Oji Fibre Solutions

Environmental Product Declaration

Tasman UKP

A paper-grade Unbleached Kraft Pulp (UKP)
manufactured at Oji Fibre Solutions Tasman Mill

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EPD® ENVIRONMENTAL PRODUCT DECLARATION

AUSTRALASIA EPD® ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006.

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.

What is an Environmental Product Declaration?

An Environmental Product Declaration (EPD) is a robust, science based, independently verified and standardised method for communicating the environmental impacts of a product. An EPD is based on a Life Cycle Assessment (LCA) which is a methodology for assessing environmental impacts associated with all the stages of the life cycle of a commercial product, process, or service. It involves collecting extensive data across the product's life cycle — from raw material extraction and processing (cradle), through the product's manufacture, distribution and use, to the recycling or final disposal of the materials composing it (grave).

The environmental impacts of Oji Fibre Solutions paper-grade Unbleached Kraft Pulp (Tasman UKP) are covered in this EPD. It is based on a cradle-to-gate LCA, with transport to customer and end-of-life. 'Cradle' refers to the raw material extraction and the 'gate' is the exit gate of the production facility (Tasman Mill) as the product is ready to go out to customers.

This EPD has been produced in accordance with a consistent set of rules known as Product Category Rules (PCR). EPDs within the same product category from different programmes may not be comparable.

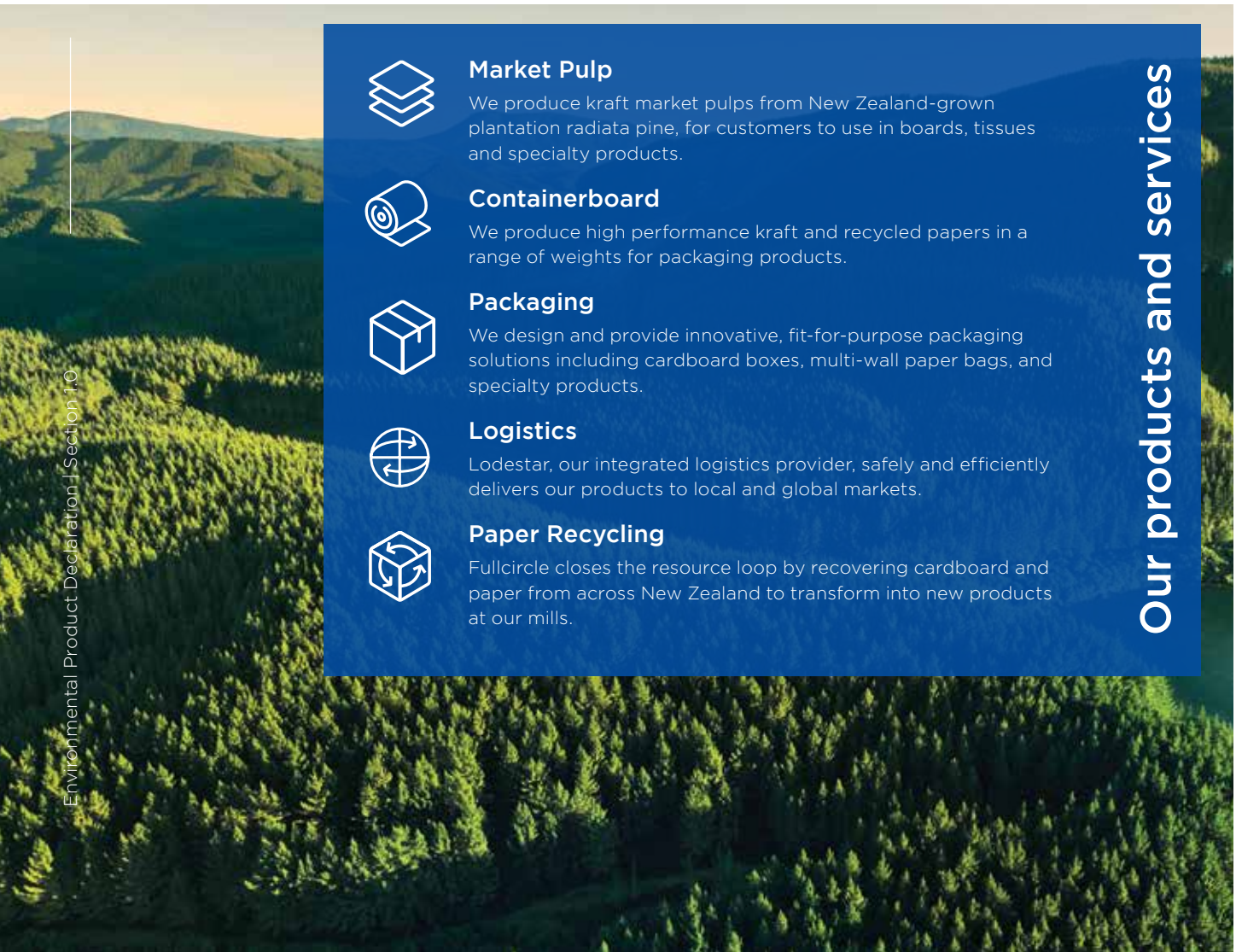
Contents

Section 1.0

About Oji Fibre Solutions

Oji Fibre Solutions is one of Australasia's leading producers of market pulp, paper and fibre-based packaging, with manufacturing operations across New Zealand and eastern Australia. We are a vertically integrated business employing around 1,800 people and supplying customers in more than 30 countries around the world.

We create long-term shared value for our people, partners, customers and communities using sustainably managed, New Zealand-grown radiata pine to produce quality fibre-based products, with aligned logistics and paper recycling services.



Our products and services

Market Pulp
We produce kraft market pulps from New Zealand-grown plantation radiata pine, for customers to use in boards, tissues and specialty products.

Containerboard
We produce high performance kraft and recycled papers in a range of weights for packaging products.

Packaging
We design and provide innovative, fit-for-purpose packaging solutions including cardboard boxes, multi-wall paper bags, and specialty products.

Logistics
Lodestar, our integrated logistics provider, safely and efficiently delivers our products to local and global markets.

Paper Recycling
Fullcircle closes the resource loop by recovering cardboard and paper from across New Zealand to transform into new products at our mills.

Our approach to sustainability

At Oji Fibre Solutions our approach to sustainability is defined by our purpose and our values. Our purpose is to create solutions by nature. We do this by innovating in the use of renewable wood-fibre and sharing the benefits of the circular bioeconomy to make a difference each day.

Built on a strong heritage of manufacturing quality products from renewable natural and low carbon resources, we are committed to a sustainable future by driving the circular bioeconomy forward and contributing towards the United Nations Sustainable Development Goals.

Our 2020-25 Sustainability Action Plan builds on the foundations we have created over the previous six years to further enhance our approach to sustainability by connecting people and connecting place.

For more information refer to: ojifs.com/sustainability

Our place in the circular bioeconomy

We are proudly part of the circular bioeconomy, harnessing the strength of natural, renewable resources and to recycle these throughout our value chain. The primary input we use in manufacturing our products is residuals from forest resources – lower value logs, toplogs not suitable for sawmilling and sawmill chips which are generated as during the production of sawn timber by other wood processors.

Chemicals and by-products manufactured as part of the pulping process are reused within our processes and by other manufacturers in New Zealand. We seek to close production loops in both our operations and products provided.

We have long provided consumers with renewable products. These are recovered globally in established recycling and remanufacturing facilities, giving our products a second-life.

Powering our operations from sustainable energy sources

As a large user and producer of low carbon energy, more than three quarters of the energy used in our operations is from renewable sources. This includes biofuels from processing residues, geothermal steam and purchased (grid) electricity from within New Zealand, which is predominantly renewable.

Our values

BUILT ON STRENGTH

Our strength stems from our heritage and from our people.

TRUSTED PARTNER

We are trusted by our communities, customers and stakeholders.

FUTURE FOCUSED

We look towards the future, and welcome change. Sustainability is core to our operations.

INNOVATION

We are always striving to raise the standard of our products and services, and to ensure the success of our customers' brands.

Sustainability at Tasman Mill

While we operate a number of pulp, paper and packaging facilities in New Zealand and Australia, this EPD is for Tasman UKP, a paper-grade Unbleached Kraft Pulp (UKP) made at Tasman Mill in Kawerau, New Zealand. The mill is strategically located in New Zealand's largest forestry region and within the Kawerau Geothermal System – the world's largest industrial geothermal area.

Oji Fibre Solutions completed a mill-wide transformation project in 2019 to refocus Tasman Mill's production mix and substantially change its energy systems which eliminated bleaching processes and the use of coal.

Natural renewable fibre inputs

Our virgin wood-fibre comes from sustainably managed exotic radiata pine plantation forests in the North Island of New Zealand. Fibre comes directly from the forest in the form of wood residues and 'pulp wood', and indirectly from sawmills, providing a value adding outlet for the by-products of New Zealand sawn timber businesses.

Tasman Mill certifications and supply chain integrity

Tasman Mill's Chain of Custody certifications provide third-party assurance (PEFC™, FSC®) of the origin of wood-fibre products to internationally recognised standards.

Forest Stewardship Council (FSC®) — FSC® C016539
Programme for the Endorsement of Forest Certification (PEFC™) — PEFC/40-31-11
Chain of Custody (CoC) certification

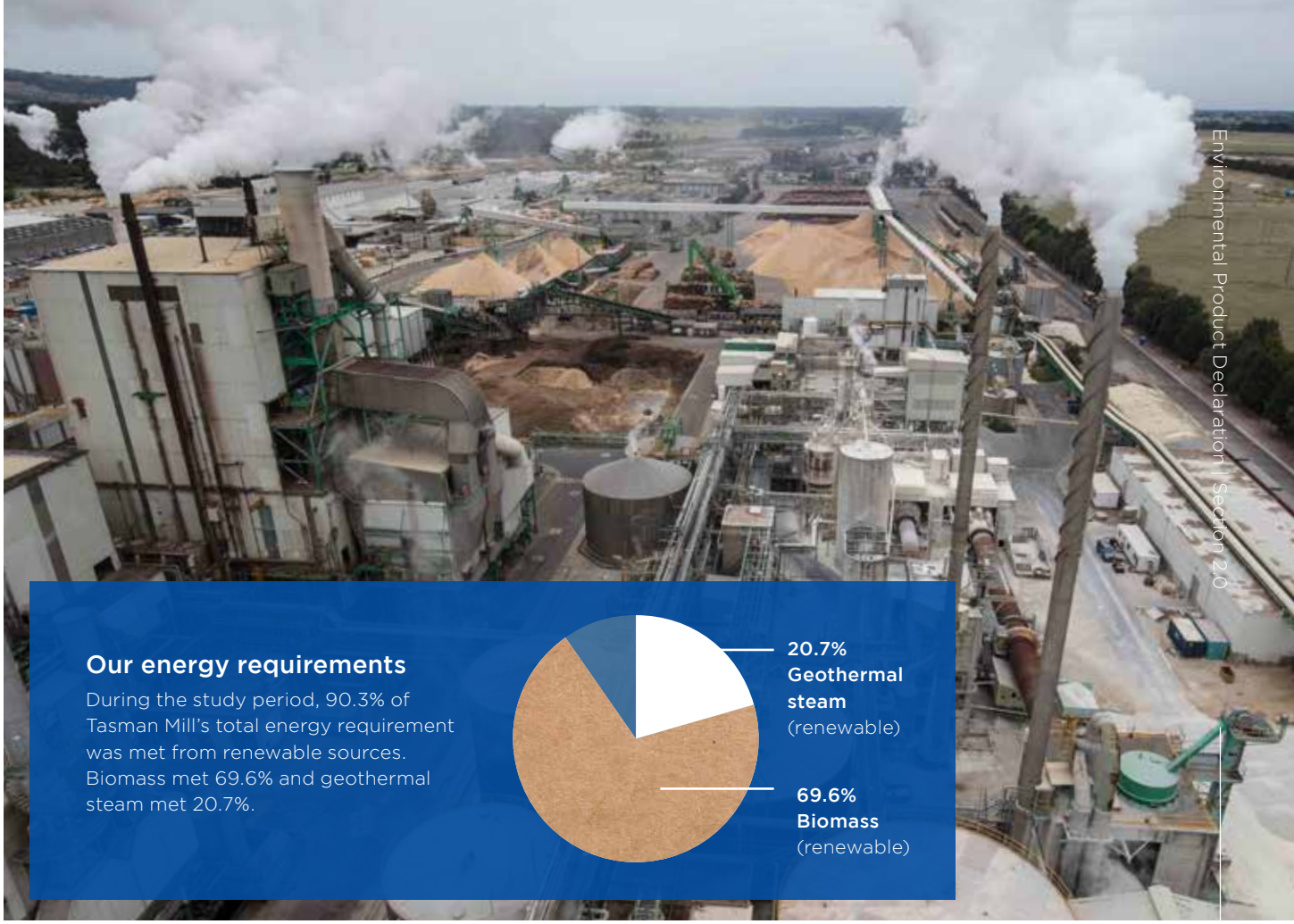
Provides assurance that the virgin fibre we use comes from suppliers with sustainable forest management systems who hold Chain of Custody certification or the fibre meets certification requirements for mixed or controlled sources.

ISO 9001:2015 certified Quality Management Systems

A voluntary international standard which defines how an efficient Quality Management System should work.

ISO 14001:2015 certified Environmental Management System

A voluntary international standard which defines how an efficient Environmental Management System should work.



Biomass and geothermal energy

The kraft pulp process creates a biofuel (black liquor) that helps power other in-mill processes. We also use the residuals from our chipping and debarking operations as a biofuel to heat and power our operations. The Tasman Mill draws geothermal steam from a local bore owned and operated by Ngāti Tāwharetoa Geothermal Assets. Using geothermal energy for direct heat is more efficient than converting it to electricity.

Water discharge

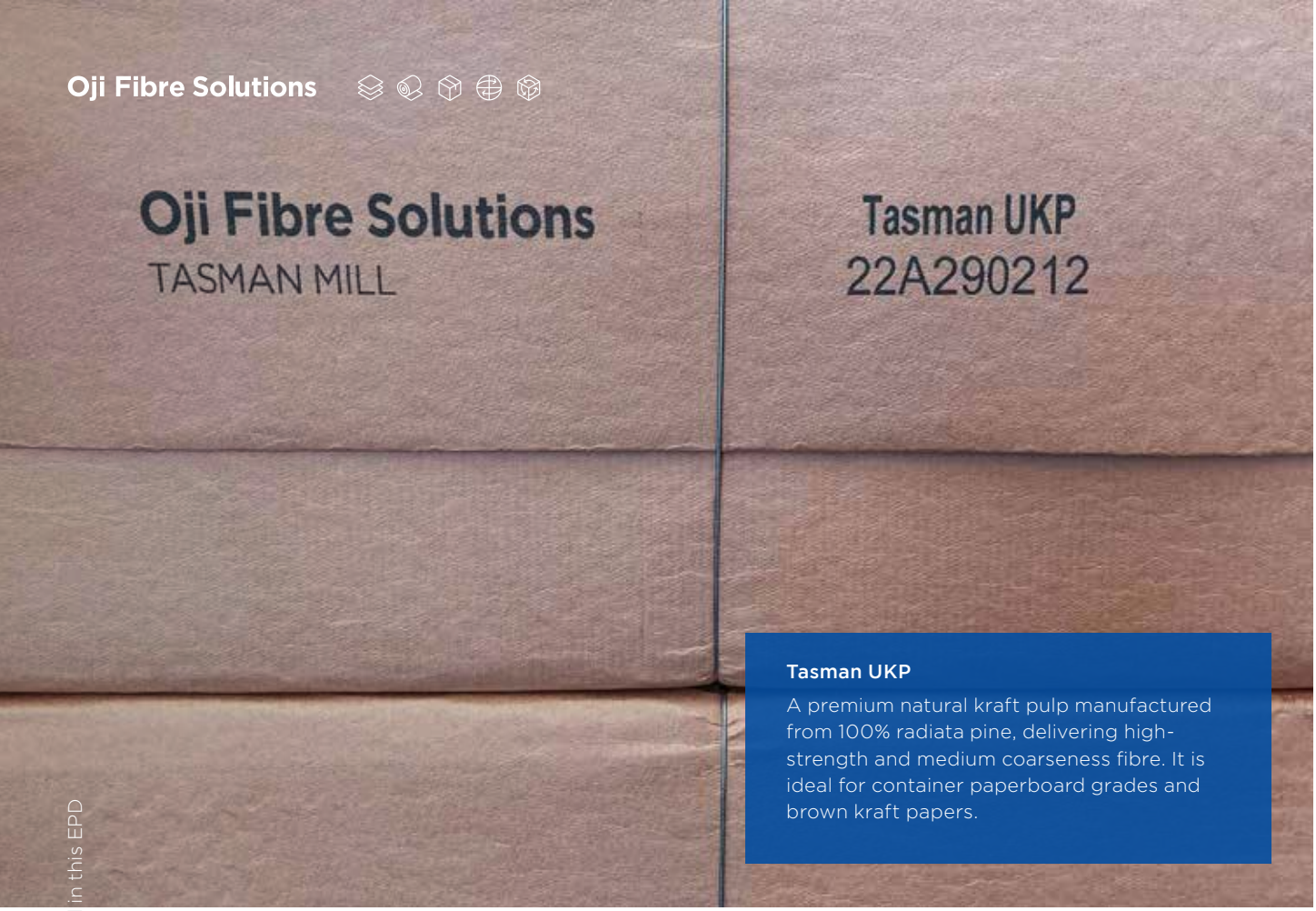
Tasman Mill wastewater undergoes primary and secondary treatment prior to discharge into the local catchment. We monitor discharges to water and in mid-2019 achieved our water colour reduction target, 16 years ahead of schedule. Closure of the Tasman Mill bleach plant removed bleach from the discharge, contributing to this success.

Pulp by-products

We aim to divert as much waste from landfill as possible. We do this within our own processes and by selling by-products (tall oil and turpentine) manufactured as part of the pulping process to other manufacturers in New Zealand. Tasman Mill closes the resource loop and achieves a beneficial reuse of waste by composting primary solids and making dry lime residuals available to farmers as a soil conditioner.

10-bale units

Tasman Mill offers pulp customers added value in supply chain logistics with a choice of traditional eight-bale or our new 10-bale units to provide 25% more pulp per twenty-foot shipping container. For example, a customer who orders 1,000 ADMT shipped as 10-bale units rather than eight-bale units requires 11 less containers. As a result, less handling and on-site container storage is required and there are fewer vehicle movements throughout the supply chain.



Tasman UKP

A premium natural kraft pulp manufactured from 100% radiata pine, delivering high-strength and medium coarseness fibre. It is ideal for container paperboard grades and brown kraft papers.

Section 2.0

Considered in this EPD

EPD for a specific product

Tasman UKP is a premium natural kraft pulp made from 100% radiata pine.

Our range of UKP grades provides a good balance of strength properties, cleanliness and shade.

Tasman UKP is an intermediate product ideal for packaging, including paperboard, kraft linerboard, corrugated medium, cartonboard and unbleached kraft papers.

Unbleached Packaging Paperboard
Including kraft linerboards, folding box board, carton board, and the top ply of testliner boards

Unbleached Kraft Papers
Including unbleached industrial packaging papers, wrapping papers and brown specialty papers.

The parts of the life cycle included in this EPD

This EPD focuses on pulp products made at Tasman Mill in Kawerau, New Zealand. It is based on a cradle-to-gate Life Cycle Assessment (LCA) with transport to customer and end-of-life. ‘Cradle’ refers to the raw material extraction. ‘Gate’ refers to the exit gate of the Tasman Mill.

The EPD includes three life cycle stages:

Upstream - includes extraction of raw materials.

Core - includes transport of raw materials to the mill and manufacturing of pulp and packaging of the product.

Downstream - includes transport to the customer and end-of-life.

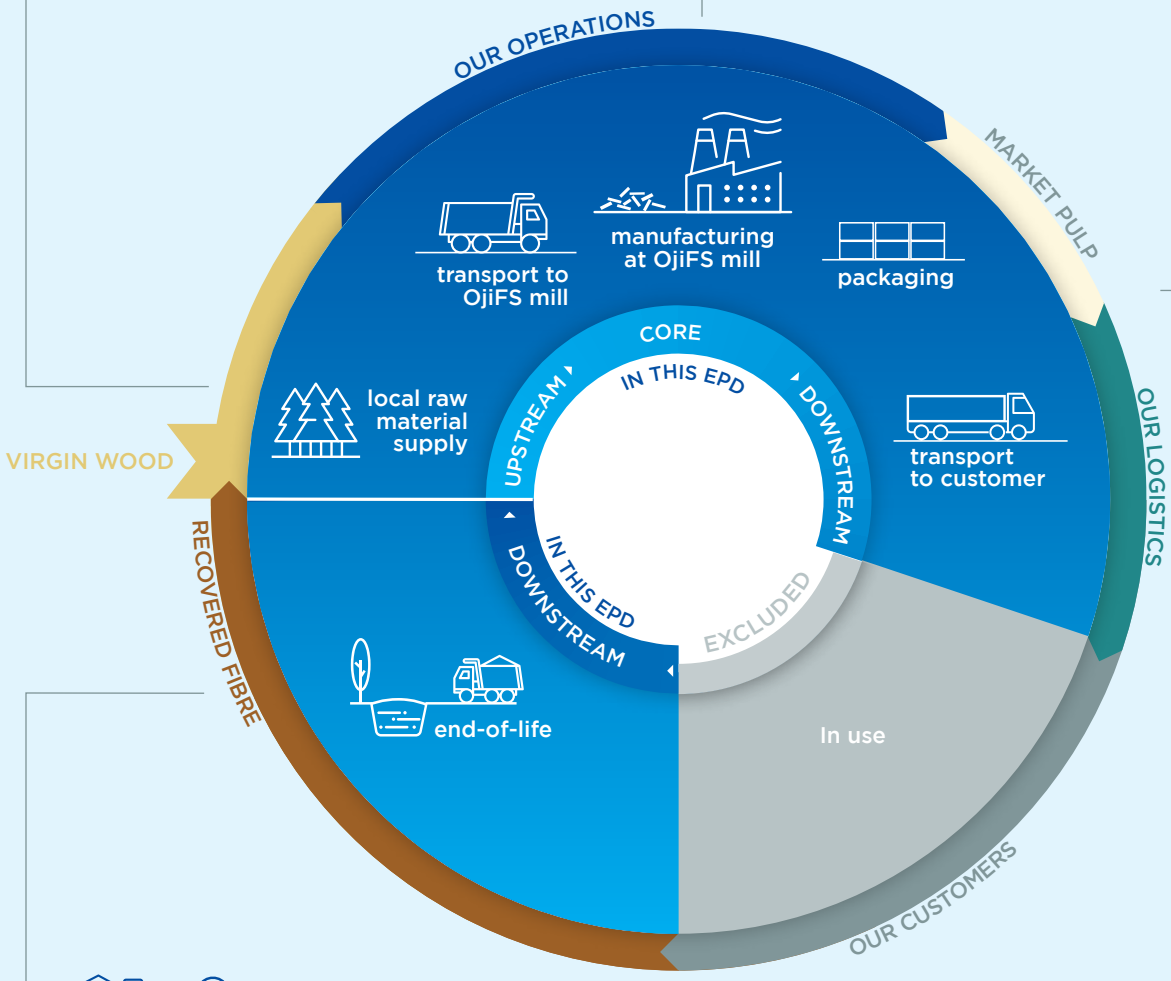
Figure 01: A simplified pulp life cycle indicating the parts that are included in this EPD.

Local raw materials (Upstream)

It starts with wood residues and pulp logs from sustainably managed New Zealand plantation forests and sawmill chip residues from sawmills.

Manufacturing (Core)

The kraft pulp process separates lignin from wood, producing black liquor. This is used as biofuel in the production process and is supplemented by wood waste such as bark. The Tasman Mill also uses local geothermal steam. 90.3% of Tasman Mill energy is from renewable sources.

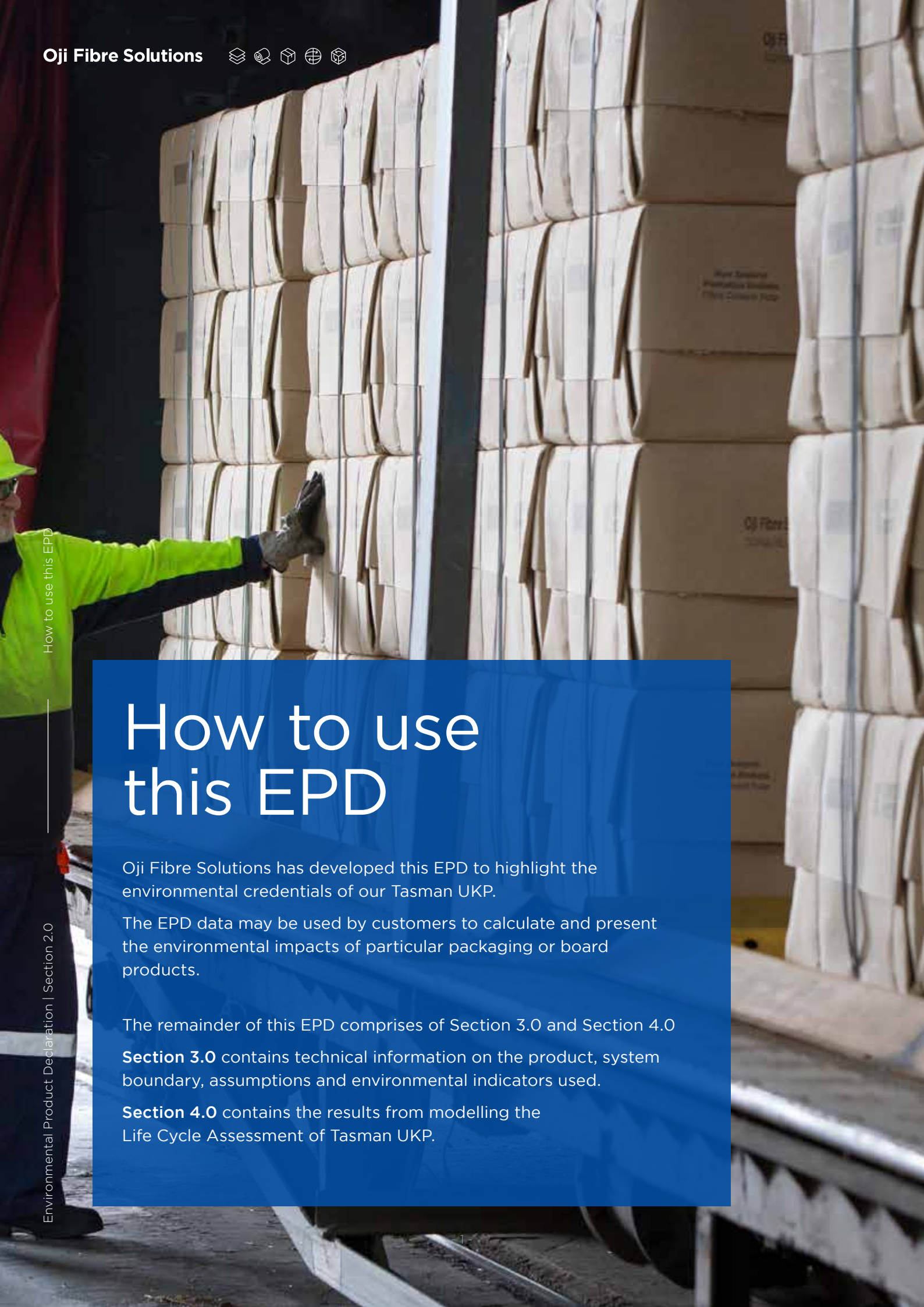


End-of-life and recovery (Downstream)

After use, products manufactured from Tasman UKP (a virgin fibre) can be recycled, contributing to the circular economy.

Packaging and transport (Core + Downstream)

Oji Fibre Solutions Tasman UKP is produced in 240 kg bales. Bales are wrapped in Tasman UKP and recycled steel wire. The product is shipped in 8 or 10 bale units. The 10-bale packaging method allows more pulp weight per container to be sent, resulting in lower transport emissions.



How to use this EPD

Oji Fibre Solutions has developed this EPD to highlight the environmental credentials of our Tasman UKP.

The EPD data may be used by customers to calculate and present the environmental impacts of particular packaging or board products.

The remainder of this EPD comprises of Section 3.0 and Section 4.0

Section 3.0 contains technical information on the product, system boundary, assumptions and environmental indicators used.

Section 4.0 contains the results from modelling the Life Cycle Assessment of Tasman UKP.

Section 3.0

Technical information

Declared unit

Every EPD must specify either a functional or declared unit. A functional unit is the 'amount' of a product on which the EPD results are based. As far as possible, this unit should relate to the product's functions (what it achieves) rather than the physical product (what it is). The unit is a measure of performance and must specify a function, a quantity, a duration and a quality.

A declared unit is the term used in place of functional unit when an EPD does not cover the full product life cycle from extracting raw materials through to end-of-life.

The declared unit for this EPD is:

1 metric tonne of air-dried (ADMT) pulp and distribution packaging.

Classification

Table 01 shows the classification codes and class descriptions of the products included within this EPD according to the UN CPC (Version 2.1) and ANZSIC 2006 classification systems.

Table 01: Classification codes and class descriptions

Product	Classification	Code	Category
Unbleached kraft pulp (Paper-grade UKP)	UN CPC Ver.2	3211	Pulps of wood or other fibrous cellulosic material
	ANZSIC 2006	1510	Pulp, Paper and Paperboard Manufacturing

Content declaration

Cellulose from wood constitutes more than 99% of the finished pulp product. The remaining up to 1% constitutes inorganic components carried through with the cellulose fibre and/or process additives.

Table 02: Content declaration

Product components	Weight (kg/ ADMT)	Post-consumer material	Biogenic material
Cellulose and hemicellulose	>990	0%	100% 459 kg C/kg
Additives	<10.0	0%	100% 0 kg C/kg
Total	**1000**	**0%**	**>99.0% 459 kg C/kg**

Packaging

Tasman UKP is packed for market in a pulp wrapper and therefore the only raw material used in packaging is steel wire from recycled steel.

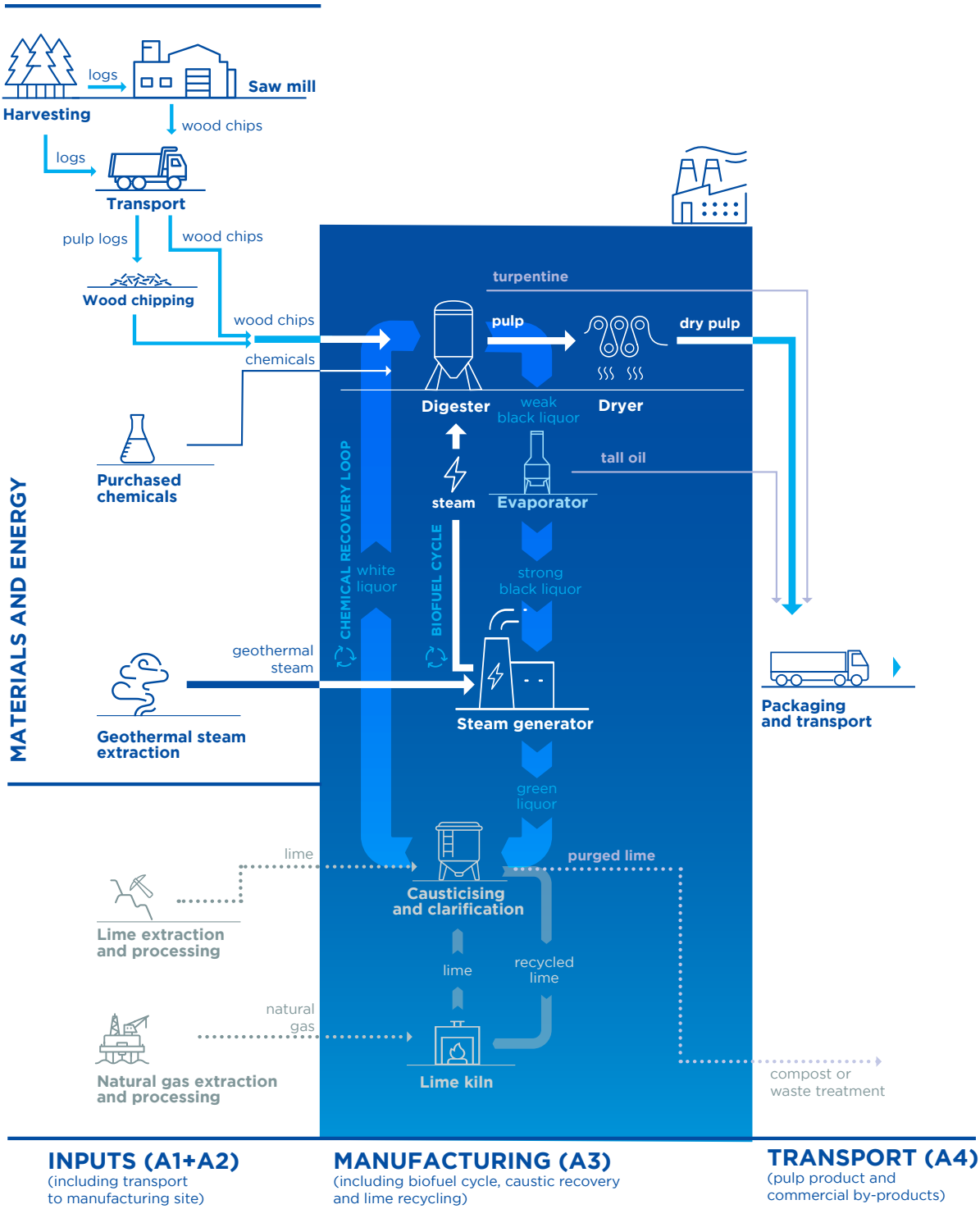
Table 03: Packaging materials

Packaging materials	Weight (kg/ ADMT)	Weight % (vs. the product)	Biogenic (kg C/kg)
Steel bailing wire	2.60	0.260%	0
Total	**2.60**	**0.260%**	**0**

Manufacturing process

The UKP is produced from 100% virgin wood chips; it does not contain recycled material. Wood chips are sourced from sawmills and chipped on-site from purchased pulp logs. The pulp is produced on two production lines each consisting of a continuous digester and a dryer. Further detail on the manufacturing process can be found in Figure 02.

Figure 02: Manufacturing process



System boundary

In Life Cycle Assessments, the system boundary is a line that divides the processes which are included from those which are excluded.

As shown in Table 04 below, this EPD is of the type 'cradle-to-gate with options and end-of-life stage'. The option included is transport to customer. The module numbers from EN 15804+A2 have been used in the table below.

Table 04: Modules included in the scope of the EPD (following EN 15804+A2)
(X = included in the EPD | ND = module not declared)

	Raw material supply	Transport of raw materials	Manufacturing	Transport to customer	Construction / Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport to waste processing	Waste processing	Disposal
	UPSTREAM	CORE			DOWNSTREAM											
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Module declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X
Geography	NZ	NZ	NZ													
Specific data	>90%															
Variation – products	Not relevant															
Variation - sites	Not relevant															
	INCLUDED IN THE EPD				NOT INCLUDED IN THIS EPD								INCLUDED IN THE EPD			

Upstream (Module A1)

The upstream stage includes the environmental impacts associated with raw materials extraction and processing of inputs, and transport to, between and within the manufacturing site.

Core (Modules A2-3)

The production stage includes manufacturing of product up to the exit gate of the manufacturing site.

Downstream (Modules A4 + C1-4)

The downstream stage is declared separately for end-of-life and other downstream activity.

Disposal is assumed to occur in China with 51% to landfill and 49% to recycling.

Life Cycle Inventory and assumptions

Primary data was collected for all processes and input materials in manufacturing. Primary data for Oji Fibre Solutions operations was sourced from the period 01 July 2020 to 30 June 2021. Background data was used for input materials sourced from other suppliers.

All data in the background system were from the GaBi Life Cycle Inventory Database 2022 (Sphera 2022). Most datasets have a reference year between 2018 and 2021.

Upstream data

Upstream data was matched to their origin regions where known, otherwise European datasets were used where Australasian datasets were not available.

Electricity

New Zealand's national electricity mix was used.

Recycling

No recycling happens on-site within the scope of the study.

Explanation of average / representative products & variation

Due to the product being produced between two production lines, results are calculated as an average weighted by production volume over the full reference period.

Cut off criteria

The following are excluded from the system boundary: personnel related activities, infrastructure, and production equipment not directly consumed in the process. All other reported data were incorporated and modelled using the best available Life Cycle Inventory data.

Transport

Upstream transportation was based on the distance between the supplier and the Tasman Mill. Where upstream transportation was not known, a standard value of 100km was used. For downstream transportation, scenarios were supplied by Oji Fibre Solutions based on major markets for Tasman UKP. This EPD assumes sea freight from New Zealand to China.

Allocation

Allocation for co-products follows the PCR. Where economic allocation was required, prices were based on data from 1 July 2020 to 30 June 2021. No secondary materials are used in the production. Allocation for input materials that contain secondary material occurs in the upstream datasets.

Environmental impact indicators

An introduction to each environmental impact indicator is provided below. The best-known effect of each indicator is listed to the right of its name.

Global Warming Potential (GWP) a.k.a. Carbon footprint | Climate Change

A measure of greenhouse gas emissions, such as carbon dioxide and methane. These emissions increase absorption of radiation emitted by the earth, intensifying the natural greenhouse effect. Contributions to GWP can come from either fossil or biogenic sources, e.g. burning fossil fuels or burning wood. GWP is reported as a total as well as being separated into biogenic carbon (GWPB) and fossil carbon (GWPF).

Ozone Depletion Potential (ODP) | Ozone Hole

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

Acidification Potential (AP) | Acid Rain

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

Eutrophication Potential (EP) | Algal Blooms

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

Photochemical Ozone Formation Potential (POFP) | Summer Smog

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

Abiotic Depletion Potential (ADPmm and ADPf) | Resource Consumption

The consumption of non-renewable resources leads to a decrease in the future availability of the functions supplied by these resources. Depletion of mineral resource elements (ADPmm) and non-renewable fossil energy resources (ADPf) are reported separately.

Water Depletion Potential | Water Consumption

The potential for water deprivation, to either humans or ecosystems.

Indicator types

The results tables describe the different environmental indicators for the product per declared unit, for each upstream, core, and downstream activities.

Below is a description of the different indicator categories with tables of the indicators assessed within these categories.

Environmental impacts

The reported impact categories represent impact potentials, i.e., they are approximations of environmental impacts that could occur if the emissions would

(a) follow the underlying impact pathway and

(b) meet certain conditions in the receiving environment while doing so.

The environmental impact results are therefore relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks.

Long-term emissions (>100 years) are not taken into consideration in the impact estimate.

Table 05: Indicators for life cycle impact assessment

INDICATOR	Abbr.
Climate change – total	GWPt
Climate change – fossil	GWPf
Climate change – biogenic	GWPb
Climate change – land use & land use change	GWPluLuc
Ozone depletion	ODP
Acidification potential	AP
Eutrophication potential - freshwater	EPfw
Eutrophication potential - marine	EPm
Eutrophication potential - terrestrial	EPt
Photochemical ozone formation potential	POFP
Abiotic depletion potential – minerals & metals	ADPmm
Abiotic depletion potential – fossil fuels	ADPf
Water Depletion Potential	WDP

Resource use indicators

The resource use indicators describe the use of renewable and non-renewable material resources, renewable and non-renewable primary energy and water.

Table 06: Life cycle inventory indicators on use of resources

INDICATOR	Abbr.
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE
Use of renewable primary energy resources used as raw materials	PERM
Total use of renewable primary energy resources	PERT
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE
Use of non-renewable primary energy resources used as raw materials	PENRM
Total use of non-renewable primary energy resources	PENRT
Use of secondary material;	SM
Use of renewable secondary fuels	RSF
Use of non-renewable secondary fuels	NRSF
Total use of net fresh water	FW

Waste and output flows

Waste indicators describe waste generated within the life cycle of the product. Waste is categorised by hazard class, end-of-life outcome and exported energy content.

Table 07: Life cycle inventory indicators on waste categories and output flows

INDICATOR	Abbr.
Hazardous waste disposed	HWD
Non-hazardous waste disposed	NHWD
Radioactive waste disposed	RWD
Components for reuse	CRU
Materials for energy recovery	MER
Materials for recycling	MFR
Exported electrical energy	EEE
Exported thermal energy	EET

Additional environmental impact indicators

These are additional environmental indicators that are not part of the core set.

Table 08:: Additional environmental impact indicators

INDICATOR	Abbr.
GWP-GHG	GWP-GHG
Particulate matter emissions	PM
Ionising radiation – human health	IRP
Eco-toxicity (freshwater)	ETPfw
Human toxicity, cancer	HTPc
Human toxicity, non-cancer	HTPnc
Soil quality	SQP

For all products, the following indicators are not relevant, hence result in zero values:

- Components for re-use (CRU) is zero since there are none produced.
- Materials for energy recovery (MER) is zero since no credits are claimed for any incinerated wastes, applying the cut-off approach.
- Exported electrical energy (EEE) is zero since there is none produced.
- Exported thermal energy (EET) is zero since there is none produced.

Section 4.0

Results for Tasman UKP - main results

Environmental impact potentials

Table 09: Environmental impact results for 1 metric tonne of air-dried pulp

Indicator	Abbr.	Unit	Upstream (A1)	Core (A2+A3)	Downstream (A4)	Downstream end-of-life (C1-C4)	TOTAL
GWP – total	GWPt	kg CO_2 eq.	-3380	2230	105	4160	3120
GWP – fossil	GWPf	kg CO_2 eq.	207	248	104	38.2	597
GWP – biogenic	GWPb	kg CO_2 eq.	-3590	1980	0.979	4120	2510
GWP – land use & land use change	GWPluluc	kg CO_2 eq.	0.0254	0.0170	0.00116	0.00570	0.0493
Ozone depletion	ODP	kg CFC 11 eq.	9.29E-10	1.15E-10	6.94E-12	4.30E-11	1.09E-09
Acidification potential	AP	mol H+ eq.	1.07	0.809	3.15	0.347	5.38
Eutrophication potential - freshwater	EPfw	kg P eq.	2.19E-04	0.103	2.22E-05	1.78E-05	0.103
Eutrophication potential - marine	EPm	kg N eq.	0.365	0.413	0.846	0.150	1.77
Eutrophication potential - terrestrial	EPt	mol N eq.	4.16	3.65	9.26	1.64	18.7
Photochemical ozone formation potential	POFP	kg NMVOC eq.	0.982	0.943	2.36	1.17	5.46
Abiotic depletion potential – minerals & metals	ADPmm	kg Sb eq.	1.89E-05	1.27E-05	3.46E-06	1.85E-06	3.69E-05
Abiotic depletion potential – fossil fuels*	ADPf	MJ, net calorific value	2790	2900	1300	477	7470
Water Depletion Potential*	WDP	m^3 eq.	10.6	97.8	0.283	11.1	120

Additional indicators

Table 10: Additional indicators results for 1 metric tonne of air-dried pulp

Indicator	Abbr.	Unit	Upstream (A1)	Core (A2+A3)	Downstream (A4)	Downstream end-of-life (C1-C4)	TOTAL
IPCC AR5 GWP (excl. biogenic carbon)	GWP-GHG	kg CO_2-eq.	207	248	104	2790	3350
Particulate Matter emissions	PM	Disease incidences	1.78E-05	5.11E-06	5.34E-05	2.02E-06	7.83E-05
Ionising Radiation – human health**	IRP	kBq U235 eq.	6.68	0.300	0.177	0.222	7.38
Eco-toxicity (freshwater)*	ETPfw	CTUe	4030	66100	819	183	71100
Human Toxicity, cancer*	HTPc	CTUh	1.16E-07	2.95E-07	1.50E-08	1.64E-08	4.42E-07
Human Toxicity, non-cancer*	HTPnc	CTUh	9.01E-06	3.32E-05	6.84E-07	1.57E-06	4.45E-05
Soil quality*	SQP	Pt	189	199	3.69	19.2	411

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

**This impact category deals mainly with the eventual impact of low dose ionising radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Use of resource

Table 11: Use of resource results for 1 metric tonne of air-dried pulp

Indicator	Abbr.	Unit	Upstream (A1)	Core (A2+A3)	Downstream (A4)	Downstream end-of-life (C1-C4)	TOTAL
Use of renewable primary energy excl. renewable primary energy resources used as raw materials	PERE	MJ, NCV	376	8620	5.36	44.4	9050
Use of renewable primary energy resources used as raw materials	PERM	MJ, NCV	0	14700	0	0	14700
Total use of renewable primary energy resources	PERT	MJ, NCV	376	0	5.36	44.4	426
Use of non-renewable primary energy excl. non-renewable primary energy resources used as raw materials	PENRE	MJ, NCV	2800	2900	1300	477	7480
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ, NCV	0	0	0	0	0
Total use of non-renewable primary energy resources	PENRT	MJ, NCV	2800	2900	1300	477	7480
Use of secondary material	SM	kg	0	0	0	0	0
Use of renewable secondary fuels	RSF	MJ, NCV	0	0	0	0	0
Use of non-renewable secondary fuels	NRSF	MJ, NCV	0	0	0	0	0
Total use of net fresh water	FW	m^3	0.693	6.38	0.00877	0.300	7.38

Waste production and output flows

Table 12: Waste production and output flows for 1 metric tonne of air-dried pulp

Indicator	Abbr.	Unit	Upstream (A1)	Core (A2+A3)	Downstream (A4)	Downstream end-of-life (C1-C4)	TOTAL
WASTE PRODUCTION							
Hazardous waste disposed	HWD	kg	1.92E-06	1.29E-07	4.61E-09	2.34E-08	2.08E-06
Non-hazardous waste disposed	NHWD	kg	13.6	47.2	0.103	61.0	122
Radioactive waste disposed	RWD	kg	0.0390	0.00213	0.00122	0.00223	0.0446
OUTPUT FLOWS							
Components for reuse	CRU	kg	0	0	0	0	0
Materials for recycling	MFR	kg	0	0	0	489	489
Materials for energy recovery	MER	kg	0	0	0	0	0
Exported electrical energy	EEE	MJ	0	0	0	0	0
Exported thermal energy	EET	MJ	0	0	0	0	0

Biogenic carbon content

Table 14: Biogenic carbon content for 1 metric tonne of air-dried pulp

Biogenic carbon content	Unit	Quantity
Biogenic carbon content in product	kg C	459
Biogenic carbon content in packaging	kg C	0

Results for Tasman UKP - Supplementary results

EN15804+A1 and SBK Bepalingsmethode (NMD 3.3)

Environmental impact indicators EN15804+A1

Table 13: Environmental impact indicators EN15804+A1 for 1 metric tonne of air-dried pulp

Indicator	Abbr.	Unit	Upstream (A1)	Core (A2+A3)	Downstream (A4)	Downstream end-of-life (C1-C4)	TOTAL
Global warming potential	GWP	kg CO_2-eq.	-3390	2190	104	3270	2170
Ozone depletion potential	ODP	kg CFC11-eq	1.13E-09	1.36E-10	8.17E-12	5.07E-11	1.32E-09
Acidification potential	AP	kg SO_2-eq.	0.793	0.505	2.50	0.249	4.05
Eutrophication potential	EP	kg P eq.	0.131	0.853	0.283	0.0509	1.32
Photochemical oxone creation potential	POCP	kg C_2H_4-eq.	0.0431	0.405	0.131	0.471	1.05
Abiotic depletion potential for non-fossil resources	ADPE	kg Sb-eq.	1.92E-05	1.27E-05	3.47E-06	1.86E-06	3.72E-05
Abiotic depletion potential for fossil resources	ADPF	MJ	2660	2890	1290	470	7310

Environmental impact indicators SBK Bepalingsmethode (NMD 3.3)

Table 14: Environmental Impact Indicators in accordance with SBK Bepalingsmethode (NMD 3.3 for 1 metric tonne of air-dried pulp

Indicator	Abbr.	Unit	Upstream (A1)	Core (A2+A3)	Downstream (A4)	Downstream end-of-life (C1-C4)	TOTAL
Depletion of abiotic raw materials, excl. fossil energy carriers	ADPe	kg Sb eq.	1.89E-05	1.27E-05	3.46E-06	1.85E-06	3.69E-05
Depletion of fossil energy carriers	ADPf	MJ	2660	2890	1290	470	7310
Climate change	GWP100	kg CO_2 eq.	-3390	2170	103	2980	1860
Ozone layer depletion	ODP	kg R11 eq.	1.13E-09	1.36E-10	8.17E-12	5.07E-11	1.32E-09
Photochemical oxidant formation	POCP	kg Ethene eq.	0.0578	0.398	0.158	0.473	1.09
Acidification	AP	kg SO_2 eq.	0.793	0.505	2.50	0.249	4.05
Eutrophication	EP	kg Phosphate eq.	0.133	0.856	0.284	0.0520	1.33
Human-toxicological effects	HTP	kg DCB-eq.	6.43	14.8	4.33	1.26	26.8
Ecotoxicological effects, aquatic, freshwater	FAETP	kg DCB-eq.	0.495	1.72	0.396	0.0793	2.69
Ecotoxicological effects, aquatic, marine	MAETP	kg DCB-eq.	1470	2440	951	2130	6990
Ecotoxicological effects, aquatic, terrestrial	TETP	kg DCB-eq.	1.77	5.58	0.0700	0.303	7.72

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Programme-related information and verification

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An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules).

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