Ekplorasi kebijakan pemerintah dalam mendukung adopsi motor listrik melalui pengembangan industri battery swapping di Indonesia dengan pendekatan sistem dinamis = Exploring government policy intervention to support electric motorcycle adoption through the development of battery swapping industry in Indonesia with system dynamics approach

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Abstrak

Transisi menuju kendaraan listrik merupakan salah satu hal yang diupayakan pemerintah untuk mengurangi emisi serta menghadirkan moda transportasi yang lebih ramah lingkungan. Namun, dalam mengadopsi kendaraan listrik, masih banyak faktor yang menjadi hambatan seperti harga yang tinggi, durasi pengisian yang lama serta jarak tempuh yang pendek. Battery swapping merupakan skema yang dapat mengatasi hambatan- hambatan bagi masyarakat dalam mengadopsi kendaraan listrik tersebut. Pemerintah Indonesia pun telah menargetkan pengembangan industri battery swapping dalam rangka meningkatkan adopsi motor listrik. Industri battery swapping merupakan sistem yang kompleks dan dinamis sehingga diperlukan beberapa alternatif strategi dalam pengembangan industri battery swapping. Simulasi dengan pendekatan sistem dinamis dapat membantu memperoleh pengetahuan mengenai faktor- faktor pendorong seperti variabel eksogen dan intervensi kebijakan dalam mendukung pengembangan industri battery swapping. Tiga jenis skenario disimulasikan bersama dengan 3 alternatif kebijakan berupa standardisasi kemasan baterai, penjualan motor listrik tanpa baterai serta subsidi pendirian stasiun battery swapping. Ketiga alternatif kebijakan secara positif mempengaruhi tingkat adopsi terhadap battery swapping serta keuntungannya. Standardisasi kemasan baterai mampu memberikan tingkat adopsi yang paling cepat serta keuntungan bagi penyedia jasa battery swapping yang paling tinggi.

.....The transition into electric vehicle has been encouraged by the government to reduce the emission and provide new type of transportation which is more friendly for the environment. However, there are still several challenges in adopting electric vehicle such as the price, range, and also charging time. Battery swapping is a scheme that could overcome those challenges for the society to adopt the electric vehicle. Indonesian government has a target to develop battery swapping industry in order to increase the adoption of the electric motorcycle. Battery swapping industry is a complex and dynamic system, thus, strategies are needed to develop this industry. Simulation with system dynamic approach is needed could help to gain insight regarding the driving forces such as exogenous variables and also policy intervention to encourage the development of battery swapping industry. Three different scenarios are simulated with three different policy alternatives: battery pack standardization, e- motorcycle sales without battery and battery swapping station establishment subsidies. Each policy intervention has positive correlation in increasing the adoption of battery swapping user as well as the profit. Battery pack standardization gives the fastest adoption rate and the highest profit for battery swapping provider.