

Automatic selection of candidate investments for transmission expansion planning

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Abstract-

This paper deals explicitly with the problem of proposing candidate lines (sometimes referred to as technical alternatives) for Transmission Expansion Planning (TEP). Candidate lines have been traditionally regarded as expert-provided system information. However, given the need to plan larger networks, identifying interesting candidates is an issue of increasing relevance and complexity. This paper proposes a consistent method to tackle this problem. First, an automatic and objective candidate discovery mechanism based on sensitivities proposes potentially interesting investments. Then, a candidate management strategy filters the list of candidates to keep problem size within tractable levels in a Mathematical Programming context without compromising global optimality. Finally, a candidate analysis tool reveals the relationships among investments from a relatively fast and simple power flow study. This information can be interesting to provide support for expansion decisions. These theoretical developments are complemented by a realistic case study which illustrates the applicability of the method.

Index Terms- Power transmission planning; Transmission Expansion Planning; Mathematical Programming; Candidate investment selection

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