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Forks in the road to e-mobility: An evaluation of national policy mixes in northwest Europe - DTU Orbit (09/11/2017)

Forks in the road to e-mobility: An evaluation of national policy mixes in northwest Europe

Passenger mobility is one of the significant and growing contributors to global climate change. Also, local air pollution limit values for PM10 and NOx are regularly exceeded at traffic monitoring sites across the European Union (Althaus 2011). Policymakers have recognized these problems associated with internal combustion engine (ICE) car mobility and implemented various policies, most notably regulations regarding vehicle emissions at EUlevel and also stimulation of low carbon fuel and propulsion systems at both EU and national level, including electric mobility. This paper evaluates how policy shaped the emergence of electric mobilities in three countries. Since there is not just one instrument affecting electric mobility, but rather a range of policy instruments (i.e. both newly introduced and established ones that affect all cars), this requires understanding the interactions between these instruments. Other studies have evaluated the effect of financial instruments or recharging infrastructure seperately (e.g. Sierzchula et al 2014 through correlation analysis), but such studies neglect or ignore interaction effects between instruments. Our aim is to highlight interaction effects and contribute empirically to the literature on policy mixes. The research question is: what are effective and (in)efficient policy mixes for electric mobility and why? We use the framework of Givoni et al (2013) to analyse the interaction effects of policy instruments. They distinguish three types of relationships: (1) preconditioned linkages, where the successful implementation of one measure is completely contingent on another; (2) synergetic linkages, where the functional capacity of a measure is enhanced by another, and; (3) contradictory linkages, where two or more countervailing policy measures undermine the functional capacity of one or both. For each country, policy and related reports are reviewed, policy mixes presented and patterns of full battery-electric vehicle (FBEV) diffusion compared. Moreover, we conducted a set of interviews and expert roundtables in each country in order to record stakeholder views on policy interactions and the subsequent effect on the effectiveness and efficiencies of the policy mixes. This included 18 semistructured personal interviews with policy makers, researchers, NGOs, project managers, business employees, and branch organizations in Denmark (11), Norway (8) and the Netherlands (8) during 2013-2015. Interviews were conducted both with people directly involved in policy decisions and implementation ('insiders') and with experts and stakeholders with good knowledge of e-mobility policies but not directly engaged in their making or implementation ('outsiders'). Norway exhibits high – and rapidly growing – levels of penetration of FBEVs, whereas Denmark presently shows limited FBEV adoption. In the Netherlands, e-mobility has grown relatively fast (although for about 85% plug-in hybrid, not FBEVs), and not only in terms of use, but also in business development associated with the recharging infrastructure. The first finding of this paper is that demand side policies, in combination with the creation of a charging infrastructure can be considered preconditions for FBEV in view of the very small diffusion in countries where one of those elements is missing, such as Estonia for example. A variety of demand-side measures, such as free toll roads and free parking, free use of bus lanes, in combination with sales tax and annual road tax exemption, contributed significantly to the fast growth of FBEV sales in Norway. Contradictory effects were observed in the Netherlands, where the support for cleaner (more fuel-efficient) ICEV encouraged probably some people to opt for a cleaner ICEV rather than an FBEV. Undesirable synergetic effects were also observed in the Netherlands, in the 1 2 2 3 4 4 1 2 3 4 form of the existence of multiple subsidy schemes for company car users, which led them to buy electric vehicles for purely economic reasons, leading to the undesirable effect of the cars being driven primarily (80%) in fossil-fuel mode, which meant that a good deal of the money for promoting electric mobility and cleaner air was being misspent. Another important lesson is that it is indeed possible to stimulate FBEVs through a set of synergetic policies. In Norway there was strong alignment between national policies (purchase and annual tax exemption) and local policies (toll road and parking exemption), which, in combination, acted as a significant pull for FBEV adopters. Over-stimulation of FBEV leads to perverse effects, however. There is a cautionary lesson. Although demand-side measures for FBEV are key— and total-cost-of-ownership of FBEV should be lower than with ICE to encourage uptake–, the difference should not be too great. An imbalance in incentives may instead simply lead to extra kilometres driven and extra vehicles bought (PHEV or FBEV as an additional vehicle instead of an ICEV replacement). The case of Denmark also brings home an important lesson for policy. There is the danger of relying too much on a specific technology configuration as was the case with the battery swapping model, where only one type of vehicle was available (the Renault Fluence Z.E.). Innovation experiments with infrastructure are generally useful but not if they increase uncertainty on the consumer side too much.

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