic pipes need to be clarified and we wanted a system that would allow us to be open and transparent"
Mark Heathcote, General Manager, PIPA (Plastics Industry Pipe Association of Australia)

Business case: Other wood

- European timber manufacturers
- North American Wood Councils





EPDS IN MARKETING AND GREEN STAR

Green Star and Timber

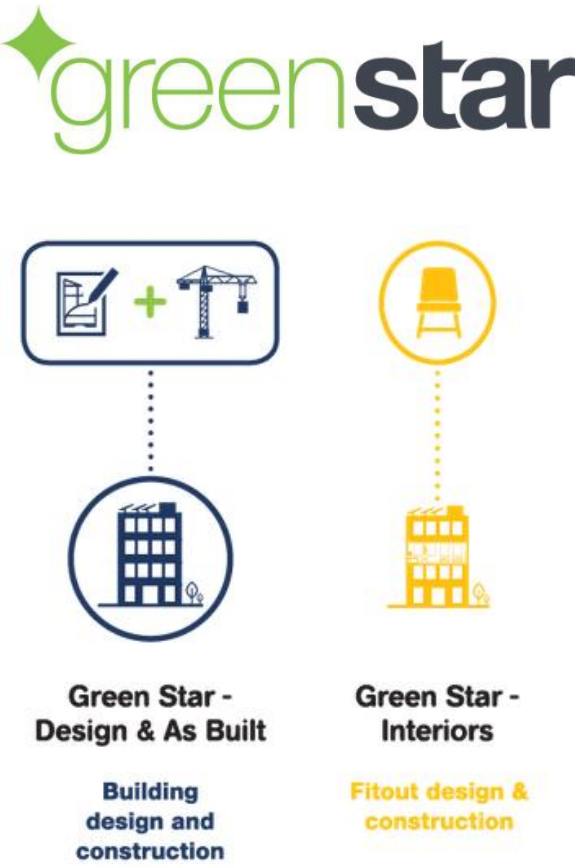
	maximum points available		
Green Star Rating Tool	**INDOOR ENVIRONMENT QUALITY (Formaldehyde)*	**MATERIALS (FSC or PEFC/AFS)*	*#MATERIALS (includes EPDs)*
Interiors	2 (Super E0)	1	19
Design & As Built	1 (Super E0, E0 or E1)	1	3

*These credits only apply to wood products

This credit applies to all materials – including wood products

Green Star

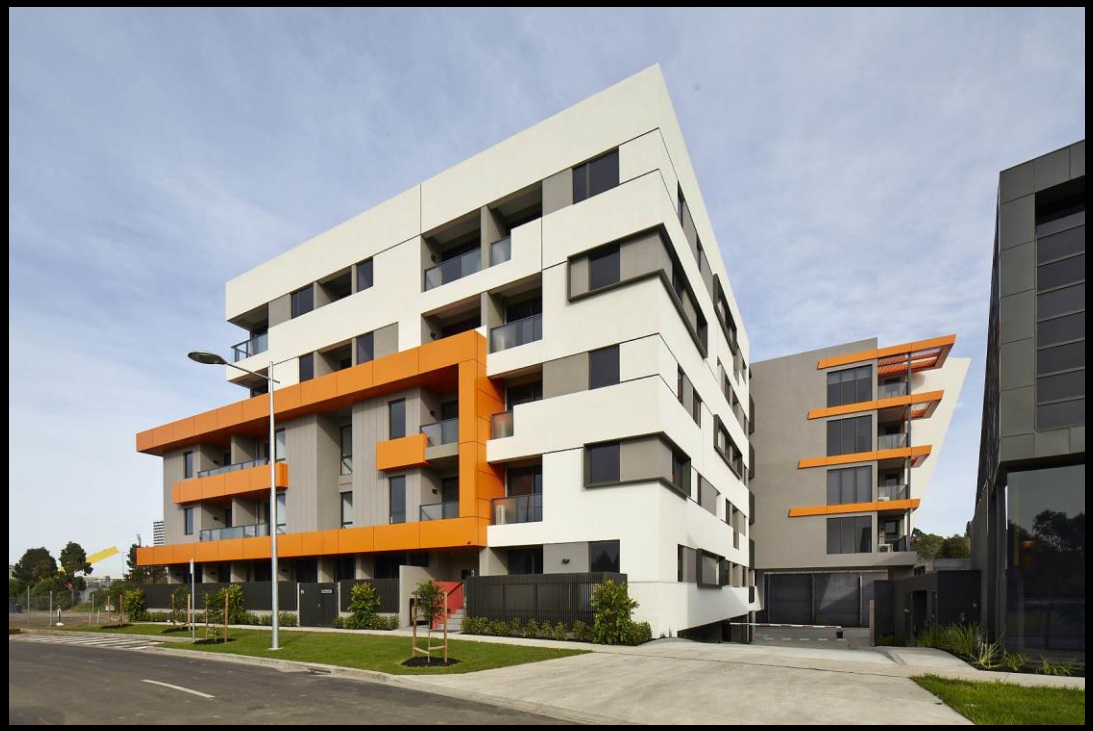
- Recognition of EPDs and Life Cycle Assessments (LCAs)
- LCA consistently showing timber-rich buildings have lower impacts (esp. lower carbon footprint)
- EPDs make LCA easier, quicker and cheaper!



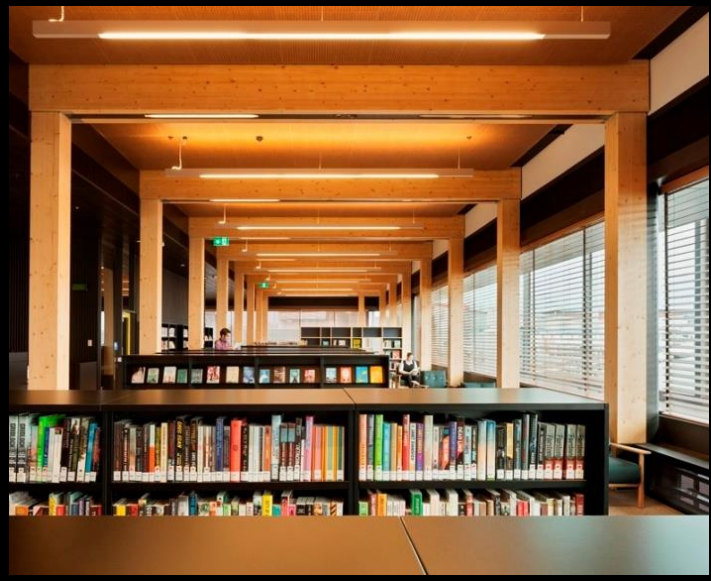
Forte

Forte by Lend Lease
Victoria Harbor, VIC
Timbers: Cross-laminated Austrian spruce
LCA used EPD for CLT
Green Star achieved: 5 star

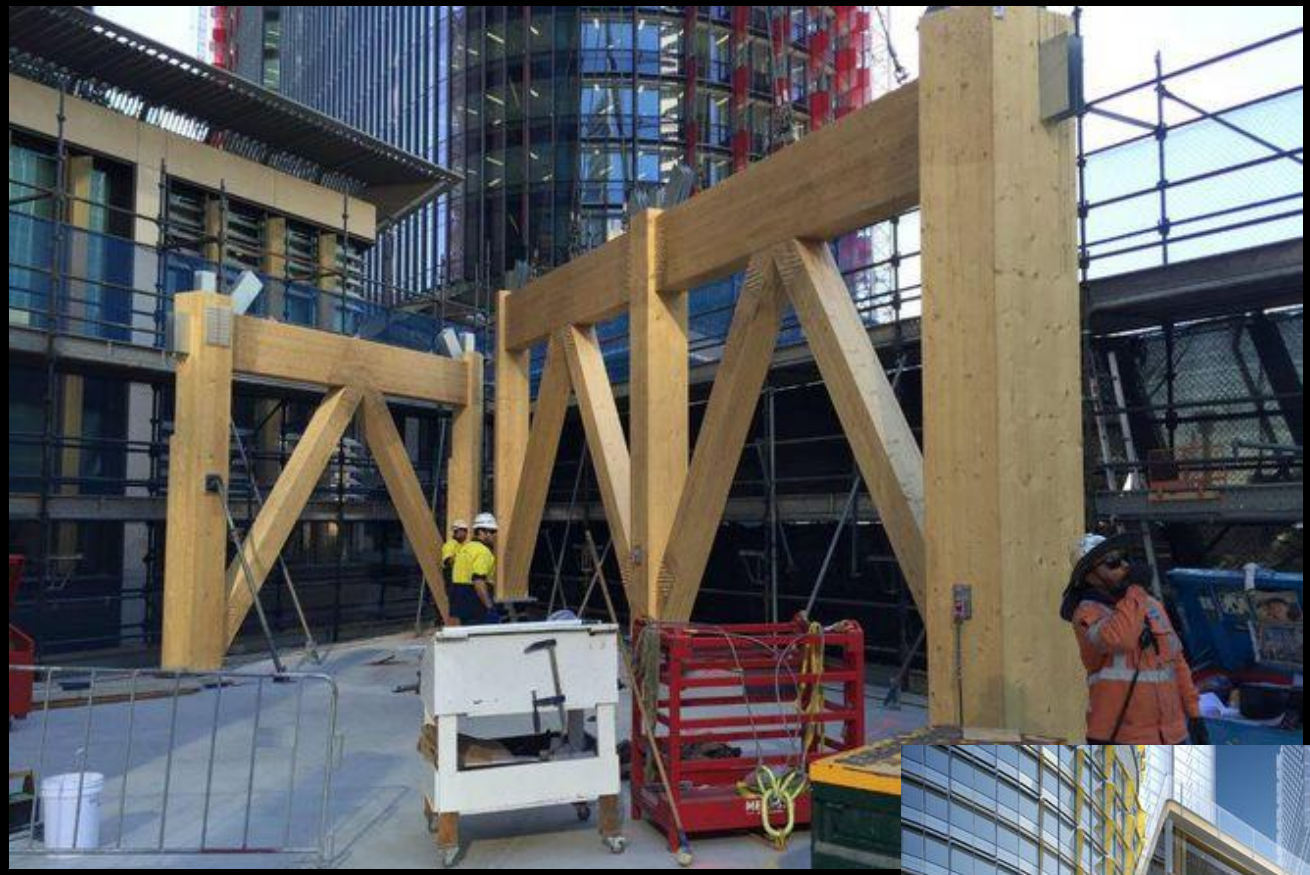
1,400 tonnes lower carbon footprint compared to standard reference building (20% reduction)



The Green by Australand
Parkville, VIC
Timbers: Sawn radiata pine and LVL frame
LCA: http://www.fwpa.com.au/rd-and-e/market-access/756-life-cycle-assessment-of-a-5-storey-residential-building-in-parkville.html



Library at the Dock by Places Victoria, City of Melbourne, Lend Lease
Victoria Harbour, VIC
Design Architect: Clare Design
Images by Dianna Snape, Emma Cross
Timbers: CLT & Glulam spruce structure (Austria), Australian hardwood
Green Star achieved: 6 Stars



International House, Sydney by Lendlease / Tzannes
Timbers: CLT (Austrian spruce), Glulam (Germany) structure, Australian ironbark ground floor exposed columns
Green Star target - 6 Stars

How the EPDs can be used

- Help your customer make an informed choice
- Data used in LCA building software and BIM (future)
- Any FWPA producer member can use EPD to help clients get Green Star points
- Note: Information is “industry average”

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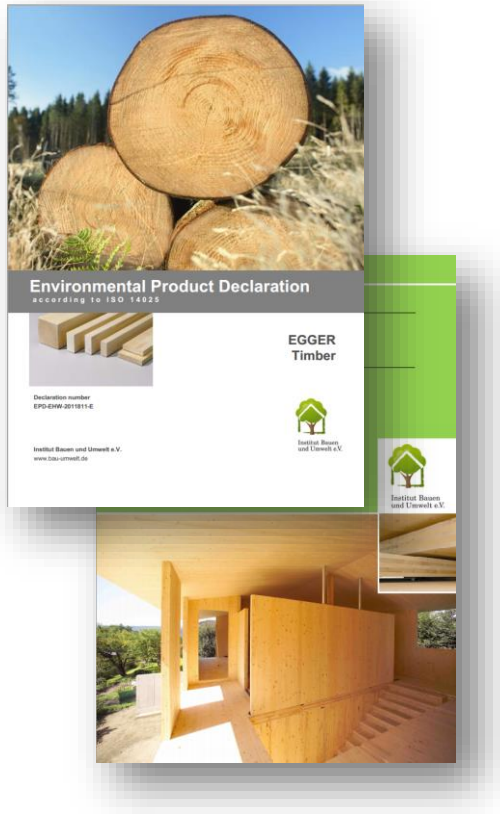
Company-specific EPDs

- Outside of the scope of this project, but can be created from the same data for an additional fee
- Benefits:
  - Allows your customers to get more points under Green Star
  - Allows you to present your own branding and marketing
  - Quicker and cheaper than creating one from scratch yourself



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Daniel Wright

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