Environmental Product Declaration

In accordance with ISO 14025:2006 for:

Masplene® MAS 8770

from

PT Polytama Propindo

Programme:	The International EPD® System, www.environdec.com
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Programme information

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com EPD registered through the fully aligned regional hub: EPD Southeast Asia Kencana Tower Level M Bussuness Park Kebon Jeruk Jalan Raya Meruya Ilir Nomor 88, Jakarta Barat 11620 Indonesia www.epd-southeastasia.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR: Plastics in Primary Forms Registration number, version: 2010:16, version 4.0.0 UN CPC 347
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Paola Borla The review panel may be contacted via the Secretariat www.environdec.com/contact
Life Cycle Assessment (LCA)
LCA accountability: PT Properindo Enviro Tech
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 from different programmes may not 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.

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Company Information

Owner of the EPD

PT Polytama Propindo
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Jl. Raya Juntinyuat KM.13 Desa Limbangan, Juntinyuat, Indramayu 45282

Description of the organisation

PT Polytama Propindo was established in 1993 as a significant manufacturer of polypropylene resin (PP resin) in Indonesia. Polytama is one of the leading and growing petrochemical companies providing PP resin in Indonesia under the Masplene® brand name. In 2017, Polytama launched its newest product innovation, which was granule. Polytama is a company in the polypropylene industry, which utilizes LyondellBasell technology, one of the best processing technologies in the world.

In line with government policies regarding the development of the petrochemical industry, Polytama has begun its business development initiative with the continuing increase of the installed production capacity at the Pertamina Refinery Unit VI Balongan to a maximum of 300,000 MT per year in 2020. Going forward, Polytama will further increase its production capacity to achieve 1 million MT per year within the next 5 to 10 year period.

To maintain its business sustainability, in 2015 Polytama built propylene-gas transfer facility at the Seaport of Cirebon, including land transportation system from port to the factory of Polytama at Balongan-Indramayu. This endeavour has supported Polytama's efforts to increase customer confidence in the supply continuity of Masplene® products in the market.

Name and location of production site

Jl. Raya Juntinyuat KM.13 Desa Limbangan, Juntinyuat, Indramayu 45282 - Indonesia

Product Information

Product name: Masplene® MAS8770

Product description:

Plastic pellet is a virgin polypropylene material that has been through the melting process in pelletizing extruder. Masplene® MAS8770 is a pellet grade which can be used as shopping bags, goodie bags, packaging liners, souvenirs, protective masks, brooches, flower decorations, and bag product linings.

Technical Specifications:

Density: 0.9 g/cm^3
Melt Flow Rate: 33.5 g/10 min
Tensile Strength: 34.1 N/mm^2
Melting Point: 163.03°C
Deflection Temperature: 106.96°C

UN CPC code: UN CPC 347

Geographical scope:

The location of the entire process studied is in Indonesia with the following details:

- The location of the propylene supplier is in Indramayu City, West Java.
- The location of the plant is in Indramayu City, West Java.

LCA Information

Declared unit:

1 kg of homopolymer polypropylene resin pellet grade MAS 8770.

Time representativeness:

Specific data: The data period used is 1 year (1 January – 31 December 2022)
Generic data: The data period used in the study are from generic datasets with temporal representativeness ranges from 2018 – 2021.

Database(s) and LCA software used:

LCA was conducted using SimaPro. Selected generic data used in this report was taken from Ecoinvent 3.8. The database used in the impact assessment of upstream and core processes.

Description of system boundaries:

The boundaries of PT Polytama Propindo's LCA study in 2022 are Upstream to Core in accordance with the Product Category

Rules (PCR) Plastics in Primary Forms, UN CPC 347 2010:16 Version 4.0.0. The production system starts from the Upstream stage, there are propylene production, chemical production, packaging manufacturing, natural gas production, rags production, lubricant production, chemical packaging production. The core processes in this system are feed treatment, catalyst preparation, reactor, gas recovery & drying system, pelletizing & granular, bagging, product storage, boiler, cooling tower system, maintenance, utility unit, propylene transportation, chemical transportation, hazardous waste treatment, hazardous waste transportation, solid waste treatment, solid waste transportation, and generation of electricity.

The infrastructure in the upstream process is included due to the usage of generic data, while the infrastructure in the core process is excluded.

The reason for choosing system boundaries is in accordance with Product Category Rules (PCR). The company's overall production process flow diagram can be seen in Figure 1.

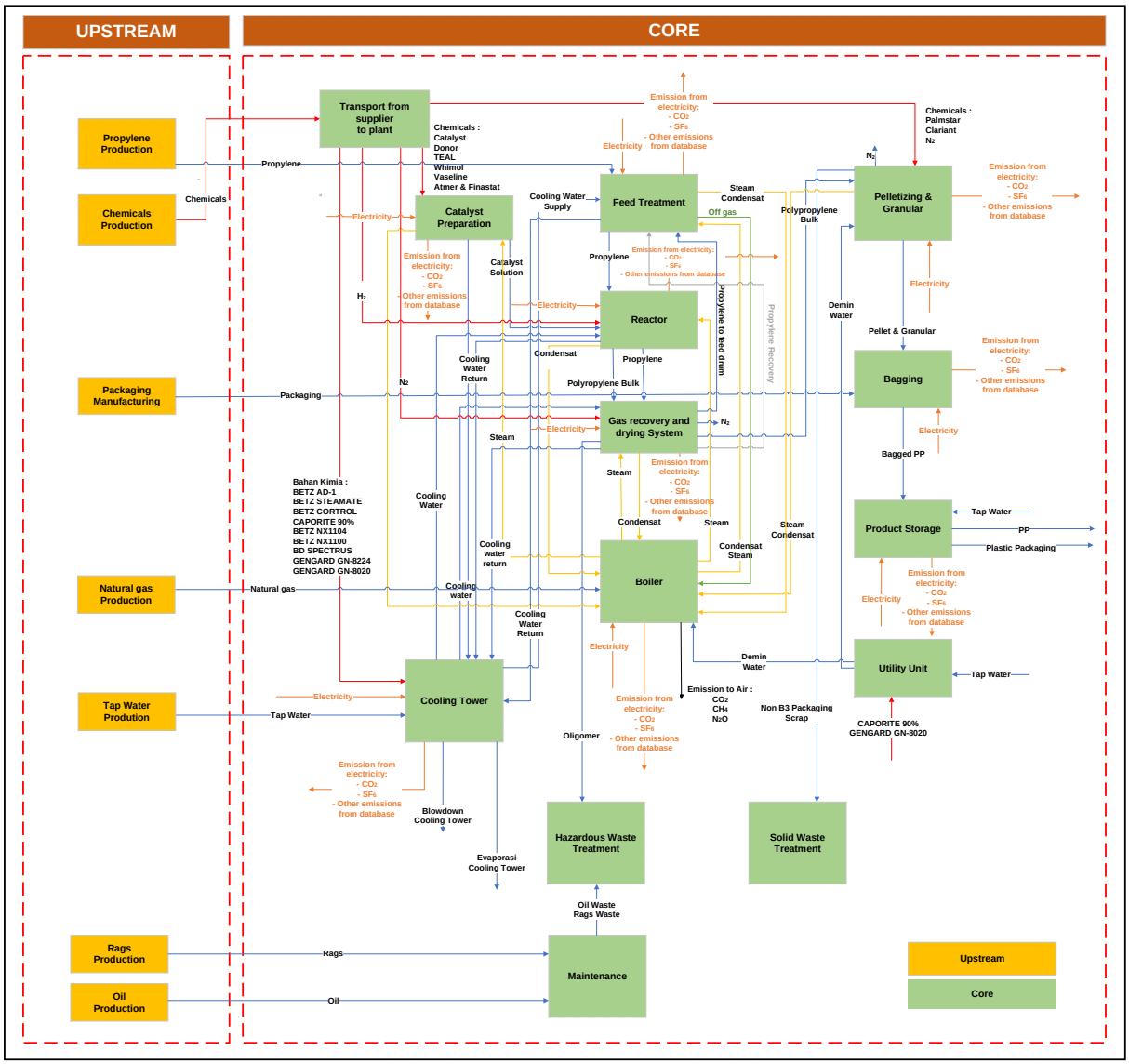

Figure 1. Diagram of Production System in PT Polytama Propindo

Assumptions:

There are several assumptions contained in this LCA study:

1. Emissions from boiler is completed with the generic data as well despite the CO_2, CH_4, and N_2O which come from the measurement.
2. Emissions from electricity using Ecoinvent 3.8 dataset.
3. Calculation for raw material, packaging, chemicals, solid waste, and hazardous waste transportation using Google Maps and Google Earth.

Cut-off rules: The cut-off rules in this study in accordance with the Product Category Rules (PCR) Plastics in Primary Forms, UN CPC 347 2010:16 Version 4.0.0 where the data is for base flow and from product system that contributing minimum of 99% of the declared environmental impacts shall be included.

Data quality:

This LCA has followes the data quality requirements according to Product Category Rules (PCR) Plastics in Primary Forms, UN CPC 347 2010:16 Version 4.0.0. For Upstream processes, it is collected from generic data which contains production process data from raw materials or supporting materials used in the production cycle but is not actually collected from PT Polytama Propindo. Specific data used

for the core process was collected from actual factory, namely PT Polytama Propindo. However, some processes in the core are collected from generic data to complete the emission that the company can't provide, namely data from generally available data sources that meet the specified data quality characteristics for presicion and completeness. Generic data were selected because specific data were not available.

The quality of specific data in the core scope is based on data from the entire polypropylene manufacturing life cycle, which is equipped with the company's process units, raw materials, chemicals, fuel/electricity used and the real emissions from the process. The quality of the generic data is based on the dataset used in the research which is no more than 10 years old so that the data quality is suitable for this research. Data quality checks must be carried out during the data collection process to provide evidence that the data quality requirements meet the SNI ISO 14040:2016 and SNI ISO 14044:2017 standards.

Allocation:

In this study, the reading of the impact of PT Polytama Propindo is considered as the entire impact of the PP Spunbond production process so that there is no allocation in the study of the main production process.

Content Declaration

Product

Product components	CAS No.	%	Environmental / hazardous properties
Polypropylene	9003-07-0	>99%	Not a hazardous substance or mixture.
Additive	Proprietary	<1%	Not classified as a hazardous chemical.

Packaging

Distribution packaging: There is no distribution packaging used.

Consumer packaging: The product is package in a 25 kg capacity polyethylene terephthalate packaging weighed 50 grams.

Recycled material:

The product does not contain any recycled material.

Result of the Environmental Performance Indicators

Impact category indicators

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Global warming potential (GWP)	Fossil	kg CO_2 eq/kg	1.64E+00	3.65E-01	ND	2.00E+00
	Biogenic	kg CO_2 eq/kg	1.23E-03	1.59E-03	ND	2.81E-03
	Land use and land transformation	kg CO_2 eq/kg	2.04E-03	1.19E-03	ND	3.22E-03
	TOTAL	kg CO_2 eq/kg	1.64E+00	3.68E-01	ND	2.01E+00
Ozone layer depletion (ODP)		kg CFC 11 eq/kg	8.62E-09	1.69E-08	ND	2.55E-08
Acidification potential (AP)		mol H^+ eq/kg	5.14E-03	1.99E-03	ND	7.13E-03
Eutrophication potential (EP)	Aquatic freshwater	kg P eq/kg	3.55E-05	4.99E-04	ND	5.34E-04
	Aquatic marine	kg N eq/kg	1.08E-03	5.46E-04	ND	1.63E-03
	Aquatic terrestrial	mol N eq/kg	1.03E-02	4.84E-03	ND	1.51E-02
Photochemical oxidant creation potential (POCP)		kg NMVOC eq/kg	4.92E-03	1.39E-03	ND	6.31E-03
Abiotic depletion potential (ADP)*	Metals and minerals	kg Sb eq/kg	4.99E-07	3.06E-06	ND	3.56E-06
	Fossil resources	MJ, net calorific value/kg	6.49E+01	3.99E+00	ND	6.88E+01
Water deprivation potential (WDP)*		m^3 world eq. deprived/kg	7.28E-01	7.17E-02	ND	7.99E-01

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

Resource use indicators

PARAMETER		UNIT	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value/kg	3.56E-01	1.88E-01	ND	**5.44E-01**
	Used as raw materials	MJ, net calorific value/kg	0	0	ND	**0**
	TOTAL	MJ, net calorific value/kg	3.56E-01	1.88E-01	ND	**5.44E-01**
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value/kg	1.89E+01	3.99E+00	ND	**2.28E+01**
	Used as raw materials	MJ, net calorific value/kg	4,60E+01	0	ND	**4.60E+01**
	TOTAL	MJ, net calorific value/kg	6.49E+01	3.99E+01	ND	**6.88E+01**
Secondary material (optional)		Kg/kg	0	0	ND	**0**
Renewable secondary fuels (optional)		MJ, net calorific value/kg	0	0	ND	**0**
Non-renewable secondary fuels (optional)		MJ, net calorific value/kg	0	0	ND	**0**
Net use of fresh water (optional)		m^3/kg	1.26E-02	6.49E-03	ND	**1.91E-02**

Waste indicators

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	Kg/kg	1.20E-06	1.76E-03	ND	**1.76E-03**
Non-hazardous waste disposed	Kg/kg	1.43E-04	1.95E-05	ND	**1.62E-04**
Radioactive waste disposed	Kg/kg	0	0	ND	**0**

Output flow indicators

PARAMETER	UNIT	Upstream	Core	Downstream	TOTAL
Components for reuse	Kg/kg	0	0	ND	0
Material for recycling	Kg/kg	0	0	ND	0
Materials for energy recovery	Kg/kg	0	0	ND	0
Exported energy, electricity	MJ per energy carrier/kg	0	0	ND	0
Exported energy, thermal	MJ per energy carrier/kg	0	0	ND	0

Impact Contribution

The distribution of impact contribution from upstream to core at PT Polytama Propindo can be seen in Figure 2. Most of the contributors come from the upstream and core processes. Impact in the upstream was mostly contributed by propylene production. While in the core process, the impact was mostly contributed by pelletizing & granular process. The source of the impact is from the electricity that used in the pelletizing & granular process.

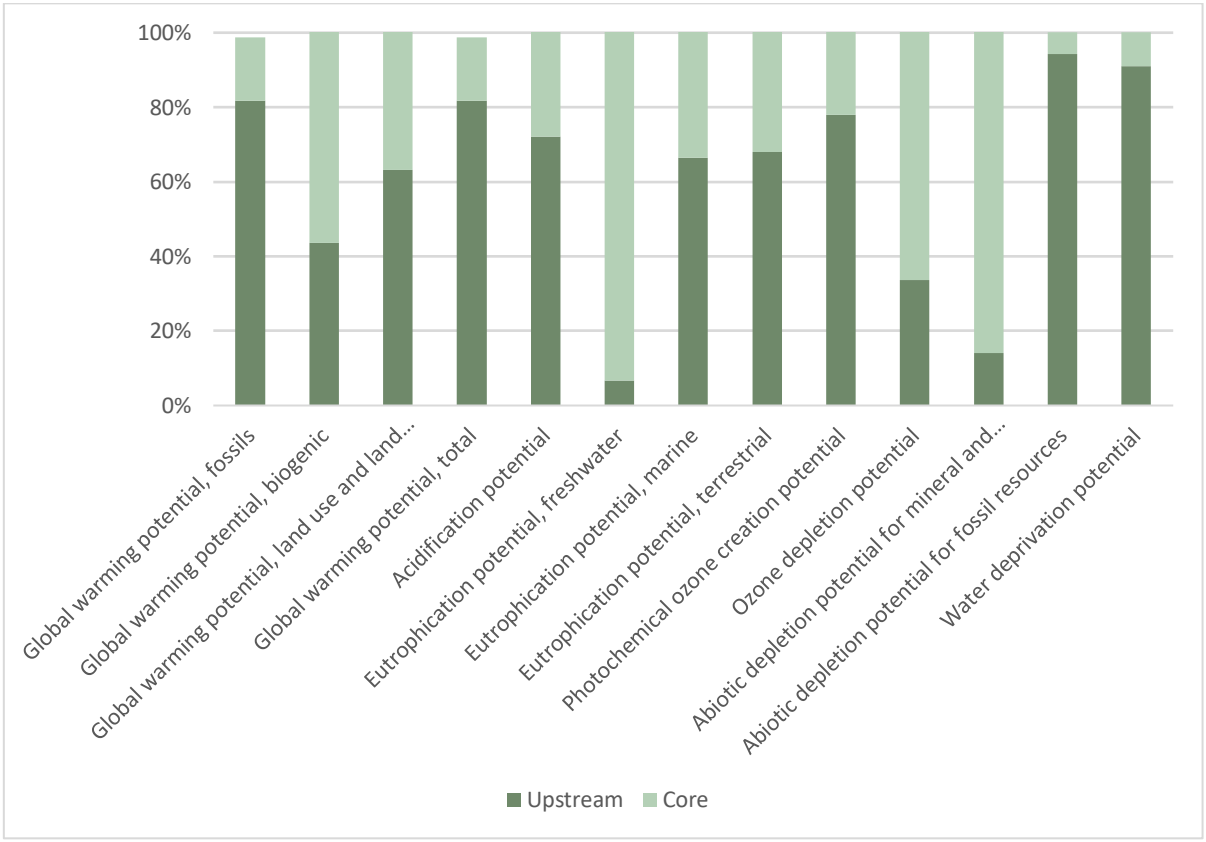

Figure 2. The Distribution of the Upstream to Core Impact Contribution

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