

# **Multi-criteria analysis for decision making applied to active distribution network planning**

G. Celli; N. Chowdhury; F. Pilo; G.G. Soma; M. Troncia; I.M. Gianinoni

## **Abstract-**

**Along with increasing presence of renewable energy in the distribution network, active network planning approach is of utmost interest for distribution system operators to harness the maximum benefits from the resources. However, it has been a challenge for the decision maker to choose the optimal planning option considering the multiple conflicting criteria. In this paper, a systematic and automatized approach for project selection based on Multi-Criteria Analysis is proposed for assessing a large set of planning alternatives. A case study has been done for a typical rural distribution network, a Pareto front of planning alternatives obtained by means of a multi-objective optimisation is analysed. Each alternative involves the optimal siting and sizing of storage units along with traditional network upgrading solutions. An automatized pairwise comparison procedure within the Analytic Hierarchy Process is proposed for rejecting subjectivity. The promising analysis illustrates the ‘best’ project selection considering nine criteria for storage system deployment to provide flexibility to the distribution network. The proposed approach aims at identifying the planning alternative that best satisfies the stakeholders’ expectation considering the multiplicity of decision makers’ points of view.**

**Index Terms-** Distribution network planning; Distributed Energy Storage; Multi-Criteria Analysis; Analytic Hierarchy Process

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