

# Life Cycle Assessment (LCA) Study Report 2025

The Life Cycle Assessment Report of PT Indonesia Asahan Aluminium (INALUM) with scope of cradle to grave was prepared in accordance with the following standards:

- SNI ISO 14040:2016
- SNI ISO 14044:2017
- PCR Base Aluminium Products and Special Alloys, 08:2022 Version 1.0 UN CPC: 4153
- Regulation of the Minister of Environment/Environmental Control Agency of the Republic of Indonesia Number 7 of 2025 concerning the Company Performance Rating Assessment Program in Environmental Management.

## Objectives of the LCA Study

Conduct an environmental footprint assessment to develop a future improvement program and identify opportunities to improve environmental performance to consistently reduce environmental impacts.

## Scope of the LCA

PT INALUM is an aluminium smelter with a production capacity of 273,073,960.00 kg in 2024. The primary raw material (cradle) is alumina, which is then processed in the company's production unit (gate), producing aluminium ingots, alloys, and billets. The resulting aluminium products are then distributed to customers (grave).

## Conclusion

The results of a company's LCA can identify critical points that cause environmental impacts, both in the production process and its products, so the company can mitigate these impacts effectively. Based on the LCA study conducted at PT INALUM, several conclusions can be drawn based on the significant impacts that arise from the aluminium production process, as follows:

### a. Cradle point

- *Global warming potential (GWP)*
- *Acidification potential*
- *Ozone depletion potential*
- *Photochemical oxidation*

- Eutrophication potential
  - Biotic depletion
  - *Toxicity*
  - *Land use change*
- b. *Gate Point*
- *Global warming potential (GWP)*
  - Acidification potential
  - Eutrophication potential
  - Biotic depletion
  - *Toxicity*
  - *Land use change*
- Abiotic depletion potential for fossil resources
  - Carcinogenic
  - *Water footprint*
- c. *Grave Point*
- *Global warming potential (GWP)*
  - Acidification potential
  - Eutrophication potential
  - Biotic depletion
  - *Toxicity*
  - *Land use change*
- Ozone depletion potential
  - *Photochemical oxidation*
  - Abiotic depletion potential for fossil resources
  - Carcinogenic
  - *Water footprint*
  - *Cumulative Energy Demand*

This LCA study can be used as an initial stage of the LCA study so that a more comprehensive LCA study can be carried out in accordance with the provisions that have been set for making declarations of environmentally friendly products (Environmental Product Declarations - Share Environmental Metrics of Products to Customers).

**Table of Summary of Core Process Impact Evaluation of Smelter Plant**

No	Impact category	Unit	Methods	Reduction Plant	Casting Plant	WWTP	Transportation	Land Use	Solid Waste Treatment	Hazardous Waste Treatment
<b>Primary Impact</b>										
1	<i>Global warming potential</i>	%	ReCiPe 2016 Midpoint (H) V1.04 dan IPCC, 2019	98,84	0,63	0,00	0,00	0,00	0,34	0,19
2	Ozone depletion potential	%	ReCiPe 2016 Midpoint (H) V1.04	69,89	30,09	0,00	0,02	0,00	0,00	0,00
3	Acidification potential	%	ReCiPe 2016 Midpoint (H) V1.04	99,18	0,82	0,00	0,00	0,00	0,00	0,00
4	Eutrophication potential	%	CML-IA Baseline V3.06	87,60	11,17	1,23	0,00	0,00	0,00	0,00
<b>Secondary Impact</b>										
5	<b>Photochemical oxidation</b>	%	CML-IA Baseline V3.06 dan IPCC, 2019	98,11	1,20	0,00	0,00	0,00	0,66	0,03
6	Abiotic depletion potential for fossil resources:									
	<i>a. Abiotic depletion (fossil fuels)</i>	%	CML-IA Baseline V3.06	0,00	100,00	0,00	0,00	0,00	0,00	0,00
	<i>b. Abiotic depletion</i>	%	CML-IA Baseline V3.06	0,00	100,00	0,00	0,00	0,00	0,00	0,00
7	Biotic depletion									
	<i>a. Terrestrial ecotoxicity</i>	%	ReCiPe 2016 Midpoint (H) V1.04	99,06	0,94	0,00	0,00	0,00	0,00	0,00
	<i>b. Freshwater ecotoxicity</i>	%	ReCiPe 2016 Midpoint (H) V1.04	43,91	56,07	0,02	0,00	0,00	0,00	0,00
	<i>c. Marine ecotoxicity</i>	%	ReCiPe 2016 Midpoint (H) V1.04	86,59	13,40	0,00	0,00	0,00	0,00	0,00
8	<b>Carcinogenic</b>	%	ReCiPe 2016 Midpoint (H) V1.04	96,09	3,91	0,00	0,00	0,00	0,00	0,00
9	<b>Toxicity</b>	%	CML-IA Baseline V3.06	91,08	8,92	0,00	0,00	0,00	0,00	0,00
10	<b>Water Footprint</b>	%	ReCiPe 2016 Midpoint (H) V1.04	14,07	85,93	0,00	0,00	0,00	0,00	0,00
11	<b>Land Use Change</b>	%	ReCiPe 2016 Midpoint (H) V1.04 dan IPCC, 2019	0,00	0,74	0,00	0,00	99,26	0,00	0,00
<b>Energy Use Impact</b>										
12	<b>Cumulative Energy Demand:</b>									
	<i>a. Non renewable</i>	%	<i>Cumulative Energy Demand</i>	86,61	7,78	0,00	5,61	0,00	0,00	0,00
	<i>b. Renewable</i>	%	<i>Cumulative Energy Demand</i>	0,14	0,04	0,00	99,82	0,00	0,00	0,00