Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

DOOR BLANK

from

PT KUTAI TIMBER INDONESIA

Programme:	The International EPD® System, www.environdec.com
EPD registered through the fully aligned regional hub:	EPD Southeast Asia, https://www.epd-southeastasia.com/
Programme operator:	EPD International AB
Regional Hub:	EPD Southeast Asia
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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

Products included in EPD :

This EPD covers one type with multiple variants of density based on the average results of the product group.

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General information

Programme information

Programme:	The International EPD® System
Address:	**EPD International AB** Box 210 60, SE-100 31 Stockholm, Sweden **EPD Southeast Asia** Kencana Tower Level M, Business Park Kebon Jeruk Jl. Raya Meruya Ilir No. 89, Jakarta Barat, 11620, Indonesia
Website:	www.environdec.com
E-mail:	info@environdec.com

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): Product Category Rules (PCR) of Construction Products (PCR 2019:14 Version 1.3.3), c-PCR-006 Wood and Wood-Based Products for use in construction (EN 16485) and UN CPC 314
PCR review was conducted by: The Technical Committee of the International EPD® System. **Review chair:** Claudia A. Peña, University of Concepción, Chile. The review panelist may be contacted via Secretariat www.envirodec.com/contact
Life Cycle Assessment (LCA)
LCA accountability: Krisbiantoro, Muhammad Faizal Mahmud, PT Superitending Company of Indonesia
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: Gloria FJ Kartikasari, PT Life Cycle Indonesia Approved by: The International EPD® System
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 registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:
PT. Kutai Timber Indonesia

Contact:
+62-335-422412
Kentaro Kanazawa, Director

Description of the organisation:
PT Kutai Timber Indonesia (PT KTI) was founded by Sumitomo Forestry Co., Ltd., Japan and the Fa. Kaltimex Jaya in 1970, its main business is marketing and manufacturing Door blank and wood product bases in Indonesia with the best technology and has had experience for the last 50 years.

The company's sustainability pays attention to aspects of forest rehabilitation and the environmental impacts arising from a series of production processes. PT KTI is aware that the manufacturing of wood products influences the environment; as a result, a scientific study is required to reduce the environmental impact resulting from the entire production process. One of the scientific studies to look at potential environmental impacts quantitatively is the environmental product declaration (EPD) based on a life cycle assessment (LCA).

In this Environmental Product Declaration, the environmental impact of Door blank items is transparently quantified. It's crucial to minimise any potential environmental impact by being transparent about how Door blank is produced. This study has implemented an international system for Type III environmental declarations according to the ISO 14025 standard.

Office address:
Tanjung Tembaga Baru Street Probolinggo Port 67218 East Java, Indonesia

E-mail:
pr@kti.co.id

Phone number:
+62-335-422412

Product-related or management system-related certifications:
Q-Mark, FSC

Name and location of production site (s):
Tanjung Tembaga Baru Street Probolinggo Port 67218 East Java, Indonesia

Product information

Product name:
Door blank

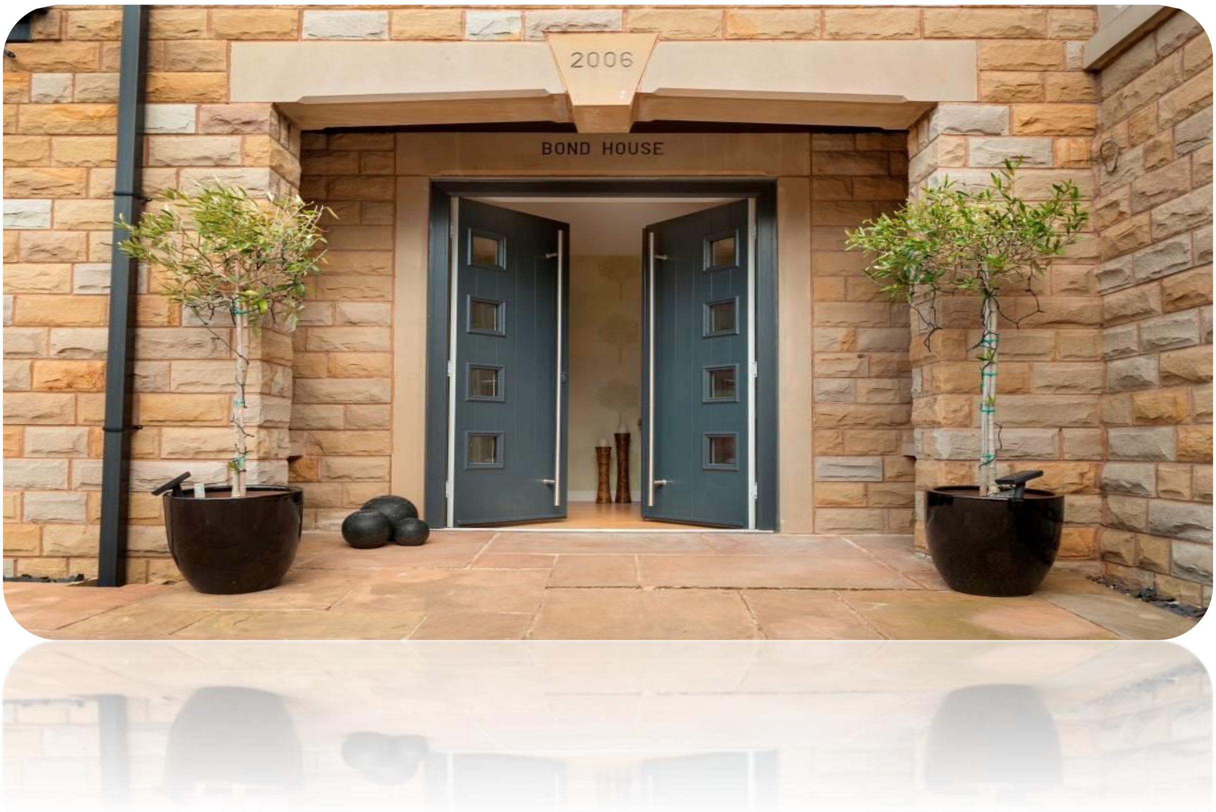

Product identification:
UN CPC 314

Product description:
Door blank is a pre-production door component used in door manufacturing. A door blank is a pre-production door component made from various materials. Door blanks are constructed using wooden raw materials, including bare core, plywood, lipping, bontos, and medium-density fiberboard (MDF). Door blanks possess the characteristic of fire resistance for 30-60 minutes. The production of door blanks employs sustainable Falcata wood, utilizing a mix of tropical hardwood for the core and plywood for the outer layer to create a fire-resistant, durable, and stable product. Door blank is often customized according to specific production needs.

Thickness (mm)	44 - 54
Dimension (mm)	Width : 915 - 1220
	Length : 2135 - 2440
Number of layers	3 - 9 plies
Density (kg/m^3)	384 – 485
Moisture content (%)	Max 14
Formaldehyde Emission Standard	Emission formaldehyde that complie with JAS Standard
Standard product	Q Mark
Forestry certification	CoC FSC STD 40.004 v.3.1; FSC STD 50.001 v.2.1 and Timber Legality Verification

UN CPC code:
UN CPC 314 – Board and panels

Geographical scope:
Raw materials are source mainly from the Maluku and Kalimantan, Indonesia (A1), and then the transported to Probolinggo, East Java, Indonesia (A2) where the manufacturing of Door blank (A3). The disposed and the end of life (C), benefit beyond (D) are scenario of U.K, Ireland, and Japan.



LCA information

Functional unit / declared unit:
1 m^3 Door blank

Reference service life:
If installed properly and moisture exposure is low or moderate, the service life of the Door blank is 100 years at minimum.

Time representativeness:
Specific data collected from 2022-01-01 to 2022-12-31 for the manufacturing. The requirement of a 10-year age for generic data has been fulfilled.

Database(s) and LCA software used:
Generic data for upstream and downstream processes use Ecoinvent 3.10 and modelled by using SimaPro Developer Software version 9.6. No datasets older than 10 years were used.

Description of system boundaries:

- **The Inclusion**
  The information modules within the scope of the LCA study are further elucidated in the technical flowchart (Figure 1). The LCA is divided into three information modules during the product stage. Information modules A1-A3 are based on actual and representative data from the Door blank production processes at PT KTI. Module C and D are scenarios.

A. Upstream (A1-A2)
   The raw material supply encompasses the sourcing and production of all materials used, including plantation wood and natural wood materials, as well as the energy consumption associated with both types of wood. Emission factors for electricity are based on the specific indonesia location using ecoinvent database.

   The raw material distribution process is calculated based on regional transportation specifications. The distribution of raw materials utilizes two modes of transportation: land transportation using dump trucks and maritime shipment using ships. The following presents the sequence of processes (A1-A2):
   1. Tree nursery/seedling and tree seedling cultivation (specifically for timber/wood plantation)
   2. Material extraction (plogging/harvesting and log cutting)
   3. Distribution of raw materials from suppliers to the factory site.
   4. Production of electricity
   5. Production and transportation of auxiliary material to the factory site

B. Core (A3)
   The production of wooden door blanks involves pieces of wood into veneers, which are subsequently bonded together to form door blanks with varying thicknesses. The manufacturing phase includes the consideration of energy consumption, water usage, and waste processing that results in emissions to the air, water, and soil. The production of door blank wood involves a sequence of processes within the manufacturing phase (A3):
   1. The production process comprises log pond management, log yard, sawmill, kiln dry, smoothing, edge trimming, edge groove cutting, putty application, lamination, pressing, final cutting, and packaging;
   2. Utilization of auxiliary materials (resin, flour);
   3. Water usage for the production process;
   4. Generation of hazardous waste (B3) and its third-party waste management;

5. Generation of non-hazardous waste and its third-party waste management;
6. Direct emissions into the environment (emissions from boilers, heavy equipment fuel, and wastewater treatment);
7. Material packaging of door blank product.

C. Downstream (C1-C4)
 1. Deconstruction and demolition;
 2. Transport;
 3. Waste processing;
 4. Disposal;

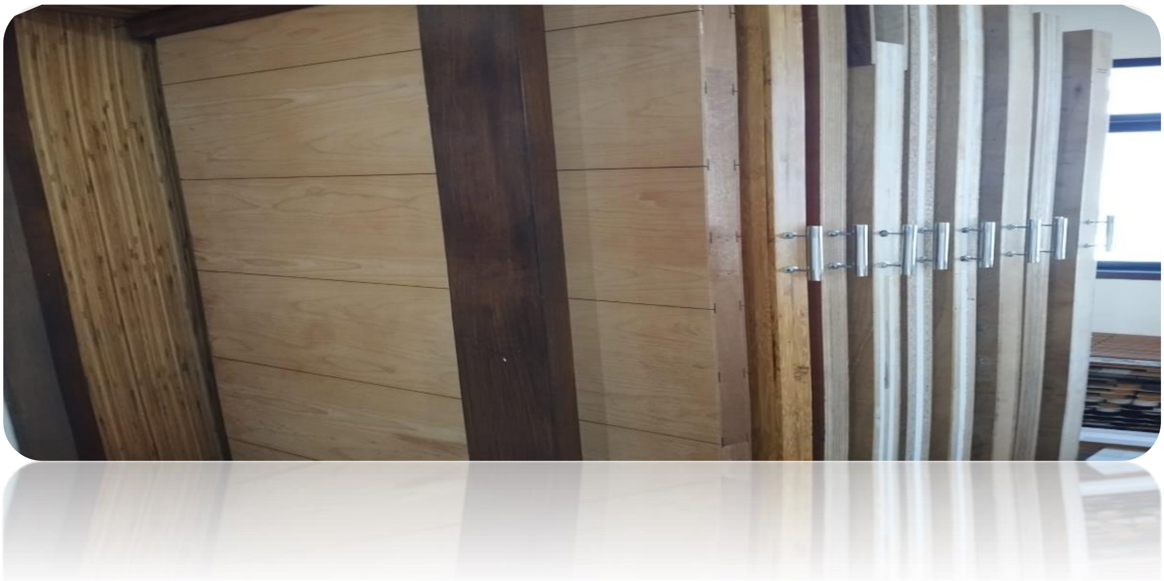
D. Downstream (Module D – Beyond benefit)
The end-of-life modelling is based on the most realistic scenario, using average values for waste treatment in the different countries (U.K, Ireland, Japan) where Door blank is sold.

- **The Exclusion**
The infrastructure, which includes factory buildings, production equipment, and utility systems, is not included in this study. Waste processing facilities, including wastewater treatment installations, as well as office buildings, shops, or warehouses used in company operations, along with office equipment, computer equipment, or other machinery used, are not included in these system boundaries.

A. Upstream (A1 and A2)
Capital goods such as logging trucks, chainsaws, forest road infrastructure such as forest roads built or maintained to facilitate access to logging sites, truck maintenance equipment, wood transport trucks, shipping terminal infrastructure are not include in this study.

B. Core (A3)
Capital goods in wood processing plant infrastructure such as factory buildings, machinery, and other equipment needed to process wood into finished products are not include in this study.

C. Donwnstream (C1-C4)
Disposal Equipment for Waste Disposal: Includes waste transport trucks, garbage compactors, and waste cutting tools to prepare construction waste for final disposal are not include in this study



System diagram:

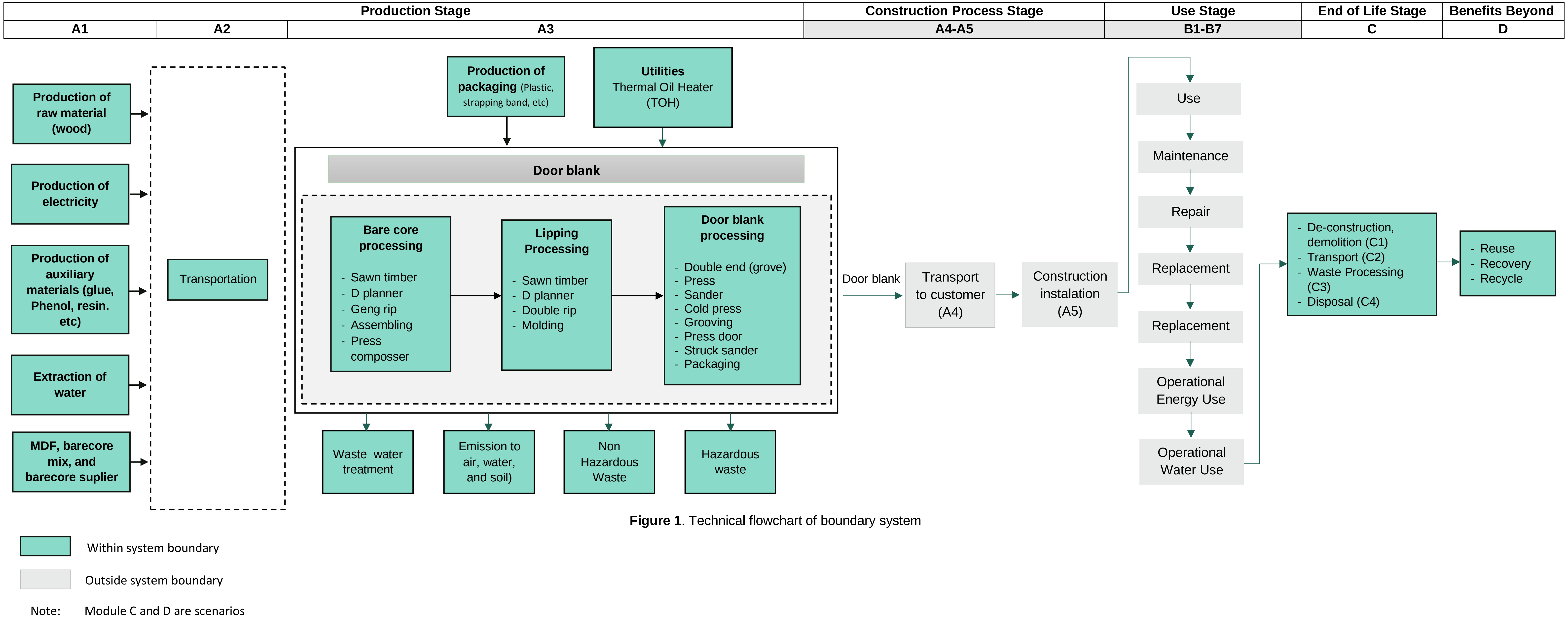


Figure 1. Technical flowchart of boundary system

More Information

Assumption

Assumptions were used to complete the unavailable data due to limitations in the data used in PT KTI's LCA study.

- Emission of land use change in module A3 is considered insignificant. The factory is located in an industrial zone established in 1970 (more than 50 years ago).
- The distribution process of raw material log wood for land and sea transportation is specifically unknown, so the data was collected from the five largest representative raw material distributors, and then weighted averages were calculated. The distribution distance via sea routes was identified using the Sea Distance Calculator.
- Energy consumption and emissions from the transportation process (from suppliers to manufacturing plant or from manufacturing plant to downstream processes including transportation to waste processing) are modeled using data available in the Ecoinvent database, considering the type of transportation used and the distance of transportation.

Cut-off

All inputs and outputs to a (unit) process shall be included in the calculation, for which data are available. In case of insufficient input data or data gaps for a unit process, the cut-off criteria shall be 1% of renewable and non-renewable primary energy usage and 1 % of the total mass input of that unit process. The total of neglected input flows per module, e.g. per module A1-A4, C1-C4 and module D shall be a maximum of 5 % of energy usage and mass. In this study, all data in the product system is included. If there is missing specific data, generic data from the database or literature was used.

Data Quallity

The data source obtained is primary data that can be traced through PT KTI's data for the year 2022. Data is collected from each internal department of PT KTI based on their respective activity data. The use of data is adjusted to the objectives and scope set at the early stages of the LCA study. Secondary data will be obtained from relevant databases and other research to complete the LCA calculations. The quality requirements for the data provided in EN15804 are based on the ISO 14044:

- Time-related coverage – The data set must be the most recent or updated within the last ten years for generic data and five years for specific data from other producers/manufacturers. Specific data were collected from January 01, 2022 – December 31, 2022, and generic data used is from 2017-2021.
- Geographical coverage – According to the research objectives, the geographical area from which data is collected should be representative. The geographic scope of this study is PT KTI, located in Probolinggo, East Java, Indonesia. Natural wood raw materials are distributed from Kalimantan and Maluku, while plantation wood raw materials are distributed from East Java. Specific data were collected from area under scope of study which is natural wood raw materials are distributed from Kalimantan and Maluku, while plantation wood raw materials are distributed from East Java. Generic data were collected from global average data
- Technological coverage – All relevant technologies are covered and reflect the reality of each product. Data collection was carried out based on industrial operations on a commercial scale, meaning that the technology used at the time of data collection was a factual operational condition (not on a pilot project scale or testing equipment). Generic data from global averages with technological aspects are similar to what is described in the process under analysis, however, improvements are needed because the processes were not modeled using specific data.
- Data quality for both specific and generic data were sufficient to conduct life cycle assessment in accordance with the defined goal and scope.

Allocation

Allocation is the distribution of input or output flows from a process or product system among the assessed product systems and one or more other product systems. Allocation is necessary when a single unit process produces more than one product, requiring the division of input or output flows from a process or product system between the primary product under study and other products. This study uses allocation because multiple products are generated, and the allocation is based on a mass-based approach.
The revenue difference from co-products in this process has been shown to be below 25%, specifically 0.12%. Therefore, in accordance with EN 15804 section 6.4.3.2, mass allocation is used as the allocation method. The use of mass allocation is considered appropriate because the small revenue difference indicates that its economic impact on the total allocation is relatively insignificant, making this method simpler and more suitable for the purpose of this analysis.

Mass allocation is applied in accordance with EN 15804:2012+A2:2019. Allocation is used to allocate the materials used in the production process. Additionally, mass allocation is also used to allocate the types of waste generated as well as the end-of-life of the waste produced in the manufacturing process, with the "polluter pays" principle applied to each type of waste. This means that KTI will bear the full environmental impact until the end-of-waste state is reached.

The benefit beyond the system boundary (module D) is a credit estimation derived from the system because in reality there are cross-continental market boundaries in Japan, the U.K., and Ireland. Therefore, the recycling recovery rates are adjusted to the rates in each country: Japan 66.74%, U.K. 15.39%, Ireland 32.92%. Unrecycled wood scraps are considered material losses that will enter another disposal scenario, such as landfill.

LCA Scenarios and Additional Technical Information

- The transportation using truck in Indonesia use euro 4 to represent the current condition (PermenLH No P.20, 2017).
- The electricity grid in module A3 is based on the Ecoinvent database for Indonesia, modified to represent the JAMALI (Java-Madura-Bali) electricity network. The composition of the electricity mix for JAMALI and the amount of electricity losses were adjusted based on statistics from the Directorate General of Electricity (2019), which heavily relies on coal (66%), gas (27.5%), hydropower (4%), geothermal (2%), and diesel (<1%). The climate impact of this electricity is 1.2 kg CO2 equivalent per kilowatt-hour.
- The wood energy recovery rate in the United Kingdom is 15.39%, recycling 65.07%, landfill 18.83%, and disposal 0.71% (BioReg, 2019)
- The wood energy recovery rate in the Ireland is 32.92%, recycling 63.72%, landfill 3.37%, and disposal 0.00% (BioReg, 2019)
- The wood energy recovery rate in the Japan is 66.74%, recycling 23.26%, landfill 10%. and disposal 0,00% (Ministry of land, infrastructure, transport and tourism, 2018)

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

	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	Water Processnig	Disposal	Reuse-Recovery-Recycling-Potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	GLO	GLO	ID										GLO	GLO	GLO	GLO	GLO
Specific data	40.6%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	<10% from GWP- GHG			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

1. Modules declared
   - ✓ Modules declared shall be noted with “X”.
   - ✓ Modules not declared shall be marked as “ND”.

2. Geography

   A1 : Modeled database based on the information from the manufacturing plant regarding the amount

   A2 : Modeled database for transportation data as specific distance and global database for material transport

   A3 : Data gathered from the specific data by manufacturing plant process

   C1 - C4 : Data are scenario from generic data

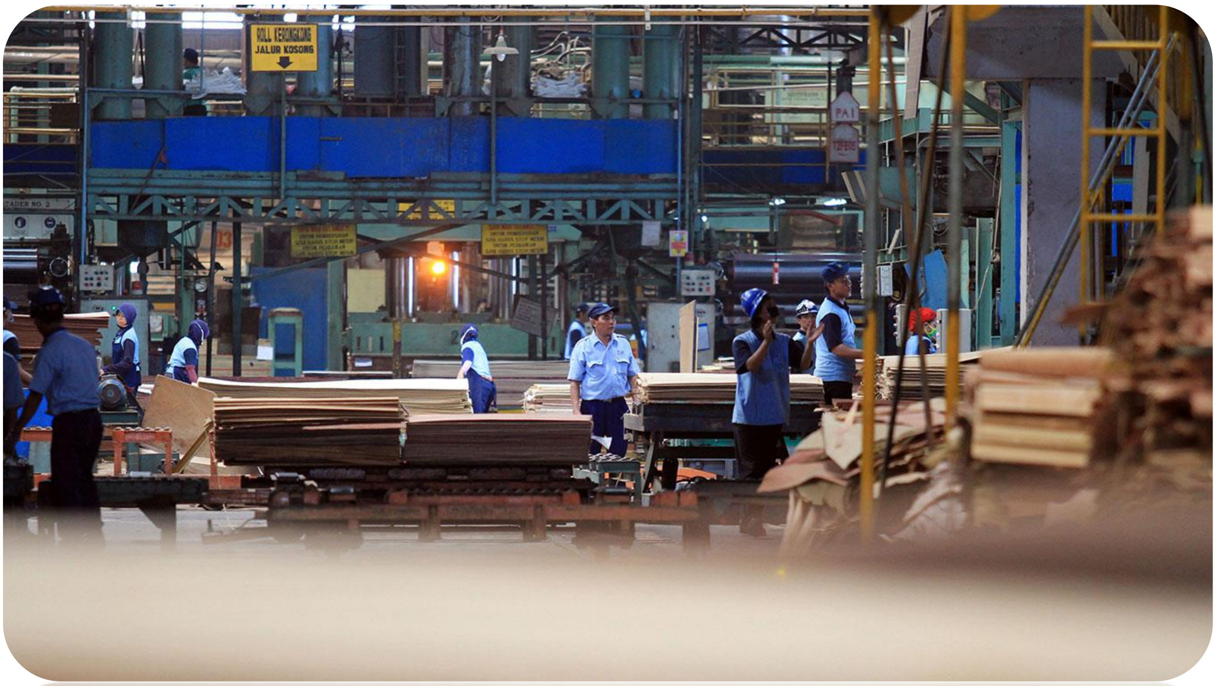
   D : Data are scenarios from generic data

3. Specific data used:

   Specific data is 40.6% from share of GWP-GHG based on specific data A1-A3 defined as:
   - ✓ A1
     - Impact of electricity
   - ✓ A2
     - Impact from transported of raw material and auxiliary
   - ✓ A3
     - Impact of burning fuel in boilers & heavy equipment
     - Impact of electricity
     - Impact of waste transportation

4. Variation product:

The door blank production process has variations in size and density where the A1 module allocation process is carried out based on the volume used. This is because tracking cannot be done based on wood type. Module A2 carries out an allocation process based on tonnage and the density of the wood used. The door blank production process (module A3) for all size variations is carried out using the same process, only the number of layers required is different. The product variation in modules A1-A3 is overall less than 10% based on GWP-GHG.



Content information

Product components	Wight, kg	Post-consumer material, weight %	Biogenic material, weight % and kg C/kg
Timber	420.60	0%	100%, 0.47 kg C/kg
Resin	19.3137	0%	-
Flour	1.6255	0%	100%, 0.475 kg C/kg
Total	**441.5392**		

Packaging materials	Wight, kg	Weight % (versus the product)	Weight biogenic carbon, kg C/kg
Strapping bands	0.0214	0.0048%	-
Plastic corners	0.0193	0.0044%	-
Cardboard corners	0.0352	0.0080%	-
Plastics	0.4115	0.0932%	
Raffia String	0.0015	0.0003%	
Total	**0.4889**		

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per Declared Unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential **(GWP total)**	Kg CO_2 eq	**2.91E+02**	**3.47E+00**	**2.44E+00**	**5.81E+02**	**1.39E+02**	**-6.43E+01**
Global warming potential (GWP fossil)	Kg CO_2 eq	8.74E+02	3.46E+00	2.44E+00	3.57E+01	8.66E-01	-5.55E+01
Global warming potential (GWP biogenic)	Kg CO_2 eq	-5.84E+02	3.14E-03	1.45E-03	5.45E+02	1.38E+02	-8.68E+00
Global warming potential land use and land use change (GWP LULUC)	Kg CO_2 Eq	7.31E-01	5.37E-03	1.01E-03	4.49E-02	8.67E-04	-5.08E-02
Depletion potential of the stratospheric ozone layer (ODP)	Kg CFC 11 Eq	6.15E-06	7.11E-07	5.30E-07	2.26E-06	2.48E-07	-1.46E-06
Acidification potential. accumulated exceedance (AP)	Mol H^+ eq	3.97E+00	1.75E-02	1.24E-02	1.18E-01	7.40E-03	-9.42E-02
Eutrophication potential. fraction of nutrients reaching freshwater end compartment (EP freshwater)	Kg P eq	4.99E-01	2.44E-04	1.84E-04	5.90E-03	1.98E-04	-1.50E-02
Eutrophication potential. fraction of nutrients reaching marine end compartment (EP marine)	Kg N eq	9.76E-01	6.36E-03	4.19E-03	2.64E-02	2.90E-02	-3.38E-03
Eutrophication potential. accumulated exceedance (EP terrestrial)	Mol N eq	1.12E+01	6.93E-02	4.58E-02	2.93E-01	2.81E-02	2.48E-01
Formation potential of tropospheric ozone (POCP)	Kg NMVOC eq	2.73E+00	2.03E-02	1.30E-02	7.32E-02	9.81E-03	-1.51E-01
Abiotic depletion potential for non-fossil resources (ADP mineral da metals)	Kg Sb eq	3.51E-03	4.54E-06	8.38E-06	1.01E-04	2.81E-06	-5.33E-04
Abiotic depletion for fossil resources potential (ADP fossil)	MJ. NCV	7.28E+03	4.87E+01	3.62E+01	8.90E+02	1.95E+01	-1.25E+03
Water (user) deprivation potential. deprivation weighted water consumption (WDP)	M^3 world eq	2.34E+02	1.56E-01	1.25E-01	1.76E+00	7.95E-01	-1.66E+01
Additional Environmental Impact Indicators. in accordance with EN 15804:2012+A2:2019							
Indicator	**Unit**	**A1-A3**			**C3**	**C4**	**D**
Particulate Matter emissions	Disease inc	4.71E-05	9.64E-08	2.14E-07	5.75E-07	1.44E-07	-3.98E-06
Ionizing radiation – human health	kBq U235 eq	9.23E+00	2.19E-01	1.66E-01	2.96E+01	9.15E-02	-2.21E+01
Eco-toxicity - freshwater	CTUe	2.99E+03	3.59E+01	3.11E+01	4.38E+02	1.94E+01	4.24E+02
Human toxicity – cancer effects	CTUh	9.15E-06	1.95E-09	9.24E-10	1.19E-08	7.35E-10	-1.23E-07
Human toxicity - non-cancer effects	CTUh	4.66E-06	2.66E-08	3.02E-08	2.70E-07	2.52E-08	-2.69E-08
Land use related impacts / soil quality	dimensionless	1.78E+04	1.11E+01	2.46E+01	3.59E+02	4.54E+01	-4.85E+03

***Disclaimer:** The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Additional mandatory and voluntary impact category indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Global warming potential **(GWP total)**	Kg CO_2 eq	8.77E+02	3.43E+00	2.42E+00	3.54E+01	5.66E+00	-5.45E+01

Resource use indicators

Results per Declared Unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	2.52E+03	5.18E-01	4.17E-01	1.59E+02	3.58E-01	-1.04E+03
Use of renewable primary energy resources used as raw materials	MJ	6.57E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	MJ	**9.08E+03**	**5.18E-01**	**4.17E-01**	**1.59E+02**	**3.58E-01**	**-1.04E+03**
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	7.28E+03	5.18E+01	3.85E+01	9.39E+02	2.07E+01	-1.34E+03
Use of non-renewable primary energy resources used as raw materials	MJ	1.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources	MJ	**7.30E+03**	**5.18E+01**	**3.85E+01**	**9.39E+02**	**2.07E+01**	**-1.34E+03**
Use of secondary material	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	7.42E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	m^3	5.84E+00	7.72E-03	4.29E-03	1.68E-01	1.96E-02	-5.24E-01

Waste Production

Results per Declared Unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	Kg	1.22E-03	2.82E-02	3.70E-03	9.25E-02	0.00E+00	1.54E-02
Non-hazardous waste disposed	Kg	1.74E+00	0.00E+00	0.00E+00	2.08E-02	7.92E+01	3.42E+02
Radioactive waste disposed	Kg	0.00E+00	0.00E+00	0.00E+00	3.69E-08	0.00E+00	0.00E+00

Output flow indicators

Results per Declared Unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Component for re-use	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	Kg	0.00E+00	0.00E+00	0.00E+00	2.67E+02	0.00E+00	0.00E+00
Materials for energy recovery	Kg	0.00E+00	0.00E+00	0.00E+00	7.43E+01	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
Exported energy. thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

References

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Contact Information

Owner of the EPD

PT. Kutai Timber Indonesia
Jl Tanjung Tembaga Baru
Probolinggo Port
67218 East Java, Indonesia

Phone
+62-335-422412
(Kentaro Kanazawa)

Faximile
62-335-421669

Website
https://www.kti.co.id/en/home/

LCA Practitioner

PT. Sucofindo
Jl Raya Pasar Minggu Kav. 34
Jakarta 12780

Phone
+62-21-7983666
(Official Sucofindo)

Email
Customer.service@sucofindo.co.id

Website
https://www.sucofindo.co.id/

Programme Operator

EPD International AB
Box 21060
SE-100 31 Stockholm
Sweden

EPD Southeast Asia
Kencana Tower Level M, Business Park Kebon Jeruk,
Jl Raya Meruya Ilir No. 88,
Jakarta Barat 11620, Indonesia
https://www-epd-southeastasia.com/Contact
admin@epd-southeastasia.com

ENVIRONMENTAL PRODUCT DECLARATION

PT KUTAI TIMBER INDONESIA

Website

https://www.kti.co.id/en/home/

Office address:
Tanjung Tembaga Baru Street Probolinggo Port 67218 East Java, Indonesia