ABSTRACT

Indonesia's commitment to achieve net zero emission by 2060 is a key driver for the development of the electric vehicle industry. One of the crucial challenges in supporting this transition is ensuring the sustainability of the battery supply chain, especially regarding the availability of key raw materials such as nickel, cobalt and manganese. This research aims to build a dynamic system model that is able to describe the interactions between components in the forward supply chain of electric vehicle batteries in Indonesia. The model was developed using a simulation approach based on Ventana System software, with reference to mining data, exports, imports, production, and demand for electric vehicles in the range of 2022 to 2024. Simulations were conducted to evaluate various scenarios that reflect fluctuations in raw material supply and market demand dynamics. The results of the analysis show that raw material availability can last until 2044 if supply management is carried out consistently and in accordance with projected production needs. In addition, the model also identifies critical points in the system that can be the focus of policy interventions. This research contributes in the form of strategic recommendations to strengthen the domestic battery supply chain and encourage the independence of the electric vehicle industry in Indonesia in a sustainable manner.

Keywords: Electric vehicle industry, Supply chain, Electric Vehicle, Battery, Dynamic system, Ventana System