



# Status Quo of Industry Appetite towards Decarbonization in Indonesia

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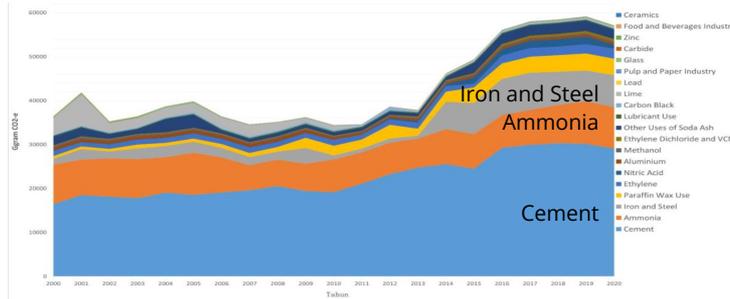
# A review of Indonesia's emissions industry



In 2022, Industrial sector contribute:

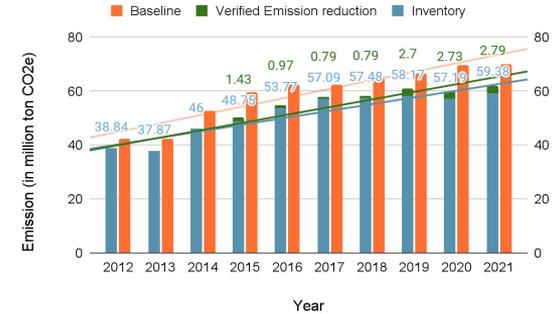
- ❑ 43.2% of national energy consumption equal 534.8 MBOE
- ❑ 15-20% of the national GHG emissions, consisting of
  - ❑ Energy consumption - 60%
  - ❑ Industrial waste - 25%
  - ❑ IPPU - 15%

IPPU emission in industrial sector - 2020



Source: [KLHK, 2022](#)

IPPU emission in industrial sector



Source: [IESR Adapted from KLHK, 2023](#)

Source: [Mol, 2023-a-b](#); [MEMR, 2022](#)

## Key parameter in industrial sector

No	Sector	Total* /Large industry*	2022 Contribution Share to National's				2020 - Emission (energy) (MtCO <sub>2</sub> e)	2020 - Emission (IPPU)(MtCO <sub>2</sub> e)
			GDP (%)	Industry Growth (%)	Export to Production (%)**	Employment (%)		
1	Cement	118 / 43	0.10%	-2	14.00%	0.13%	21,222	29,083
2	Iron and steel	295 / 170	0.45%	14.8	35.40%	0.61%	32,606	7,307
3	Textile	1988 / 780	0.82%	9.34	11.30%	2.93%	< 21,378	-
4	Pulp and paper	813 / 345	0.52%	3.73	36.86%	0.79%	6,485	-
5	Ammonia / pupuk	167 / 26	0.14%	0.69	27.00%	0.10%	< 9,365	9,408

Source: [IESR, 2023](#) Sourced from [Statistic Manufacture IKH-Mol, 2023](#); [Mol, 2023a](#); [MITI, 2023](#); [Satu Data MITI, 2023](#); [ASI, 2023](#); [Pefindo, 2023](#); [UOB, 2023](#); [Kompas, 2022](#)

Note: \*registered under same code in Mol, "KBLI"; \*\* IESR rough calculation based on production and export data



# Urgency in Decarbonization and its possible impact

## GHG emission to climate threat and possible impact on environmental and health

GHG emission				Global Warming				Climate Change				Climate Change Threat			
Climate Change Threat		1.5°C	2°C	2°C impact	Climate Change Threat		1.5°C	2°C	2°C impact	Climate Change Threat		1.5°C	2°C	2°C impact	
Extreme heat		Affecting <b>14% of world's population</b> (960 million people)	Affecting <b>37% of world's population</b> (2,960 million people)	<b>3.1x worse</b>	Affected species		<b>6% of insect, 8% of plants and 4% of vertebrata</b>	<b>18% of insect, 16% of plants and 8% of vertebrata</b>	<b>2.2x worse</b>						
Water availability		<b>350 million</b> urban residents exposed to severe drought by 2100	<b>410 million</b> urban residents exposed to severe drought by 2100	<b>1.2x worse</b>	Forest and wild fires		<b>+41% increase in forest and wild fires</b>	<b>+62% increase in forest and wild fires</b>	<b>1.5x worse</b>						
Arctic sea ice		Ice-free summer in arctic at least <b>once every 100 years</b>	Ice-free summer in arctic at least <b>once every 10 years</b>	<b>10x worse</b>	Arctic Permafrost		<b>4.8 million km² will thaw</b>	<b>6.6 million km² will thaw</b>	<b>38% worse</b>						
Sea-level rise		<b>46 million people</b> impacted by sea-level rise of 48cm by 2100	<b>49 million people</b> impacted by sea-level rise of 48cm by 2100	<b>1.1x worse</b>	Flooding		<b>100% increase in flood risk</b>	<b>170% increase in flood risk</b>	<b>1.7x worse</b>						
Coral bleaching		<b>70% of world's coral reefs</b> are lost by 2100	Virtually <b>all</b> coral reefs are lost by 2100	<b>Extinction</b>	Decline in marine fisheries		<b>1.5 million tonnes</b>	<b>3 million tonnes</b>	<b>2.x worse</b>						

Source: IESR, 2023 adapted from WWF, 2021; Forbes, 2022; Climate Council, 2023

Destruction is inevitable.  
**Maintaining 1.5C mean temperature rise will save millions of people and other living creatures**





# Prospects for economic growth

## Economics



### Main Idea:

**For a healthy, emission free and sustainable world**

### Efforts:

**Green Industry**



Source: IESR Analysis, 2023 adapted from [WPI Economics, 2023](#); [DOE, 2023](#)

# Overview Industrial Decarbonization-supporting Policy & Regulations



Number of regulation that support decarbonization

No	Sector	Total	Law	GR	PD	MEMR	Mol	KLHK	MITI
1	Cross-sector	32	3	4	4	8	3	10	-
2	Cement	4	-	-	-	-	2	2	-
3	Iron and Steel	5	-	1	-	-	1	2	1
4	Pulp and Paper	9	-	1	-	-	5	3	-
5	Textile	4	-	1	-	-	3	-	-
6	Ammonia	3	-	-	-	-	1	2	-

Note: GR: Government Regulation; PD: Presidential Decree

Source: *IESR Analysis, 2023.*

- Decarbonization efforts can be encouraged in Indonesia based on the already existing regulatory framework.
- The government should be encouraged to include stronger and more binding regulations in the future, including support and incentives for industry and ensure that producers, consumers, and markets are protected by product control that support industrial decarbonization.

## Legal Basis for Green Industry

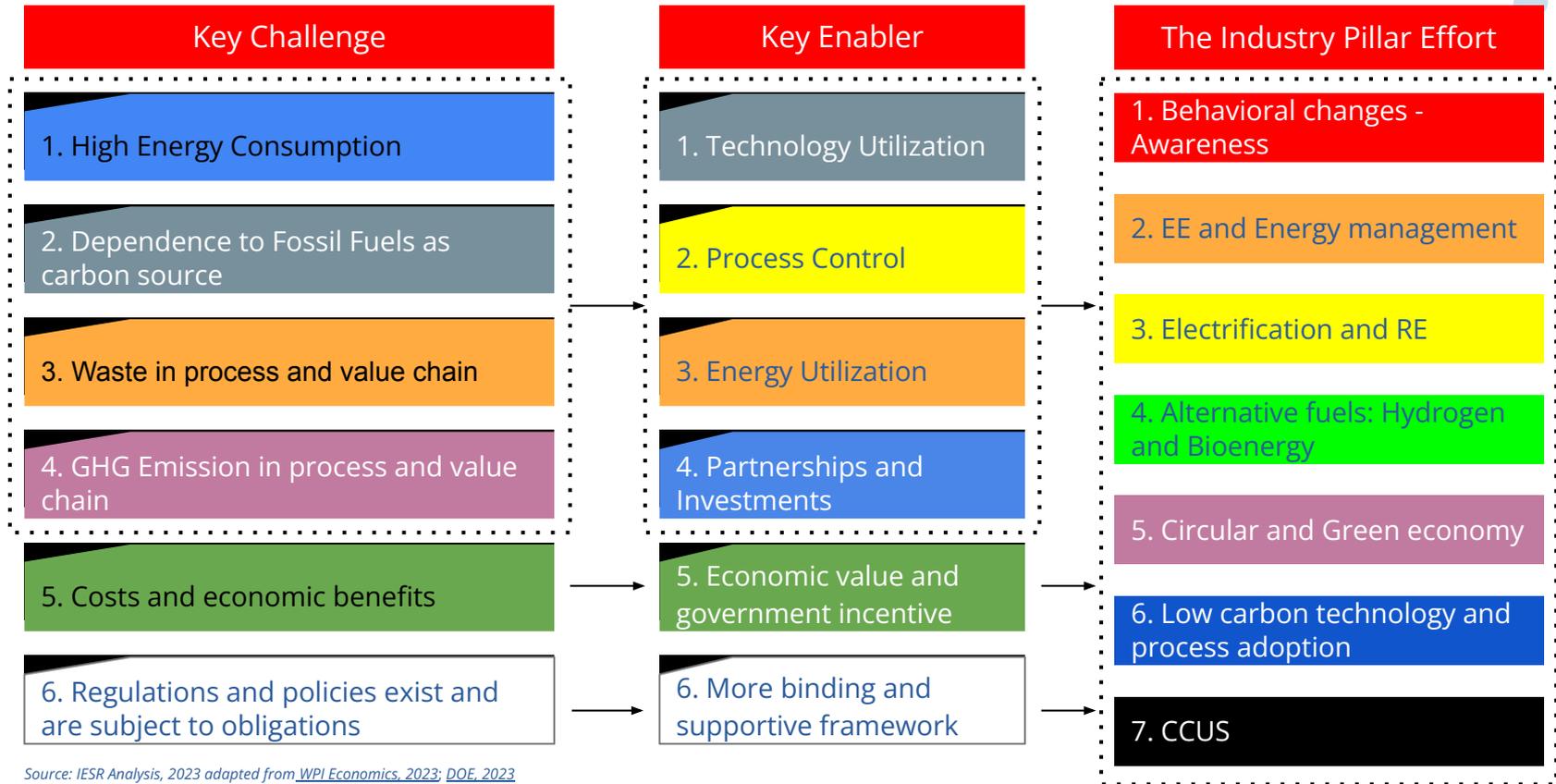
- 01 Law No. 3 of 2014 concerning Industry
- 02 Government Regulation (GR) No.41 of 2015 concerning Industrial Resource Development
- 03 Government Regulation (GR) No. 14 of 2015 concerning the National Industrial Development Master Plan 2015 – 2035
- 04 Government Regulation (GR) 29 of 2018 concerning Industrial Empowerment
- 05 Presidential Decree (PD) No. 59 of 2017 concerning Implementation of the Achievement of Sustainable Development Goals
- 06 Presidential Decree (PD) No.18 of 2020 concerning the 2020-2024 National RPJM

34 Green Industry Standard

14 Green Industry Certification Institutions (LSIH)

Source: *BSKIL, 2023.*

# Key challenge and enabler in industrial decarbonization



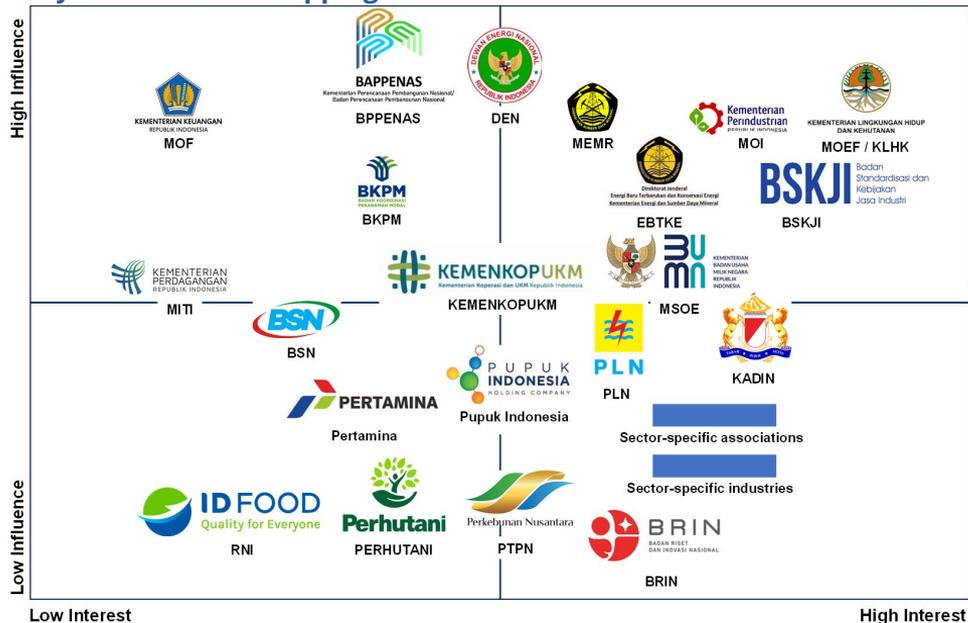
Source: IESR Analysis, 2023 adapted from [WPI Economics, 2023](#); [DOE, 2023](#)



# Industrial decarbonization key stakeholders

For industrial decarbonization to be achieved in Indonesia, many stakeholders will need to work together, in particular to establish a green industrial ecosystem that supports the concept of NZE.

## Key Stakeholders mapping for industrial decarbonization in Indonesia



## Key stakeholders in decarbonization effort

No	Sector	Gov	SOE	Priv	IA	CB	RI
1	Cross-sector	10	6	-	1	1	1
2	Cement	2	1	6	1	1	-
3	Iron and steel	2	1	4	1	1	-
4	Textile	2	-	9	1	2	-
6	Pulp and paper	4	-	9	1	1	-
7	Ammonia	2	1	2	2	-	-

Note:

Gov: government  
 SOE: State-owned enterprise  
 Priv: Private company

IA: Industry Association  
 CB: Green certification bod  
 RI: Research institution

Source: IESR Analysis, 2023.

Source: IESR Analysis, 2023

# The desire of industry to reduce emissions - Cement, Iron and steel



## Industry decarbonization target, effort and strategy

No	Sector	Total Sample	Decarbonization target		Effort for decarbonization		Strategy for decarbonization
			Specified	Unspecified	Have	N/A	
1	Cement	4	67%	33%	100%	-	<ol style="list-style-type: none"> <li>1.Implementing ISO 50001:2018 energy management system</li> <li>2.Optimizing the waste heat recovery power generator</li> <li>3.Utilization of alternative fuels, such as biomass and hydrogen injection</li> <li>4.Utilization of renewable energy of solar PV</li> <li>5.Automation and machine learning in smart plants</li> <li>6.Substituting clinker and using alternative raw materials</li> <li>7.Promoting hydraulic cement standards with lower clinker factors</li> <li>8.Measuring and reducing SO2, NOx, and dust emissions by using a bag filter</li> <li>9.Distribute cement using trains as truck alternative</li> <li>10.Utilization CCS/CCUS (plan)</li> </ol>
2	Iron and Steel	3	67%	33%	100%	-	<ol style="list-style-type: none"> <li>1.Implementing ISO 50001:2018 energy management system</li> <li>2.Utilization of alternative fuels, such as natural gas</li> <li>3.Utilization of renewable energy of solar PV and floating solar</li> <li>4.Coke over gas for reheating furnace's fuel</li> <li>5.Hydrogen based direct reduction (plan)</li> <li>6.Investment on blue or green plant (plan)</li> <li>7.Utilization of off-gas from blast/steel furnaces, and coal oven batteries</li> <li>8.Utilization CCS/CCUS (plan)</li> </ol>

Source: IESR Analysis, 2023.

# The desire of industry to reduce emissions - Pulp and Paper, Textile



## Industry decarbonization target, effort and strategy

No	Sector	Total Sample	Decarbonization target		Effort for decarbonization		Strategy for decarbonization
			Specified	Unspecified	Have	N/A	
3	Pulp and Paper	3	100%	-	100%	-	<ol style="list-style-type: none"> <li>1.Implementing ISO 50001:2018 energy management system</li> <li>2.Utilization of alternative fuels</li> <li>3.Utilization of renewable energy of solar PV</li> <li>4.Regular emission-process control monitoring and measurement</li> <li>5.Designing low environmental impact product and eco-label</li> <li>6.Integrated fire management system</li> <li>7.Sustainable forest management</li> <li>8.Conservation and ecosystem restoration</li> <li>9.Improvement material efficiency throughout supply chain</li> <li>10.Maximizing the use of energy efficient utilities machinery and processes</li> </ol>
4	Textile	4	25%	75%	100%	-	<ol style="list-style-type: none"> <li>1.Implementing ISO 50001:2018 energy management system</li> <li>2.Utilization of alternative fuels, such as natural gas</li> <li>3.Utilization of renewable energy of solar PV and hydro</li> <li>4.Maximizing the use of energy efficient utilities machinery and processes</li> <li>5.Periodically replace and upgrade ageing machinery and technology with energy efficient technology and machines</li> <li>6.Regular emission-process control monitoring and measurement</li> </ol>

Source: IESR Analysis, 2023.



# The desire of industry to reduce emissions - Ammonia, Summary

## Industry decarbonization target, effort and strategy

No	Sector	Total Sample	Decarbonization target		Effort for decarbonization		Strategy for decarbonization
			Specified	Unspecified	Have	N/A	
5	Ammonia	3	33%	67%	100%	-	1.Utilization of alternative fuels, such as biomass 2.Implementation of a circular economy (converting CO <sub>2</sub> into other products, such as CO <sub>2</sub> liquid and soda ash) 3.Process optimization and use high-efficient equipment 4.Development of blue and green ammoniak 5.Maximizing the use of energy efficient utilities machinery and processes 6.Utilization CCS/CCUS (plan)
Summary of minimum effort that possible to reduce emission (Cross sector)							1.Implementing ISO 50001:2018 energy management system 2.Utilization of alternative fuels, such as biomass 3.Utilization of renewable energy of solar PV 4.Maximizing energy and materials efficiency 5.Regular emission-process control monitoring and measurement

Source: IESR Analysis, 2023.

- According to the results of the survey, large industries in sectors of cement, iron and steel, textiles, pulp and paper, and ammonia are highly motivated to decarbonize.
- However, costs, competitive value, and regulatory obligations for business actors and consumers still face challenges and obstacles that must be resolved together.



# More Information

[IESR | Institute for Essential Services Reform](#)

[www.iesr.or.id](http://www.iesr.or.id)



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# Reference

- Climate Councils, 2023. <https://www.climatecouncil.org.au/resources/impacts-degrees-warming/>
- IESR Analysis, 2023. Analysis by [DR. Farid Wijaya](#), Senior Analyst in IESR and IESR Team for presentation of: Status Quo of Industry Appetite towards Decarbonization in Indonesia, 25 October 2023.
- Forbes, 2022.  
<https://www.forbes.com/sites/mitsubishiheavyindustries/2022/01/26/the-stark-difference-between-global-warming-of-15c-and-20c/?sh=5edc79bf2a48>
- Kompas, 2022. Industri Tekstil dan Produk Tekstil: Sejarah, Potret, Tantangan, dan Kebijakan.  
<https://www.kompas.id/baca/paparan-topik/2022/05/09/industri-tekstil-dan-produk-tekstil-sejarah-potret-tantangan-dan-kebijakan>
- MITI, 2023. Laporan Kinerja Kementerian Perdagangan 2022.  
<https://www.kemendag.go.id/public/laporan/9CPysMbUa1ZnlXPMc8sZvQQTOHiK1pHkidbuBg68.pdf>
- Mol, 2023a. Kurangi Emisi Karbon, Kemenperin Dukung Industri Bangun Panel Surya.  
<https://kemenperin.go.id/artikel/24249/Kurangi-Emisi-Karbon,-Kemenperin-Dukung-Industri-Bangun-Panel-Surya>
- Mol, 2023b. Seri Dekarbonisasi Industri: Perlu Sinergi Wujudkan Sumber Energi Bersih.  
<https://kemenperin.go.id/artikel/24374/Seri-Dekarbonisasi-Industri:-Perlu-Sinergi-Wujudkan-Sumber-Energi-Bersih>
- Mol, 2023c. Statistics of Indonesia Manufacturing Industry 2021 un 2022.  
<https://kemenperin.go.id/download/29068/Laporan-PP-39-Kementerian-Perindustrian-Triwulan-IV-Tahun-2022>
- WPI Economics, 2023. <https://wpieconomics.com/publications/economic-benefits-of-industrial-decarbonisation/>
- WWF, 2021. <https://lindseynicholson.org/2021/03/difference-between-1-5-and-2-0c-warming/>