

## Environmental Product Declaration

In accordance with ISO 14025:2006 for

# Pupuk Urea Pusri

From



**PT Pupuk Sriwidjaja  
Palembang**

Jalan Mayor Zen, Palembang  
30118, Indonesia.



### Programme

The International EPD® System,  
[www.environdec.com](http://www.environdec.com)

### Programme operator

EPD International AB

**EPD registered through the fully  
aligned regional hub**

EPD Southeast Asia,  
<https://www.epd-southeastasia.com/>

### Regional Hub

EPD Southeast Asia

### EPD registration number

S-P-03274

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2023-09-22

### Revision date

2024-01-31 (Version 2)

### Valid until

2028-09-20

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](http://www.environdec.com)

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# General Information

## Programme information

Programme	<b>The International EPD® System</b> EPD registered through the fully aligned regional hub: EPD Southeast Asia	
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	<b>EPD Southeast Asia</b> Kencana Tower Level M, Business Park Kebon Jeruk Jl. Raya Meruya Ilir No. 89, Jakarta Barat 11620, Indonesia	Website: <a href="http://www.environdec.com">www.environdec.com</a> <a href="http://www.epd-southeastasia.com">www.epd-southeastasia.com</a> Email: <a href="mailto:info@environdec.com">info@environdec.com</a>

Accountabilities for PCR, LCA and independent, third-party verification

**Product category rules (PCR):**

PCR: 2010:20 of Mineral or Chemical Fertilizers, version 3.0.1. UN CPC: 3461

**PCR review was conducted by:**

The Technical Committee of the International EPD® System.

**Review chair:**

Lars-Gunnar Lindfors, IVL Swedish Environmental Research Institute

The review panel may be contacted via the Secretariat [www.environdec.com/contact](http://www.environdec.com/contact).

**Life Cycle Assessment (LCA)**

LCA accountability: PT. Life Cycle Indonesia

**Third-party verification**

Independent third-party verification of the declaration and data, according to ISO 14025:2006:

EPD verification by individual verifier

**Third party verifier:** Claudia A. Peña, ADDERE Research & Technology, [cpena@addere.cl](mailto:cpena@addere.cl)

**Approved by:** The International EPD® System Technical Committee, supported by the Secretariat

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, 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 ISO 14025.

# Company Information

## Owner of the EPD

PT Pupuk Sriwidjaja Palembang, Jalan Mayor Zen, Palembang 30118, Indonesia. Tel: +62-(711)-712222, 712111 ; Fax: +62-(711)-712222

## Description of the organisation

PT Pupuk Sriwidjaja Palembang (Pusri) is a Petrochemical industry that produces Urea, Ammonia, and NPK Fertilizers located in Palembang, South Sumatera Province. Pusri is a Subsidiary of PT Pupuk Indonesia (Persero). Pusri has an area of 230 ha and 6 (six) factories namely Pusri-IB, Pusri-IIB, Pusri-III, Pusri-IV, NPK-1, NPK-2 & 3. These fertilizers are products of the Pusri sold to the non-PSO (domestic dan export), and Public Service Obligation (PSO), which are marketed in South Sumatera, Central Java, DIY, East Java and Bali.

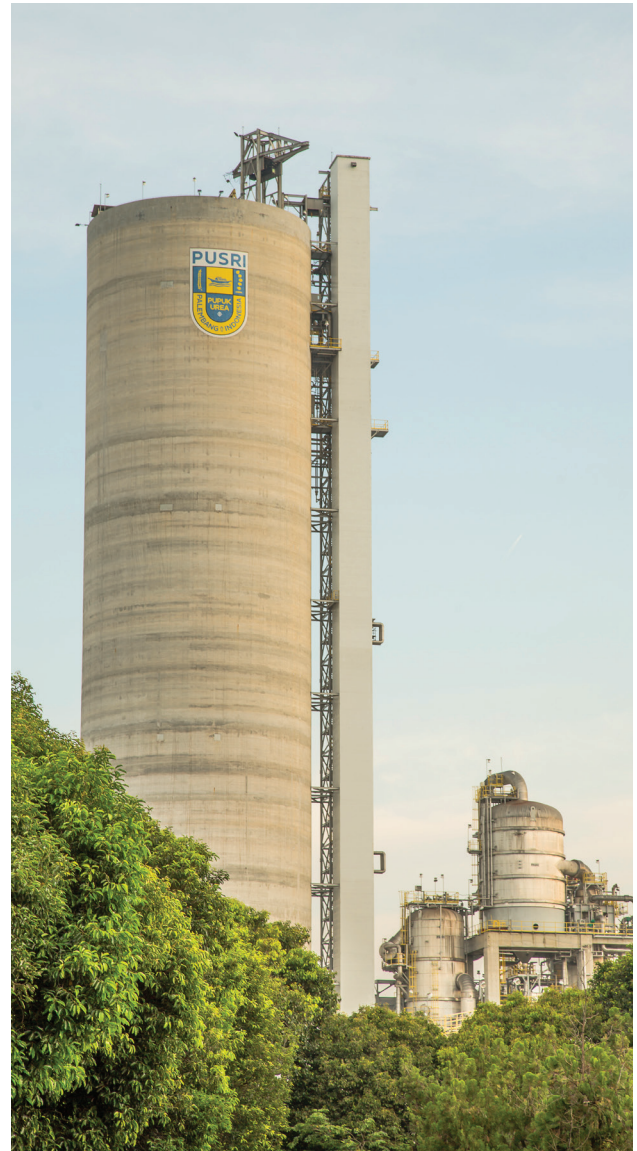
## Product-related or management system-related certifications:

SNI, ISO 9001:2015, ISO 14001:2015, ISO 17025:2017, ISO 50001:2018 ISO 45001:2018, ISO 31000:2018 and Green Industry.

Details of Pusri's commitment to sustainable development can be found in the company's annual report.

## Name and location of production site

The result shown in this EPD is from the weighted average of 4 sites of urea fertilizer production plant (Pusri-IB, Pusri-IIB, Pusri-III, and Pusri-IV) located in Palembang, South Sumatra Regency, Indonesia.



# Product Information

## Product name

Urea Fertilizer

## Product identification

Urea is also known as Carmabide, Carbonyldiamide, and carbamidic acid with chemical formulation  $(\text{NH}_2)_2\text{CO}$

The products to be declared are shown in Fig 1 below

## Product description

Pusri produces urea fertilizer, one of the types of chemical fertilizer formed from a chemical reaction between ammonia and carbon dioxide through a chemical process. Urea products produced by Pusri come in the form of urea prill in -6+18 US Mesh in size distribution and main content of Nitrogen at a minimum of 46%, Biuret at a maximum of 1.2%, and water content at a maximum of 0.5%. In the agricultural sector, urea fertilizer product that contains high Nitrogen content is needed for crops as nutrients.

## Agronomic Efficiency Index (AEI)

Agronomic Efficiency Index (AEI) is an indicator of the impact of applied urea on corn productivity. The AEI of Pusri's urea fertilizer is estimated to be in the range of 7.0 - 12.7 kg corn/kg urea granulated based on a field study conducted by the Pusri's internal team

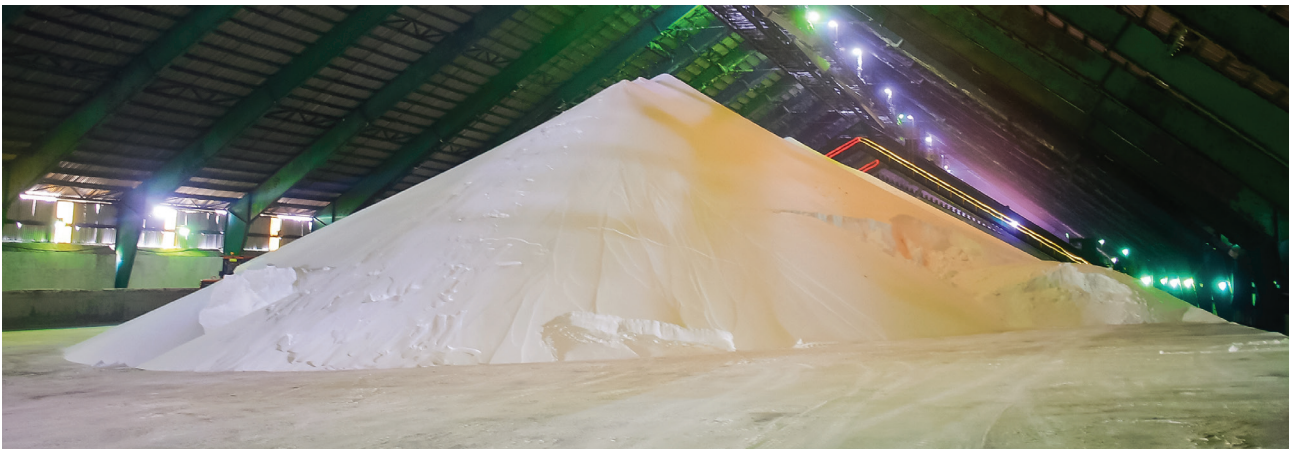


Figure 1. Urea Fertilizer Product to be Declared

## Uptake Index (UI)

For urea application on soil is 23 460 kg/2 000 m<sup>2</sup> farmland, Uptake Index for urea is represented by Nitrogen uptake, when the urea is applied on soil, 27% of N will be uptaken by plant, while 68% will be persisted on soil and the rest which is 5% will be lost and brought by water as run off.

## UN CPC code

3461 Mineral or chemical fertilizers, nitrogenous

## Other codes for product classification

SNI 2801:2010

## Geographical Scope

Global

# LCA Information

## Declared unit

1000 kg of urea fertilizer and its packaging

The declared unit may have different functionality depending on the composition of the product that is declared.

## Time representativeness

Specific data for the manufacturing collected from 2022-01-01 to 2022-12-31. The 10-year age requirement for generic data has been met.

## Database(s) and LCA software used

Generic data for upstream and downstream processes use Ecoinvent 3.9, EF 2.0, and USLCI database and modelled by using SimaPro Developer software version 9.5.0.0. No datasets older than 10 years were used.

## Description of system boundaries

The system boundary was chosen based on the goal and scope of the study and in accordance with PCR 2010:20 Mineral or chemical fertilizers ver 3.0.1, i.e. cradle-to-grave including the use phase and end of life for the packaging.



The processes below are included in the product system to be studied:

## 1 Upstream

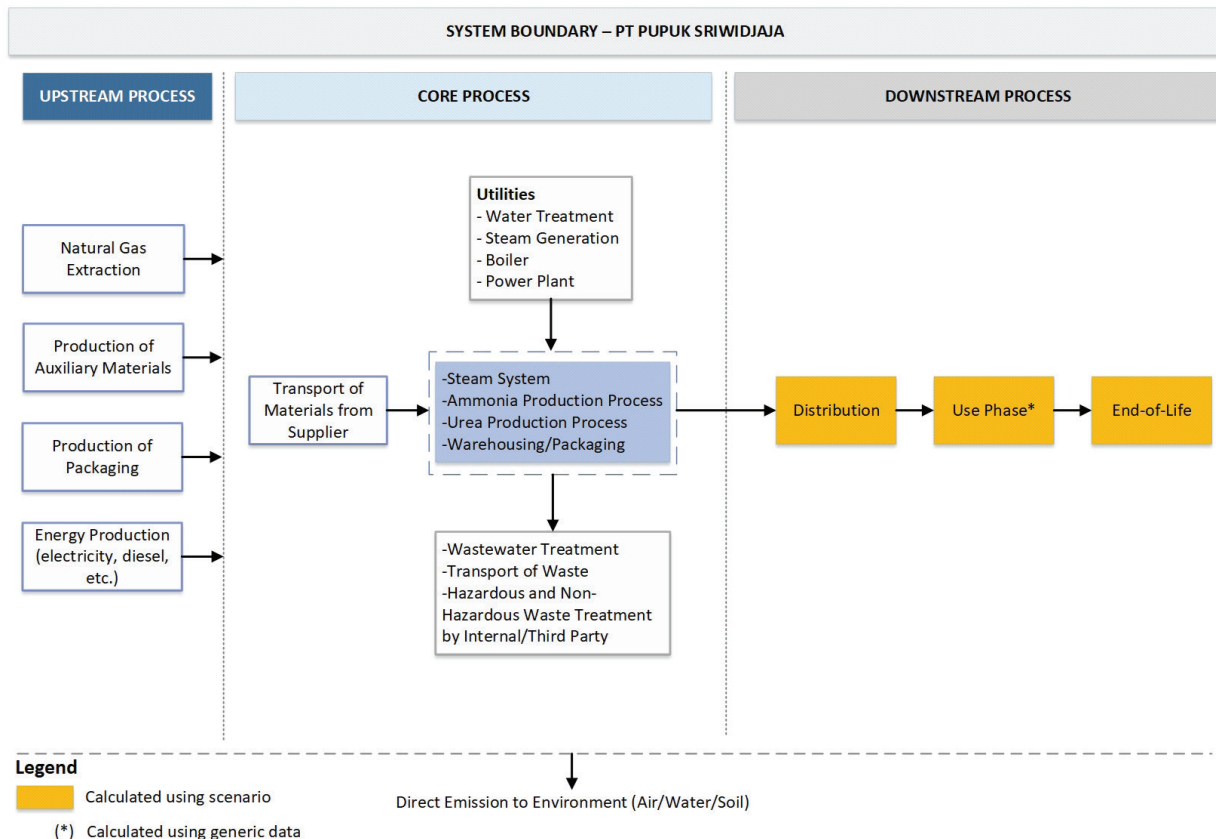
- Extraction of raw material (e.g., natural gas)
- Production of electricity and fuels used in the upstream module
- Production of auxiliary materials (e.g., catalyst, vanadium pentoxide, etc.)
- Production of primary packaging (e.g., polypropylene bag and thread)
- Extraction of water (e.g., river water)

## 2 Core

- Transportation of raw/auxiliary materials from the supplier to manufacturing plant
- Ammonia plant: Feed treating unit, reforming unit, steam system, process condensate stripper, compressor, syngas purification unit, ammonia synthesis unit, ammonia purification unit, ARU&HRU, distribution pipe.
- Urea plant: Compression section, synthesis section, recovery section purification section, crystallizer, prilling section, process condensate treatment
- Production of electricity: Gas turbine generator, steam turbine generator
- Utilities: Filter water treatment, demin water treatment, cooling water treatment, package boiler, waste heat boiler, coal boiler
- Warehouse and packaging
- Waste treatment (e.g., used oil, waste catalyst, etc.)

## 3 Downstream

- Transportation from final manufacturing to distribution center
- The customer or consumer use of the product
- Waste management of packaging



## More information

Relevant websites for more information regarding the urea fertilizer and its manufacturing process can be referred from company website: <https://www.pusri.co.id/>

### Key Assumptions and Limitations

- The emissions and impact of electricity production are based on modified Ecoinvent 3.9 database which only have primary data for electricity mix composition in Indonesia. The emissions resulted from the power plant are still based on the generic data as well.
- There is no available data from suppliers regarding the production process, type of fuel, and technology used to produce supporting material. Therefore, Ecoinvent 3.9 database is used where some data are modified to available Pusri's specific supplier databases, i.e. for input water, natural gas, electricity, and wastewater.
- The impact of transportation for raw materials and supporting materials are calculated based on the amount of load, distance, and transportation type by using generic data from Ecoinvent 3.9.
- There is no direct measurement for the emissions comes from boiler, and reforming unit. They are calculated based on the sampling every 6 months and then extrapolated based on the flow rate of the stack and running hour of the stack.
- There is no direct measurement for the emission comes from the use stage. They are calculated based on the IPCC Guidelines for National Greenhouse Gas Inventories (IPCC, 2019).

### Cut-off rules

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 upstream to downstream 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 will be used.

### Data Quality

- Time related coverage: specific data were collected from 2022-01-01 to 2022-12-31, and generic data are representative of the year 2022.
- Geographic coverage: specific data were collected from area under study, i.e., South Sumatera, Indonesia. Natural gas production as key input is sourced from Indonesia's national production, calculated using dataset available in Ecoinvent 3.9. Generic data were collected from global average data.
- Technological coverage: specific data were collected from current urea fertilizer production process under study. Upstream data for raw materials and other auxiliary materials utilize generic data from global average with technology aspects were similar with what described in the process under study, but merits improvement as processes were not modelled with 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 was applied according to the referential PCR to allocate the water used in the manufacturing process. For the end-of-life of waste generated in the manufacturing process, polluter pays principle are applied for each type of waste. This means that Pusri will carry the full environmental impact until the end-of-waste state is reached.



## LCA scenarios and additional technical information

- Natural gas is used as raw material and transported to Pusri from multiple suppliers in Indonesia. Therefore, the global Ecoinvent database is modified by using available Indonesia Ecoinvent databases, i.e. for input water, electricity, and wastewater.
- For most of the supporting material production from Indonesia, the global Ecoinvent database is modified by using available Indonesia Ecoinvent databases for water and wastewater. Moreover, electricity is modified by using the electricity databases specifically for the Indonesian electricity grid because the location of the supplier is mostly in Indonesia.
- The characterisation factor (CF) for water use is modified to describe the watershed level where the unit process withdraws water, i.e., Palembang, South Sumatera, Indonesia. The CF data is documented by AWARE through a Google Layer Document that provides CF up to watershed level in the region. The CF for water use is modified to  $0.6 \text{ m}^3/\text{m}^3$  from average Indonesia  $23.6 \text{ m}^3/\text{m}^3$ .



# Content Declaration

## Product

Product components	Unit	%	Environmental / hazardous properties
Nitrogen	%wt	46	Contain gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.
Biuret	%wt	1.2	Causes severe skin burn and eye damage
Water	%wt	0.5	Not Classified as a hazardous chemical
Others	%wt	52.3	Not Classified as a hazardous chemical



## Packaging

### Distribution packaging:

The products are distributed in 50 kg bag packaging and in bulk

### Consumer packaging:

The product is packaged in a bag of 50 kg capacity plastic packaging weighing 145 grams and is composed of 40 grams of polyethylene and 105 grams of polypropylene

## Recycled material

### Provenience of recycled materials

**(pre-consumer or post-consumer) in the product:**

The product does not contain any recycled materials.

# Results of the Environmental Performance Indicators

The estimated impact results provided in this EPD report are solely relative statements and do not serve as indicators of the end points of the impact categories, surpassing threshold values, safety margins, or risks.

## Impact category indicators

No.	Parameter		Unit	Upstream	Core	Downstream	Total
1	Global warming potential (GWP)	Fossil	kg CO <sub>2</sub> eq.	2.96E+02	5.36E+02	3.31E+03	4.14E+03
2		Biogenic	kg CO <sub>2</sub> eq.	2.72E-01	2.11E-02	-1.13E-01	1.81E-01
3		Land use and land transformation	kg CO <sub>2</sub> eq.	4.74E-02	5.68E-03	6.42E-06	5.31E-02
4		TOTAL	kg CO <sub>2</sub> eq.	2.97E+02	5.36E+02	3.31E+03	4.14E+03
5	Ozone layer depletion (ODP)		kg CFC 11 eq.	4.74E-05	7.70E-06	8.01E-10	5.51E-05
6	Acidification potential (AP)		mol H <sup>+</sup> eq.	4.79E-01	3.48E+01	1.71E+02	2.06E+02
7	Eutrophication potential (EP)	Aquatic freshwater	kg P eq.	4.37E-02	6.96E-04	5.67E-08	4.43E-02
8		Aquatic marine	kg N eq.	1.42E-01	1.19E+00	1.18E+02	1.20E+02
9		Aquatic terrestrial	mol N eq.	1.63E+00	1.55E+02	7.80E+02	9.37E+02
10	Photochemical oxidant creation potential (POCP)		kg NMVOC eq.	2.67E+00	8.19E-01	1.91E+01	2.26E+01
11	Abiotic depletion potential (ADP)	Metals and minerals <sup>1</sup>	kg Sb eq.	5.84E-05	1.94E-06	7.91E-09	6.04E-05
12		Fossil resources <sup>1</sup>	MJ, net calorific value	3.40E+04	5.40E+03	7.66E-01	3.94E+04
13	Water deprivation potential (WDP) <sup>1</sup>		m <sup>3</sup> world eq. deprived	1.00E-00	5.19E+00	1.93E-04	6.19E+00

<sup>1</sup>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 experienced with the indicator.

## Resource use indicators

Parameter		Unit	Upstream	Core	Downstream	TOTAL
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1.77E+01	1.47E+00	1.49E-03	1.92E+01
	Used as raw materials	MJ, net calorific value	0	0	0	0
	TOTAL	MJ, net calorific value	1.77E+01	1.47E+00	1.49E-03	1.92E+01
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	1.87E+04	6.00E+03	8.15E-01	2.47E+04
	Used as raw materials	MJ, net calorific value	1.87E+04	0	0	1.87E+04
	TOTAL	MJ, net calorific value	3.74E+04	6.00E+03	8.15E-01	4.34E+04
Secondary material (optional)		kg	0	0	0	0
Renewable secondary fuels (optional)		MJ, net calorific value	0	0	0	0
Non-renewable secondary fuels (optional)		MJ, net calorific value	0	0	0	0
Net use of fresh water (optional)		m <sup>3</sup>	3.20E+00	9.94E+00	2.45E-04	1.31E+01

## Waste indicators

Parameter	Unit	Upstream	Core	Downstream	TOTAL
Hazardous waste disposed	kg	1.26E-01	1.32E-01	0	2.59E-01
Non-hazardous waste disposed	kg	1.51E+03	1.55E+01	8.28E-01	1.52E+03
Radioactive waste disposed	kg	8.46E-07	0	0	8.46E-07

# Contact Information

## Owner of the EPD



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Towards Sustainable Indonesia

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# Differences Compared to the Previous Version

The following are the differences derived from the new version of the LCA study with respect to the previous one.

1. Revised allocation methodologies within the calculation model.
2. The Global Warming Potential (GWP) - biogenic impact value has been recalibrated to adhere to the principles outlined in EN 15804:2012+2019:A2/AC:2021.
3. The product content declaration has been revised to align with the General Programme Instructions (GPI) standards.
4. Report formatting corrections.

## References

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Environmental Product Declaration



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