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Islam Abdin, Yan-fu Li, Enrico Zio

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Risk Assessment of Power Transmission Network Failures in a Uniform Pricing Electricity Market Environment

Islam Abdin^a, Yan-fu Li^{b,*}, Enrico Zio^{a,c},

^a*Laboratoire Genie Industriel, CentraleSupélec, Université Paris-Saclay
Grande voie des Vignes, 92290 Chatenay-Malabry, France.*

Chair Systems Science and the Energy Challenge, Fondation Electricité de France (EDF)

^b*Department of Industrial Engineering, Tsinghua University, China*

^c*Politecnico di Milano, Italy*

Abstract

This paper proposes a novel risk assessment method for power network failures considering a uniform-pricing market environment, different from previous risk assessment studies, which mainly emphasize technical consequences of the failures. In this type of market, dispatch infeasibilities caused by line failures are solved using a counter-trading mechanism where costs arise as a result of correcting the power dispatch. The risk index proposed takes into account these correction costs as well as the cost of the energy not served due to the failure, while considering an oligopolistic behavior of the generation companies. A 3-stage model is proposed to simulate the bidding behavior in the market, under different line failures scenarios. The risk index proposed and the method for its calculation are applied on an adapted IEEE 6-bus

*Corresponding author.

Email addresses: islam.abdin@centralesupelec.fr (Islam Abdin),
liyanfu@tsinghua.edu.cn (Yan-fu Li), enrico.zio@centralesupelec.fr,
enrico.zio@polimi.it (Enrico Zio)

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