

A Computable General Equilibrium Analysis of Electric Vehicle Society in Toyohashi City, Japan

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Abstract:

In this paper we explore economic impact of promotion and realization of an electric vehicle society (EVS). More concretely, this paper emphasizes a CGE-modeling approach to evaluate the following issues: entire economic impacts of subsidies for promotion of an EVS, price reductions, a change of industrial structure towards an EVS and modal shift towards an EVS.

Our simulation results demonstrate that after introducing 20% subsidies to five industries, which are electric vehicle (EV) manufacturing, EV transport, solar power, cogeneration, and other transport, the total industrial output and city GDP increase. A large growth rate is found in industries where subsidies are introduced. But non-ferrous metal industry is exceptional. It is interesting that decreasing proportions are found in oil and coal product, mining, heat supply and gasoline vehicles (GVs) transport industries.

Moreover, all the commodity prices decrease due to subsidies. Hence, Toyohashi city's economy shows a direction where the demand for conventional vehicles and energy use are decreased, and conversely the demand for EVs and renewable energy are increased that displays a different lifestyle from the current one.

For all these reasons, it is authors' opinion that EVS can really represent a realistic alternative society both in terms of economic development and CO₂ emissions reduction. In this study therefore it is clear that modal shift occurs to EVS, and thus we suggest the promotion of new industrial structure for introducing an EVS in Toyohashi city, Japan. The proposed model can even be applied to the other cities in Japan and other countries in the world which are similar to this area.

Keywords: CGE model, electric vehicle society, electric vehicle, Toyohashi city, Japan