

Modelling the distribution of Costs from Network/Infrastructural Upgrades for Electric Vehicles (EVs): who ultimately pays?

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The UK and Scottish Governments have set ambitious targets for the roll out of electric vehicles (EVs). Both government and the car industry are predicting a rapid expansion in EV ownership over the next couple of decades. With that comes a shift in demand away from petrol and diesel fuels and towards electricity. The mass roll out of EVs will have a profound impact on the electricity system, and it is likely to require upgrades to the electricity network itself, which will carry significant costs. In this work, we address the crucial question of “who ultimately pays”™ for the costs of upgrading the power network to facilitate the intended roll out of EVs. We adopt whole energy system and economy-wide models: TIMES and CGE to consider the knock-on effects across the economy of changes to the price of electricity faced by both residential and commercial users, and how this impacts spending power and demand from different final consumers, including different types of households. Our data include the UK Social Accounting Matrix (SAM) produced by the Fraser of Allander Institute (FAI) and the underlining dataset of the UK-TIMES model. Our research gains novelty and significance, where existing studies have focussed mainly on the impacts of integrating EVs with the electricity system/network, grid control designs and the type of charging infrastructure and architecture to support uptake of EVs (see for example Dagsvik et al., 2002; Glerum et. al 2011; Link et al., 2012; Schmelzer and Miess, and Truong and Heshner, 2012). We believe that the type of information and insights emerging from this research will be of particular interest to policy makers, energy industry actors involved in the decision making on EV charging planning and decarbonisation of the transport sector.