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Multiple criteria decision-making and risk analysis as risk management tools for power systems planning

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Abstract— Uncertainties in power systems planning are gaining importance due to the liberalization of the electricity industry and the increasing concem for the environmental impact of electricity generation. This paper presents an electricity planning model that deals with uncertainty and its associated risk at two levels: at the first level, by minimizing environmental risk through a multiple-criteria model; at the second level, by perfonning a risk analysis consistent with the multiple criteria model used before and which applies classical decision rules for selecting the best planning strategy under uncertainty. Results show that the incorporation of additional criteria produce much more flexible and efficient strategies, which greatly reduce environmental risk at a little cost increment while the risk analysis process selects flexible and robust strategies for the scenarios analyzed.

Index Terms— Power systems planning, decision-making, risk analysis, uncertainty

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