

Network tariff design for efficient flexibility utilization

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Extended Abstract

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Abstract Summary

Network congestion is a persistent and hard-to-solve problem in The Netherlands, not only due to resource allocation concerns, but also because of challenges in obtaining stakeholder buy-in. Currently, different tariff structures are imposed on different consumers, shielding some consumers from network conditions and withholding incentives for demand response. In our study, we aim to analyze the impact of a harmonized tariff structure comprising a volumetric charge, a maximum-consumption capacity charge and a contracted capacity limit. We compare the results with the current network tariff design with different tariff components for different consumers. We measure the impact of time-varying tariffs on the demand profiles of different consumer segments including household, electric vehicles, industrial and agricultural. We also examine the changes in consumer welfare as well as market outcomes.

Using an agent-based model, we study the impact of harmonized network tariff design on the consumption behavior of different consumer segments. We find that network tariffs have substantial potential to enable flexible demand behavior but require careful design in order to expose all consumers to the required signals and must be in accordance with their contribution to the grid load and congestion.

Presenting Author Biography

Sugandha Chauhan is a PhD candidate in the Faculty of Technology, Policy and Management at TU Delft. Her research focuses on the effect of energy market regulation on the availability and utilisation of demand flexibility in wholesale energy markets. She is working on a decentralised model coupling framework to represent various electricity market participants and their interaction with the market. She holds a master's degree in Environmental Management from Duke University and has previously worked in electric utility, think tank and consulting organisations.