

***A skills measurement model for the South African Energy Sector: applying the Analytic Hierarchy Process to the SA electric power industry***

***Markus Meyer***

(Student number: 698432)

School of Mechanical, Industrial & Aeronautical Engineering

University of the Witwatersrand

Johannesburg, South Africa.

**Supervisor: Ms Bernadette Sunjka**

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**Abstract**

The need to understand the skills value inherent in a project in the South African electrical power sector lies at the core of addressing various skills related challenges in this sector that can hamper effective implementation of projects. In this study a model was developed based on the Analytic Hierarchy Process (AHP) by Thomas Saaty whereby three different power generating projects were compared to one another as to their skills values at the feasibility stage.

A hierarchy was developed that contains all the elements that form part of this problem and the criteria and sub-criteria that form part of this hierarchy were identified. Four industry specialists were approached to apply this model in a real-world example by comparing three different power generating projects with one another as to their skills values - with the goal to identify the project that had the highest skills value. The three alternatives to be compared were coal-fired power, nuclear power and wind power. This process was conducted by completing individual guided survey questionnaires with each participant where the questions in the questionnaires were designed in such a manner that they represented the pairwise comparisons that form a part of the hierarchy to compare sub-criteria with each other in relation to criteria on a higher level of the hierarchy.

Tests to determine consensus of participants were conducted along the way, with the Consistency Ratios for each matrix. The three options were compared to the sub-criteria along with each sub-criteria's priorities and the overall ranking thus derived. A sensitivity analysis was carried out to determine the validity and accuracy of the final result and all were found acceptable. The final ranking had coal-fired power at first position followed by nuclear and solar.