# Multi-criteria analysis of electricity generation scenarios for sustainable energy planning in Pakistan

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## ABSTRACT
The now over a decade-long electricity crisis in Pakistan has adversely affected the socio-economic development of the country. This situation is mainly due to a lack of sustainable energy planning and policy formulation. In this context, energy models can be of great help but only a handful of such efforts have been undertaken in Pakistan. Two key shortcomings pertaining to energy models lead to their low utilization in developing countries. First, the models do not effectively make decisions, but rather provide a set of alternatives based on modeling parameters; and secondly, the complexity of these models is often poorly understood by the decision makers. As such, in this study, the Analytical Hierarchy Process (AHP) methodology of Multi-Criteria Decision-Making (MCDM) has been used for the sustainability assessment of energy modeling results for long-term electricity planning. The four scenario alternatives developed in the energy modeling effort, Reference (REF), Renewable Energy Technologies (RET), Clean Coal Maximum (CCM) and Energy Efficiency and Conservation (EEC), have been ranked using the Expert Choice® tool based on the AHP methodology. The AHP decision support framework of this study revealed the EEC scenario as the most favorable electricity generation scenario followed by the REF, RET and CCM scenarios. Besides that, this study proposes policy recommendations to undertake integrated energy modeling and decision analysis for sustainable energy planning in Pakistan.