

Non-Utility Generation: An Analysis of Its Impact on the Kenyan Power System

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ABSTRACT

With the increase in economic activities of the country and with the embracement of new technologies, the demand for the energy input into the production processes must rise. These economic activities in Kenya involve: industrial, agricultural and domestic processes. Electrical Energy is one of the inputs to these processes. Kenya like many other developing nations has for a long time depended on electrical power generated from hydro plants, to meet a large proportion of her national demand. Over time however, some significant occurrences have had a direct impact on the energy sector: increase in the electrical energy demand and the continuous degradation of the catchment areas due to the ever unpromising (unpredictable) climatic patterns. To address this scenario, a number of changes have been done in the energy sector by the Kenyan Government through the Ministry of Energy. These include the unbundling of the power generation from transmission and distribution functions (for efficiency) and contracting Non-utility Generation (i.e. the Independent Power Producers-IPPs and industrial cogeneration) to supplement the power generation from the state controlled entities so as to meet the national electrical demand. This research aimed at analyzing the effects/impact of the Non-utility Generation otherwise referred to as parallel generation on the operational flexibility of the Kenyan power system and the cost of electrical energy in Kenya. These studies have been done using the data acquired from the Supervisory Control and Data Acquisition (SCADA) system (as discussed in the appendix 2) from The Kenya Power and Lighting Company (KPLC) Limited. The economic aspect of this

study has been done by taking a sample of four large power consumers as shown in the research methodology and analyzing their electricity bills while focusing on the Fuel Cost Adjustment (FCA) from the year 2003 to 2007. The duration saw the largest rise of the Non-utility Generation in Kenya (most of the IPPs run on a variety of fuels – detailed in table 8, that are quite expensive and these costs are passed on to the customers at a rate proportional to the energy consumed). This thesis presents an analysis that shows the effects of the Non-utility Generation (NUG) in Kenya, with emphasis on operational flexibility in the Kenyan Power system and the cost of electrical energy in Kenya. The findings of the research will assist all the stakeholders in the energy sector to plan, design and control power system operations. Further, the thesis brings out the need for prudent utilization of electrical energy by the customers. The layout of this thesis is as follows: Chapter one gives the introduction; the background, objectives, the statement of the problem and justification of the study. Chapter two gives the review of related literature, while chapter three presents the methodology that was employed in data collection and data analysis. Chapters four and five detail the research findings namely: the impact of the NUGs on the operational flexibility of the Kenyan power system and economic impact of NUGs on electricity tariffs. The conclusion and recommendations are outlined in Chapter six.