

Evaluation of the Role of National and Local Authorities in Electric Vehicle Promotion Systems

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Overview

Although electric vehicles can significantly contribute to energy consumption efficiency, reduction of carbon dioxide emissions and independence from petroleum imports, numerous technical and economic challenges burden electric vehicle mass-market adoption (Kley et al., 2010). Having faced the problems of air quality decrease, a number of countries worldwide are striving to promote electric vehicle usage. One of the reasons why natural market entry for electric vehicles is relatively slow can be linked to their prices, which are higher than the prices of traditional fossil fuel-driven vehicles. Trying to improve the situation, national and local authorities develop promotive policy instruments which enhance competitiveness of electric vehicles and increase their popularity among consumers (Yang et al., 2016). Significant public interest in electromotive technologies and the environmental impact of these technologies determines topicality of such problems as efficiency and effects of electric vehicle promotion measures researched by Hall et al. (2017), Hall and Lutsey (2017), Jin and Slowik (2017), Yang et al. (2016), Mock and Yang (2014), Alhulail and Takeuchi (2014), Windisch (2013), Perdiguero and Jiménez (2012), and many other authors. In terms of promotion of the transition from traditional fossil fuel-driven vehicles to electric vehicles, local authorities do not lag behind national authorities and demonstrate the ability to significantly reduce carbon emissions in the transport sector. Even after incorporating upstream emissions, electric vehicles provide a carbon emission reduction advantage, which in Chinese, European and U.S. markets varies from 30% to over 98% in comparison to the statistics of traditional fossil fuel-driven vehicles. In the area of electric vehicle promotion, contribution of not only car manufacturers but also energy producers is essential, especially in terms of energy decarbonisation (Hall et al. 2017). Nevertheless, electric vehicle promotion systems, measures and even goals may significantly vary at different levels: some of them are implemented at a national level, while others are orientated towards local resources and focus areas (Yang et al., 2016). Particular effects can also be caused by some other determinants. For instance, Alhulail and Takeuchi (2014) note that the sales of eco-friendly cars can be significantly affected by fuel prices, car model prices and population income. Fuel prices, however, are not stable, and even if high prices can affect the sales of eco-friendly cars, these changes can turn out to be only temporary. The main purpose of this article is to research the most common electric vehicle usage promotion measures at different administrative levels.

Methods

Interdisciplinary research, literature review.

Results

The review of the key differences between the focus areas and promotion measures implemented at the national and local administrative levels has been presented in table (compiled by the authors) on the next page:

Conclusions

The above-analysed examples of electric vehicle promotion indicate that complementation of national policy schemes with local policy measures may help to create electric vehicle-favourable environment and reduce barriers for consumers. Development of charging infrastructures, considered to be the key determinant of electric vehicle promotion, is the responsibility of both national and local authorities: national authorities set the standards and build highway infrastructures, while local authorities take care of arrangement of charging points in each of microdistricts. Arrangement of charging points can be treated not only as a promotive measure (especially, minding subsidies, grants or preferential loans for establishment of charging points at homes, workplaces or public areas), but also as building of the necessary infrastructure.

In the initial stage of electric vehicle promotion, the actions of national authorities that set the political aims of general planning and co-ordination serve as a signal to manufacturers and service providers about the changes in the demand for electric vehicles in the future. Standardisation, which ensures interaction of electric vehicles inside and outside a country, along with economic and regulatory mechanisms can be treated as the other key instruments. The main purpose of financial incentives is to reduce electric vehicle prices or usage costs so that the critical differences between electric and traditional vehicle costs would be eliminated. Regulatory mechanisms, such as pollution taxes, restrictions and limitations, can cause side effects for the substitutes of electric vehicles. The decisions of national authorities may affect fossil fuel prices, while the growth of petrol and diesel prices may directly affect the usage of alternative means of transportation. In this case, sales mandates, which fix the proportion of electric vehicles in the total number of newly-sold vehicles, can be introduced. The

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Administrative levels	Focus areas	Policy framework Examples of measures
National	Setting national goals Standardizations Regulations Deployment of charging infrastructures Financial initiatives Marketing	<ul style="list-style-type: none"> • Exemption from VAT • Direct subsidies for vehicle consumers • Tax credits • Financial support for car manufacturers • Incentives in energy taxation • Incentives in vehicle registration taxes • Annual vehicle tax reduction • Initiatives for public charging infrastructure • Regulation of charging infrastructure • Fuel regulation incentives • Cap and trade system • Green public procurement • Obligation for new constructions • R&D stimulation • Sales mandates • Promotion campaigns
Local	Setting local goals Marketing Parking policy Traffic management tools Urban access restrictions Fleets upgrade Private and public partnerships Deployment of charging infrastructures Financial Incentives	<ul style="list-style-type: none"> • Initiatives for home charging infrastructure • Incentives for business charging infrastructure • Initiatives for public charging infrastructure • Regulation of charging infrastructures • Obligation for new constructions • Fleet tests and demonstration programs • Incentives in parking policies • Bus lane incentives • Road pricing incentives • Congestion taxes • Low-emission zone incentives • Route/Access restrictions • Promotion campaigns • Consulting

other method, applied in China, is provision of electric vehicle purchase subsidies only for domestically made vehicles. Summarising, it can be stated that the actions of national authorities are concentrated at the macro level.

Despite significance of the role of national authorities, it is also the case that local authorities are closer to consumers, and therefore can more efficiently communicate with all social groups and co-operate with business, which, in turn, helps to create synergy by employing not only financial and non-financial measures, but also marketing campaigns, consulting and provision of the basic information. The latter measures qualitatively change consumer attitudes towards alternative transports. Local authorities can also take the initiative to reform car, public transport and taxi fleets. They have a direct impact on the micro-level focus areas which are linked to traffic and transport regulation: parking policies, traffic management tools and urban access restrictions. Such benefits as convenience and cost saving opportunities are effective electric vehicle purchase and usage motivators. Successful pilot projects implemented on a city scale combine multiple measures.

The findings of this research do not propose that the functions of national and local authorities

never duplicate, and the similar or same financial and non-financial measures are never employed at the national and local levels. On the contrary, adjustment of national and local actions along with a comprehensive approach towards electric vehicle promotion can significantly enhance the efficiency of the measures applied. Regions (the role of which has not been comprehensively analysed in this article) are intermediates between national and local authorities. They can also play a significant role in implementation of regional policies. It should be noted that the conclusions of this research on the functions of national and local authorities reflect the regular trends. However, in some cases, irregular administrative distributions can be found. For instance, Chinese municipal authorities provide the subsidies that are commonly provided by national authorities; vast majority of electric vehicle promotion measures in Norway are implemented at the national rather than local level, etc. Hence, as sets of municipal functions and powers may differ, the measures implemented in particular jurisdictions not necessarily suit other jurisdictions.

See References on page 55