
Energy (Electricity) Consumption In South African Hotels: A Panel Data Analysis

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Addressing the large energy consumption of Hotels and tourist accommodation establishments requires an understanding of the factors that drive this consumption. This enquiry is particularly crucial for the South African economy which has experienced significant strain in meeting its domestic energy demand. The nation has come under severe scrutiny by the public, having to resort to power cuts, termed “load shedding”, as it struggles to manage the increasing pressure on demand. This pressure co-occurs with increases in tourist arrivals in the country, a positive occurrence for the nation’s tourism sector, but detrimental to the already strained energy resources. The tourism sector has been identified as crucial to meeting the unemployment challenge in the nation and as a significant contributor to the National Income. The growth in the sector as indicated by the increase in tourist arrivals, however, places additional pressure on the already strained energy resources as the country struggles to meet the energy needs of the tourist population, in addition to the local population. Sustaining the positive socio-economic impact of the sector hence requires that its impact on already strained resources be adequately managed.

Tourism accommodation establishments- a major industry within the tourism sector, have been identified in literature as large consumers of both energy and water resources. Addressing this large energy consumption requires an understanding of the factors that drive this consumption. This paper evaluates the drivers of energy consumption in hotels with the aim of providing empirical accounts for informed policy and decision making. The paper makes use of a novel¹ unbalanced panel data set generated by real-time high-frequency smart electricity meters. These meters generate and present daily energy consumption data, and this data is collected for twenty-two (22) hotels across South Africa for a period ranging from three (4) months to sixty-six months (66). Hypotheses on the various drivers of energy consumption are tested within a Dynamic Random Effects framework. The choice of a Dynamic Random Effects framework for analysing the data was made after careful consideration of unbalanced nature and statistical characteristics of the data, and other data analysis techniques. Hypotheses were developed from a detailed review of previous studies that evaluate the drivers of consumption, as well as from the data available. Specifically, hypotheses on the relationship between the hotels’ daily energy consumption and weather elements (temperature, humidity, rainfall, and seasons), hotel characteristics, electricity tariff rate, and occupancy are tested.

¹ The authors would like to thank [Power-star Energy Intelligence](#) for providing the data used for this analysis, and for their support throughout this project.

Findings from various specifications of the model suggest that hotel characteristics, services and facilities offered (such as the number of rooms and the availability of Conference and Spa facilities) are the strongest drivers of energy consumption in the twenty-two hotels analysed. This is followed by the tariff rate, measured as the cents per kWh charged on energy consumption. The third strongest consumption driver identified was climatic conditions (i.e. temperature, humidity, and rainfall) with a significant variation in consumption based on seasonal changes being captured. However, the role of occupancy as a driver could not be fully ascertained due to severe data limitations. The results suggest that in the design of policy and practices for energy efficiency in South African Hotels, the details of the energy consumption of the facilities and services offered at the hotel should be the first point of call; and the strenuous impact of extreme weather conditions on energy consumption need to be factored in at the phase of building design and construction. The results further highlight the role of tariff rate in regulating energy consumption, suggesting that price-regulation does play a significant role in curtailing consumption of electricity, even in high-end hotels. These findings are relevant, not only for government and public authorities, but also for industry managers and stakeholders, as well as third-party energy service providers to the industry.