Executive Summary

Do you view the opportunity in the crisis that the "EV Conversion" could be a transition strategy?

Upgrading the automotive industry from internal combustion engine (ICE) vehicles to electric vehicle (EV) conversion can be considered a transition strategy to prepare for the full-scale production and use of EVs in the future. This also creates confidence among entrepreneurs and consumers by generating demand for EVs, which will lead to a supply of investment in the production of EV components within the country. This is supported by Office of the National Economics and Social Development Council (NESDC) which targets EV conversion of at least 40,000 vehicles by 2027 and responds to Thailand's 30@30 policy, which aims to have zero-emission vehicles represent at least 30% of all cars produced by 2030.

Rapidly shifting from ICE vehicles to EVs may cause disruption to the traditional industry, destroying the supply chain that cannot adapt quickly enough. Therefore, supporting the EV conversion industry should be a government priority for no more than 5-10 years. This will be a critical step in the strategic transition towards widespread use of EVs in the country. Stimulating the creation of this industry has a positive impact on related industries, knowledge development, and technological advancement within the country.

"EV conversion is the process of retrofitting an old gasoline-powered car with a new propulsion system to replace the reliance on gasoline with a 100% electric system." The conversion involves changing the entire technology used and the number of components required, reducing the number of gasoline components from 30,000 to just 3,000 when converted to an EV. The heart of EV conversion lies in the EV Kit or motor kit and related electrical systems, which cost between 400,000 and 800,000 baht depending on the model and the components of the car. This is considered high when compared to a survey that found that users are willing to pay only about 300,000 baht for an EV conversion. It is reported that the price may be reduced to 300,000 baht per car with government subsidization.

For the cost-effectiveness of EV conversion, small four-wheeled cars are more cost-effective when using electricity compared to larger six or ten-wheeled vehicles. In this regard, the

EV conversion industry should focus on the niche market of commercial vehicles, which have more demand and are more cost-effective to convert. The optimum price currently should not exceed 300,000 baht per car. In terms of the economic impact, considering that pickup trucks in the country are over 10 years old and there are about 4 million of them if only 10% (400,000) were converted, it would generate currency circulation of more than 120 billion baht for component manufacturers and garages throughout the country. It would also reduce the environmental impact by reducing emissions by 560 million baht.

In terms of safety, there are currently “Thai Industrial Standard S” set by the Ministry of Industry in the industry of "car and motorcycle EV Conversion services" to certify the quality of products and services, with two standards in place. In addition, there are EEC standards that will soon be announced as 3 guidelines. Based on safety concerns, these guidelines provide a preliminary answer to building confidence in the safety of using EV Conversion, but there are currently no mandatory regulations in place. The government is currently working on setting standards, testing, certifying quality, and preparing safety measures.

A key factor for breakthrough success in the EV Conversion industry is support from the government in terms of strategy, policy, and measures, as well as setting standards and certifying product and service quality. In addition, forming associations or consortia through Public-Private-Partnerships (PPP) is another important way to support the sustainable development of this industry.

Over the past 5 years, NECTEC has collaborated with the Electricity Generating Authority of Thailand (EGAT) to conduct research and development of EV kits and blueprints for EV conversions using the e-Engine method, which differs from conventional conversions and is the first successful implementation in the world. This is achieved through the principle of creating a simulated engine using electric motors and an Engine Emulating Unit (EEU) to allow the original ECU of the vehicle to continue functioning. In addition, there have been four projects on EV conversions for cars, motorcycles, passenger vehicles, and passenger boats. Furthermore, a project is underway to develop industrial production recommendations and inspection standards for EV conversions with funding support from Program Management Unit for Competitiveness Enhancement (PMU-C).

The standpoint and role of NECTEC are on research and development of conversion methods, kits, and manuals, research and development of major components, testing of component standards, development of industrial production recommendations, and inspection standards for EV conversions. NECTEC works with the National EV Board to operate the EV conversion program and promote understanding of EV conversion to the general public. This is done by providing suggestions for driving this industry in three main dimensions, starting with research and development and integration between the government and private sectors, training and development of human resources, and testing and certification standards to support the creation of an ecosystem for testing and certification standards.

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