Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019 for:

INNOWOOD Composite Timber Products

from

Innowood Australia Pty Ltd

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD Australasia Ltd, www.epd-australasia.com
EPD registration number:	S-P-00853
Publication date:	2017-05-29
Version date:	2023-03-27
Validity period:	2023-03-27 to 2028-03-27

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

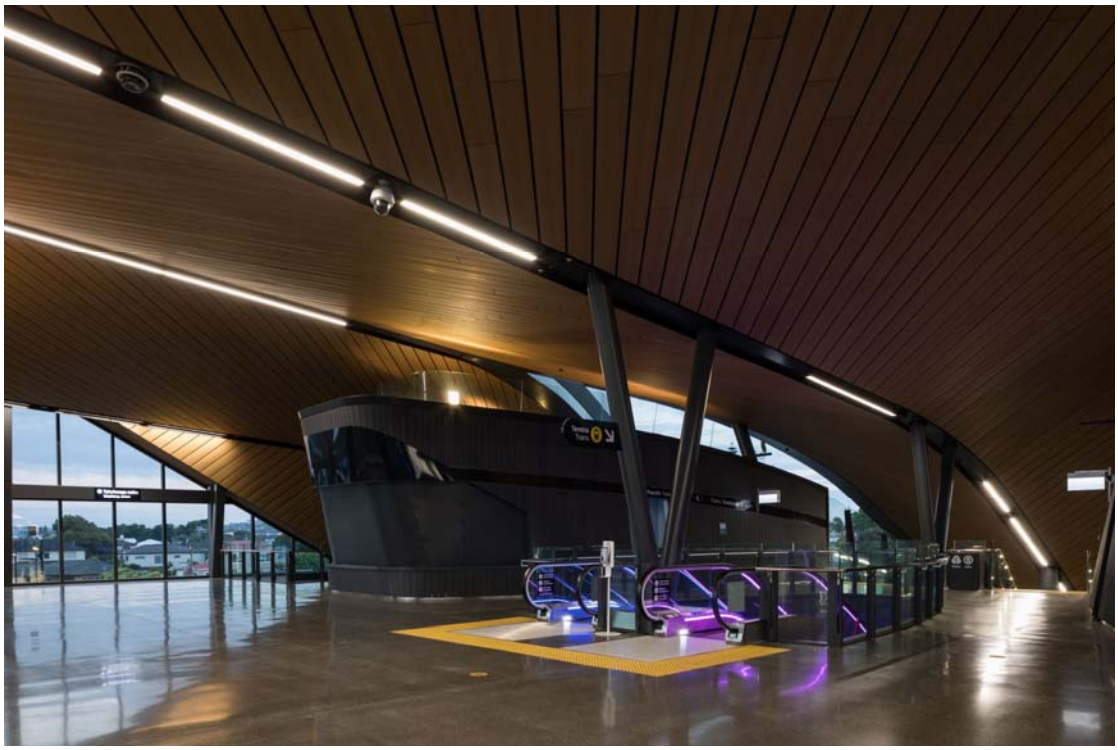

Image 1 - Puhinui Interchange, Auckland, NZ – 2020 (CL30025)

General information

Programme information

Programme:	EPD Australasia
Address:	EPD Australasia Limited 315a Hardy Street Nelson 7010 New Zealand
Website:	www.epd-australasia.com
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR) 2019:14 Construction products, Version 1.11, 2021-02-05 UN CPC Code: 54
PCR review was conducted by: *The Technical Committee of the International EPD® System.* A full list of members available on *www.environdec.com for a list of members. The review panel may be contacted via info@environdec.com. Review chair: Claudia A. Peña, University of Concepción, Chile.*
Life Cycle Assessment (LCA)
Thuy Nguyen, Elizabeth Cuan & Iris Caballero Edge Environment Pty Limited Level 5. 39 East Esplanade, Manly NSW 2095 Australia W: www.edgeimpact.global E: info@edgeimpact.global
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Epsten Group, Inc.* *101 Marietta St. NW, Suite 2600, Atlanta, Georgia 30303, USA* *www.epstengroup.com* Approved by: EPD Australasia
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Innowood Australia Pty Ltd

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Description of the organisation:

Established in 2005, INNOWOOD is an Australian company specialised in the design, manufacture and supply of composite timber products. We pride ourselves on continuous improvement and innovation resulting in the delivery of high quality products and services for commercial, residential and industrial applications. INNOWOOD products represent an alternative to natural timber. Manufactured predominantly from natural wood waste, our products help to prevent forest depletion through efficient use of recycled material and energy management. INNOWOOD is the chosen composite timber supplier of leading national and international architects, designers and builders. Our versatility and product performance are instrumental to the continued success of various projects completed within Australia and overseas.

Product-related or management system-related certifications: [e.g. ISO 14024 Type I environmental labels, ISO 9001- and 14001-certificates, EMAS-registrations, SA 8000, supply chain management and social responsibility]

Name and location of production site(s): China

Product information

Product name: INNOWOOD Composite Timber Products

Product identification:

INNOWOOD composite timber products was created as an alternative to natural timber in the face of the rapidly depleting global forests and timber resources. We want to help shape the world we live in by doing our part, and to continue to push the boundaries of our commitment to the environment.

INNOWOOD composite timber products use wood waste as the main resource and through an energy conserving production process with low emission to air, soil and water. After the service life of the material the product can be recycled through use of INNOWOOD proprietary recycling program to continue to remanufacture and reuse.

INNOWOOD PRODUCT SYSTEMS ARE COST EFFECTIVE & DURABLE

Since 2005, our expert technical team has designed and developed a range of product systems based on INNOWOOD material properties, INNOWOOD composite timber product system are flexible to design, lightweight solution, easy to install and suitable for use in indoor & outdoor environment.

INNOWOOD composite timber material is resistant to termites, water & fire, durable and requires low maintenance.

Product description:

CLADDING

INNOWOOD Cladding is low VOC formaldehyde emission, 100% recyclable composite wood cladding product that is suitable for residential and commercial applications.

CEILING

InnoCeil offers Architect & Designers the flexibility to create architectural features, curves, waves and shadows effects while incorporating basic building services such as lighting, ventilation, sprinklers and air vents.

SCREENING

INNOWOOD Screen System offers an exciting alternative to conventional facade design. They provide a softened timber look to internal and external wall surfaces and soffits, which not only greatly enhances their appearance, but also protects the building and its occupants from the harsh sun.

SHADING

Architecturally designed and developed to create shade, privacy, control amount of light, and it can fully retract for reducing light glare and reducing solar heat gain by up to 90%.

DECKING INNOWOOD

Decking looks and feels like natural timber without any of natural timber's challenges. InnoDeck's nature-inspired embossed surface delivers the highest wet pendulum slip rating possible to create a safe, slip-resistant surface.

This EPD covers INNOWOOD's product range for internal and external cladding, Internal and soffit ceiling, external decking, external screen and external louvers, specifically for the products depicted in
.

Table 1.

Table 1 - Product dimensions of products included in this EPD

Product code	Name and description	Weight per meter length (kg/m)	Weight per m^2 (kg/ m^2)
WC13625	InnoClad, External Cladding	1.31	12.48
WC20025	InnoClad, External Cladding	1.824	11.05
WC24025	InnoClad, External Cladding	2.225	10.85
WC28525	InnoClad, External Cladding	3.14	12.31
WC17533	InnoClad, External Cladding	1.79	11.93
WC20435	InnoClad, External Cladding	2.296	12.76
CL07030	InnoCeil, Internal Ceiling	0.495	8.55
CL05020	InnoCeil, Internal Ceiling	0.371	6.48
CL14010	InnoCeil, Internal Ceiling	0.665	5.54
CL17012	InnoCeil, Internal Ceiling	1.63	9.59
CL16728	InnoCeil, Internal Ceiling	1.376	9.30
CL21923	InnoCeil, Internal Ceiling	1.589	8.15
CL26430	InnoCeil, Internal Ceiling	2.209	9.20
CL27765	InnoCeil, Internal Ceiling	2.438	9.75
CL30025	InnoCeil, Internal Ceiling	2.998	8.57
PS06040	InnoScreen, External Screening	0.9	6.00
PS05050	InnoScreen, External Screening	0.93	6.20
PS10050	InnoScreen, External Screening	1.5	10.00
PS15050	InnoScreen, External Screening	1.864	12.43
SS05050	InnoScreen, External Screening	1.562	10.41
RS10050	InnoScreen, External Screening	2.069	13.79

Product code	Name and description	Weight per meter length (kg/m)	Weight per m^2 (kg/ m^2)
RS15050	InnoScreen, External Screening	2.766	18.44
FS06535	InnoScreen, External Screening	1.722	11.48
FS04535	InnoScreen, External Screening	1.367	9.11
LB15035	InnoShade, External Louver	2.214	11.07
LB30060	InnoShade, External Louver	6.189	29.47
DB14025	Innowood Fiba-Dek, Decking	3.421	23.79

Notes:
Weight per m^2 is calculated at:
- 30mm gaps between adjacent profiles for CL07030,
- 20mm gaps between adjacenr profiles for CL05020,
- 100mm gaps between adjacent profiles for PS06040, PS05050, PS10050, PS15050, SS05050, RS10050, RS15050, FS06535, FS04535
- 150mm gaps between adjacent profiles for LB15035, LB30060

Table 2 - Product characteristics of INNOWOOD products

Product Characteristics	
Product names	InnoClad – Internal & External Cladding - Shiplap, Concealed Clip Fixing and Flat Joint systems InnoCeil - Internal & Soffit Ceiling - Concealed Clip, Shiplap, Slatted and Suspended Click On systems InnoScreen - External Screening - Conceal Snap In, Conceal Lock On, Face and Rear fixing systems InnoShade - External Louvers - Sol 'ART shading systems InnoDeck - External Decking - Concealed Smart Clip fixing system
Modulus of Rupture	30.78 - 32.2 MPa (N/mm^2) (AS/NZS 4266.5:2004)
Modulus of Elasticity	1.527 - 2.102 GPa ($103N/mm^2$) (AS/NZS 4266.5:2004)
Moisture Absorption	0.54 % Mass Change (AS/NZS 4266.5:2004)
Moisture Movement	δ =4.4 x 10-6 mm/mm/% R.H. Extrapolated Average (AS/NZS 4266.14:2004)
Surface Water Absorption	1.0435 g/m2/hr Extrapolated Average (AS/NZS 4266.12:2003)
Internal Bond Strength	1.36 MPa =N/mm^2 (AS/NZS 4266.5:2004)
Thermal Coefficient of Linear Expansion (α)	A = ~6.0 x 10-5 mm/mm/0C Estimated Average (REF AS 4459.8)
Impact Resistance	Mean failure height: 1330mm, Mean failure energy: 59J (ASTM D4495-12)
Static Coefficients of friction	0.57 (ASTM D2394-05 (2011) Section 33~37)
Sliding Coefficients of friction	0.36 (ASTM D2394-05 (2011) Section 33~37)
Abrasion Resistance	Weight loss: 108mg (ASTM D4060-10)
Fire Hazard Property	Group 1 (By Request) (AS/NZS 3837 Specification A2.4 of BCA)
Bushfire Attack Level (BAL rating)	Up to BAL-29 (By Request) (AS3959:2009 Construction of Buildings in Bushfire Prone Areas. Appendix F)

Early Fire Hazard Indices	Ignitability Index 11/20, Spread of Flame Index 0/10, Heat Evolved Index 0/10, Smoke Developed Index 6/10 (AS/NZS 1530.3 CSIRO Report FNE11482)

UN CPC code: 54

Geographical scope: Australia, New Zealand, Hong Kong, Western USA and Mediterranean Europe

LCA information

Declared unit: 1 kg of INNOWOOD composite timber products

Reference service life: 15 years

Time representativeness: The LCA study was conducted on the financial year 2020-2021 production data

Database(s) and LCA software used:

The inventory data for the process are entered into the SimaPro (v9.4.0.1) LCA software program and linked to the pre-existing data for the upstream feedstocks and services selected in order of preference from:

- The Australian Life Cycle Inventory (AusLCI) v1.36 compiled by the Australian Life Cycle Assessment Society (ALCAS, 2021) and the Australasian Unit Process LCI v2014.09. The AusLCI database at the time of this report was less than a year old, while the Australasian Unit Process LCI was 6 years old.
- Ecoinvent v3.8, (Wernet, et al., The ecoinvent database version 3.8, 2021) for processes occurring outside of Australia. At the time of reporting, the Ecoinvent v3.8 database was 1 year old.
- Other sources with sensitivity analysis reported to show the significance of this data for the results and conclusions drawn.

Description of system boundaries: Cradle to gate with module A4, modules C1-C4 and module D.

System diagram:

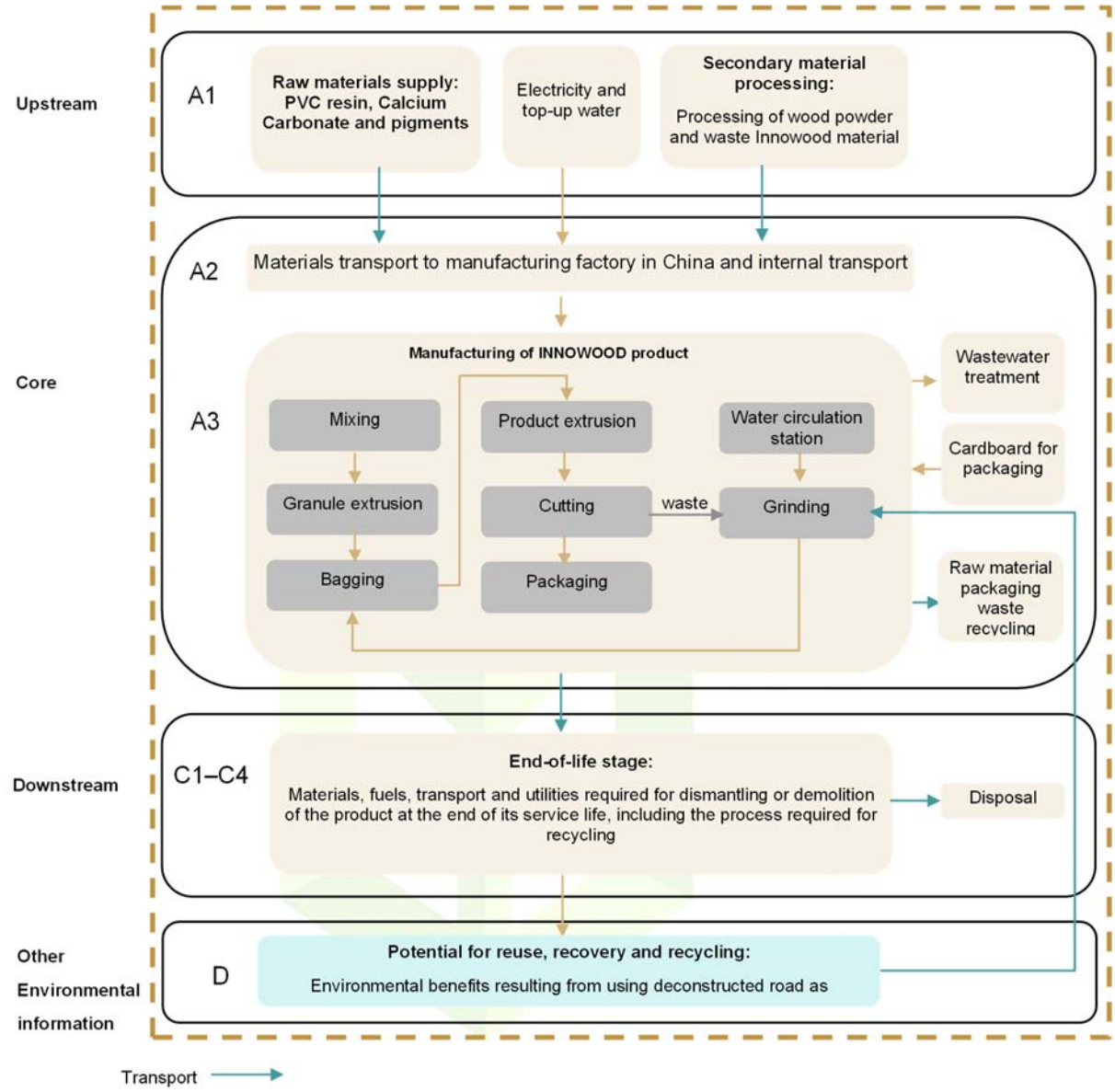

Figure 1 - INNOWOOD product LCA system boundary

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

The life cycle of a building product is divided into three process modules according to the General Program Instructions (GPI) of the Australasian EPD Programme (AEPDP, 2015) and four information modules according to ISO 21930 and EN 15804. The scope of the EPD is "cradle to gate with options" as defined by EN 15804 – the specific system boundary is shown in Figure 2. The intent of the EPD is to cover all significant environmental impact over the full product lifecycle. Stages A5 to B6 were not included due to uncertainty and variability in installation and maintenance. Installation and use practices will vary significantly with the type of system, if the elements are installed externally or internally and their exposure to natural stressors (radiation, saltwater, rainfall). Please see further sections for additional information on life cycle stage.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	Aust NZ HK USA EU	Aust NZ HK USA EU	Aust NZ HK USA EU	Aust NZ HK USA EU	Aust NZ HK USA EU								Aust NZ HK USA EU	Aust NZ HK USA EU	Aust NZ HK USA EU	Aust NZ HK USA EU	Aust NZ HK USA EU
Specific data used						-	-	-	-	-	-	-	-	-	-	-	-
Variation – products						-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites						-	-	-	-	-	-	-	-	-	-	-	-

X = module included in EPD

MND = module not declared

Figure 2 Life cycle diagram of INNOWOOD products

Content information

This section includes the main details of the LCA study as well as assumptions and methods of the assessment.

Although the functional unit and sale unit is square meter (m^2) or linear meters, there is no direct proportion between product area and life cycle inputs because INNOWOOD commercializes products with a variety of shapes and profiles. As all products have the same composition, ensuring the same volumetric density of raw material, and undergoing the same manufacturing process, a declared unit of 1 kg ensures that proportionality. Potential impacts can be assessed per product or per m^2 for each product using the dimensions given in Table 1.

LCA requires a compilation of the inputs, outputs and environmental impacts of a product system throughout its life cycle. LCA can enable businesses to identify resource flows, waste generation and contribution to environmental impacts (such as climate change) associated with the provision of products and services.

Life cycle thinking is a core concept in sustainable consumption and production for policy and business. Upstream and downstream consequences of decisions must be taken into account to help avoid the shifting of burdens from one type of environmental impact to another, from one political region to another, or from one stage to another in a product's life cycle from the cradle to the grave.

Core Data Collection

Life cycle data has been sourced from first-hand sources from:

- Core manufacturing data was collected directly from factory, pertaining to activity ithe n financial year 2020 – 2021;
- Product properties, applications and recyclability information retrieved from INNOWOOD's catalogue and material safety datasheets.

Background Data

Generic background data was sourced for raw materials in the upstream module, transportation and end of life. Background data was adapted to represent INNOWOOD product as accurately as possible. Inputs to manufacture and to transport within China were primarily modelled with ecoinvent 3.8 database based on global averages. Data on manufactured materials (raw materials, additives, packaging, consumables), which are locally sourced, were amended with Chinese electricity. Global averages were used since the sourcing of these materials often changes from year to year. Australian inputs for distribution transport and waste disposal were primarily modelled with the AusLCI database (AusLCI, 2021) all background data used was less than 1 year old.

Cut Off Criteria

It is common practice in LCA/LCI protocols to propose exclusion limits for inputs and outputs that fall below a threshold % of the total, but with the exception that where the input/output has a "significant" impact it should be included. According to the PCR 2019:14 v1.11, Life cycle inventory data shall according to EN 15804+A2 include a minimum of 95% of total inflows (mass and energy) per module. Inflows not included in the LCA shall be documented in the EPD. Data gaps in included stages in the downstream modules shall be reported in the EPD, including an evaluation of their significance. In accordance with the PCR 2019:14 v1.11, the following system boundaries are applied to manufacturing equipment and employees:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI. Capital equipment and buildings typically account for less than a few percent of nearly all LCIs and this is usually smaller than the error in the inventory data itself. For this project, it is assumed that capital equipment makes a negligible contribution to the impacts as per Frischknecht et al. (Frischknecht, 2007) with no further investigation.
- The granule bags and pallets are reused within the production line to convey new material from the granule extruders to the finished product extruders. These elements were excluded from analysis because they are used repeatedly, reason for which they

have a negligible impact. Assuming 20 reuses1, bags and pallets combined have an impact of less than 0.3%.

- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. For this project, the impacts of employees are excluded.

Allocation

According to EN 15804+A2, in a process step where more than one type of product is generated, it is necessary to allocate the environmental stressors (inputs and outputs) from the process to the different products (functional outputs) in order to get product-based inventory data instead of process-based data. An allocation problem also occurs for multi-input processes.

In an allocation procedure, the sum of the allocated inputs and outputs to the products shall be equal to the unallocated inputs and outputs of the unit process.

The following stepwise allocation principles shall be applied for multi-input/output allocations:

- The initial allocation step includes dividing up the system sub-processes and collecting the input and output data related to these sub-processes.
- The first (preferable) allocation procedure step for each sub-process is to partition the inputs and outputs of the system into their different products in a way that reflects the underlying physical relationships between them.
- The second (worst case) allocation procedure step is needed when physical relationship alone cannot be established or used as the basis for allocation. In this case, the remaining environmental inputs and outputs from a sub-process must be allocated between the products in a way that reflects other relationships between them, such as the economic value of the products.

Cradle to Gate (Modules A1 – A3)

Production Inventory for 1 kg of INNOWOOD composite timber products

Material Input	**Percentage Content (on mass)**	
Wood waste	53%	
Post-consumer scrap	1%	
PVC resin	38%	
Pigments	2.5%	
Calcium Carbonate	6%	
Internal Scrap	11%	
Manufacturing energy	**Unit**	**Unit (per kg INNOWOOD product)**
Electricity	kWh	0.480
Output		
Finished product	kg	1
Scrap for internal recycling	kg	0.111

[1] 1 use = 1 loading + 1 moving within the factory + 1 unloading. Assumes a bag of 25kg capacity, weighing 70-75g. Assumes a EUR pallet with 1500kg capacity.

Raw material transport from suppliers to the manufacturing plant

Except for pigments, all raw materials are sourced in China. The following table summarise the transport of raw materials to the plant.

Material	Supplier	Supplier location	Transport distance (kgkm)	Vehicle
Wood powder	Supplier in Deqing	Deqing, China	628.5	truck
Internal scrap	Supplier in Guangzhou	Guangzhou, China	0.1	truck
PVC resin	Supplier in Tianjin	Tianjin, China	821.3	truck
Calcium carbonate	Non-specified	Ji'an, China	33.64	truck
Pigments	Supplier in Muttenz	Muttenz, Switzerland	12.1	truck
			36.75	ship

Inventory of inputs and outputs to the manufacturing process, other than raw materials and energy, per kg finished product

Direction	Material	Quantity	Unit (per kg)
Input	Water	0.00168	kg
	Cardboard packaging for finished product	0.0500	kg
	Transport of packaging (truck)	0.00500	tkm
Output	Wastewater	0.000126	m^3
	Cardboard waste from raw material	0.050	kg
	Plastic waste from raw material	0.000725	kg
	Waste transport	0.00254	tkm

Gate to Site (Module A4)

The transport distances from the manufacturing plant were calculated based on primary data from INNOWOOD's percentage of total products shipped to Australia, New Zealand, Hong Kong, USA and Europe. Transport includes:

- Distances from factory to warehouse at the Huangpu port – 99.4 km by truck;
- From warehouse to entry port at the market (not applicable for product sold to Hong Kong) – variable distances;
- From port to costumer – variable distances.

The following are conservative average transport distance assumptions:

Market	Share of product sold	Distance sea (km)	Distance road (km)
Australia	50%	8,460	100
New Zealand	30%	9,488	10
Hong Kong	5%	190	10
USA	10%	11,908	15
Europe	5%	18,183	20

Deconstruction and End of Life (Modules C1 – C4)

Modules C1 to C4 include the energy used in deconstructing the cladding and screens, transporting demolition waste to end of life facilities, and the recycling and landfilling of the wood composite waste.

The scenarios are representative for one of the most likely scenario alternatives.

Deconstruction (C1)

Deconstruction was assumed to be done manually, so no energy or material inputs are included in this module and its impact is 0 (zero).

End of life (C2-C4)

Two end of life pathways were considered: Recycling under the auspice of INNOWOOD's take-back program and landfill.

The transport to end of life processing facilities (Module C2) was modelled to each share (recycled vs landfilled) with specific distances to each pathway

Recycling

- INNOWOOD has a recycling policy by which the recovery and repurposing of its products is incentivised. INNOWOOD ships deconstruction waste to the manufacturing plant for recycling into new products.
- Most INNOWOOD products so far installed have not reached their end of life. Therefore, recycling rates and practice was therefore assumed from INNOWOOD's business planning estimate for the uptake of the take-back scheme.
- Based on INNOWOOD's estimate for the future uptake of the recycling policy, 7.5% of the product is recycled. This recycling rate is much lower than current recycling rates for construction materials in Australia (between 30-90% in Victoria and New South Wales (Smith, O'Farrell, & Brindley, 2012)). INNOWOOD's estimate provides a conservative figure which serves to illustrate potential benefits of recycling.
- The transport from building to the manufacturing factory is included in C2 subject to the share of recycled product. The transport distance considered in C2 for the recycled fraction is, therefore, the same as that of C4.
- The recycling process includes the use of chipping machinery.

Benefits and loads beyond the system boundary (Module D)

The benefit of recycling INNOWOOD was estimated as the offset of virgin material that does not get used in the extrusion line. The quality degradation of wood composite material is estimated by their manufacturing team to be 10%. This implies that per 1 kg of recycled INNOWOOD material offsets the production of 0.9 kg virgin material.

Module D was modelled as per the current recovery rates of INNOWOOD material under its take-back policy (7.5%). Hence, Module D only assumes the recycling is done by INNOWOOD's manufacturing plant to produce new INNOWOOD materials.

Materials	Virgin material	In (kg/kg)	Out (kg/kg)	Balance (kg/kg)	Virgin material replenishment needed
Wood powder waste	Wood chips	0.525	0.035	-0.490	0.490
Post-consumer scrap	Wood chips	0.01	0.001	-0.009	0.009
Recycled Recycled PVC resin	PVC		0.026	0.026	-0.026
Recycled Pigments	Chemical, organic		0.002	0.002	-0.002
Recycled Calcium carbonate	Limestone		0.004	0.004	-0.004

Electricity use was not debited use because it isn't possible to allocate electricity use between the extrusion of granules and the extrusion of the finished product. Debiting electricity would be an overestimation since the recycling only reduces the electricity use in the granule extrusion stage.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per 1 kg of INNOWOOD Composite Timber Products											
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP - Fossil	kg CO_2 eq.	1.50E+00	2.67E-01	4.80E-02	1.82E+00	1.16E-01	0.00E+00	8.04E-03	1.17E-03	1.07E-02	-4.44E-02
GWP - Biogenic	kg CO_2 eq.	1.19E-03	1.57E-04	2.63E-02	2.76E-02	2.32E-05	0.00E+00	4.70E-06	3.80E-06	1.40E-07	-9.48E-01
GWP - Luluc	kg CO_2 eq.	4.42E-03	1.09E-04	3.12E-04	4.84E-03	7.06E-05	0.00E+00	3.28E-06	2.01E-06	6.46E-08	8.05E-05
GWP - Total	kg CO_2 eq.	1.51E+00	2.67E-01	7.46E-02	1.85E+00	1.16E-01	0.00E+00	8.04E-03	1.18E-03	1.07E-02	-9.92E-01
ODP	kg CFC 11 eq.	4.47E-07	5.94E-08	4.10E-09	5.11E-07	2.34E-08	0.00E+00	1.77E-09	3.52E-11	3.17E-09	-2.73E-08
AP	mol H^+ eq.	7.44E-03	1.82E-03	2.47E-04	9.50E-03	2.06E-03	0.00E+00	3.34E-05	5.75E-06	5.60E-05	-1.22E-04
EP - F	kg P eq.	3.73E-04	2.01E-05	1.92E-05	4.12E-04	5.59E-06	0.00E+00	6.04E-07	4.87E-07	2.32E-07	-1.26E-05
EP - M	kg N eq.	1.46E-03	6.96E-04	1.26E-04	2.29E-03	5.06E-04	0.00E+00	9.83E-06	1.13E-06	1.45E-05	8.02E-06
EP - T	mol N eq.	1.51E-02	7.61E-03	7.56E-04	2.35E-02	5.61E-03	0.00E+00	1.07E-04	1.14E-05	1.59E-04	1.30E-04
POCP	kg NMVOC eq.	4.56E-03	2.09E-03	1.65E-04	6.81E-03	1.49E-03	0.00E+00	3.27E-05	3.11E-06	4.03E-05	8.35E-06
ADP-minerals & metals*	kg Sb eq.	1.51E-05	9.11E-07	2.29E-07	1.62E-05	2.87E-07	0.00E+00	2.74E-08	1.67E-09	1.62E-08	-9.41E-07
ADP-Fossil*	MJ	2.67E+01	3.97E+00	5.88E-01	3.13E+01	1.56E+00	0.00E+00	1.18E-01	1.41E-02	2.37E-01	-1.19E+00
WDP	**m^3**	7.81E-01	1.36E-02	1.83E-02	8.13E-01	7.67E-03	0.00E+00	4.10E-04	1.80E-04	1.20E-02	-4.52E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption										

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per 1 kg of INNOWOOD Composite Timber Products											
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO2 eq	1.43E+00	2.64E-01	4.65E-02	1.74E+00	1.15E-01	0.00E+00	7.95E-03	1.14E-03	1.04E-02	-4.17E-02
PM	disease incidence	7.95E-08	3.10E-08	4.94E-09	1.15E-07	7.17E-09	0.00E+00	6.84E-10	4.94E-11	4.54E-10	8.57E-09
IRP	kBq U-235 eq	9.18E-02	1.81E-02	2.06E-03	1.12E-01	6.40E-03	0.00E+00	5.40E-04	1.15E-04	6.15E-06	-2.49E-03
ETP - fw	CTUe	3.19E+01	3.45E+00	2.27E+00	3.77E+01	1.09E+00	0.00E+00	1.03E-01	2.25E-02	8.82E-02	-5.36E-01
HTP - c	CTUh	8.02E-10	1.63E-10	3.91E-11	1.00E-09	6.49E-11	0.00E+00	3.03E-12	4.33E-13	2.39E-12	-2.55E-11
HTP - nc	CTUh	2.16E-08	4.02E-09	7.30E-10	2.63E-08	1.02E-09	0.00E+00	9.89E-11	1.07E-11	8.41E-11	-7.15E-10
SQP	Pt	3.58E+00	2.68E-00	1.88E+00	8.14E+00	5.92E-01	0.00E+00	8.05E-02	2.30E-03	3.92E-01	4.51E+01
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage; PM = Particulate matter; IRP = Ionising radiation - human health; ETP – fw = Ecotoxicity – freshwater; HTP – c = Human toxicity potential - cancer effects; HTP – nc = Human toxicity potential - non cancer effects; SQP = Soil quality										

Use of resources

Results per 1 kg of INNOWOOD Composite Timber Products											
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	9.86E+00	4.54E-02	3.89E-01	1.03E+01	1.62E-02	0.00E+00	1.36E-03	1.51E-03	2.00E-03	3.74E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	9.86E+00	4.54E-02	3.89E-01	1.03E+01	1.62E-02	0.00E+00	1.36E-03	1.51E-03	2.00E-03	3.74E+00
PENRE	MJ	2.86E+01	4.22E+00	6.37E-01	3.35E+01	1.66E+00	0.00E+00	1.26E-01	1.50E-02	2.50E-01	-1.28E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	2.86E+01	4.22E+00	6.37E-01	3.35E+01	1.66E+00	0.00E+00	1.26E-01	1.50E-02	2.50E-01	-1.28E+00
SM	kg	5.35E-01	0.00E+00	0.00E+00	5.35E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	9.41E-03	1.97E-04	2.86E-04	9.89E-03	7.50E-05	0.00E+00	5.91E-06	2.77E-06	1.41E-04	-5.18E-04
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water										

Waste production and output flows

Waste production

Results per 1 kg of INNOWOOD Composite Timber Products											
Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1.52E-05	1.03E-05	7.14E-07	2.63E-05	2.54E-06	0.00E+00	3.08E-07	5.57E-09	1.07E-07	-2.52E-07
Non-hazardous waste disposed	kg	1.63E-01	2.00E-01	9.62E-03	3.73E-01	3.48E-02	0.00E+00	6.02E-03	1.13E-04	5.99E-04	-2.82E-03
Radioactive waste disposed	kg	3.34E-05	2.58E-05	1.15E-06	6.03E-05	9.31E-06	0.00E+00	7.69E-07	3.31E-08	8.41E-10	-3.29E-07

Output flows

Results per 1 kg of INNOWOOD Composite Timber Products											
Indicator	**Unit**	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.11E-01	0.00E+00	0.00E+00	1.11E-01	0.00E+00	0.00E+00	0.00E+00	7.50E-05	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Information on biogenic carbon content

Results per 1 kg of INNOWOOD Composite Timber Products		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0.00E+00
Biogenic carbon content in packaging	kg C	3.31E-01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2

Interpretation of LCA Results

Most environmental impacts are in the manufacturing stage i.e. (A1-A3), which contributes to 93% of the GWP-T impacts.

Within the manufacturing stage (A1-A3):

- PVC resin and calcium carbonate are the largest contributors to almost all environmental and resource use impacts. They account for 65% and 32% of the manufacturing Global Warming Potential (GWP-T) respectively.
- The production of INNOWOOD at the manufacturing plant is responsible for 93% of GWP-T and 98% of WDP.

Distribution (A4) accounts for less than **7%** GWP-T and less **23%** of impacts across all environmental impact indicators.

End of life deconstruction and demolition, transport, waste processing and disposal (**Module C**) make up just over **1%** of GWP-T and less than 2% of the potential environmental impacts across all environmental impact indicators.

The main quantities of waste are non-hazardous waste disposed, primarily from product offcuts during production. The waste from the manufacturing plant is relatively small, largely due to all product scrap being recycled on site leaving only minute amounts of packaging to be wasted.

In general, the electricity and water consumption for manufacturing of all products has increased in FY 2020-2021 compared to CY 2016.

Changes to this EPD version

Changes to this version of the EPD include reassessment after the 5 year validity period to reflect changes in product composition and distribution ratios.

In terms of results, there is a variation in the product composition between CY2016 and CY2020-2021 which resulted in a **33%** increase in material (A1) GWP-T emissions.

The GWP impact from distribution (A4) is **2%** lower for CY 2020-2021 compared to CY2016 because distribution ratios changed. However, since distribution contributes to less than **7%** of total environmental impacts, its influence is minimal.

Additional information

In regards to the Environmental management system, INNOWOOD has signed up for a Material Recycling Stewardship Scheme with the manufacturer and set out the required commitments to the environment with the participant. The agreement also helps business and organisation to identify any preparation they need to make before they process. The manufacturers of INNOWOOD have been certified with ISO9001:2008 for the quality management system and also has passed through TS16949 automotive quality management system certification in 2005 that provides an effective guarantee for the stability of product quality. Added to the above, the manufacturer has also got the OHSAS18001 Occupational Health and Safety Management System (OHSMS) certification.

Product Stewardship

In Australia from 2006 - 2016, 240 tonnes of timber has been supplied into the Australian market. The vast majority of Australia's product supplied has yet to reach end-of-life. Small proportion of end-of-life are recycled or used in Australia.

When end-of-life product are put to environmentally sound use they: reduce the demand for virgin materials in the production of goods and energy; reduce pressure on landfill space and improve the amenity of the land.

The scheme is designed to increase resource recovery and recycling and to minimise the environmental, health and safety impacts of all end-of-life product generated in Australia; and develop Australia's recycling industry and markets for INNOWOOD composite timber derived products.

The INNOWOOD composite timber stewardship scheme is an arrangement between the parties in the supply chain to share responsibility for the long term management of end-of-life products in Australia.

Scope

The scheme will be national in scope and is relevant to all IINNOWOOD composite timber products entering the Australian market for the first time.

Guiding Principles

In this scheme, Innowood:

- acknowledges the inherent value of all end-of-life product across Australia
- recognises that there is a cost associated with ensuring the environmentally sound use of end-of-life product
- is committed to market based solutions for environmentally sound end-of-life management
- is committed to achieving the highest value end use possible for end-of-life in accordance with the waste management hierarchy
- complements relevant policies and legislation and supports compliance with relevant laws and practices, including those that apply to the environment and occupational health and safety, and
- is appropriately resourced and empowered to deliver its objectives according to agreed timeframes and
- is committed to environmentally sound use

Commitment to sound use

Innowood's commitment to environmentally sound use includes:

- recycling into crumbs, shred, chips, granules components;

- use as a fuel (other than in direct incineration without effective energy recovery and unsustainable burning for energy recovery) or other means to generate energy;
- production derived products, including for ground cover;
- civil engineering.

INNOWOOD Material Recycling Policy

INNOWOOD material is 100% recyclable, and aims to protect the environment by reusing wood that would otherwise be destined for the landfill. We are protecting forests, using a low energy consumption manufacturing methods to further reduce our already carbon neutral footprint. INNOWOOD's Material Recycling Service is in line with our commitment to the environment and our product stewardship. Our goal of this service is to make it simple for our customers to dispose of our products in an environmentally conscious manner. INNOWOOD is a composite timber alternative material. Innowood material is nontoxic and safe. Any waste material or off cuts can be disposed of in the same manner that you would typically dispose of general building materials in accordance with your local regulations. However, we offer to our consumers any Innowood life cycle material such like product end of the life or customer prefer replace used Innowood material to other new INNOWOOD profile or others. Please find the INNOWOOD recycling policy in the following link - http://innowood.com/recycling-policy/

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