

IMPACT OF THE DEVELOPMENT OF EMERGING RENEWABLE ENERGY TECHNOLOGY ON THE LITHIUM MARKET IN CHINA

Donghui Liu, Xiangyun Gao¹, Haizhong An School of Economics and Management, China University of Geosciences, Beijing 100083, China E-mail address: gxy5669777@126.com (X. Gao).

Abstract

The renewable energy technologies are the key solutions to cope with the depletion of fossil energy and the environmental problem caused by the usage of fossil energy. Among them, electric energy storage (EES) technology is innovated to promote the replacement of thermal power generation with renewable power generation. Meanwhile, new energy vehicles (NEV) are promoted for clean and sustainable transportation and the mitigation of carbon emissions. However, the rapid development of EES and NEV consumes huge amount of lithium resource. Consequently, it is critical to study the market of lithium resource driven by the demand of renewable energy technology, including EES and NEV. A system dynamics model for renewable energy technology–lithium supply and demand (RET-LiSD) is developed in this paper to investigate the impact of development of EES and NEV on the lithium market. In addition, analysis is also conducted on whether the lithium demand of EES and NEV can be met under different demand scenarios. Furthermore, the consumption structure of battery-grade lithium carbonate will also be presented in this paper under different demand scenarios. The model is simulated under the Matlab/Simulink platform. Simulation results suggest that lithium resource price will gradually increase for a certain period, which creates incentive for the upstream industry to increase production capacity. Under high scenario, the market fluctuation happens at the early stage, while the vitality occurs at latter stage for low scenario. In addition, under high scenario, lithium demand for EES and NEV cannot be met, and therefore more incentives and supports are needed for technological breakthrough, such as increasing of NEV mileage, to increase the production capacity to meet the market demand for EES and NEV. Moreover, EES will play a significant role in the market in the future period, which should not be ignored.

¹ Corresponding author at: School of Economics and Management, China University of Geosciences, Beijing 100083, China.
E-mail address: gxy5669777@126.com (X. Gao).