

# **Strategic decision-making support for distribution system planning with flexibility alternatives**

M. Troncia; S. Ruggeri; G.G. Soma; F. Pilo; J.P. Chaves Ávila; D. Muntoni; I.M. Gianinoni

## **Abstract-**

**The ongoing Decision Theory based Multi-Criteria Cost-Benefit Analysis (DT-MCA-CBA) methodology for smart grid initiatives that capture the complexity of the distribution system planning activities in which flexibility competes with grid expansion. Based on international guidelines, the proposed DT-MCA-CBA methodology systematically assesses tangible and intangible impacts, considering multiple conflicting criteria. The DT-MCA-CBA methodology relies on a novel approach that combines MCA and Decision Theory to identify the most valuable option in a complex decision-making problem by modelling the stakeholder perspective with the comparative case study concerning four different approaches for distribution system planning. A web-based software which implements the proposed decision-making framework and the DT-MCA-CBA methodology is developed to provide a novel decision-making support tool for strategical smart distribution system planning.**

**Index Terms- Cost–benefit analysis; Multicriteria analysis; Decision theory; Power system; Planning; Flexibility**

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If you institution has a electronic subscription to Sustainable Energy, Grids and Networks, you can download the paper from the journal website:

[Access to the Journal website](#)

## **Citation:**

*Troncia, M.; Ruggeri, S.; Soma, G.G.; Pilo, F.; Chaves, J.P.; Muntoni, D.; Gianinoni, I.M. "Strategic decision-making support for distribution system planning with flexibility alternatives", Sustainable Energy, Grids and Networks, vol.35, pp.101138-1-101138-19, September, 2023.*