**INDONESIA’S EV DEVELOPMENT: OPPORTUNITIES & CHALLENGES**

**INTRODUCTION**

Energy transition in the transportation sector is indicated by the gradual shifting from the use of internal combustion engine (ICE) vehicles to electric vehicles (EVs) globally. The transportation sector consumed 43% of total energy and emitted 16.2% of total global emissions in 2016 (IEA, 2020). In 2020, battery electric vehicles (BEV) dominated the global EV stock, which accounted for 67.0%, followed by plug-in hybrid electric vehicles (PHEV) for the other 32.9%. Indonesia is preparing a Roadmap for the National Electric Vehicle Acceleration as one of the implementation strategies of the Paris Agreement ratification to control greenhouse gas emissions in the transportation sector. The Indonesian government has set up The National Energy Plan of Indonesia (RUEN, 2017), as it has targeted to have 2,200 electric cars and 2.13 million electric motorcycles in Indonesia by 2025.

**LESSON LEARNED:**

**EV Regulations in the world**

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<th>Policy Measures</th>
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<td>No ICE Sales by 2025-2030</td>
<td>100% EV ZEV LDV by 2025-2030</td>
<td>No ICE Sales by 2040</td>
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<td>100% Public Transport by 2020</td>
<td>100% ZEV Public Transport by 2030</td>
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**Indonesian EV Supply Chain**

**OCCURRANCES:**

**Countries with Abundant EV Battery Raw Materials**

Nickel is one of the essential minerals in the development of EV batteries. Having 22% of the global nickel reserves, Indonesia has an excellent opportunity to become one of the main players in the global EV battery chain.
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**MAP OF NICKEL RESOURCES AND RESERVES**

- **03. Southeast Sulawesi**
  - Total Location (MMt): 567
  - Total Resources (MMt): 6,754,799
  - Total Reserve (MMt): 2,720,928
- **03. North Maluku**
  - Total Location (MMt): 68
  - Total Resources (MMt): 3,382,791
  - Total Reserve (MMt): 1,318,171
- **03. Central Sulawesi**
  - Total Location (MMt): 62
  - Total Resources (MMt): 3,471,173
  - Total Reserve (MMt): 1,060,900
- **04. Special Region of Papua**
  - Total Location (MMt): 4
  - Total Resources (MMt): 438,235
  - Total Reserve (MMt): 73,916
- **05. Special Region of West Papua**
  - Total Location (MMt): 14
  - Total Resources (MMt): 4,892,930
  - Total Reserve (MMt): 1,214,964

**WORLD NICKEL PRODUCTION**

- **Nickel Production (Ton)**
  - Indonesia: 130k
  - Philippines: 345k
  - Indonesia: 855k
  - Indonesia: 766k

**RESOURCES AND RESERVES**

- **Nickel Ore Reserve by the Grade**
  - >1.7% (3,184,407 Thousand Ton)
  - 81%
  - 19%
  - <1.7% (2,056,360 Thousand Ton)
  - 80%
  - 20%
- **Nickel Metal Reserve by the Grade**
  - >1.7% (918,329 Thousand Ton)
  - 75%
  - 25%
  - <1.7% (128,685 Thousand Ton)
  - 76%
  - 24%

**CHALLENGES**

- **The implementation and adoption of Indonesian EV are still far off from the target set by the government.**
- **The infrastructure for nickel processing (Smelter) NEAL for battery cell is still lacking.**
- **Differences in perception between government and industry for local content regulations for battery and electric vehicle manufacturing.**
- **The price of electric vehicles is still expensive compared to the price of vehicles based on combustion engines.**
- **Less incentives for the electric vehicle industry and consumers.**

**ABBREVIATIONS**

- BMW: Bureau of Meterology
- BRI: Indonesian Research Agency
- EK: Electric Car
- DPL: Low Pressure Air Leach
- IC: Nickel Fired Combustion
- KCI: Nickel-Nickel Carbonate
- LCI: Low-Cost Electrolyte
- LNI: Lithium Nickelate
- IMR: Indonesia Institute of Sciences
- MCNR: Ministry of Energy and Mineral Resources
- MKN: Ministry of National Development Capability
- MTPN: Ministry of Transportation
- NKK: New Government Communication
- NGR: New Government Regulation
- PHEV: Plug-in Hybrid Electric Vehicle
- WBN: National Energy General Public in Indonesia
- USA: United States of America
- ZEV: Zero-Emission Vehicles