Statement of Verification

BREG EN EPD No.: 000124 Issue 1
ECO EPD Ref. No. 000504

This is to verify that the

Environmental Product Declaration

provided by:

Wood for Good

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

1m³ of kiln dried planed or machined sawn timber used as structural timber

Company Address

The Building Centre
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Wood for Good

Signed for BRE Global Ltd	Emma Baker Operator	10 April 2017 Date of this Issue
10 April 2017 Date of First Issue		09 April 2022 Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD EN 15804 VERIFIED

Environmental Product Declaration

EPD Number: 000124

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	**LCA consultant/Tool**
Wood for Good The Building Centre, 26 Store Street, London WC1E 7BT	EPD Tool for Kiln Dried Sawn Timber thinkstep www.thinkstep.com
Declared/Functional Unit	**Applicability/Coverage**
1m^3 of kiln dried planed or machined sawn timber used as structural timber.	Product Average.
EPD Type	**Background database**
Cradle to Gate with options	GaBi

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Kim Allbury
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A1:2013 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing sites

Data for this EPD was provided through Wood for Good from three manufacturing sites:

BSW Timber Ltd
East End,
Earlston,
TD4 6JA
UK

James Jones & Sons Ltd
Broomage Avenue,
Larbert,
FK5 4NQ
UK

John Gordon and Son Ltd
Balblair Road,
Naim,
IV12 5LY
UK

Construction Product:

Product Description

This Environmental Product Declaration (EPD) covers UK-sourced and produced kiln dried sawn timber produced by BSW Timber Ltd., James Jones & Sons Ltd. and John Gordon and Son Ltd. The kiln dried timber covered by this EPD is produced from UK sourced timber and covers four softwood species – Spruce, Pine, Larch and Douglas Fir. Kiln dried sawn timber is sold pre-planed and/or machined and can be used to produce a wide variety of products used in construction including doors and windows, decking, fencing, flooring, laths, timber frame, cladding, roof battens and tile battens.

For the purpose of this EPD, the use phase has been modelled based on the timber product being used as structural timber, in the form of a beam, joist, stud or batten. The declared unit is 1m^3 of kiln dried planed or machine sawn timber used as structural timber with a final moisture content of 15% and an average density of 479 kg/m^3.

Technical Information

Property	Value, Unit
Average density (at 15% moisture content)	479 kg/m^3
Bending parallel to grain	4.1 – 7.5 N/mm^2
Tension parallel to grain	2.5 – 4.5 N/mm^2
Compression parallel to grain	5.2 – 7.9 N/mm^2
Compression perpendicular to grain	1.4 – 2.5 N/mm^2
Shear parallel to grain	0.60 – 0.88 N/mm^2
Modulus of elasticity, mean	6500 – 11000 N/mm^2
Modulus of elasticity, minimum	4500 – 7000 N/mm^2

Main Product Contents

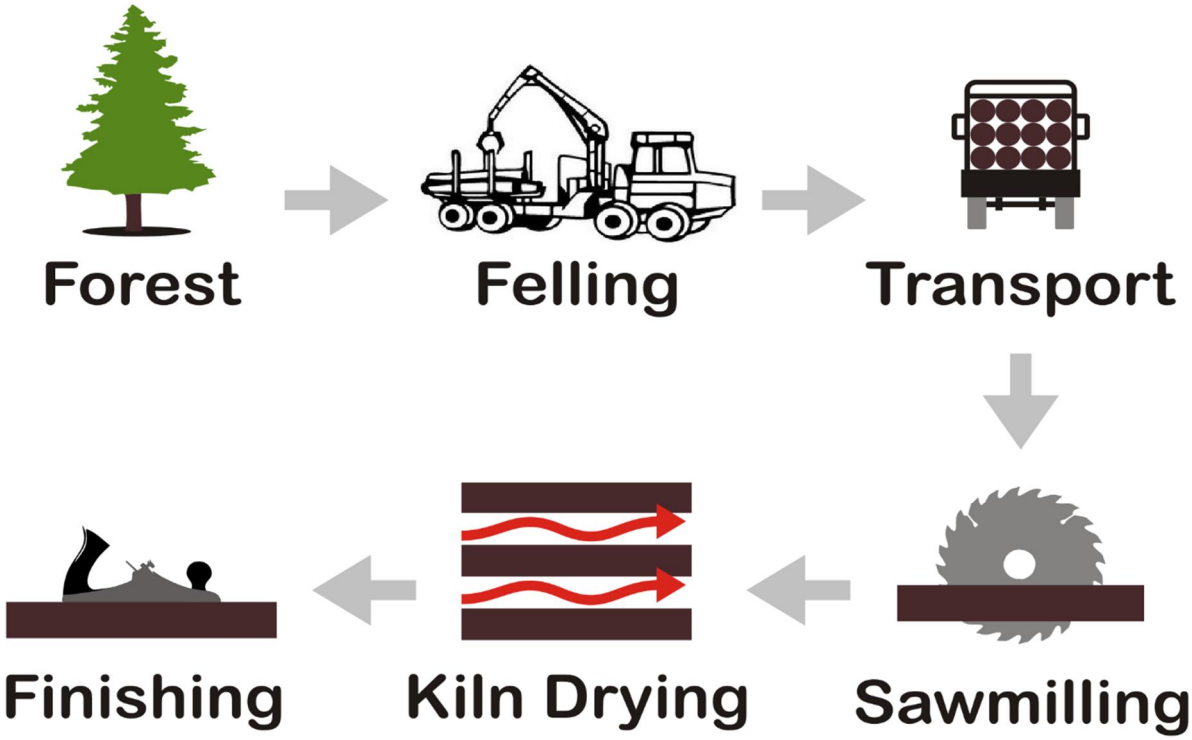
Constituted entirely of UK-sourced timber.

Material/Chemical Input	%
Softwood timber	100%

Manufacturing Process

Kiln dried sawn timber covered by this EPD is produced from four softwood species – Spruce, Pine, Larch and Douglas Fir. The trees used to produce the timber are grown in the UK in certified sustainable forests. Felled logs are transported to the sawmill which produces sawn timber and a number of wood co-products primarily woodchips, shavings, sawdust and bark. Sawn timber may be sold without kiln drying (either green or with air drying), however this EPD covers kiln dried products, with the drying kilns fired by biomass, natural gas or fuel oils depending on the site. The kiln dried timber is generally further cut or machined before leaving the manufacturing site depending on the specific client requirements. Product strength, stiffness and performance data is measured in line with EN 408, EN 338 and/or EN 384. The final kiln dried planed/machined sawn timber product is packaged for distribution using a mix of plastic film, plastic strapping, steel banding/fixings and various timber packaging elements including bearers and spacers.

Process flow diagram



Construction Installation

Kiln dried timber may be used directly in construction projects or may be used as an input material for the production of a wide variety of construction products including doors and windows, decking, fencing, flooring, laths, timber frame, cladding, roof battens and tile battens. For the purpose of this EPD, the use phase has been modelled based on the timber product being used as structural timber, in the form of a beam, joist, stud or batten. Apart from material wastage, no installation impacts have been measured – no adhesives, fixings or coatings are included within the scope of the EPD. On-site wastage of the product during installation has been estimated to be 5%.

Use Information

It is not anticipated that there will be any impacts associated with the use stage of kiln dried timber product. No chemical treatments or coatings are included in this EPD and consequently, no maintenance, repair or replacement is required during the structural timber's product lifetime.

End of Life

Demolition of the timber structure has been modelled based on information related to the demolition of commercial buildings. Transport to recycling, energy recovery or landfill are also included. The five main fates for sawn softwood timber in the construction and demolition (C&D) waste stream at end-of-life and the proportions of material managed by each of these are listed below:

- Recycling for use as input into other products e.g. panel board manufacture – 35%
- Recycling for use as animal bedding and surfaces – 20%
- Recycling for use as a biomass fuel in the UK – 22%
- Recycling for use as a biomass fuel for export – 22%
- Landfill – 1%

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

The declared unit is 1m^3 of kiln dried planed or machined sawn timber used as structural timber.

System boundary

This is a cradle to gate with all options declared EPD covering all modules from A1 to C4 and includes module D. Impacts and aspects related to losses/wastage (i.e. production, transport and waste processing and end-of-life stage of lost waste products and materials) are considered in the modules in which the losses/wastage occur.

Data sources, quality and allocation

Primary data has been collected by Wood for Good members for the 2014 calendar year to generate a mass weighted average of kiln dried sawn timber production for this EPD. Data provided covers all significant raw materials, energy inputs, water consumed and co-products, wastes and emissions produced over the lifetime of the product.

Allocation of inputs and outputs between the various wood co-products has been made on an economic basis in accordance with the rules stated in EN 15804 section 6.4.3.2. Modelling has been conducted in line with the core Product Category Rules given in EN 15804 supported by BS EN 16485:2014. Carbon sequestration during the growth phase has been calculated with the aid of BS EN 16449:2014.

All background LCI datasets used in the generation of this EPD are taken from the GaBi databases contained in the GaBi ts software tool.

Cut-off criteria

All raw materials and energy inputs related to the production of kiln dried sawn timber have been included. Energy and materials used on site for supporting functions (offices, testing, R&D, finishing) are beyond the system boundary and have been excluded where possible. However, for some sites, energy consumed by these functions cannot be separated from the total so has been included in the total consumption.

Transport of fuels, lubricants and packaging materials to site has been omitted, although this is expected to be minimal.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO_2 equiv.	kg CFC 11 equiv.	kg SO_2 equiv.	kg $(PO_4)^{3-}$ equiv.	kg C_2H_4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	-712	2.52E-09	0.644	0.126	0.0453	5.13E-06	1420
Construction process stage	Transport	A4	7.76	5.26E-12	0.0321	0.00786	-0.0132	1.46E-07	107
	Construction	A5	41.5	8.00E-11	0.00241	0.000482	0.000308	1.95E-07	5.71
Use stage	Use	B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Maintenance	B2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Repair	B3	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Replacement	B4	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Refurbishment	B5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Operational energy use	B6	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Operational water use	B7	0.00	0.00	0.00	0.00	0.00	0.00	0.00
End of life	Deconstruction, demolition	C1	12.7	7.52E-12	0.0248	0.00372	0.00246	1.75E-07	174
	Transport	C2	7.38	2.17E-11	0.0790	0.0110	-0.00439	2.89E-07	98.6
	Waste processing	C3	775	2.50E-10	0.332	0.0648	0.0351	4.28E-07	64.0
	Disposal	C4	9.19	2.90E-12	0.0147	0.000991	0.00227	5.98E-08	4.87
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-251	-5.89E-08	-0.571	-0.0552	-0.0418	-3.42E-05	-3290

GWP = Global Warming Potential;
ODP = Ozone Depletion Potential;
AP = Acidification Potential for Soil and Water;
EP = Eutrophication Potential;
POCP = Formation potential of tropospheric Ozone;
ADPE = Abiotic Depletion Potential – Elements;
ADPF = Abiotic Depletion Potential – Fossil Fuels;

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	2270	8440	10700	1570	0.00	1570
Construction process stage	Transport	A4	2.18	0.00	2.18	107	0.00	107
	Construction	A5	-225	0.00	-225	6.86	0.00	6.86
Use stage	Use	B1	0.00	0.00	0.00	0.00	0.00	0.00
	Maintenance	B2	0.00	0.00	0.00	0.00	0.00	0.00
	Repair	B3	0.00	0.00	0.00	0.00	0.00	0.00
	Replacement	B4	0.00	0.00	0.00	0.00	0.00	0.00
	Refurbishment	B5	0.00	0.00	0.00	0.00	0.00	0.00
	Operational energy use	B6	0.00	0.00	0.00	0.00	0.00	0.00
	Operational water use	B7	0.00	0.00	0.00	0.00	0.00	0.00
End of life	Deconstruction, demolition	C1	0.234	0.00	0.234	175	0.00	175
	Transport	C2	3.01	0.00	3.01	98.9	0.00	98.9
	Waste processing	C3	-4410	0.00	-4410	79.2	0.00	79.2
	Disposal	C4	0.298	0.00	0.298	5.03	0.00	5.03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5190	0.00	-5190	-4170	0.00	-4170

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00	0.00	0.00	0.204
Construction process stage	Transport	A4	0.00	0.00	0.00	0.00696
	Construction	A5	0.00	0.00	0.00	0.0471
Use stage	Use	B1	0.00	0.00	0.00	0.00
	Maintenance	B2	0.00	0.00	0.00	0.00
	Repair	B3	0.00	0.00	0.00	0.00
	Replacement	B4	0.00	0.00	0.00	0.00
	Refurbishment	B5	0.00	0.00	0.00	0.00
	Operational energy use	B6	0.00	0.00	0.00	0.00
	Operational water use	B7	0.00	0.00	0.00	0.00
End of life	Deconstruction, demolition	C1	0.00	0.00	0.00	0.000899
	Transport	C2	0.00	0.00	0.00	0.00802
	Waste processing	C3	0.00	0.00	0.00	0.239
	Disposal	C4	0.00	0.00	0.00	-0.00444
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00	0.00	0.00	-0.966

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (of product stage)	A1-3	7.54E-06	1.37	0.0615
Construction process stage	Transport	A4	4.98E-07	0.00187	0.000115
	Construction	A5	4.42E-08	0.271	0.000461
Use stage	Use	B1	0.00	0.00	0.00
	Maintenance	B2	0.00	0.00	0.00
	Repair	B3	0.00	0.00	0.00
	Replacement	B4	0.00	0.00	0.00
	Refurbishment	B5	0.00	0.00	0.00
	Operational energy use	B6	0.00	0.00	0.00
	Operational water use	B7	0.00	0.00	0.00
End of life	Deconstruction , demolition	C1	2.17E-08	0.0216	0.000186
	Transport	C2	3.14E-06	0.00405	0.000124
	Waste processing	C3	1.36E-06	0.0441	0.00624
	Disposal	C4	2.87E-08	1.97	6.30E-05
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.23E-06	-1.95	-0.354

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

Other environmental information describing output flows – at end of life						
			CRU	MFR	MER	EE
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00	0.00	0.00	0.00
Construction process stage	Transport	A4	0.00	0.00	0.00	0.00
	Construction	A5	0.00	0.00	0.00	79.6
Use stage	Use	B1	0.00	0.00	0.00	0.00
	Maintenance	B2	0.00	0.00	0.00	0.00
	Repair	B3	0.00	0.00	0.00	0.00
	Replacement	B4	0.00	0.00	0.00	0.00
	Refurbishment	B5	0.00	0.00	0.00	0.00
	Operational energy use	B6	0.00	0.00	0.00	0.00
	Operational water use	B7	0.00	0.00	0.00	0.00
End of life	Deconstruction, demolition	C1	0.00	0.00	0.00	0.00
	Transport	C2	0.00	0.00	0.00	0.00
	Waste processing	C3	0.00	264	0.00	2270
	Disposal	C4	0.00	0.00	0.00	0.00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00	0.00	0.00	0.00

CRU = Components for re-use;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	**Parameter**	**Units**	**Results**
A4 – Transport to the building site	Articulated lorry (27t payload capacity)	L/km	0.0110
	Distance	km	292
	Capacity utilisation	%	70
	Bulk density of transported products	kg/m^3	479
A5 – Installation in the building	Waste material generated at construction / installation site.	%	5
	Apart from material wastage, no installation impacts have been modelled.		
B2 – Maintenance	There is no maintenance throughout the service life of the product.		
B3 – Repair	There is no repair throughout the service life of the product.		
B4 – Replacement	There is no replacement throughout the service life of the product.		
B5 – Refurbishment	There is no refurbishment throughout the service life of the product.		
Reference service life	Reference service life	Years	60
	The reference service life will be equal to the lifetime of the individual structure in which the kiln dried timber is used. As an industry, the timber sector generally assumes a reference service life of 60 years for buildings, with timber products designed to last the full lifetime of the building assuming correct specification, installation and use.		
B6 – Use of energy; B7 – Use of water	There are no energy use requirements throughout the service life of the product.		
	There are no water use requirements throughout the service life of the product.		
C1 to C4 End of life	Waste for recycling (used as animal bedding/surfaces)	%	20
	Waste for recycling (used as input to other products e.g. panelboard manufacture)	%	35
	Transport to recycling – lorry carrying 12 m^3 skip	L/km	0.0159
	Distance, to recycling	km	50
	Capacity utilisation, to recycling	%	64
	Waste for energy recovery (includes domestic and export)	%	44
	Transport to energy recovery (domestic) – Lorry carrying 12m^3 skip	L/km	0.0159
	Distance, to energy recovery (domestic)	km	46
	Capacity utilisation, to energy recovery (domestic)	%	64
	Transport to energy recovery (export) – Articulated lorry (27t payload capacity)	L/km	0.0110
	Distance; to energy recovery (export) – lorry	km	327
	Capacity utilisation; to energy recovery (export) – lorry	%	64
	Transport to energy recovery (export) – Container ship	L/km	52.2
	Distance; to energy recovery (export) – ship	km	1274
	Capacity utilisation; to energy recovery (export) – ship	%	48
	Waste for final disposal (wood waste to landfill)	%	1
	Transport to landfill – Lorry carrying 12 m^3 skip	L/km	0.0159

Scenarios and additional technical information			
Scenario	**Parameter**	**Units**	**Results**
C1 to C4 End of life,			
	Distance; to landfill	km	21
	Capacity utilisation; to landfill	%	64
	Density of product; for all end of life scenarios	Kg/m^3	479
Module D	Recycled woodchips to be used as animal bedding, surfaces or as inputs to panelboard manufacture are credited with avoiding the production of woodchips from virgin softwood timber. Production of energy from biomass is credited with avoiding the production of grid electricity and thermal energy from natural gas. For UK production, UK electricity/thermal energy datasets are credited in module D. For exported biomass, datasets for the EU-27 are used. Landfill gas which is captured and used for electricity production is credited with avoiding the production of UK grid electricity. Module D also captures the benefits and loads associated with recycling, energy recovery and use of landfill gas from packaging materials and waste generated on site which is disposed of during the installation phase (A5).		

Summary, comments and additional information

Interpretation

Graphs showing the percentage contribution by each lifecycle stage to six of the EPD impact categories as well as primary energy and fresh water consumption are shown in the graph below. Global Warming Potential has been presented on a separate graph as the large negative value from carbon sequestration during growth makes other impact categories harder to interpret.

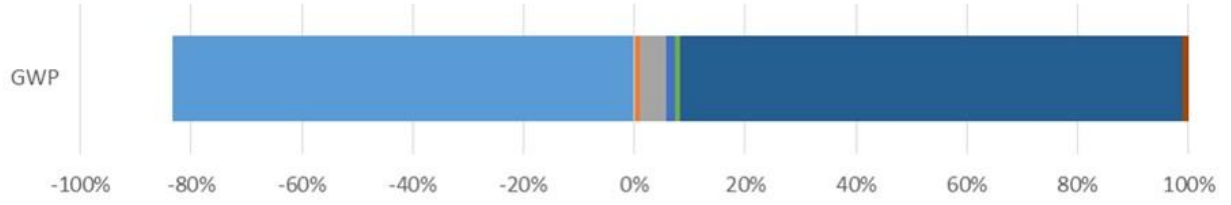
GWP is dominated by two lifecycle phases. In A1-A3 carbon is sequestered by the tree during the growth phase resulting in a GWP of -712 $kgCO_2e/m^3$, or -83% of the total. In C3 the incineration of woodchips for energy recovery results in a significant release of biotic carbon dioxide. C3 is also where woodchips to be used for recycling reach end-of-waste and cross the system boundary, which is also reported as a release of biotic carbon dioxide at the system boundary. Only 1% of wood C&D waste is landfilled, so the contribution from landfill in C4 is very small. The GWP of production (A1-A3) excluding biogenic carbon is 107 $kgCO_2e/m^3$ of product – mostly driven by electricity consumption and the fossil fuels used in kiln drying, such as fuel oil and natural gas.

Production of the kiln dried timber (A1-A3) is the most significant lifecycle phase for every impact category and indicator apart from freshwater consumption accounting for more than 50% of the total impact.

For freshwater consumption, the largest contribution comes from water used for cooling and steam production during waste biomass energy recovery. For acidification potential, eutrophication potential photochemical ozone creation potential production is the largest lifecycle phase (more than 50%), but there is a significant contribution from C3 due to emissions from biomass energy recovery as the material is combusted.

	ODP	AP	EP	POCP	ADPE	ADPF	PERT	PENRT	FW
A1-A3	87%	57%	59%	53%	80%	76%	102%	77%	40%
A4	0%	3%	4%	-15%	2%	6%	0%	5%	1%
A5	3%	0%	0%	0%	3%	0%	-2%	0%	9%
B1-B7	0%	0%	0%	0%	0%	0%	0%	0%	0%
C1	0%	2%	2%	3%	3%	9%	0%	9%	0%
C2	1%	7%	5%	-5%	4%	5%	0%	5%	2%
C3	9%	29%	30%	41%	7%	3%	-42%	4%	47%
C4	0%	1%	0%	3%	1%	0%	0%	0%	-1%

Figure 1



	GWP
A1-A3	-83%
A4	1%
A5	5%
B1-B7	0%
C1	1%
C2	1%
C3	91%
C4	1%

Figure 2

References

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BS EN 16485:2014. Round and sawn timber – Environmental Product Declarations – Product category rules for wood and wood-based products for use in construction

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BS EN 384:2016. Structural timber. Determination of characteristic values of mechanical properties and density.

BS EN 408:2010+A1:2012. Timber structures. Structural timber and glued laminated timber. Determination of some physical and mechanical properties.