

Indonesia's Potential as A Major Player in the Electric Car Battery Industry for the Global Market

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Introduction

Indonesia's economic growth continues to increase coupled with a population of more than 270 million and a population of productive age of more than 60%, making Indonesia a potential market for automotive manufacturers. In 2019, car sales in Indonesia reached 1.02 million units, becoming the largest among ASEAN countries. Of this value, only 600 units of cars were sold in the form of electric vehicles (EVs), but most of them were used for transportation such as taxis. The government has issued a policy to capture the potential for developing the electric car market in the future through the Presidential Decree, concerning the Acceleration of the Battery-based Electric Motor Vehicle Program for Road Transportation. In this policy, the government targets to accelerate the development of the domestic battery-based EVs industry, provide incentives, and provide electricity charging infrastructure.

As a potential major player in the battery component supply chain and has a potential market, various EVs manufacturers have started to look at Indonesia to invest in establishing their factories in Indonesia. For starters, Hyundai Motor has announced to invest US\$1.55 billion by 2030 to build a factory in Indonesia dedicated mostly to the production of electric cars for the Southeast Asia region. As a sign of its seriousness in working on the domestic market, Hyundai has launched the cheapest electric car product currently available in the Indonesian market. The newly released Hyundai Ionic and Hyundai Kona are in the range of IDR 640 million.

Batteries are a key component for EVs and contribute about 25-40% of the price of EVs. EVs use lithium-ion batteries (LIBs) with cathode active ingredients including lithium, nickel, cobalt, manganese, and aluminum elements. The cathode itself contributes the highest to the price of lithium battery cells, which is around 34%. Therefore, the Ministry of Industry encourages that these materials, especially nickel must be processed domestically to get a more economical price, considering that Indonesia has abundant natural resources that can be processed into these active ingredients.

It is estimated that the world's nickel demand will increase significantly due to the growth of the LIBs industry. Because it is more economical and has a higher energy density level, nickel is the raw material of choice for the manufacture of LIBs for EVs. An estimate suggests that the amount of nickel needed for EVs batteries sold in 2018 was 34 kilotons. In addition to nickel, other materials needed include 15 kilotons of cobalt, 11 kilotons of lithium, and 11 kilotons of manganese. By 2030, for a battery chemical mixture consisting of 10% NCA, 40% NMC 622, and

50% NMC 811, it is projected that the demand for class 1 nickel (>99% Ni) will reach 850 kilotons. Meanwhile, the demand for cobalt is 170 kilotons, lithium is 155 kilotons, and manganese is 155 kilotons.⁴ The consumption of nickel is increasingly important for the manufacture of EVs, because technological innovations for the manufacture of EVs are less dependent on cobalt but rely on nickel with higher levels. A major manufacturer of EVs batteries, Contemporary Amperex Technology Co. Ltd. (CATL), for example, has announced that it is mass-producing high-nickel grade batteries. The company will produce the next-generation NCM 811 battery - which has a composition of 80% nickel, 10% cobalt and 10% manganese which is considered to have a longer life. This battery generation allows EVs to go further on a single charge.

Indonesia's Nickel Resources

Based on the mapping of the Geological Agency in July 2020, Indonesia has nickel ore resources of 11,887 million tons and ore reserves of 4,346 million tons. Meanwhile, the total metal resources reached 174 million tons and 68 million tons of metal reserves. The areas of Southeast Sulawesi, Central Sulawesi, and North Maluku have the greatest potential in Indonesia to date. Nickel exploration activities must continue so that Indonesia can be more independent in nickel production. Through the downstream process, it can add added value to the country. Indonesia itself has positioned itself as the largest nickel ore producer in the world in 2019. The 2.67 million tons of nickel produced worldwide, Indonesia has produced 800 thousand tons, far ahead of the Philippines (420 thousand tons Ni), Russia (270 thousand tons Ni), and New Caledonia (220 thousand tons of Ni).

Currently, there are several types of nickel processed products in Indonesia, namely nickel pig iron (NPI), ferronickel (FeNi), Ni-matte, mixed hydroxide precipitate (MHP), mixed sulphide precipitate (MSP), and stainless steel (stainless steel). In the future, pure nickel, nickel sulfate, and cathode material will also be produced. Each of these products has characteristics, both technically, chemical composition, use, and commercial value. On the other hand, the potential resources of nickel limonite ore, with lower nickel content, are still abundant. NPI is a pyrometallurgically processed nickel product (smelter) with a nickel content of less than 14%. The NPI is dominated by iron and several other elements which are not commercially valued. Nickel metal on the NPI is priced at 88-95% LME. Basically, the price of several types of nickel processed products will be higher if the nickel is already in the form of certain compounds with very precise proportions for various very specific needs.

Government Regulations

Down streaming is closely related to the concept of added value and product competitiveness. The more downstream a product is produced from industrial activities, the higher the value or price. In the macroeconomic order, the more downstream the activities of a production, the greater the contribution to the total gross domestic income of a country. In industrial practice, the concept of added value is the difference or ratio between the selling value of the product produced and all cost components to produce the product in equivalent volume/weight units.

The production cost structure per ton of product is an accumulation of raw material prices, wages, management costs, productivity, taxes, depreciation, and other costs that are often unpredictable. The lower the cost structure of production, the higher the competitiveness of the product (or country). Especially if the quality of the resulting product is very good.

Down streaming in the mineral and coal sector has become the mandate of Law Number 3 of 2020 concerning Amendments to Law Number 4 of 2009 concerning Mineral and Coal Mining. The downstream obligation attached to the mining industry is none other than to provide added value for mining products. The government itself has banned the export of nickel ore starting in January 2020 through the Minister of Energy and Mineral Resources Number 11 of 2019 concerning the Second Amendment to the Minister of Energy and Mineral Resources Number 25 of 2018 concerning Mineral and Coal Mining Concessions.

Construction of Electric Car Infrastructure

The government through the Ministry of Energy and Mineral Resources seeks to accelerate the development of electric vehicle infrastructure. As is known, until now Indonesia has had 96 charging stations for electric vehicles owned by PT PLN (*Perusahaan Listrik Negara*, state-owned electricity company), PT Pertamina (state-owned oil company), and the private sector. PT PLN has allocated IDR 120 billion for the construction of electricity infrastructure to accelerate the formation of an electric vehicle ecosystem. The government based on Presidential Decree No. 55 of 2019 has a policy stake to facilitate the electric car market, starting from the provision of PpnBM (Sales Tax on Luxury Goods) incentives, exemptions, or reductions from central and regional taxes to incentives for import duty on production materials.

The government involves several institutions and universities and provides incentives to realize the national electric car production. The production of electric cars is prioritized in the form of city cars, buses cannot be mass produced because of constraints on the battery system which is still limited. In addition, electric car manufacturers must also be ready for after-sales and other requirements. Regarding the charging station infrastructure, PT PLN stated its ability to build infrastructure and provide electricity for electric cars. Where PT PLN has experience in providing electricity facilities for mass transportation of electric trains. The main issue is that there are two standardizations of chargers, namely Japan and Europe. This standard will be used to determine cars in Indonesia.

Electric Battery Investment

The collaboration between the Ministry of State-Owned Enterprises (BUMN) and the Ministry of Investment/Investment Coordinating Agency (BKPM) with the Hyundai Consortium paved the way for the development of electric vehicle battery cells in Indonesia. The Ministry of SOEs announced the formation of a battery company called PT Industri Battery Indonesia (IBI). Holding IBI consists of Indonesian Mining Industry (Mind ID), PT Indonesia Asahan Aluminum (Inalum), PT Aneka Tambang Tbk. (Antam), PT Pertamina, and PT PLN. In addition to the collaboration with

the Hyundai Consortium, the formation of this company also involves the KIA Corporation, Mobis Hyundai, and LG Energy Solution. This collaboration obtained groundbreaking for the construction of an electric battery factory in Karawang, West Java with a project worth US\$ 1.1 billion or equivalent to IDR 15.6 trillion.

The purpose of this collaboration, apart from manufacturing conventional vehicles, is to make Indonesia a center for the development of a battery-based electric vehicle ecosystem. Therefore, IBI must be able to produce batteries competitively to meet Indonesia's needs and be able to export battery cells abroad. Meanwhile, the investment disbursed for this electric battery project does not only come from foreign investment, but also from domestic investment. Investment cooperation in the construction of battery factories in Indonesia is carried out with at least two countries, namely LG Chem from South Korea and CATL from China. Furthermore, there are already several other countries that want to cooperate in investment with Indonesia.

Market Potential

Expansion of battery manufacturing is fueled by the growth of the EVs industry. It is estimated that the trend in demand for EVs will continue to grow. China is the largest market for EVs. The country accounted for 54% of the world's total electric car sales in 2018. Globally, more than half of all new car sales will be electric cars by 2040. China itself is already known to be investing heavily in the electric vehicle industry and its supporting industries. China has even become one of the main producers of LIBs and a major use for vehicle batteries. Like battery manufacturing, the manufacture of EVs is also controlled by a handful of transnational companies.

Indonesia is a country that has a very large population, so it has a very wide market potential. The Indonesian market is often referred to as the emerging market because its market development continues to increase from time to time. The Association of Indonesian Automotive Industries (Gaikindo) explained that the market for electric cars or battery EVs in Indonesia is quite potential. The market share of internal combustion engine (ICE) cars priced below IDR 300 million is around 40% and LGCG (low-cost green car) cars priced below IDR 150 million are 22% of total sales each year. As for the first semester of 2021, sales of EVs have reached 488 units. Throughout 2020, sales of electric cars were only recorded at 120 units. The challenge for the development of EVs still lies in the low purchasing power of the people.

Conclusion

Indonesia's potential as a producer and market for EVs has significantly changed in recent years. Nickel ore as a new commodity for battery materials makes EVs companies around the world searching this natural resource. Indonesia government is very careful to maintain this "new gold" for domestic EVs industries. With a huge reserve of nickel in Sulawesi Island, the government released some new regulations to develop state-owned battery companies. EVs infrastructure for the domestic market is the main concern to establish a sustainable business. Furthermore, many foreign investments and companies make agreements and cooperation to

build a battery factory and EVs industries, especially Korean carmakers. Within decades, the Indonesia government wants to be the main player of battery production for EVs industry of the world.

References

- <https://indonesia.go.id/kategori/feature/2997/electric-vehicle-battery-factory-to-absorb-1-000-indonesian-workers?lang=2>
- <https://www.indonesia-investments.com/news/todays-headlines/indonesia-battery-corporation-lg-corp-to-start-construction-electric-vehicle-battery-plant/item9422>