



Development of Integrated Battery-based EV and Battery Energy Storage System

Presented at Forum Guru Besar ITB

Jakarta, 31st May 2024

indonesiabatterycorp.com

Global Demand Outlook



Source: BNEF, Avicenne, 2022

- By 2035, the world's battery demand will reach 5,300 GWh, dominated by demand of 4-wheeled Electric Vehicles, followed by 2wheeled Electric Vehicles, Buses, Battery Energy Storage Systems, and electronic goods.
- Demand of EV batteries mostly comes from 3 areas, namely: US, European Union, and Asia.
- Indonesia has the world's number 1 nickel reserves, which are the main component of lithium batteries, so Indonesia has the opportunity to become a global battery material and battery producer.



Material Processing

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EV

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Source: Global Supply Chains of EV Batteries, IEA 2021

3 Battery & EV Industry and Market Update

Industry and Market Overview

US	 US projected to face cell and PCAM shortage with IRA regulation limiting China supply ✓ Projected to face 109 GWh cell shortage by 2024 and 627 kt PCAM shortage by 2030 ✓ US IRA regulation will eliminate China as importer competition and favoring countries within FTA list 		
EU	 EU projected to face cell and PCAM shortage but with stricter import regulation ✓ Projected to face 97 GWh cell shortage by 2024 and 255 kt PCAM shortage by 2030 ✓ Critical Raw Material Act, Battery Passport, etc. result in higher barrier for battery import from Indonesia 	Recommended Play	
China	 China OEMs are shifting their battery supplies from 3rd party to their Internal Group China OEMs are using batteries from their internal group. They plan to have backward vertical integration to fulfill the components supply chain. Chinese OEMs are planning to deploy both E4W Swappable Ecosystem and Charging Model for Indonesian Market 	 Together with Partners to ensure the ESG Compliance across the battery value chain Directly Collaborate with OEMs to develop battery business 	
Indonesia	 Nickel serves as important raw material for High Performance Battery The demand for high-performance batteries with nickel-based cathodes, essential for electric mobility and household applications, can be met by Indonesia's abundant nickel mineral resources. Indonesia as the 4th Largest Population Country, offers the potential for a significant increase in battery demand, projected to reach 60 GWh by the year 2035. IBC aspires to become a leading Battery Player for E-Mobility and Battery Energy Storage System in The Region 		

Indonesia Battery Corporation

Vision

World Class Company in EV & Battery Ecosystem

Mission

- 1. Maximizing the potential of Indonesia's resources by establishing a synergized EV battery ecosystem end-to-end from upstream to downstream
- 2. Proactively shape Indonesia's EV battery market and ecosystem
- 3. Continuously build capabilities and strengthen our competitiveness in order to become a world class company
- 4. To Support Indonesia as a production base / hub for battery production and EV in ASEAN
- 5. Collaborating with global partners in the development of the EV and battery ecosystem

Shareholders of IBC



- MIND ID: a state-owned mining holding company
 - **ANTAM**: a public company and subsidiary of MIND ID with primary businesses in nickel, bauxite and gold mining
 - INALUM: a subsidiary of MIND ID in aluminium smelting business
- PERTAMINA: a state-owned oil & gas holding company
- PLN: a state-owned electricity generation & distribution holding company

5 Indonesia Battery Demand Outlook

Total domestic battery demand is projected to grow 20 GWh 2030 until 59 GWh in 2035 with CAGR of 23% until 2035.



Opportunities in the Development of Battery Industry in Indonesia:



Source: BCG Analysis, 2021



Integrated nickel-to-battery projects – Partnership with CBL/CATL ["Project Dragon"]



JV	Industry	Investment Value ⁽¹⁾	Entity	(Subs) SOEs %Shares	&	Operation Date
JV 1	Ni mining	~ \$ 0.1 Bio.	PT SDA		51%	
JV 2	RKEF & industrial park	~ \$ 1.4 Bio.	PT FHT	ANTAM	NTAM 30% s/d IBC	- 2027
JV 3	HPAL	~ \$ 1.9 Bio.	sedang -			
JV 4	Battery Materials	~ \$ 0.7 Bio.	proses			
JV 5	Li-ion Battery cell-pack	~ \$ 1.2 Bio.	pendirian	⊢ IBC		2026
JV 6	Li-ion Battery Recycling	~ \$ 0.2 Bio.	PT baru			2031
		~\$ 5.4 Bio.				

(1) This investment value does not include the investment value by partners acquiring shares in PT SDA (IUP nickel ANTAM) and PT FHT (ANTAM's land and infrastructure assets in East Halmahera)

Realization in 2023			Ong	oing activities		
 ✓ 	completion of a joint feasibility study for each cooperation project plan			All JVs : fulfillment of condition precedents in the JVA for the establishment of the JV and the realization of investment including the		
\checkmark	Signing of 6 <i>conditional</i> JVA (joint venture agreement)			approval process from the shareholders of each party		
\	closing transaction of PT SDA and PT FHT (ANTAM and CBL)			FHT JV: preparation for FHT industrial estate construction in East Halmahera (construction plan from 2024)		
				JV Battery: due diligence of industrial land in Karawang & construction preparation (construction plan from 2024)		

8 IBC Initiative – Battery as-a-Service (1/2)

IBC Battery as-a Service (Battery Swap) Initiative: Providing energy stored in the battery to the OEMs (Produce – Manage – Repurpose – Recycle)



Pilot Project is underway, Commercial Deployment will be implemented in Q2 2024



Jakarta

9 Challenges in Development of Integrated Battery Ecosystem (1/2)

Manpower Development for EV Battery Industry

The integrated EV Battery Ecosystem would require >15.000 workers (>500 university graduates), from various disciplines, i.e metallurgical engineer, mining engineer, chemical engineering, etc

Clean energy with competitive electricity tariff

> 2000 MW of clean energy is required to support the integrated EV Battery Ecosystem with competitive electricity tariff

Challenges



A massive Electric Vehicle Infrastructure development (i.e charging station and battery swap station) would be required to support the electric vehicle deployment.

Investment, Project Execution , and high technology

Large investment USD 15 Billion, multiple partners, high technology requirement, and complex integrated value chain.

9 Challenges in Development of Integrated Battery Ecosystem (2/2)



How fast the technology will shift?

How much resources do we have?

How capable are we?

V

Don't Reinvent the Wheel

Collaborate with Partners who are willing to share the knowledge

Focus on area that will accelerate the industrial growth

Thank You

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Global Demand Outlook (2/2)

The Ni-Based Battery is projected to maintain a significant demand in the global market, reaching 40 ~ 50% until the year 2035.



Source: BloombergNEF. Note: Na-ion = sodium ion; LMFP = lithium manganese iron phosphate; LFP = lithium iron phosphate; LNMO = lithium nickel manganese oxide; LMO = lithium manganese oxide; LNO = lithium nickel oxide; NCA = nickel cobalt

Technology | Solid State

Cell structure Liquid electrolyte LIB Current collector Separator Cathode active Current collector material Solid-state battery Current collector

Current collector

CAM/SE composite

The general structure of solid-state batteries combines a solid electrolyte separator with an anolyte, a catholyte, and anode and cathode active materials. Various options exist for each of these components, opening up a wide range of possible combinations.

