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Smart Grids as Information Infrastructures

Abstract

Emerging energy infrastructure technologies develop quickly.[1] To gain a better understanding of the interdependencies of smart energy technologies and the complex interactions of related actors, a more flexible analysis is needed, which takes local variabilities into account. This flexible analysis could be successfully reached with new theoretical approaches since the traditional way of analysis of the energy infrastructure in the literature seems not to be suitable anymore as there are no classic roles of supplier and consumer present.[2] Consumers can also be energy producers, and their actions cannot be considered as isolated since the grid as well as the energy supply system, in general, have lots of interdependencies.[3] The initial electricity generation system was conceptualised as a system in which energy supply and demand needed to be balanced.[4] While the focus was on central energy sources, the consumers could be relatively neglected at that time. With this approach, however, the variability of energy supply and demand as well as the user behaviour, which is crucial regarding today's renewable energy, is not covered. Consequently, considering energy supply through a systemic approach does not adequately reflect the related interdependencies within currently existing as well as emerging smart energy systems.[5] An extensive analysis of smart grids including smart meters with a more appropriate framework could give a better understanding of the interdependencies of smart energy technologies and their users. With that understanding, further analysis on how to adjust and enhance the technology and how to introduce appropriate customer participation as well as to improve the acceptance in society could be undertaken. Moreover, the research could contribute to new approaches for the analysis of information infrastructures of other sectors of public interest, such as the health care system and public administrations.

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