

# Revisiting electricity network tariffs in a context of decarbonization, digitalization, and decentralization

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## Abstract-

The electricity system is evolving due to three driven forces: decarbonization, digitalization, and decentralization (3 Ds). Should these three forces occur, electricity network tariffs must be revisited. In most countries, actual network charges incentivize inefficient network usage when volumetric or low granular (temporal and locational) charges are applied. This paper analyses the effect of 3 Ds on tariff design principles and proposes an efficient methodology for network tariff design that promotes efficient usage of the network as well as an equitable share of the costs for network users. The proposed network tariff consists of two components: a peak-coincident and a fixed charge. The peak-coincident forward-looking charge considers the cost of future network reinforcements required, calculated element-by-element, and assigned to customers during the peak utilization hours of each network element. Fixed charges allocate the residual part of the total network costs following equity principles. A simplified network model is used to compare the charges faced by consumers through three tariff structures: (1) a volumetric tariff, (2) a simplified version of the Spanish tariff, and (3) the proposed efficient tariff. This case study highlights the economic benefits of applying a highly granular and peak-coincident tariff structure.

**Index Terms-** electricity network tariffs; tariff principles; customer response; distributed energy resources

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