

Decision framework for selecting flexibility mechanisms in distribution grids

F.D. Martín Utrilla; R. Cossent Arín; J.P. Chaves Ávila

Abstract-

The energy transition will lead to the coexistence of centralised and distributed energy resources (DER) and the increasing electrification of processes traditionally fed by other energy vectors. This scenario requires adapting distribution networks to integrate these new grid users while maintaining the reliability of the service. In this context, flexibility services from DER are presented as a new alternative that will allow more efficient use of the networks. However, not all flexibility mechanisms (as ways of accessing flexibility) are equally suitable to address the different problems and needs faced by distribution system operators (DSOs). This paper identifies the key criteria that determine the more suitable mechanism to implement in each case and discusses the different criteria to choose the way to acquire flexibility for DSO use. Based on this, the paper proposes a comprehensive decision framework to consider all the different available mechanisms and, based on the DSO needs and the situation of the network, proposes the most suitable flexibility mechanism. Additionally, several key criteria are used to evaluate the different flexibility mechanisms. As a result, the most suitable mechanisms are highlighted as useful tools to solve the needs of the network at all voltage levels and adapted to each situation.

Index Terms- Flexibility procurement, distribution networks DSO, Flexibility mechanisms.

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