EPD™

Environmental Product Declaration

Global GreenTag EPD Program:
Compliant to EN ISO 14025:2010

Abco Products Pty Ltd

Enviro Plus Bioactive Jumbo Toilet Rolls

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Australia

abco
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Enviroplus Bioactive® Jumbo Toilet Rolls
EVS TP02 2024EP

Mandatory Disclosures

EPD type	Cradle to grave	**EPD Number**	EVS TP02 2024EP
Issue Date	21 February 2024	Valid Until	21 February 2027
Demonstration of Verification			
Product Category Rules	Global GreenTag International Product PCR complying with the ISO14025 standard [1] [2]. PCR TPS: 2023 V2 Toilet Paper in Compost, Septic and Sewer Systems		
☑ Internal	21 Feb 2024 LCA & EPD Developed by Delwyn Jones, The Evah Institute		
	21-02-2024 LCA & EPD Peer reviewed by Murray Jones Ecquate Pty Ltd		
☑ External	26/07/2024 EPD Reviewed by David Baggs, Global GreenTag Pty Ltd Verification of the declaration and data for business-to-consumer communication according to ISO 14025:2010 [2]		
Communication	This EPD discloses potential environmental outcomes compliant with ISO14025 for business-to-business communication.		
Comparability	Different program EPDs may not be comparable. Comparability is further dependent on the product category rules and data source used.		
Reliability	LCIA results are relative expressions that do not predict impacts on category endpoints, exceeding of thresholds, safety margins or risks.		
Explanations	Further explanatory information is available at info@globalgreentag.com or by contacting certification1@globalgreentag.com [3].		

EPD Program Operator	LCA and EPD Producer	Declaration Owner
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Enviroplus Bioactive® Jumbo Toilet Rolls
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Program Description

EPD Scope	Cradle to grave A1 to C4 + D as defined by ISO14025 [1]
System boundary	The system boundary with nature includes material and energy acquisition, processing, manufacture, transport, installation, use plus waste arising to end of life.
Stages included	Operations A1 to D3
Information	Figure 1 depicts all Information modules being declared including some with zero

Model	**Actual**					**Scenarios**												**Potential**		
Information	Building Life Cycle Assessment																	Supplementary		
Stages	Product			Construct		Use							End-of-Life				Benefit & load beyond system			
Modules						Fabric					Operation									
Unit Operations	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D1	D2	D3	
Cradle to grave phases	Resources	Transport	Manufacture	Transport	Construct	Use	Maintain	Repair	Replace	Refurbish	Energy use	Water use	Demolish	Transport	Process Waste	Disposal	Reuse	Recovery	Recycling	

Figure 1 EPD Life Cycle Modules Cradle to Grave

Data Sources

Primary Data	Data is from primary sources 2017 to 2022 including the manufacturer and suppliers' standards, logistics, technology, market share, management system in accordance with EN ISO 14044:2006, 4.3.2 [4]. All are physically allocated not economically allocated.
A1-A3 Stage inclusions	Operations include all known raw material acquisition, refining and processing plus scrap or material reuse from prior systems; electricity generated from all sources with extraction, refining & transport plus secondary fuel energy and recovery processes. Also, transport to factory gate; manufacture of inputs, ancillary material, product, packaging, maintenance, replacement plus flows leaving at end-of-waste boundary and fate of all flows at end of life.
Variability	Significant differences of average LCIA results are declared.
Chemicals of Concern	Contains no substances in the European Chemicals Agency "Authorised or Candidate Lists of Substances of Very High Concern (SVHCs)".

Data Quality

Data cut-off & quality criteria complies with ISO14025 [1] The LCA used background data aged <10 years and quality parameters tabled below.

Background	**Data Quality**	**Parameters and Uncertainty (U)**			
Correlation	**Metric σg**	U ±0.01	U ±0.05	U ±0.10	U ±0.20
Reliability	**Reporting**	Site Audit	Expert verify	Region	Sector
	Sample	>66% trend	>25% trend	>10% batch	>5% batch
Completion	**Including**	>50%	>25%	>10%	>5%
	Cut-off	0.01%w/w	0.05%w/w	0.1%w/w	0.5%w/w
Temporal	**Data Age**	<3 years	≤5 years	<7.5 years	<10 years
	Duration	>3 years	<3 years	<2 years	1 year
Technology	**Typology**	Actual	Comparable	In Class	Convention
Geography	**Focus**	Process	Line	Plant	Corporate
	Range	Continent	Nation	Plant	Line
	Jurisdiction	Representation is Global. Australasia and Pacific Rim			

System Analysis Scope and Boundaries

Stages A1 to 3 model actual operations. Processes to acquire, refine, transport, fabricate, coat, use, clean, repair, reuse and dispose of metal, masonry, ceramic, timber, glass, plastic and composites are modelled. These include those of:

- Mining, extracting and refining resources to make commodities and packaging;
- Acquiring, cultivating, harvesting, extracting, refining produce and biomass;
- Fuel production to supply power and process energy and freight;
- Chemicals use in processing resources, intermediates and ancillaries;
- Process energy, fuel and freight of resources, intermediates and ancillaries;
- Use, cleaning, recoating, repair, recycling, re-use and landfill, as well as
- Infrastructure process energy transformed and material wear loss e.g. tyres.

Figure 2. shows included processes in a cradle to grave system boundary to end of life fates reuse, recycling, or landfill grave beyond the boundary.

Stage A4 to C4 are model scenarios. Typical scenarios are assumed to forecast unit operations as described in the next section.

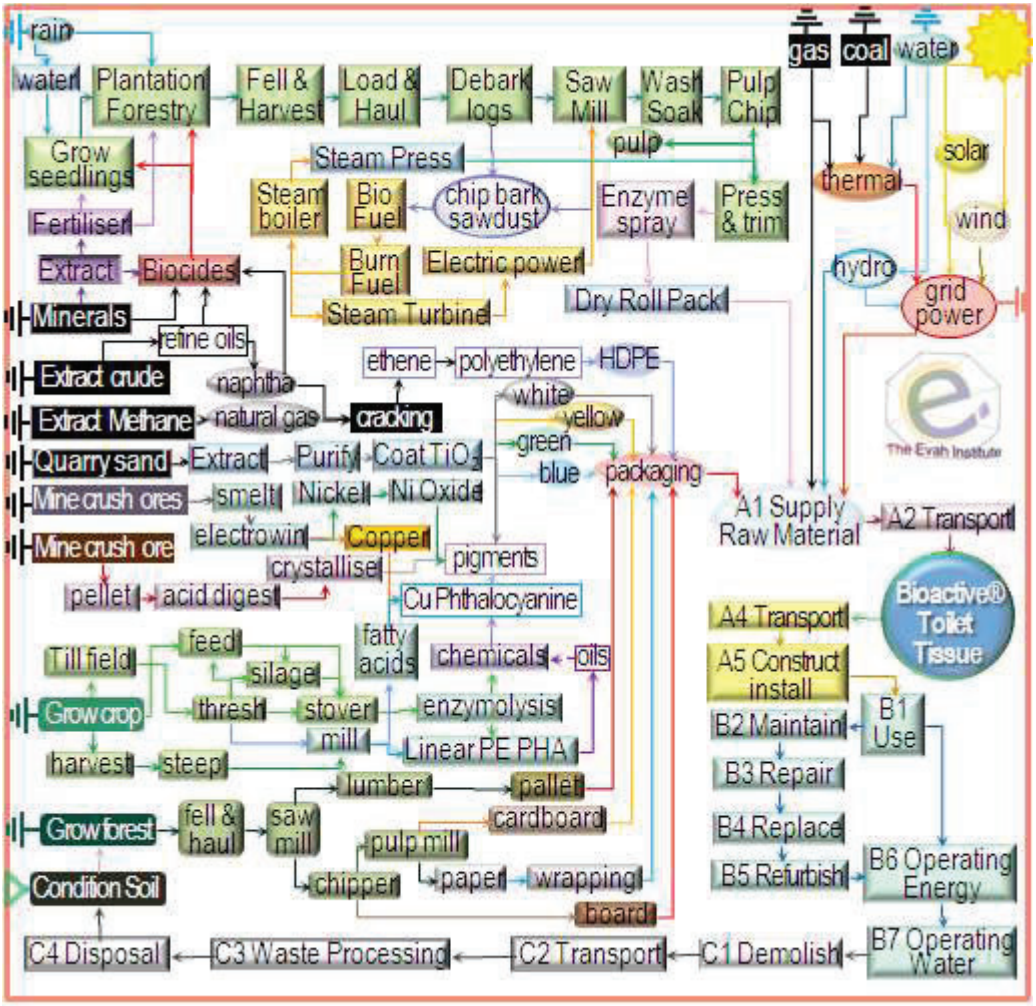

Figure 2. Product Process Flow Chart

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Details of Manufacturer

The declared product Enviroplus Bioactive® Toilet roll was made for ABCO in China in 2020 for sale for commercial and residential applications. Enviroplus is owned and exclusively distributed by Abco Products as at http://www.abcopro.com.au/. The factory has ISO9001 and ISO14001 in place. Enviroplus Bioactive® Toilet Paper is made with FSC certified paper. Enviroplus is range of products that employ plant extracts, microbial, antimicrobial and enzyme technology. These can prevent urinal blockages; control harmful microorganisms present in sanitary bins and neutralise odours at the source.

The Paper incorporates patented BATP® technology using a synergy of five natural microorganisms. The microorganisms activate only when in contact with water to reproduce and secrete enzymes that biodegrade encrustations and organic substances in pipes and sewage system.

The Enviroplus range was developed as a result of customer's seeking environmentally sustainable solutions for commercial cleaning industry projects. Detail is at http://enviroplusproducts.com.au/. Their extensive range of cleaning solutions deliver powerful results for operators and facilities across Australia for floor cleaning, urinal and sanitary treatments and commercial showers and sinks.

Product Information

This section provides data required to calculate assessment results factoring different mass and periods.

Brand Name & Code	Enviroplus Bioactive® Jumbo Toilet Roll 100228
Range Names	Enviroplus Bioactive® Toilet Paper 2PLY 300m Roll
Factory warranty	Fit for purpose Commercial and Residential use
Manufacturer	Dongguan Lopie Paper Co. Ltd.
Factory address	Xinshagang Industrial Zone, Chajiao Village, Zhongtang Town, Dongguan, Guangdong, P R China
Site representation	Made in China. Uses are assumed as for Australasia and Pacific Rim
Time	Made in and sold from 2020 for single use
Application	Post sanitising end of life >98.9% scrap is reused as farm soil conditioner, typical of all Australian Capital Cities sewerage treatment facilities
Function	Sanitary paper for removing human waste and effluent system odours
Lifetime [5,6]	20 years Reference Service Life (RSL) modelled
Declared unit	17g/m^2 Enviroplus Bioactive® Toilet Paper 2PLY 400 Sheet Roll
Functional unit	Enviroplus Bioactive® Toilet Paper 20 years 160kg use/capita cradle to fate

Whole of life Performance

Service life	Multi-purpose with most material flows from the cradle returned to cradle
Health Protection	The product does not contain levels of carcinogenic, toxic or hazardous substances that warrant ecological or human health concern cradle to grave. It passed the Ecospecifier Cautionary Assessment Process (ESCAP) and no issues or red-light concerns existed for product human or ecological toxicity
Effluent	LCI results and ESCAP raised no red light concerns in emissions to water[1]
Waste	Cradle to grave waste to landfill from operations was non-hazardous
Environmental Protection	Continuous improvement under the maker's certified ISO14001 EMS aims to avoid toxics, waste and pollution plus reduce their material and energy use
Environmental Health Effects	No potential in-use impacts on environment or health are known

1 According with national standards in ANZECC Guideline For Fresh & Marine Water Quality (2000)

Product Components

This section summarises factory components, functions, source nation and % mass share. Product content listed below has a ±5% range and confidence interval 90% certain to contain true population means at any time. Listing such 90±5% certainty considers normal resource acquisition, supply chain, sedimentation, seasonal, manufacturing and product variation over this EPD's validity period. This also allows for intellectual property protection whilst ensuring fullest possible transparency.

Base Material Origin and Detail

Table 2 lists key components by function, type, sources and % mass share

Function	Component	Source	Amount
Substrate Paper	FSC pulp logs	China	>85 <100
	FSC pulp logs	New Zealand and Australia	>6.5 <10
	FSC pulp logs	Europe	>4.0 <10
	FSC pulp logs	US	>2.0 <5
	FSC pulp logs	Canada	>1.0 <2
Synergists	Enzymes	Italy	>0.1 <0.11
Packing			
Product	Paper	As above	>93 <94
Core	Cardboard	P R China	>2.5 <2.6
Cartons	Cardboard	P R China	>4.1< 4.2

Product Functional & Technical Performance Information

This section provides manufacturer specifications and additional information

Definition	Enviroplus Bioactive® Toilet paper for commercial and residential use
Standards	BATP L1700S complies with the following codes and regulations: EC Reg. No. 648/2004 of 31/03/2004 (biodegradability and labelling of detergents) EC Reg. No. 1907/2006 (REACH) EC Reg. No. 834/2007 of 28/06/2007 EC Reg. No. 1272/2008 of 16/12/2008 BATP L1700S has passed the human occlusive patch test.
Practices Reference	https://enviroplusproducts.com.au/bioactive-toilet-paper/
Effluent	LCI results and ESCAP raised no red-light concerns in emissions to water[2].
Disposal	Zero product waste to river, land or ocean outfalls or council landfill
Health Safety & Environment	Apart from compliance to occupational and workplace health safety and environmental laws no additional personal protection is considered essential for manufacture, use or reuse

2 According with national standards in ANZECC Guideline For Fresh & Marine Water Quality (2000)

Scenarios Descriptions

This section defines modelling stages scenarios A4 to D3 beyond actual operations in module A1 to A3.

A4 Transport to Site	Type specified	Amount	Type specified	Amount
Intercity road trucking	2t to 5t vans	220 km	85% Capacity	Full back load
Long distance road trucking	25t semi-trailer	600 km	85% Capacity	Full back load
Continental freight rail	Diesel train	600 km	85% Capacity	Full back load
Global container shipping	Factory to CBD	1,200km	85% Capacity	Full back load
Volume capacity (<1 to ≥1)	Utilisation factor	1	Uncompressed	Un-nested

A5 Installation	Type specified	Amount	Type specified	Amount
Utilities used	Grid Power	Nil	Town water	Nil
Emissions	VOCs indoors	Nil	From landfill	All known
Waste on site	Roll core	1.7%	Scrap Fate	To recycling
Collection	Sewer	160kg	Piping route	Returned to cradle
All packaging	As declared	163kg	Energy recovery	nil
Pack scrap recycled	Council site bins	163kg	To Recycler	50km no return

Modules B1 Use of building fabric, **B3 Repair**, B4 Replacement, B5 Refurbishment, B6 Operating Energy and B7 Operating Water each have zero flows. Scenarios for Building B2 and B3 are listed below.

2 End of Life	Type specified	Amount	Type specified	Amount
Fate of Scrap	Fate farm land	153kg	Solid fibre	153 kg
Energy input & source	No excess	Nil	Packaging	163kg

Re disposal, zero product waste to river, land or ocean outfalls or council landfill. Post sanitising at end of life >98.9% scrap is assumed reused as agricultural soil conditioner. This is typical of all Australian capital cities sewerage treatment facilities.

Module C3 Waste Treatment has zero flows. End of Life scenarios C1, C2 and C4 are listed below.

	Type specified	Amount	Type specified	Amount
C1 Demolition	Collection process	100%	Site sewer waste	100%
C2 Transport	Sewer system	100%	Sewage treatment	100%
C4 Disposal	Farm Soil Carbon	100%	All emissions	mass share

Scenarios for modules D1Reuse, D2 Recovery and D3 Recycling have zero flows as listed below.

D Beyond System Boundary

	Type specified	Amount	Type specified	Amount
D1 Reuse	Soil conditioner	100%		
D2 Recovery	Nil fit for purpose	0%		
D3 Recycle	Nil fit for purpose	0%		

Environmental Impact Terminology

Environmental impacts contributing to risks of social and ecological issues and collapse are tabled below with common names and remedies given for each indicator.

Global warming forcing Climate Change	Greenhouse gases absorb infra-red radiation. This heat reduces thermal energy differentials, from equator to poles, forcing ocean current and wind circulation to blend and regulate climate. Weakly blended "lumpier" weather has more frequent, extreme heat wave, fire-storm, cyclone, rain-storm, flood and blizzard events. Accumulation of carbon dioxide, natural gas methane, nitrous oxides and volatile organic compounds from burning fossil fuels causes global warming. Forest and wilderness growth absorbing air-borne carbon in biomass can drawdown such accumulation. Urgent renewable energy reliance is vital in time to avoid imminent tipping points and the worsening "***climate emergency***".
Ozone layer depletion	Stratospheric ozone loss weakens the planet's solar shield so more shorter wavelength ultraviolet (UVB) light reaching earth damages plants and increases malignant melanoma and skin cancer in humans and animals. Chlorofluorocarbons, hydrochlorofluorocarbons (HCFC), chlorobromomethane, hydrobromofluorocarbons, carbon tetrachloride, methyl chloroform, methyl bromide and halon gas cause ozone layer loss. To repair the *"**ozone hole**"* reliance on ozone-safe refrigerants, aerosols and solvents is essential to avoid further its depletion and enable accumulation of naturally-formed ozone.
Acidification	Acidification reduces soil and waterway pH, impedes nitrogen fixation vital for plant growth and inhibits natural decomposition. It increases rates and incidence of fish kills, forest loss and deterioration of buildings and materials. Chief synthetic causes of "***acid rain***" are emissions of sulphur and nitrogen oxides, hydrochloric and hydrofluoric acids and ammonia from burning fossil fuels polluting precipitation of rain and snow world-wide.
Eutrophication of terrestrial, freshwater and marine life	Eutrophication from excessively high macronutrient levels added to natural waters promotes excessive plant growth that severely reduces oxygen, water and habitat security for aquatic and terrestrial organisms across related ecosystems. Chief synthetic cause of "***algal blooms***" is nitrogen (N, NOx, NH_4) and phosphorus (P, PO_4^{3-}) in rain run-off over-fertilised land catchments.
Photochemical ozone creation	Tropospheric photochemical ozone, called "***summer smog***" near ground level, is created from natural and synthetic compounds in UV sunlight. Low concentration smog damages vegetation and crops. High concentration smog is hazardous to human health. Chief synthetic causes are nitrogen oxides, carbon monoxide and volatile organic compounds (VOC) pollutants. Avoiding reliance on dirtiest coal fuel and volatile chemicals has reduced smog incidence in many areas globally.
Depletion of minerals, metals & water	Abiotic depletion of finite mineral resources increases time, effort and money required to obtain more resources to the point of extinction of naturally viable reserves. This can limit access to available, valuable and scarce elements vital for human-life. The youth movement "***extinction rebellion***" calls on adults to secure climate, reserves and biodiversity for current and future generations.
Depletion of fossil fuel reserves	Abiotic depletion of resources by consuming finite oil, natural gas, coal and yellowcake fossil fuel reserves leaves current and future generations suffering limited available, accessible, plentiful, essential valuable as well as scarce raw material, medicinal, chemical, feedstock and fuel stock. Approaching "***peak oil***" acknowledged fossil fuel reserves are finite and the need for decision-makers to act to avoid market instability, insecurity and or oil and gas wars.

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Environmental Impact Methods

Listed below are inventory and potential impact, units, descriptions of methods and references to sources.

Table 1 A1-3 to A5 Impact & Inventory Results/Functional Unit

Result	Units	Description of Methods
Climate Change biogenic	kg CO_{2eq}	GWP fossil fuels [7]
Climate Change luluc	kg CO_{2eq}	GWP biogenic [7]
Climate Change fossil	kg CO_{2eq}	GWP land use & change [7]
Climate Change total	kg CO_{2eq}	Global Warming Potential [7]
Stratospheric Ozone Depletion	kg CFC_{11e}	Stratospheric Ozone Loss [8]
Photochemical Ozone Creation	kg NVOC $_e$	Summer Smog [9]
Acidification Potential	mol H^+ $_{eq}$	Accumulated Exceedance [10]
Eutrophication Freshwater	kg P $_{eq}$	Excess freshwater nutrients [11]
Eutrophication Marine	kg N $_{eq}$	Excess marine nutrients [11]
Eutrophication Terrestrial	mol N $_{eq}$	Excess nutrients to land [11]
Fossil Fuel & Feedstock Depletion	MJ $_{ncv}$	Abiotic Depletion fossil fuel [12]
Mineral and Metal Depletion	kg Sb $_{eq}$	Abiotic Depletion minerals [13]
Water Scarcity Depletion	m^3 $_{WDP\ eq}$	Water Deprivation Scarcity [14, 15]
Net Fresh Water Use	m^3	Lake, river, well & town water
Secondary Material	kg	Post-consumer recycled (PCR)
Secondary Renewable Energy Used	MJ $_{ncv}$	PCR biomass burnt
Primary Renewable Feedstock Material	MJ $_{ncv}$	Biomass retained material
Primary Renewable Energy Used	MJ $_{ncv}$	Biomass fuels burnt
Total Primary Renewable Energy	MJ $_{ncv}$	Biomass burnt + retained
Secondary Fossil Energy Used	MJ $_{ncv}$	PCR fossil-fuels burnt
Primary Fossil Feedstock Material	MJ $_{ncv}$	Fossil feedstock retained
Primary Fossil Energy Transformed	MJ $_{ncv}$	fossil-fuel used or burnt
Total Primary Fossil Energy Used	MJ $_{ncv}$	Fossil feedstock & fuel use
Hazardous Waste Disposed	kg	Reprocessed to contain risks
Non-hazardous Waste Disposed	kg	Municipal landfill facility waste
Radioactive Waste Disposed	kg	Most ex nuclear power stations
Components For Reuse	kg	Product scrap for reuse as is
Material For Recycling	kg	Factory scrap to remanufacture
Material For Energy Recovery	kg	Factory scrap use as fuel
Exported Energy Electrical	MJ $_{ncv}$	Uncommon for building products
Exported Energy Thermal	MJ $_{ncv}$	Uncommon for building products

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Module A1 to D3 Cradle to Grave Results

Table 1 shows inventory and impact results per 160kg capita 20 years use and per kilogram.

Table 1 A1-3 to D3 Impact & Inventory Results/Functional Unit

Result	Per 160kg pp 20yr	Per kg	Units
Climate Change biogenic	-570	-3.6	kg CO_{2eq}
Climate Change luluc	2.7E-02	1.7E-04	kg CO_{2eq}
Climate Change fossil	403	2.5	kg CO_{2eq}
Climate Change total	-167	-1.0	kg CO_{2eq}
Stratospheric Ozone Depletion	4.2E-06	2.6E-08	kg CFC_{11e}
Photochemical Ozone Creation	2.2	1.4E-02	kg NVOC $_{e}$
Acidification Potential	0.72	4.5E-03	mol H^{+} $_{eq}$
Eutrophication Freshwater	3.0E-02	1.9E-04	kg P $_{eq}$
Eutrophication Marine	0.15	9.5E-04	kg N $_{eq}$
Eutrophication Terrestrial	3.6	2.3E-02	mol N $_{eq}$
Fossil Fuel & Feedstock Depletion	318	2.0	MJ $_{ncv}$
Mineral and Metal Depletion	0.11	6.8E-04	kg Sb $_{eq}$
Water Scarcity Depletion	0.58	3.6E-03	m^3 $_{WDP\ eq}$
Net Fresh Water Use	3.6	2.2E-02	m^3
Secondary Material	25	0.2	kg
Secondary Renewable Energy Used	12	7.7E-02	MJ $_{ncv}$
Primary Renewable Feedstock Material	5265	33	MJ $_{ncv}$
Primary Renewable Energy Used	860	5.4	MJ $_{ncv}$
Total Primary Renewable Energy	6125	38	MJ $_{ncv}$
Secondary Fossil Energy Used	9.2	5.7E-02	MJ $_{ncv}$
Primary Fossil Feedstock Material	945	5.9	MJ $_{ncv}$
Primary Fossil Energy Transformed	4096	26	MJ $_{ncv}$
Total Primary Fossil Energy Used	5041	32	MJ $_{ncv}$
Hazardous Waste Disposed	0.32	2.0E-03	kg
Non-hazardous Waste Disposed	8.6	5.4E-02	kg
Radioactive Waste Disposed	6.0E-14	3.8E-16	kg
Components For Reuse	0	0	kg
Material For Recycling	162	1.0	kg
Material For Energy Recovery	2.5E-03	1.5E-05	kg
Exported Energy Electrical	0	0	MJ $_{ncv}$
Exported Energy Thermal	0	0	MJ $_{ncv}$

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Life Cycle Assessment Method

LCA Author	The Evah Institute as described at www.evah.com.au
Study Period	Factory data was collected from 2015 to 2018
LCA Method	Compliant with ISO 14040 and ISO 14044 Standards
LCIA method	EcoIndicator 99 Life Cycle Impact (LCIA) Assessment
Scope	Cradle to Fate including all supply chain phases and stages depicted in Figure a.
Phases	The LCA covered all known flows in all known stages cradle to end of life fate.
Assumptions	Use is to typical Australian Facility Management professional practice.
Scenarios	Use, cleaning, maintenance plus disposal and re-use were scenario-based using Facility Management Association denoted and published typical operations.
System Boundaries	The LCA covers all operations in the system boundary depicted in Figure 3.
Processes	All known processes are included from resource acquisition, water, fuel & energy use, power generation & distribution, freight, refining, intermediates, manufacture, scrap re-use, packing and dispatch, installation, use, maintenance and landfill. All significant waste and emission flows from all supply chain operations involved to make, pack and install the product are included.

Life Cycle Stages	Product			Construct-ion		Use stage related to the building Fabric					Operation		End of Life				Beyond system Boundary
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Unit Operations	Raw material supply	Transport	Manufacture	Transport	Construction	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy use	Operational Water use	Demolition	Transport	Waste Processing	Disposal	Potential Reuse Recovery and Recycling load &benefit
Modeling	Actual			Scenarios													
Cradle to Gate	M	M	M														
Cradle to Gate +options	M	M	M	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Cradle to Grave	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	O

Figure a Phases and Stages Cradle to Grave

Evah industry databases cover all known domestic and global scope 1 and 2 operations. They exclude scope 3 burdens from capital facilities, equipment churn, noise and dehydration as well as incidental activities and employee commuting. Electricity supply models in active databases are updated annually. As each project is modelled and new data is available the databases are updated and audited by external Type 1 ecolabel certifiers. The databases exist in top zones of commercial global modelling and calculating engines. Quality control methods are applied to ensure:

- Coverage of place in time with all information[3] for each dataset noted, checked and updated;
- Consistency to Evah guidelines[4] for all process technology, transport and energy demand;
- Completeness of modeling based on in-house reports, literature and industry reviews;
- Plausibility in 2 way checks of LCI input and output flows of data checked for validity, plus
- Mathematical correctness of all calculations in mass and energy balance cross checks.

[3] Jones D G (2004) LCI Database for Commercial Building Report 2001-006-B-15 Icon.net, Australia
[4] Evah Tools, Databases and Methodology Queensland, Australia at http://www.evah.com.au/tools.html

Data Sources Representativeness and Quality

Primary data used for modelling the state of art of each operation includes all known process for:

- Technology sequences;
- Energy and water use;
- Landfill and effluent plus
- Reliance on raw and recycled material;
- High and reduced process emissions;
- Freight and distribution systems.

Primary data is sourced from clients, Annual Reports and their publications on corporate locations, logistics, technology use, market share, management systems, standards and commitment to improved environmental performance. Information on operations is also sourced from client:

- Supply chain mills, their technical manuals, corporate annual reports and sector experts, and
- Manufacturing specifications websites and factory site development license applications.

Background data is sourced from the International Energy Agency, IBISWorld, USGS Minerals, Franklin Associates, Boustead 6, Plastics Europe, CML2, Simapro 8, EcoInvent 3 and NREL USLCI model databases. Information on operations is also sourced from:

- Library, document, NPI and web searches, review papers, building manuals and
- Global Industry Association and Government reports on Best Available Technology (BAT).

For benchmarking, comparison and integrity checks inventory data is developed to represent BAT, business as usual and worst practice options with operations covering industry sector supply and infrastructure in Australia and overseas.

Such technology, performance and license conditions were modelled and evaluated across mining, farming, forestry, freight, infrastructure and manufacturing and building industry sectors since 1995.

As most sources do not provide estimates of accuracy, a pedigree matrix of uncertainty estimates to 95% confidence levels of Geometric Standard Deviation[2] (σ_g) is used to define quality as in Table a[5].

No data set with >±30% uncertainty is used.

Table a. Data Quality Uncertainty (U)

Correlation	Metric σ_g	U ±0.01	U ±0.05	U ±0.10	U ±0.20	U ±0.30
Reliability	Reporting	Site Audit	Expert verify	Region	Sector	Academic
	Sample	>66% trend	>25% trend	>10% batch	>5% batch	<1% batch
Completion	Including	>50%	>25%	>10%	>5%	<5%
	Cut-off	0.01%w/w	0.05%w/w	0.1%w/w	0.5%w/w	1%w/w
Temporal	Data Age	<3 years	≤5 years	<10 years	<15 years	>16 years
	Duration	>3 years	<3 years	<2 years	1 year	<1 year
Geography	Focus	Process	Line	Plant	Corporate	Sector
	Range	Continent	Nation	Plant	Line	Process
Technology	Typology	Actual	Comparable	In Class	Convention	In Sector

[5] Evah Institute data quality control system accords with UNEP SETAC Global LCI Database Quality 2010 Guidelines

Supply Chain Modelling Assumptions

Australian building sector rules and Evah assumptions applied are defined in Table b.

Table b. Scope Boundaries Assumptions and Metadata

Quality/Domain	National including Import and Export
Process Model	Typical industry practice with currently most common or best (BAT) technology
Resource flows	Regional data for resource mapping, fuels, energy, electricity and logistics
Temporal	Project data was collated from 2018 to 2019
Geography	Designated client, site, regional, national, Pacific Rim then European jurisdiction
Representation	Designated client, their suppliers and energy supply chains back to the cradle
Consistency	Model all operations by known given operations with closest proximity
Technology	Pacific Rim Industry Supply Chain Technology typical of 2019 to 2022
Functional Unit	Typical product usage with cleaning& disposal/m^2 over the set year service life
System Control	
Primary Sources	Clients and suppliers' mills, publications, websites, specifications & manuals
Other Sources	IEA 2022, GGT 2022, Boustead 2013, Simapro 2016, IBIS 2022, EcoInvent 2018
Data mix	Power grid and renewable shares updated to latest IEA 2022reports
Operational	Company data for process performance, product share, waste and emissions
Logistics	Local data is used for power, fuel mix, water supply, logistics share & capacity
New Data Entry	VliegLCA, Evah Institute 2022; Global Green Tag Researchers 2022
Data Generator	Manufacturers, Evah Institute 2022; GGT 2022; Meta: IBIS 2022, Other pre-2022
Data Publisher	The Evah Institute to Global GreenTag and designated client only
Contributors	All people's contributors cited in Evah & Global GreenTag records or websites
Data Flow & Mix	
System	Earth's cradle of all resource & emission flows to end of use, fitout or build life
System flows	All known from and to air, land, water and community sources & sinks
Capital	Natural stocksΔ, industry stockpilesΔ, capital wear Δ, system losses and use
Arid Practice	Dry technology adopted; Water use is factored by 0.1 as for e.g. Mining
Transportation	Distance >20% than EU; >20% fuel efficient larger vehicles, load & distance
Industrial	Company or industry sector data for manufacturing and minerals involved
Mining	All raw material extraction is based on Australian or Pacific Rim technology
Imported fuel	Mix is from nearest sources is e.g. UAE, SE Asia, Canada or New Zealand
Finishes	Processing inputs with finishing burdens are factored in. If not that is denoted
Validation	
Accuracy	10^{th} generation study is ± 5 to 15% uncertain due to some background data
Completeness	All significant operations are tracked and documented from the cradle to grave
Precision	Tracking of >90% flows applies a 90:10 rule sequentially to 99.9% and beyond
Allocation	100% to co products on reaction stoichiometry by energetic or mass fraction
Burdens	All resource use from & emissions to community air land, water are included
Plausibility	Results are checked and benchmarked against BAT, BAU & worst practice
Sensitivity	Calculated U is reported & compared to libraries of Bath U RICE & EcoInvent 3.2
Validity Checks	Are made versus Plastics Europe, Ecobilan, GaBi & or Industry LCA Literature

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Reviewers Report Conclusions

The independent LCA reviewer's report confirmed that the LCA project report and addition information addressed the EPD.

The verifier was not involved in developing the LCA or EPD and has no conflict of interests from their organisational position.

While the report is confidential its conclusions confirmed that documentation according to set ISO Standard requirements was provided including evidence from the:

The Evah Institute, the LCA developer:

- a) Recipes of input and output data of unit processes used for LCA calculations √
- b) Datasheets of measures, calculations, estimates and emails with sources as in Table 6 √
- e) References to literature and databases from which data was extracted as noted in Table 6 √
- g) Notes on supply chain processes and scenarios satisfying requirements of this Standard √
- i) Embodied Energy shares as used for sensitivity analyses re ISO 14044:2006, 4.5.3.3 √
- j) Proof percentages or figures in calculations in the end of life scenario √
- k) Notes on proof of % and allocation calculations √
- o) All operations covered Vs criteria and substantiation used to determine system boundaries √

Product Manufacturer in:

- c) Specifications used to create the manufacturer's product √
- d) Citations, references, specifications or regulations & data showing completeness √
- f) Specification demonstrating that the building product can fulfil the intended use √

The Certifier Global GreenTag on:

- l) Notes and calculation of averages of different locations yielding generic data √
- m) Substantiating additional environmental information ISO 14025:2006, 7.2.4 √
- n) Procedures for data collection, questionnaires, instructions, confidentiality deeds √

Requiring No Evidence:

As the EPD is cradle to grave as well as PCR compliant the independent reviewer did not need to:

- h) Substantiate a few stages as all stages were substantiated √
- p) Substantiate alternatives when no other choices and assumptions were applied √
- q) Demonstrate consistency for few stages as the same rules in Tables 5 and 6 applied to all. √

This Environmental Product Declaration (EPD) discloses potential environmental outcomes compliant with ISO 14025 for business to business communication.

Further and explanatory information is found at

http://www.globalgreentag.com/

or contact:

certification1@globalgreentag.com

Global GreenTagCertTM EPD Program

Environmental Product Declaration

Compliant to ISO 14025