



PLN

GREEN AMMONIA FOR POWER SECTOR IN INDONESIA

28 September 2022

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Who We are ...



One of the largest Indonesia's state owned company within USD 102.78 Billion assets and revenue USD 18.82 Billion/year



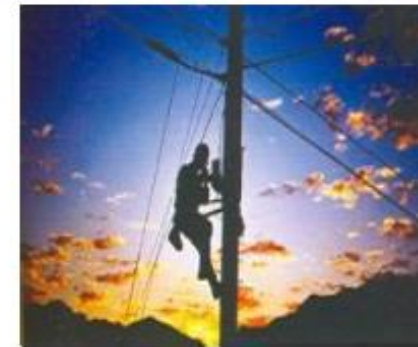
Power Generation

- Total capacity 63.3 GW:
- 41.1 GW (63%) PLN
 - 23.2 GW (37%) IPP



Transmission

- 53,278 kms Transmission line
- 131,164 MVA power transformers

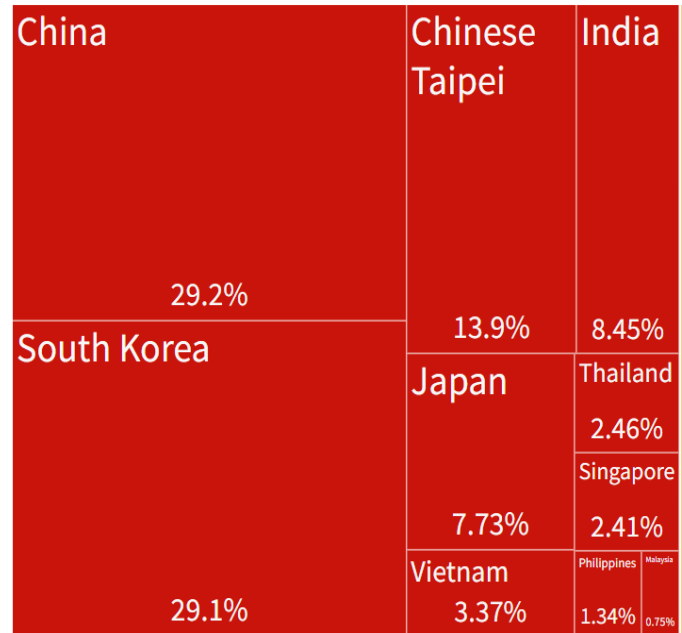


Distribution

- 953,459 kms distribution lines
- Over 80 million customers (> 35 million using pre-paid meter)
- Employees 54.225

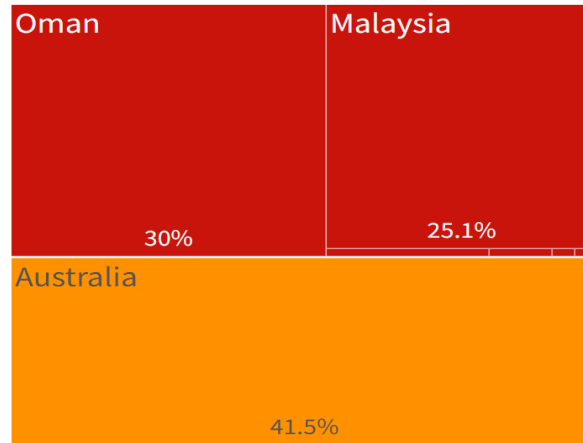
Where We are ...

EXPORT ←



In 2020, Indonesia exported \$413M in Ammonia, making it the 4th largest exporter of Ammonia in the world. The main destination are China (\$120M), South Korea (\$120M), Chinese Taipei (\$57.5M), and Japan (\$32M).

IMPORT →



On the other hand Indonesia imported \$5.27M in Ammonia, primarily from Australia (\$2.18M), Oman (\$1.58M), Malaysia (\$1.32M), Germany (\$97.7k), and United States (\$31.9k).

Totally The Indonesia net trade of ammonia is **\$408M**.

→ **IMPORT**

Year	Import (ton)	Year	Import (ton)
2012	1.374.881	2016	1.613.021
2013	1.295.943	2017	2.016.412
2014	1.802.884	2018	1.881.322
2015	1.642.922	2019	1.571.838
		2020	1.376.403

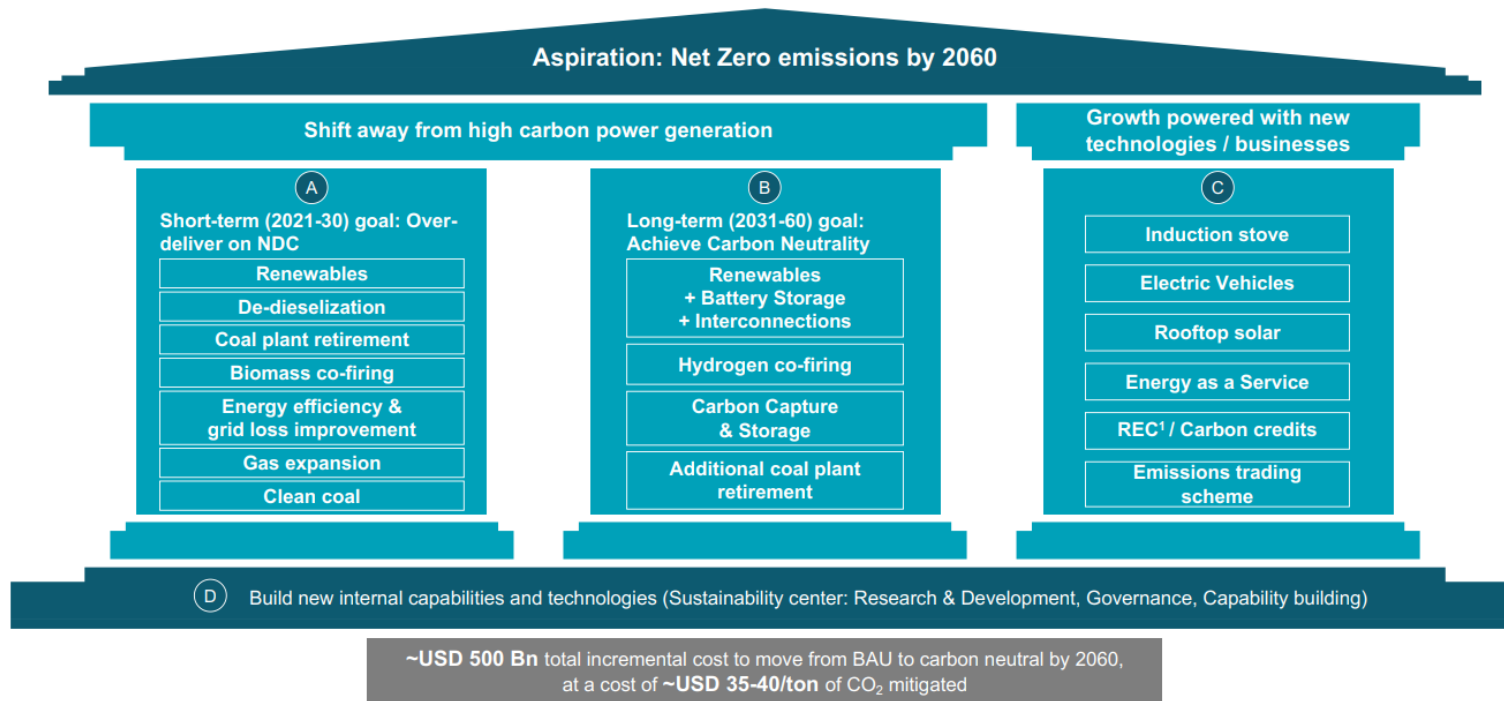
However, currently Indonesia **imported H₂** (not green yet) for industrial users.

Why PLN ...

- 1 Hydrogen (and Ammonia) is apart of PLN's Net Zero Emissions road map. PLN will utilize Green Hydrogen (and ammonia) for co-firing at Long-term goal starting from 2031.

- 2 PLN has the largest Renewable Energy power in Indonesia for producing Green Hydrogen (Ammonia). Its capacity right now is 8.2 GW and will increase.

- 3 PLN is the most potential users of Green Hydrogen /Ammonia in Indonesia. The market of co-firing for its existing coal fired power plants is up to 32.8 GW. For co-firing hydrogen of gas fired power plants is 14,3 GW recently and for the energy storage is 3.2 GWh until 2026.



What We've done ...

Activities

Technology assessment and roadmap of Co-firing Hydrogen implementation

Techno-economic of Hydrogen Fuel Cell for Micro Grid implementation

Pilot project of Hydrogen for small scale utilization at Diesel & Gas Engine Power Station

Pilot project of Co-firing Ammonia for Gresik Coal fired power plant

Pilot project of Co-firing Hydrogen for Kramasan Combined Cycle Power Plant

Partner



BRIN
BADAN RISET
DAN INOVASI NASIONAL



What The Issues ...

- 1. Today, making ammonia from Renewables (Green Ammonia) is expensive. To be financially feasible its price should be less than the coal price (\$ 70/ton) or the ammonia production cost has to be below \$ 0.07/kg. Additionally, to be financially feasible Green H₂ price should be less than the gas price (\$ 6/MMBTU) or its production cost has to be below \$ 1/kg.**
- 2. Multiple possible usage for hydrogen (and ammonia), there will be a tough competition among the industry for utilizing it in the future.**
- 3. Some countries will have strong competitiveness against Indonesia for producing green H₂ (and Ammonia) includes Australia, India, Malaysia, Saudi Arabia, Canada etc.**
- 4. The strategic partnership is needed by Indonesia to create an effective and competitive business model for H₂ for both domestic and international market.**



PLN

THANK YOU

<https://www.researchgate.net/profile/Zainal-Arifin-13/research>