

The impact of PVs and EVs on Domestic Electricity Network Charges: a case study from Great Britain

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Abstract Electric power distribution network charges have become a popular area of study for regulators, industry and academia. Increasing use of photovoltaics (PVs) and electric vehicles (EVs) by domestic customers has created concerns about the fairness of the current tariff structure. Proposing a tariff design, which will be cost reflective, transparent, sustainable, economically efficient is socially desirable. Wealth transfer through electricity distribution tariffs is a major concern for energy regulators. This paper aims to analyse the current distribution network tariffs faced by four main household customer groups in Great Britain - defined as those who own a PV and an EV, those with EV but no PV, those with PV but no EV and finally those with neither EV nor PV – under various uptake scenarios for EVs and PVs. We illustrate the impact on household tariffs for the most and least expensive British network operators, namely London Power Networks and Scottish Hydro Electric Power Distribution. The results show that, due to the current network charges calculation structure, as PV penetration increases, the distribution tariffs increase for all customers regardless of whether someone owns a PV or not. On the other hand, as EV penetration increases, the distribution tariffs decrease for all customer groups. Another key finding is that the distribution tariffs in Great Britain are EV dominated and the future EV and PV penetration projections indicate that the distribution tariffs will likely decrease for all customers in Great Britain.

Keywords distribution; network; tariff; PV; EV

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