

Financial Feasibility of Introducing Electrical Vehicles into Taxi Service in Singapore

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Abstract

With a rise in global warming, Governments around the world are turning to electric vehicles as a solution to resolve the partially increasing carbon emissions caused by fuel vehicles. According to International Energy Agency (IEA), which is a multi-government policy forum formed by governments from Africa, Asia, Europe, North America as well as EVI, with the aim to facilitate and accelerate the adoption of electric vehicles, the sales of electric vehicles worldwide have more than doubled from 45,000 in 2011 to 113,000 in 2012. However, the challenges to the deployment are the high costs of the electric vehicles, the high initial cost of setting up the charging infrastructures and the great efforts needed to promote electric vehicles to the public.

The purpose of this paper is to analyze the financial feasibility of introducing electric vehicles to replace diesel taxi for Singapore market. The net present values of electric vehicles and diesel vehicles are discussed and compared on a 10-year (20 cycles) period. After detailed analysis on deterministic base case, base case under uncertainty and base case under uncertainty with flexibility, the recommendation is to introduce electric vehicles to Singapore future taxi market.

This paper presents a four-phase project evaluation technique that provides a higher accuracy in economic analysis of projects. The analysis begins with base case model which utilize discount cash flow (DCF) to compute project net present worth (NPV). The second step takes into consideration possible sources of uncertainty and model them using Monte Carlo simulation. Next step involves identification of possible flexible design in attempt to reduce project impact from market uncertainty. The last step compares results from the previous three scenarios and determines the most profitable design. In this paper, the analysis was performed on the topic to implement electric vehicle into taxis service in Singapore from a taxi company perspective. The analysis covers all four phases depicting a difference in project value at different phase of analysis, when different factors are taken into consideration.

Keywords: Taxi, Cab, Electrical Vehicles, Electrical Cars, Singapore