

■ 연구논문 요약문1

논문제목	An optimal electric vehicle investment model for consumers using total cost of ownership: A real option approach
게재정보	Applied Energy, vol253, 2019
개요	<p>The purpose of this study is to develop a consumer-based optimal electric vehicle investment model using total cost of ownership (TCO) which is the actual total cost paid by consumers from acquisition to disposal. Especially, this model includes recent rapid technological advances in EVs and high volatility of oil prices. To quantify the economic value of the options of a consumer's decision, we estimated the TCO of vehicles. Specifically, to provide realistic results for consumers, we used empirical data from the Korean automobile market to evaluate the economic value of the TCO. Using the proposed investment model with empirical data, we derived an optimal decision path as a function of time, considering oil price uncertainty and technological advancements, by analyzing a binomial lattice model to identify the optimal timing of adoption.</p>
연구결과	<p>EVs are more cost-effective at the current fuel price levels without subsidies than ICEVs, and still cost-effective even if current fuel prices decrease 20% further. Thus, the current EV purchase subsidy level in Korea can be regarded as somewhat inordinate. Furthermore, as the volatility of fuel price becomes higher, to wait and see the market condition would be better decision for consumers rather than to replace the old vehicle. Thus, as the fluctuations of fuel price become more stable, the likelihood of adoption EVs should be increased if consumers make a decision optimally according to our investment model.</p>
활용분야 및 기대효과	<p>The major contribution of this paper is that our EV investment model can consider not only the cost dynamics of TCO by technological advances but also oil price uncertainty by using real option approach. With this novel attempt, the model can provide the optimal investment decision path of adopting EV according to the contingencies of technological and market environments. Also, this model can be applied to any consumers considering to purchase EVs if the relevant empirical data of specific country is available because all components of TCO are general</p>