



## SOCIO-ECONOMIC EFFECTS OF ELECTRICITY CRISIS AND COPING STRATEGIES: PERCEPTION OF HOTELS IN ACCRA

Mary Acquaye Moore

### Abstract

Ensuring there is regular supply of electricity to support industrial growth and development is a huge challenge for countries the world over. However, Ghana's power supply challenges culminated into a four-year electricity crisis (2012-2016) that earned the name "dumsor," meaning "on and off" in the Akan language. The crisis was different in its intensity, complexity, and reach from any previously recorded case. At its peak, a greater expanse of southern Ghana endured a load shedding schedule of 12 hours with electricity and 24 hours without electricity, with the capital city (Accra) being the worse affected. Heavy electricity consumers were among the hardest hit businesses since the dumsor did not only increase operational cost and reduce productivity but also resulted in significant withdrawal of investments. The narrative was progressively dismal for hotels because the industry has high entry and exit costs and their success and reputation is based on rendering quality services at a comparatively lower price. Thus, any compromise on their product results in disproportionate decline in patronage due to poor reviews and bad word-of-mouth. Given the above, a review of the socio-economic effects of dumsor on hotels and adopted coping strategies were needed to lay a framework to examine the effects of electricity crises on the tourism industry. Adopting a mixed-method approach, seventy-three (73) hotels in the Accra Metropolitan Area were engaged. The results reveal an increase in both operational cost and customer complaints. This brought about the adoption of diesel-fuelled generators as an immediate stop-gap measure to curb the crisis.

**Key words:** energy crisis, electricity crisis, dumsor, socio-economic effects, coping strategies

### INTRODUCTION

In today's world, electricity is a fundamental part of daily living (Festus & Ogoegbunam, 2015) and an important strategic commodity for economic growth and development (Naik, More, & Naik, 2011). Yet, this increasing reliance on continuous electricity supply has also rendered society much more vulnerable to supply interruptions (Bruch, Munch, Aichinger, Kuhn, Weymann, & Schmid, 2011). Consequently, instances of unreliable electricity supply have had overt adverse effects on the livelihood of people, businesses, and nations (Dar, Azeem, & Ramzan, 2013; Tahir Masood & Shah, 2012).

A shortfall in the supply of energy resources (be it fossil fuel, electricity, or natural resources) to an economy is known as an energy crisis (Dar et al., 2013; Haq, 2008). It has been revealed in the literature that most

African nations at one stage or the other have encountered an energy crisis (Abotsi, 2016). Ghana has experienced four major electricity crises since 1983 (Amoako-Tuffour, 2007), the cause of which were attributed to trends in climate change, complacency in policymaking, and the chronic avoidance of tough decisions in the energy sector even when national security was at stake (Amoako-Tuffour, 2007). Apart from these crises, the nation also experiences constant minor deficits in electricity supply, resulting in frequent power outages. In major cities like Accra, these frequent, intermittent, and unannounced glitches in electricity supply are even considered a normal daily occurrence (Subramanian & Hayfron-Benjamin, 2012). The government's solution to shoring-up these deficiencies is to import gas from Nigeria or buy crude oil to power more electricity generating plants.

However, from the early part of 2012 through to the ending of 2016, Ghana experienced an electricity crisis that was more intense, complex, and far-reaching than any prior reported energy crisis. Typically, energy crises

Mary Acquaye Moore, Department of Hospitality and Tourism Management, University of Cape Coast  
Email: marymoore374@gmail.com



are portrayed in the literature as rolling blackouts where an area is without power for no more than one to twelve hours at a time (Mannak, 2015), and none has lasted for a continuous period of three years. Even so, reported effects of such crises include withdrawal of investments, destruction of equipment and appliances, death, spoilage of perishable goods, decreased productivity, increased operational cost, increased complaints, and overall decreased customer satisfaction (Mannak, 2015; von Ketelhodt & Wocke, 2008).

Still, none of these reported cases were on par with the electricity crisis which became popularly dubbed *dumsor*, which, in the Akan language, means “off and on” (“Dumsor,” n.d.). This crisis was an accumulated consequence of several deficits in electricity supply over a six-year period. First, Ghana lost an estimated 600 MW of power between 2006 and 2007, when the Volta basin was affected by a drought that led to the shutdown of two of the required six turbines needed to generate electricity from the Akosombo hydro-electric dam (the main power generator for the country). Usually, the government’s immediate stop-gap measure is to buy more crude oil for alternate power generation. However, in 2008, world crude oil prices skyrocketed from US\$ 60 a barrel to US\$ 147 a barrel; thus, the country was spending between US\$ 280 million to over US\$ 500 million to operate thermal plants to make up for the shortfall (Bayor & Yelyang, 2015; Energy Commission, 2006). Before the situation could normalize, there was another shortfall in electricity supply. This time, it was due to the shutdown of the West Africa Gas Pipeline (WAGP), which supplies gas from Nigeria, and resulted in the loss of another 200 MW of electricity. All these culminated into the official announcement of an energy crisis in February 2012. By August 2012, the country was reportedly shedding between 90 to 300 MW daily, necessitating a rationing schedule of 12 hours without power and 24 hours with power in all major cities (IMANI Events, 2014; Volta River Authority Newsletter, 2012). Then again, mid-way through 2015, the situation worsened to 400 – 600 MW daily, resulting in a more drastic rationing schedule of 24 hours without power and 12 hours with power. In the capital city, Accra, even the 12 hours of electricity supply was frequently interrupted by unannounced glitches.

This had all sectors of the economy whirling under tremendous pressure, jeopardizing growth in industry (Ghana News Agency, 2015). Companies were forced to close down, workers laid-off, people could not do any meaningful work or plan effectively, and even social events became stifled. It is worth noting that, although several papers provide insight on the crisis, details are skewed more towards the economic effects, with the social effects generally understated.

*Dumsor*’s effects were also reported to be worse on the commercial and service industry, where electricity is an indispensable input for operation (Apeaning, 2012; Subramanian & Hayfron-Benjamin, 2012). However, studies so far, including Danso-Wiredu, Dadson, and Amoako-Andoh (2016), Doe and Asamoah (2014), Forkuoh and Li (2015), have either been focused on the residential or industrial sector.

With regard to the aforementioned situation, a business segment likely to be hampered exceptionally by this crisis is the tourism and hospitality industry. The tourism product is described as multifaceted, integrated, highly susceptible to shocks, associated with negative externalities and above all a discretionary purchase (Lubbe, 2003; Maditinos & Vassiliadis, 2008; Page & Connell, 2012; Swarbrooke & Horne, 2007; Zibanai, 2014). Owing to this, Sahir and Qureshi (2007), Ardahaey (2011), Page and Connell (2012), and Dar et al. (2013) have all expressed that the tourism industry would endure widespread and acute ramifications of an energy crisis. Indeed, Dogbevi (2015) testified that tourism’s contribution to Ghana’s GDP dropped from US\$ 2.5 billion in 2012 to US\$ 2.1 billion in 2014.

More precisely, the accommodation sub-sector is implicitly posited to bear the brunt of such a crisis mainly because hotels are among the foremost electricity consumers among tertiary buildings (Hotel Energy Solutions, 2011). More so, by nature, it is not conducive for them to adopt the more laid-back approach for mitigating such a crisis, including temporarily shutting down (Mensah-Ansah, Martin & Egan, 2011), compromising their product offering (Tribe, 1997), or passing on increased operational cost to their clients (Hume, 2014). Such an action would only lead to a disproportionate decline in their patronage (Goeldner, Ritchie, & Ve Brent, 2006; Swarbrooke & Horne, 2007).



Yet, save for Boakye, Twenefour, and McArthur-Floyd (2015), who provided a general quantitative overview of the issue, little has been done with regard to the effects of the *dumsor* on the accommodation sector. What's more, the literature is silent on how businesses coped with the crisis.

Boakye et al. (2015) states that there are two main approaches to assessing the cost of the electricity crisis: the subjective approach (self-assessing the loss to production) and the objective approach (how power outages intervene directly in the production function). Most of the studies conducted on the *dumsor* have adopted the objective approach much to the neglect of the subjective approach.

Taking a case study approach and engaging both Skinner's (1983) three-term contingency theory and the contemporary theory of risk management, this paper aims to provide both objective and subjective details of the *dumsor* on the tourism and hospitality industry, chiefly by exploring its socio-economic effects on hotels in the Accra Metropolitan Area as well as examining the various coping strategies adopted by their managements to address the issue.

### Effects of Energy Crisis

Despite numerous blogs and newspaper articles detailing the enormity of Ghana's *dumsor* crisis and its effects on small and medium-sized enterprises (SMEs), the manufacturing sector, and entire economy, so far, very little academic inquiry has been done on its effects particularly on the tourism industry.

Generally, Ghana's *dumsor* crisis was reported to have had cost pass-through effect, implying that its effects rippled through the entire production chain of the economy, starting from the manufacturing sector right down to the petty trader on the street (Asamoah, 2015). Gross Domestic Product (GDP) and international trade were directly impacted on by the crisis, leading to restricted output growth (Anam, 2012). As at February 2015, the Bank of Ghana had reported that the country's GDP growth rate had declined from 7.3 percent in 2013 to 4.2 percent in 2014. The rising cost of inputs also negatively affected per unit cost of goods, profits, and employment (Anam, 2012). As reported by Institute of Statistical, Social, and Economic Research (ISSER), by the end of 2014, Ghana had lost approximately US\$ 1 million because of the

electricity crisis (Braitham & Amponsah, 2012). Not only that, but the crisis was also known to be associated with poor service quality, social confusion, and mental distortions (Anam, 2012). Analysts speculated that the *dumsor* crisis had the potential to reverse and erode the economic gains made by the country since 2007 (Yeboah & Bokpe, 2015).

Comparatively, von Ketelhodt and Wocke (2008) also reported on South Africa's electricity crisis, documented as an acute one that hit one of Africa's giant economies, during which Cape Town in particular suffered seven interspersed 24-hours power outage between November 2005 and January 2006. This crisis resulted in the Chevron refinery losing 12 days of production and six oil refineries suffering unexpected hiccups which caused disruptions in operations. The social effect of this crisis included traffic congestion, damaged equipment (mainly computers), spoilage of perishables, and non-delivery to clients. Businesses reported loss of trade or productivity due to carrying the cost of overheads while not trading. By the end of January 2006, prospective multinational corporations openly questioned the suitability of South Africa as an investment-friendly destination. Moreover, the crisis split-over to neighbouring countries, especially Namibia, that depends on South Africa for their electricity import. In all, an estimated US\$ 425 million was spent on the purchase of generators in Cape Town as a result of this three-month electricity crisis.

Mannak (2015), for one, reported that South Africa's electricity crisis threatened the survival of tourism businesses – especially restaurants, bars and smaller hotels. In one reported instance, a bed and breakfast establishment had a group of international tourists cancelling their reservation due to the electricity crisis, despite the business having spent US\$ 15,000 to install generators (von Ketelhodt & Wocke, 2008).

Studies have shown that the most popular effect of electricity crises is increased operational cost: an effect succinctly put by Blanco-Delgado (2013, p.1) as “pay more for decreased productivity.” Increased operational cost mainly results from the decision made by most businesses to opt for self-generation (Karekezi & Kimani, 2002), that is, alternative sources of energy during shortfalls in energy supply. First and foremost, the set-up cost involved in implementing



any form of self-generation tends to be more expensive, compared to sourcing electricity from the grid, thus, necessitating an increase in their capital requirement for operations (Scott, Darko, Lemma, & Rud, 2014). Moreover, the cost of fuel to generate power also increases operational costs (Steinbuks & Foster, 2010). Notwithstanding, the energy crisis itself causes local products, especially tourism products that are deemed discretionary, to become less competitive on the global market. Less patronage is an impediment to hotels achieving economies of scale, which further increases their cost of production (Steinbuks & Foster, 2010), all the while maintaining a shortfall in revenue (Staff, 2011). Mannak (2015) also points out that most tourism businesses tend to be small enterprises which often lack the reserve to absorb the additional costs that come with self-generation or finding alternate electricity supply during energy crises.

Yeboah and Bokpe (2015) concur that the effects of energy crises tend to be more pronounced on small and medium scale businesses that depend heavily on electricity but cannot afford alternative energy sources. Hence, to offset cost, these businesses try to decrease employment, reasoning that, since the electricity crisis hinders productivity (Staff, 2011) owing to frequent operational halts and idle time (Anam, 2012), they can operate with less personnel. Another major effect of electricity crises on the tourism and hospitality industry, as noted by Blanco-Delgado (2013), is losses incurred due to food spoilage or damaged perishables. Braimah and Amponsah (2012) pin-point fish and meat to be the two main foods that immediately go bad as a result of frequent power disruptions. In Germany's 2006 power blackout, Bruch et al. (2011) recount that costs to restaurants and bars in spoiled products and lost sales totaled up to US\$ 139 million.

Furthermore, most electricity crises are also accompanied by instances of poor-quality supply. Continuous supply of substandard electricity is known to cause system failures, equipment damages, and repeated need to repair or replace damaged equipment (Cissokho & Seck, 2013; Scott et al., 2014). According to Ilskog (2011), other indirect complications include generators producing hazardous exhaust fumes, noise, and accidents due to faulty refilling of fuel. In hotels, this results in sluggish service

delivery that negatively impacts the experience of customers, resulting in bad word of mouth or apathetic referrals (Adingo, 2015). What is more, frequent and long hours of power blackouts immensely decrease customer satisfaction.

To prevent increased customer complaints, most hotels spend a lot just to maintain their standard of operations. Bruch et al. (2011) indicate that most customer complaints in hotels during electricity crises result due to interruptions in heating and cooling systems.

Although the economic effects of the crisis feature more in the literature, Danso-Wiredu et al. (2016) indicate that the crisis also affected the very fabric of society. It caused theft and robbery to increase, which resulted in people being unwilling to leave their homes at night. In one reported instance, a couple lost their lives due to smoke inhalation, because they feared losing their generator to thieves (Abbey, 2015). Also, social events like funerals, weddings, and parties which are popular pastimes of most Ghanaians became more costly and brief because organizers had to rely on the use of generators. Households equally stated that the *dumsor* made even sleeping uncomfortable since ventilation was compromised.

### **Coping Strategies for Managing Energy Crisis**

The literature shows that there are two main ways of mitigating energy deficits: either through finding an alternative source of energy supply or effectively managing the limited energy available (Ilskog, 2011; Scott et al., 2014). Seeking alternative sources of energy supply rather than utilizing the limited and inconsistent energy supply from the electricity grid is most often the first measure most businesses take in the face of an energy crisis. As put by Doe and Asamoah (2014, p. 41), "for most businesses power outage does not mean stoppage in production, as their ability to produce and sell brings income for self-sustenance. Therefore, the need for alternative sources of energy becomes more apparent."

For this reason, self-generated electricity in the form of private generators abounds in the face of most energy crises (Braimah & Amponsah, 2012; Foster & Steinbuks, 2009; Ilskog, 2011). Electricity can be generated from various sources using wind, water, sun, biomass, and fossil fuel (U.S. Department of Energy, 2011). Doe and Asamoah (2014) report that



the use of fossil-fuelled generators constitutes the largest proportion (66%) of the alternative sources of power, with solar panels taking up the smallest portion (4%). Von Ketelhodt and Wocke (2008) explain that most companies do not consider solar energy as an alternative energy source due to its high set-up cost, long payback period, and general lack of information on solar energy. A solar water heater is estimated to cost anywhere between US 650 and US\$ 1,400 for small buildings and has a payback period of 5–10 years depending on usage. By comparison, the cost of fossil-fuelled generators, for use in the short term, is relatively cheaper.

Generally, having access to a generator increases the opportunity of a firm maintaining its business during periods of outages. However, the cost of running a privately-owned generator is about three times the cost of purchasing power from the public electricity grid (Ilskog, 2011). Due to this, most smaller businesses opt out of self-generation during electricity crises because it increases their production cost, which in turn affects the businesses' bottom line and profit margin.

The second and most effective coping strategy adopted by businesses to mitigate energy crises is energy conservation. This is because, in the words of the Centre for Policy Analysis (CEPA) (2007, p. 19), "a good rule of thumb when faced with a cost-escalating shock [such as an electricity crisis] is to fund it, if it is of short duration, but [it becomes imperative] to make appropriate behavioural adjustments if it is likely to persist into the medium or long term." For the purpose of this study, energy conservation is simply defined as using energy more efficiently or reducing wastage of energy without affecting productivity and growth rate in any way (Kaur & Kaur, 2012). According to Edelstein and Shriberg (2011), energy conservation strategies aim at four things: decreasing demand, eliminating waste, substituting for less energy intensity alternatives, and maximizing efficiency. In almost all electricity crises, reports indicate that businesses eventually opt for energy conservation because, according to Zabel (as cited in von Ketelhodt & Wocke, 2008), the rewards for unsustainable behaviour becomes too great.

The literature has also identified other less distinct strategies used by businesses to manage electricity crises. Agyei (2015), for

instance, reported that, to reduce the increasing operational cost and loss in profits, some companies resorted to shutting down a line or two (at worst shutting down their entire operations), during the *dumsor* crisis. CEPA (2007) and IMANI Events (2014) also indicate that businesses were forced to undertake job cuts during energy crises, mainly as a cost reduction measure. Businesses also invest in new technologies such as uninterruptible power supply (UPS) systems (Oseni, 2012).

### Conceptual Framework

The theoretical basis of this study is founded on Skinner's three-term contingency theory (Skinner, 1938) and the contemporary theory of risk management based on the synthesized works of Vaughan (1997), Knight (2006), Drennan and McConnell (2007), and Habegger (2008). According to Skinner (1938), behaviour is divided into three fundamental parts: antecedent condition (stimulus), behaviour (response), and consequences (reinforcement / punishment).

Adopting a system's approach, Skinner explains that the existence of an antecedent condition prompts a particular behaviour, which can either lead to a positive or negative outcome. For this study, the antecedent was the hectic load shedding schedule which pressurized hotels to react in certain ways. For each hotel, the schedule immediately manifested into socio-economic effects, that is, a behaviour that they needed to adjust to. This behaviour, thus, resulted in a particular consequence, which, in this case, is the coping measure implemented by the hotels.

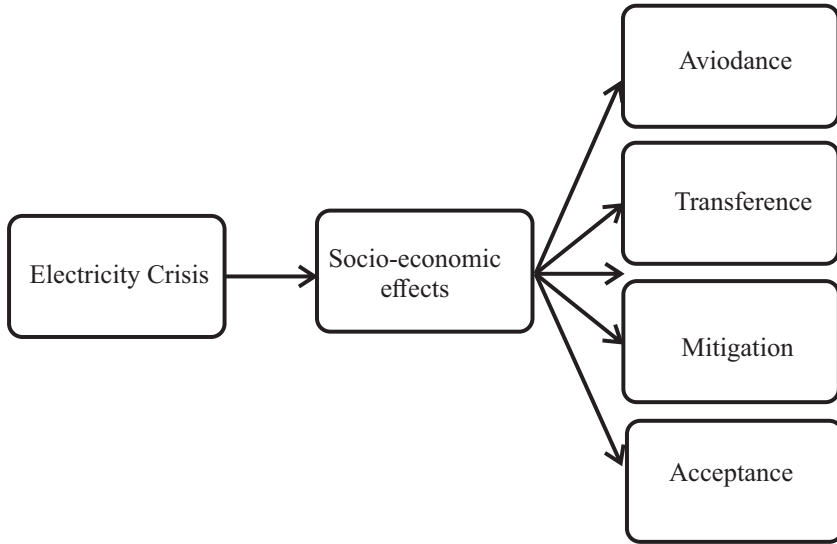
Looking at the consequences, the contemporary theory of risk management postulates that, in any given crisis situation, there are four main outcomes to be expected: avoidance (refuse to accept any exposure to loss arising from the crisis), transference (shift the burden and consequence of the crisis to a third party), mitigation (try to reduce the adverse effects of the crisis), and acceptance (deciding not to change anything).

Utilizing these two theories, the study sought to provide a clear understanding of the *dumsor* crisis from the perspective of hotel.

### Limitations of the Study

The main limitation of the study was the inability to gain access to the hotels' records to track their





**Figure 1: Conceptual Framework of Socio-Economic Effects of Electricity Crisis and Coping Strategies of Hotels in Accra**

Source: Author's Construct

financial losses and electricity consumption as well as declines in number of customers patronizing hotels as a result of the energy crisis. As such, the study could not specifically quantify their changes in sales and production costs. Thus, the objective approach to the study is more descriptive than inferential.

Also, some directors and high-level executives were reluctant to participate in the survey, hence the need to include all personnel within the management levels of hotels.

Furthermore, using the sequential mixed method approach proved to be time-consuming. This approach required contacting some people twice at different intervals. But gaining access to management members takes time; therefore, it took a longer than the assigned two-month period to collect the data.

## METHODS

The adopted philosophy for this study was pragmatism. Using the explanatory sequential mixed method research design, both quantitative and qualitative data were collected from hotels in the Accra Metropolitan Assembly (AMA).

The target population for the study comprised all the hotels within AMA. The hotels were identified based on the Ghana Tourism Authority (GTA) hotel directory for 2013, which also served as the sample frame for the study.

The unit of analysis were hotels: more specifically, the "one person" within the selected facility that possessed most information on the effect of the *dumsor* on the hotel. Hence, the selected respondents became representatives of their respective hotel managements.

For the quantitative data, Fisher, Liang, Stoeckel, and Townsend's (1998) formula for sample size determination was used to select a sample of one hundred and three (103). Then, using the disproportionate stratified random sampling technique (lottery method), self-administered questionnaires were distributed to the management members of the hotels. The hotels were stratified based on their star rating, as provided by GTA (2013). Seventy-three (73) useable questionnaires were successfully retrieved, indicating a 71 percent response rate. Based on the responses from the questionnaires, twenty-three (23) managers were purposively selected for an in-depth interview.

In measuring the socio-economic effects, respondents were asked to indicate their degree of agreement with the stated effects on a five-point Likert scale where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree. Also, this aspect required the respondents to rate the severity of the crisis on their businesses. Next, the coping measures employed by most businesses as identified in



the literature were listed and the respondents were asked to indicate which ones their hotel implemented on a three-point scale ranging from 1 = Disagree, 2 = Neutral, and 3 = Agree. The aim was to examine whether these coping measures were applicable to the hotel industry. Throughout the data collection process, all ethical considerations were adhered to. First and foremost, permission was sought from the hotels' management before questionnaires were administered and also before in-depth interviews commenced. It was also made clear to the respondents that their participation in the study was voluntary and they had the freedom to withdraw from the survey any time they deemed necessary. Raw data collected were secured

and not made available to the public. Lastly, the respondents' privacy and anonymity were assured. Confidentiality was guaranteed.

The quantitative data were analyzed using descriptive statistics from SPSS (version 21), whereas the qualitative was manually done using directed content analysis.

## RESULTS AND DISCUSSION

### Socio-Demographics of Respondents

More than half (57.6%) of the respondents were departmental managers, comprising maintenance managers, human resource managers, marketing managers, and housekeeping managers. General managers constituted 20.5%, followed by supervisors

**Table 1: Demographics of Respondents (N=73)**

Socio-demographics of respondents	Frequency (n)	Percentage (%)
Respondent's Position		
General Managers	15	20.5
Department Managers	42	57.6
Supervisor/ Assistants	9	12.3
Owners	7	9.6
Duration of employment		
Less than a year	2	2.7
1 – 4 years	37	50.7
5 – 10 years	27	37.0

**Source:** Fieldwork, 2016

(12.3%) and owner managers (9.6%)

In terms of respondents' duration of employment with their current hotels, about half (50.7%) had been with the same hotel for 1–4 years. Only 9.6 percent had worked for more than 10 years.

Majority of the hotels (65.8%) had been in

operation for 5–10 years, whilst 11 percent had operated for less than four years. A profile of the number of available rooms showed that majority (54.8%) of the selected hotels had 11–30 rooms. Also, 78.1 percent of the hotels were affiliated, in the sense that they formed part of a chain, franchise, partnership, or alliance.

**Table 2: Characteristics of The Hotels (N = 73)**

Characteristics of the hotels	Frequency(n)	Percentage (%)
Length of operation		
1–4 years	8	11.0
5–10 years	48	65.8
More than 10 years	17	23.3
Number of rooms available		
Less than 11	11	15.0
11–30	40	54.8
31–50	8	11.0
51 +	14	19.2

**Source:** Fieldwork, 2016



To establish the basis for this study and give a better understanding of the role of electricity crises (as an antecedent), management of hotels were asked to express the severity of the *dumsor* crisis on their operations on a five-point scale. Eighty-two percent (82.0%) of the hotels acknowledged that the effect of the electricity crisis on their operations was very severe. According to Coombs (2007), it is only when an organization has recognized an emergency situation that it becomes a crisis to them.

Furthermore, this extensive acknowledgment of the *dumsor* corroborates the findings of von Ketelhodt and Wocke (2008) and Anam (2012) that, in power outages, those hardest hits are entrepreneurs and businesses. It also goes to validate the reports made by CEPA (2007), IMANI Events (2014), and Asamoah (2015) that the *dumsor* crisis had serious negative implications for all businesses.

### Socio-Economic Effects of Crisis on Hotels

All respondents strongly agreed that the energy crisis resulted in increased costs of operations, a view that is in line with the findings of Scott et al. (2014). The respondents disclosed that the primary contributing factor to increased operational costs was the cost of buying fuel for generators, and the amount of fuel used depended on the size and capacity of the generator. Some participants indicated the costs they incurred through the use of generators (*represented at an exchange rate of US\$ 1 = GHC 5*) as follows:

*We buy US\$ 20 of diesel every night, whilst a prepaid of US\$ 20 – US\$ 30 takes us three days.*

[Participant A, Budget Hotel]

*My generator which is a 500 K.V.A plant uses one drum of diesel every 2 hours and costs about US\$ 35,000 a month while electricity from the grid costs US\$ 32 000 a month.*

[Participant B, 3-star Hotel]

*We use about 9,000 litres of diesel every 72 hours, costing about US\$ 5,000. Compare this to an electricity bill of about US\$ 29,273 a month.*

[Participant C, 5-star Hotel]

As Iliskog (2011) indicated, the cost of running a privately-owned generator is about three times more than purchasing power from the public electricity grid. Feedback from hotel management, however, estimated the use of diesel-fuelled generators to have caused electricity bills to increase from 9 percent to 600 percent, implying that most hotels were using more electricity in their operations than warranted.

Most importantly, though the load shedding

adversely increased the use of generators, it was the constant fluctuations in electricity supply, the low-quality supplied, and frequent disruptions in the load shedding schedules that caused the most damage: an opinion that was well-expressed by von Ketelhodt and Wocke (2008). Some hotels stated that they went days without power from the grid, which increased their reliance on generators for operations, concurring the report by Quaicoe-Duho (2015).

According to Participant D, a departmental manager of a 4-star hotel,

*You go through your normal load shedding. By the time the power comes on, there is a fault or failure somewhere that takes ECG [Electricity Company of Ghana] the whole day to work on.*

*By the time they finish, you are back to your normal load shedding schedule. We did not have power for 4 days, even though we were supposed to have electricity supply from two power lines.*

At its worst, some hotels went without power for a week while most hotels experienced between 25–36 hours of blackout outside their normal load shedding schedules.

According to a participant (departmental manager of a 3-star hotel), the poor quality of electricity supplied from the grid caused constant fluctuations; hence, some hotels chose to rely solely on their generators. Others also re-designed their energy system to switch from ECG supply to generator supply when the quality was not good enough and this came at a cost, as indicated by the following participants:

*Our changeover switch does not only change power when the lights go off, but it also senses the quality of the power. So, if the power from ECG is not good enough, the system automatically takes off ECG and runs the generator.*

[Participant B, 3-star Hotel]

*Because of the constant 'on' and 'off', everything in this hotel is run by the generator, even the toilets. As a result of this, the bill at the end of the month is very huge, compared to what we used to receive from ECG.*

[Participant E, Budget Hotel]

To manage this situation, some hotels invested in new equipment, including power banks and generators, which added to their cost of operations. As explained by Participant F of a 2-star hotel,

*At first, we had one 800 K.V.A generator, but it could not handle the load during the energy crisis, so we bought another 1,400 K.V.A*





generator. Now we use 4,500 litres of diesel every day. Even with that we sometimes experience sparks and small burns.

In addition to this, there was also the need to buy new equipment parts (when they got damaged) as well as the need for constant servicing of generators. According to Participant C, due to the *dumsor*, they had to purchase a new changeover switch costing US\$ 40,000. Others also expressed the following:

*General repairs such as changing alternators, radiators, and compressors cost the hotel thousands of dollars.*

[Participant G, 4-star Hotel]

All these direct or indirect costs contributed to increased operational costs for hotels and it all culminated into a huge bill at the end of the month.

Managers agreed that the above-stated elements (that is, fluctuations, poor electricity supply, and disruptions in the load shedding schedule) caused both equipment damage (91.8%) and disruptions in operational processes (90.5%), which increases the overhead costs of running their hotels. This affirms earlier findings by Cissokho and Seck (2013) and Scott et al. (2014).

Popular equipment and appliances ruined include air-conditioning compressors, LED (Light Emitting Diodes) bulbs, changeover switches,

sockets, power outlets, and office equipment such as computers and motors of gadgets like fridges and pumping systems. Respondents expounded further by saying:

*You know air conditioning compressors are designed not to easily get spoilt. But you know in Ghana, these easily get spoiled.*

[Participant B, 3-star Hotel]

*We spent between US\$ 28 to 160 per day for small repairs like damaged lights.*

[Participant C, 5-star Hotel]

Frequent disruptions in the load shedding schedule contributed immensely to the breakdown of generators, as a result of overuse. Outlined damage to generators included broken tanks, spillage of oil, and overheating leading to fumes, sparks, and (in some cases) fire. Some participants said their generator overheated to an extent that they had to cool it by pouring in more coolant. Others attributed the breakdown in generators mainly to the design of changeover switches. One participant stated that hotels that did not have utility or energy systems capable of sensing and controlling the quality of electricity supplied from the grid but had shorter changeover time (less than 42 seconds) experienced frequent equipment damages.

**Table 3: Socio-Economic Effects of the Dumsor Crisis on Hotels (N = 73)**

Socio-economic effects of the energy crisis	(%) in agreement
Increased operational cost	100
Increased equipment damage	91.8
Increased disruptions in operational processes	90.5
Increased customer complaints	86.3
Increased service delays	82.2
Decreased service quality	74.0
Decreased customer patronage	64.4
Increased spoilage of goods	36.1
Increased complaints from neighbours	32.8
Increased delays in employee wages	28.8
Increased reservation cancellations	26.0
Increased employee lay-offs	20.5

Source: Field work, 2016

Approximately eighty-six percent (86.3%) of the hotels also experienced increased customer complaints and increased service delays (82.2%). Chau (as cited in Doe & Asamoah, 2014) explains that most electricity crises result

in degradation of both product quality and customer service, which results in customer complaints. Most often, the complaints centered around two main issues, namely heat/warmth generated when air-conditioning went off during



the dumsor, and unreliable internet access. According to Participant H of a 2-star hotel, in their case, complaints were mainly from guests who had their rooms closer to the generator. These guests complained mainly about the noise made by the generator as well as the heat it generated.

Incidences of service delay also became quite common during the electricity crisis especially in areas such as the kitchen, restaurant, reception (software glitches when guests were being checked in), and in the housekeeping departments, as Participant H recounts as follows:

*We have five floors and our elevator got spoilt once, so housekeepers had difficulty sending their trolleys up and down. That delayed the servicing of rooms for the whole day.*

According to Anam (2012), load shedding and constant fluctuations in power supply impede overall productivity and negatively affect service quality. This reflected in the study's findings, as 74 percent of the managers admitted to the crisis causing service quality to decline as elaborated in the opinion of Participant I, a department manager of a 5-star hotel:

*There is no way a hotel or any service business can say that their service quality was not compromised during this dumsor. Even us, who have a 1,200 K.V.A generator that can fully sustain us, had an hour of total blackout when our generator got spoilt. Thank God we had a backup generator and the maintenance unit got to it in time.*

The loss incurred from food spoilage was not as high as what Blanco-Delgado (2013) and Braimah and Amponsah (2012) reported. Contrary to reports that food spoilage is one of the main effects of the dumsor crisis on hotels, only 36.1 percent were severely affected in this way. Even so, these hotels indicated that, mostly, it was cooked food rather than raw produce that got spoilt.

Careful scrutiny disclosed that most of the facilities in this category were hotels that operated restaurants but lacked regular customers. Hence, at the end of each day, foods that were not consumed got wasted, since unreliable power supply resulted in erratic refrigeration. Incidentally, fufu was reported to be the most affected in terms of spoilage, which is also in contrast to the findings of Braimah and Amponsah (2012) and Blanco-Delgado (2013),

where mainly fish and meat made up the largest portion of spoil goods.

Approximately forty-nine percent (48.6%) managed to completely avoid this effect. Some of these participants explained that management addressed this issue by making purchases of foodstuffs or produce in smaller quantities. Others who bought in bulk kept it refrigerated. A participant reported that health inspectors increased their surveillance on hotels during the electricity crisis.

*Our generator bills were very high. We have three walk-in freezers and we have to keep them functioning all the time. During the dumsor, we did not have the chance to consider any other option because health inspectors came around more often to check the temperature of the freezers and cold rooms because of the energy crisis.*

[Participant J, 3-star Hotel]

The study findings correspond with Yeboah and Bokpe's (2015) view that Ghana's electricity crisis increased unemployment; however, unemployment was the least experienced socio-economic effect (20.5%) recorded by the present study. True to fact, even in a high turn-over and labor-intensive sector like hotels, workers were laid-off, although layoffs were not as popular among managements as the literature reported. Follow up, however, uncovered that some hotels found innovative ways to minimizing the number of employees without resorting to laying-off their staff. One participant stated that:

*At some point, we even had to ask some staff to go home for two weeks, because we could not afford to pay their salaries. Then we did multi-tasking: where you did more than your job. When you operate at the reception, you operate the bar and restaurant as well. Also, when housekeeping needs help you go there too. After two weeks you go home, and then another person also comes on for two weeks. Even as the Manager, I had to take a compulsory two weeks leave since the director said he could not pay our salaries and something had to be done.*

[Participant K, 2-star Hotel]

In other cases, there were no layoffs; however, workers who left were not replaced. Hence, the total number of workers still dwindled.

*Coping measures implemented during the crises*

The study brought to the fore the fact that 46.6 percent of the hotels had experienced



and operated through a past electricity crisis. According to Rousaki and Alcott (2006, p. 31), "an organization, which has crisis experience, will show a higher perceived crisis readiness score than an organization that has not experienced a crisis." Moreover, in Kyhn's (2008) opinion, recognizing a crisis is the first step to taking appropriate action to remedy the situation. Yet, going by the opinion of the respondents, almost all the hotels (97.3%) were not prepared for the energy crisis. A common assertion made was, "*who would have seen this coming*"

This is in line with Rousaki and Alcott (2006, p. 31), who stated that "most hospitality managers tended to overlook exogenous changes in their environment, especially when success and relative stability reinforces a personal sense of security." Despite this, 2.7 percent were prepared for the crisis in the sense that they were capable of handling their own electricity demands for brief periods, though not to the extent of a four-year energy crisis.

Kaur and Kaur (2012) pinpoint two main ways of mitigating an energy crisis: that is, finding an alternative source of energy supply or cutting down on energy use. Also, researchers like Foster and Steinbuks (2009), Ilskog (2011), and Braimah and Amponsah (2012) indicated that self-generated energy in the form of private generators abounds in the face of most electricity crises. Similarly, this study revealed that all the hotels found alternative sources of energy mainly in the form of diesel-fuelled generators. Also, 19.2 percent of all the hotels owned more than one generator and the maximum number of generators possessed by any one hotel was three. The highest generator capacity encountered during this study was 1,500 K.V.A.

When participants were asked why they all opted for diesel generators, two main answers were given: (1) solar energy was a new technology and thus was not well known to businesses and (2) Accra has always been beset by frequent and unpredictable power outages.

*We are not known to solar and gas – it is a new thing coming to Ghana. All we know is petrol, petrol.*

[Participant L, 3-star Hotel]

*With all the on and offs in Accra, how can you run any business, most especially a hotel without a generator*

[Participant B, 3-star Hotel]

Only four respondents used solar as an 'alternative source of energy in any capacity, even though all the hotels got proposals and estimates for the setup of a solar plant. This is in line with Doe and Asamoah's (2014) findings that, in any electricity crisis, solar constitutes a very small percentage of alternative energy used. All hotel managements were in consensus that solar was a very good option; however, they did not utilize it due to the high cost involved in its initial setup.

*The infrastructure to set up is expensive, for our hotel, we are talking about millions of US\$ and GHC.*

[Participant F, 2-star Hotel]

*The initial cost is so high that, it would be better to buy another generator set.*

[Participant I, 5-star hotel]

Even with these four hotels, only one entirely depended on solar for every aspect of its operation. All four hotels used solar for their boiler system; however, one hotel relied solely on solar for its hot water (boiler system). Two of the four managers indicated that their systems were designed to use the sun to heat their water to a predetermined temperature (in one hotel it was 50°C). The water was then transferred to the electric part of the boiler, where the water was heated to the required temperature before finally conveying it to the pumping system. According to the fourth hotel:

*Our boiler is a solar system operated with electric and gas as back up. The solar is primary; however, if for reasons of bad weather, it is not able to heat the water to the required temperature, the secondary system (gas), kicks in. Only when the gas is not able to heat the water to the required temperature does the electric system come on. The system was originally designed with just the solar and electric component:*

*We introduced an intermediary – gas.*

[Participant A, Budget Hotel]

Managers further explained that any solar system gives off two main forms of energy: (1) the photovoltaic energy which can be transmitted as electricity and (2) the thermal energy. Hotels used the thermal part of the solar system to generate heat which was used to heat water. However, only the photovoltaic part can be used to power air conditioners: Generating photovoltaic energy in industrial quantity is



what makes the use of solar very expensive. Participants explained

*To get a full solar plant to produce photovoltaic power, a bigger place is needed to mount its panels, to enable it supply enough energy for powering gadgets like air conditioners, fridges, and other high capacity equipment. This requires a long-term plan to make it fully beneficial.*

[Participant G, 4-star Hotel]

*Embracing solar is a very good idea, but considering the requirement to set up, if you want to put solar into practice, it would be best to make it part of the initial building.*

[Participant B, 3-star Hotel]

The second most adopted coping measure was cutting down on the use of electricity: However, less than half (49.3%) of hotels implemented it and none of the respondents was from the 5-star hotel category. CEPA (2007) states that, when businesses are faced with a cost-escalating shock such as the dumsor crisis and it becomes prolonged, most often behavioural adjustments become imperative. However, this did not happen in a greater part of the hotels.

According to the literature, there are two main ways of cutting down energy use: (1) investing in technology to help reduce energy use and (2) instituting practices that ensured the use of less energy. Edelstein and Shriberg (2011) and McKane (2009) refer to these two forms respectively as technological fix and behavioural change.

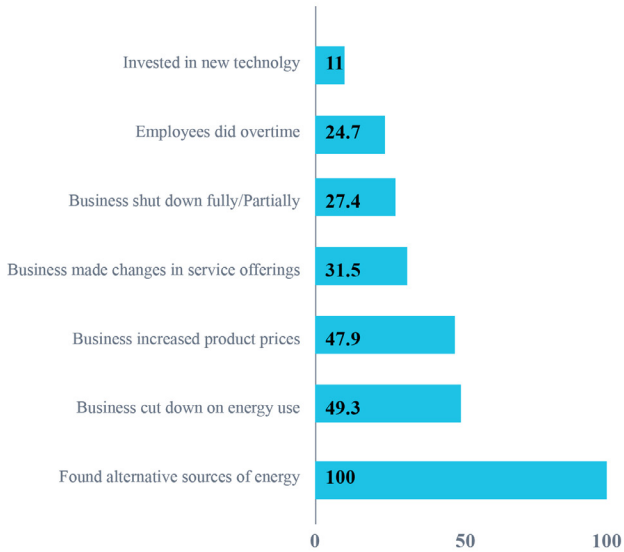
Behavioural change measures were more popular among hotels. Management got their employees (mainly the housekeeping staff) to turn off all electrical appliances within rooms, especially when guests dropped their keys at the reception on their way out (to run errands). Some hotels also tasked their housekeeping and maintenance departments with the responsibility of going into vacant rooms at the end of each shift to make sure all appliances were off. However, feedback indicates that this resulted in some customer complaints. Participant B stated that, in their case, the hotel started limiting the time used to pre-chill rooms before guests' arrival.

Technological fix was more common among larger hotels. It mainly involved the use of room access power-cards, also known as VIN cards and utility management systems. Participants identified this to be an easier and more effective way of saving energy. Guests used their VIN/

electronic room access cards (keys) to open and close their doors as well as activate the rooms' electrical system unit on which electrical gadgets operate. Once the key is placed in the control (power slot), the guest gains access to all electrical gadgets that the key activates. To leave the room, the guest needs the key to close the door; hence, it has to be removed from the slot, thereby turning everything off automatically. This eliminates guest complaints as well as the need for employees going around to make sure everything is off. However, the study revealed that the use of room access power cards was not uniform in all hotels. Besides, not all electrical items needed the key card to activate them. Most hotels utilizing this system placed only their lights and air conditioners on the card.

Contrary to Hume's (2014) suggestion that transferring the cost of the crisis to customers through increased product prices in hotels was a prejudicial idea, 47.9 percent of the hotels executed this measure. This substantiates WANEP's (2015) report that there were pass-through effects of the energy crisis. Scott et al. (2014) explained that electricity crises lead to increase in operational cost which eventually causes the price of products to also increase. However, despite it being popular, none of the 4-star hotels implemented it, although the study observed that most of the big hotels charged in dollars (US\$). During the dumsor crisis, the Ghanaian currency depreciated, increasing the exchange rate. Hence, room rates of hotels charging in foreign currencies also increased. According to Participant N, the manager of a budget hotel, their prices did not necessarily increase but became negotiable

Another way hotels transferred the effects of the crisis was by making changes to the services they offered (31.5%). These changes included changing the setup of the operational area (such as switching from electricity to gas in the kitchen or changing from high consuming appliances to energy-efficient appliances), removing some of the electrical gadgets previously offered to their guests (such as kettles and irons), refusing to offer air conditioning in rooms, charging for services that were previously free, and outsourcing non-essential operational areas such as laundry. In the course of the dumsor, ECG made a recommendation for businesses to shut down their operations partially or fully for a while. This was to help limit the demand or



**Figure 2: Coping Measures Instituted During the Dumsor**

Source: Fieldwork, 2016

pressure on electricity supply from the national grid (Agyei, 2015). The study shows that just 27.4 percent of hotel managements implemented this suggestion, and they were all budget, 1-star, 2 star, or 3-star hotels. Some ways by which management partially implemented this measure include shutting down operational areas like the swimming pools, restaurants, kitchens, and gyms and closing some of their rooms for business. Moreover, it was observed during the course of the study that some managements chose to avoid the dumsor crisis entirely: Two hotels completely shut down, while one was being converted into an apartment. Apart from the aforementioned two, there was another hotel that had been sold to a new owner.

Moreover, Scott et al. (2014) expressed that, if power outages follow a reasonably regular pattern, businesses usually plan their work schedules to correspond with power supply, leading to working overtime. Although the load shedding was somewhat structured, less than a quarter of the respondents (24.7%), comprising budget, 1-star, and 2-star hotels, instituted an overtime policy for employees. Observation, however, noted that hotels typically operate 24/7 and employees work in shifts; hence, most hotels would not find it necessary to grant overtime.

As a mitigation measure, investing in new technology was least adopted: Only 11 percent (made up of budget and 5-star hotels) made any

kind of investment to curtail the effect of the crisis. According to Fishbein (as cited in Scott et al., 2014, p. 24), most businesses do not opt for this coping measure because it "requires support with skills and knowledge, as well as technical support and capital." Investments made include buying chemicals that could be poured into their generators to make them more efficient, redesigning their energy distribution system, instituting energy management system, and going partially solar.

#### Theoretical and Managerial Implications

The findings suggest that Skinner's three-term contingency theory, although mainly employed in the field of psychology, can be applied to understand the behaviour of hotels during crisis situations. From the study, it can be deduced that the dumsor was beyond severe for most of the hotels. However, its severity was not due to the assumed hectic load shedding schedule of 12 hours with and 24 hours without power. Rather, it was the constant power fluctuations, poor-quality power supply, and frequent disruptions in the rationing schedule which caused the most damage and exacerbated the effects of dumsor.

This situation was the real antecedent that negatively affected hotels' socio-economic gains. It increased operational costs, equipment damage, and disruptions in operational processes. The crisis resulted in increased service delays and diminished service quality





resulting in customer complaints, all of which did not encourage patronage. This shows that the socio-economic effects of the crisis were not isolated but rather related.

To overcome the worst effects of the crisis, most hotels mitigated the crisis by finding alternative sources of power (fossil fuel generators and solar), cutting down on electricity use, and investing in new technology. Others transferred the burden of the crisis unto their employees (instituting overtime), customers (making changes in service offerings and increasing product prices), or to a third party (outsourcing), while managements who actively accepted the crisis partially shut down some operational areas in their hotels. A few chose to avoid the crisis entirely by exiting the hotel industry.

Although there is no statistical basis to affirm this assertion, a closer look at the narratives suggests that some of the ways employed by hotels to mitigate the crisis also contributed to gravity of their socio-economic effects such as increase in operational cost, equipment damage, among others. Thus, the link between the effects of the crisis and coping strategies employed is not one-way but goes both ways.

These findings also have implications for managers of hotels. First and foremost, it is high time hotels stopped adopting the "high luxury" attitude and begin incorporating energy conservation and efficiency measures into their operations. Management need to be more conscious about hotel energy consumption and must work to identify and eliminate points of electricity waste within their facilities. Electricity, after all, constitutes a larger percentage of hotel utility cost.

More so, GTA as the implementing and regulatory body of the tourism industry needs to be authorized to ensure the incorporation of green practices into the building plans of hotels. Most importantly, the government, in the form of the Ministry of Energy, needs to gear more of its policies on subsidization of renewable energy generation towards the hotel subsector, given

that it is one of the highest consumers of energy in the commercial and services sector. Subsidies for solar generation should also be extended to cover hotels as well. Energy awareness campaigns, here, should focus more on the use of utility management systems.

## CONCLUSION

This study sought to examine the socio-economic effects of Ghana's 2012-2016 electricity crisis on hotels in AMA and adopted coping strategies. Some key findings of the study are that the load shedding schedule was not the worst part of the crisis, that the socio-economic effects were not as isolated as portrayed by the literature but rather interrelated, that hotels as expected mitigated the effects of the crisis by turning to alternative sources of electricity supply (mainly diesel-fuelled generators), that employee lay-offs were not as popular a practice as indicated by the literature, and that there seems to be a two-way link between the socio-economic effects and coping strategies adopted. From the latter part of 2018 to mid-2019, once again, the country started experiencing frequent and intermittent power cuts. This situation was deemed not as serious as the dumsor; hence, no load shedding schedule was announced. Although the situation has once again abated, discourse on Ghana's electricity sector situation indicates that the fundamental problems (technical and financial challenges) have not yet been fully resolved. As such, the situation can once again easily get out of hand.

This situation can serve as a platform for further studies into the recovery and preparedness of the hotel sector for possible future electricity crises. Additionally, the scope of the study can be broadened to permit a comparative study on the consequences of power cuts on other major affected areas like Kumasi and Tema. Other than that, further research opportunities should consider leaning more towards the objective approach to establish the linkage between effects of power outages and coping measures adopted.

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