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**REPORT ON  
ELECTRICAL APPLIANCES WITH  
ELECTRICAL CONFIGURATION  
DIFFERENT TO BARBADOS'  
(110V/50HZ)**

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## EXECUTIVE SUMMARY

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Barbados' electrical configuration is pegged at 115V/50Hz, as stated by the Global Electric Directory<sup>1</sup>. However, electrical configurations that range between 100V - 127V are deemed to be fixed at 110V<sup>2</sup>.

Barbados' suppliers import electrical appliances from the United States of America (USA) and/or Europe that operate on a configuration of 110V/60Hz and 220V/50Hz, respectively.

An electrical appliance with a configuration of 110V/60Hz or 220V/50Hz will operate in Barbados. However, its operational capacity may be reduced when compared to the environment for which the appliance was created.

Examples of reduced capability include:

- The clocks and timers on the appliances do not retain the correct time, and
- The appliances' lifespans are shortened.

The anomaly of Barbadian suppliers purchasing electrical goods in Europe/USA for usage in Barbados that is different to our electrical configuration, leave consumers in Barbados with no option but to purchase transformers<sup>3</sup> at an additional cost. A transformer converts the voltage from one level to another, to make the appliance work more efficiently. This anomaly raises a number of pertinent questions which must be asked and answered. These include:

- *Why do suppliers import electrical appliances that are different to our system?*

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<sup>1</sup> The Global Electric phone directory [p://www.kropla.com/electric2.htm](http://www.kropla.com/electric2.htm)

<sup>2</sup> According to Mr Howard Deane, Chief Electrical Inspector of the Government Electrical Engineering Department (GEED),

<sup>3</sup> Electrical Transformers are used to "transform" voltage from one level to another, usually from a higher voltage to a lower voltage. They do this by applying the principle of magnetic induction between coils to convert voltage and/or current levels. <http://www.electricityforum.com/products/trans-s.htm>

- *What can be done to rectify this matter since the extra cost of paying for a transformer increases the overall cost of the appliance to the consumer?*

Based on the situation in the market place with respect to the importation of electrical appliances that have a different electrical configuration to Barbados' electrical configuration, the Fair Trading Commission (the Commission) on its own initiative launched an investigation to determine whether or not consumer welfare was being adversely affected.

Given that there is a dearth of published information on the issue, key stakeholders were interviewed and a questionnaire was formulated and distributed to consumers, as part of the fact-finding process.

The study revealed that suppliers who imported appliances which are not of the same configuration as Barbados' electrical configuration are not in contravention of the Consumer Protection Act, CAP. 326D "the Act".

However, where a supplier sells an appliance to a consumer and does not inform the consumer that it is necessary to purchase a transformer, the supplier has misled the consumer and therefore breaches the Act.

To remedy the situation, several proposals were forwarded by stakeholders. The proposals submitted were that:

- Consumers should be informed by suppliers prior to purchasing an appliance with a dissimilar configuration, that it is necessary to purchase a transformer;
- There should be a joint initiative between the Barbados Light & Power Company Limited (BL&P) and suppliers to educate consumers about the need and usage of transformers; and
- The BL&P should change its plant to produce a configuration of 110V/60Hz or 220V/50Hz. It should be noted that the BL&P stated that the cost of implementing the proposal was prohibitive.

The Commission believes that having completed this investigation:

- Consumers should be educated about the use of appliances with a different configuration to that of Barbados and the necessity to purchase transformers.
- Transformers being essential to the effective operation of appliances with a different electrical configuration should be provided with the appliance, thus, eliminating the current problems that exist.
- Consumers who are either renovating or building a new home should have their homes also wired with 220V in essential areas, e.g. kitchen and laundry. The Government Electrical Engineering Department should be consulted on this matter to determine the feasibility of conducting this exercise. Furthermore, it is suggested that a Building Code for Barbados should reflect the need for houses to be wired with 220V/50Hz.

## 1.0 INTRODUCTION

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### 1.1 Background

Barbados is presently faced with an issue where many of the appliances purchased by consumers from suppliers are said to have a different configuration to Barbados' electric configuration of 110V/50Hz. The usage of an electrical appliance with a different configuration has shown that the appliance does not operate efficiently without the use of a transformer. Therefore, consumers have no option but to purchase transformers to enhance the operation of appliances with a dissimilar configuration.

- 1.2 Several countries including Barbados and Jamaica utilise the electrical configuration of 110V/50Hz<sup>4</sup>. It should be noted that some of these countries are converting to 220V or they are currently operating a dual system of 110V/220V/50Hz<sup>5</sup> and so, the sourcing of appliances for their domestic markets will not be as acute as that of Barbados.

Barbados imports electrical appliances from the United States of America (USA) and/or Europe that operate on a configuration of 110V/60Hz and 220V/50Hz cycle, respectively. These appliances are dissimilar to Barbados' electrical configuration.

- 1.3 The issue of consumers having to purchase transformers, at an additional cost to make electrical appliances operate more efficiently, has had wide spread publicity. It has been covered in newspaper articles and on call-in radio programmes. An editorial was written on the issue and appeared in the "Midweek Nation" newspaper of July 14, 2010. The author of the article raised the question:-

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<sup>4</sup> <http://www.kropla.com/electric2.htm>, Jamaica, Indonesia, Japan, Lebanon, Libya, Monaco, Morocco, Netherland Antilles and Vietnam.

<sup>5</sup> *ibid*

*“Why suppliers are selling appliances that operate on 110 volts/60 cycles when Barbados is pegged at 110volts/50 and would require a Transformer in order to work?”<sup>6</sup>*

The author of the said article also questioned the role of the Commission in addressing the issue.

### **Role of the Commission**

- 1.4 Under the Act, the Commission safeguards the interest of consumer welfare in Barbados and ensures that consumer detriment is eradicated or is at a minimum.

Although consumers have not lodged official complaints at the Commission with respect to the usage of electrical appliances with a different configuration to Barbados’ electrical configuration, the Commission empowered under Section 4(6) of the Fair Trading Commission Act, CAP. 326B conducted this investigation to assess, if there is any harm to consumers.

Section 4(6) states:

*“The commission may on its own initiative or on the request of any person carry out any investigation that it considers necessary or desirable in connection with matters falling within the provisions of this Act, Utilities Regulations Act and any laws relating to consumer protection and fair competition which the Commission has jurisdiction to administer.”<sup>7</sup>*

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<sup>6</sup> Midweek Nation, Wednesday July 14, 2010

<sup>7</sup> Fair Trading Commission Act, CAP. 326B

## **Aim of the Report**

- 1.5 The main objective of the report is to examine the issue raised in the editorial<sup>8</sup> and determine whether suppliers are contravening the Act. The report will also examine the part transformers play in improving the operation of electrical appliances imported into Barbados with a different electrical configuration.

Additionally, the report will offer possible solutions and recommendations to rectify the matter.

## **Methodology**

- 1.6 Due to a dearth of documented research on the issue under investigation, several face to face interviews were conducted. Interviewees included suppliers of large and small appliances, the Barbados Light and Power Company Limited and several governmental agencies such as the Barbados National Standards Institute (BNSI), the Government Electrical Engineering Department (GEED), the Ministry of Commerce and the Office of Public Counsel (OPC)

Questionnaires were formulated and distributed to consumers to ascertain whether suppliers selling electrical appliances were informing consumers of the necessity to purchase transformers with their appliances.

## **Structure of the Report**

- 1.7 The structure of this report is as follows: section one (1) provides the background into the problem under review; section two (2) gives a brief account of electrical configurations worldwide and the history of electricity in Barbados; section three (3) discusses legislation that may address the situation and the role of the Commission; while section four (4), five (5) and six (6)

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<sup>8</sup> Midweek Nation newspaper of July 14, 2010.



respectively summarises the findings, conclusions and offers recommendations.

## 2.0 HISTORY OF ELECTRICITY CONFIGURATION

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### World Electrical Configuration

- 2.1 A German company named AEG constructed the first European generating plant and began distributing electricity in Europe. AEG used 50Hz instead of the 60Hz because the number sixty was incompatible with their metric standard unit sequence system<sup>9</sup>.
- 2.2 Initially, Europe used 120V which is the same voltage currently used by the United States of America. In the 1950's, after the Second World War, Europe including England switched to 220V - 240V and from 60Hz to 50Hz. It was argued that the change was necessary, in order to get more power with fewer voltage drops from the same copper wire thickness<sup>10</sup>.
- 2.3 Apparently, the USA considered changing to the same system but was prohibited from doing so because most households in the USA had large appliances, like refrigerators and washing machines, and these appliances would have been particularly costly to replace<sup>11</sup>. The changeover took place in Europe since most households did not have such appliances and thus, replacing appliances to conform to the new electrical configuration was not an issue<sup>12</sup>.
- 2.4 It should be noted that all new buildings in the USA are wired with 240V, but it is divided into two (2) 120Vs between neutral and hot wire<sup>13</sup>. Therefore,

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<sup>9</sup> ibid

<sup>10</sup> <http://users.telenet.be/worldstandards/electricity.htm>

<sup>11</sup> ibid

<sup>12</sup> ibid

<sup>13</sup> ibid

large appliances such as dryers, refrigerators and ovens, are connected to 240 volts<sup>14</sup>.

- 2.5 In Brazil most consumers use 127V of electricity. However, on the north eastern side of the country, consumers mainly use 220V<sup>15</sup>.

Saudi Arabia has an electricity pattern similar to Brazil with 110V in many parts of the country and 220V in others areas. The 220V is mainly found in hotels. Japan on the other hand, uses the same voltage throughout, but different frequencies. Eastern Japan including Tokyo uses 50Hz while Western Japan including Osaka and Kyoto, use 60Hz<sup>16</sup>.

- 2.6 This usage of different frequencies in Japan can be attributed to the Japanese reconstruction after World War II, where Great Britain was responsible for the electricity in the eastern region and the USA in the western region.

Currently, most countries including Europe have voltages which range between 220V - 240V. This voltage range is twice that of the majority of the America's systems which is between 100V - 127V<sup>17</sup>.

- 2.7 The two (2) main electrical configurations worldwide are 220V/50Hz and 110V/60Hz. However, the voltage can vary between 100V and 240V<sup>18</sup>.

## **The History of Electricity in Barbados**

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<sup>14</sup> ibid

<sup>15</sup> <http://users.telenet.be/worldstandards/electricity.htm>

<sup>16</sup> <http://www.kropla.com/electric2.htm>

<sup>17</sup> Please refer to Appendix B

<sup>18</sup> Please refer to Appendix B

2.8 The Barbados Electric Supply Corporation (BESC) was established in 1909<sup>19</sup>. In 1955, the BL&P was created to handle the Barbadian assets of the BESC<sup>20</sup>.

The BL&P stated that the current electrical system in Barbados dates back to the early '50's, when Barbados changed from the English system, after it was acquired by the Canadian International Power company. The company adopted the American voltage but the English frequency was used resulting in the current configuration of 110V/50Hz.

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<sup>19</sup> [http://www.blpc.com.bb/co\\_his.cfm](http://www.blpc.com.bb/co_his.cfm)

<sup>20</sup> *ibid*

### 3.0 LEGISLATION

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3.1 In analysing the issue under review, it is necessary to first look at the role of the Fair Trading Commission to determine whether or not the issue falls under its ambit. Part II of the Fair Trading Commission Act, CAP. 326B sets out the functions of the Commission. Some of its functions in relation to this matter are listed below.

Section 4(1) states:

*“The functions of the Commission are to enforce the Utilities Regulation Act and any laws relating to consumer protection and fair competition which the Commission has jurisdiction to administer.....*

*h) keep commercial activities under review;*

*i) receive and evaluate consumer complaints;*

*j) educate and assist consumers in resolving complaints.....”*

Section 4(6) further states:

*“The Commission may on its own initiative or on the request of any person carry out any investigation that it considers necessary or desirable in connection with matters falling within the provisions of this Act, the Utilities Regulations Act and any laws relating to consumer protection and fair competition which the Commission has jurisdiction to administer.”*

3.2 In view of the Fair Trading Commission Act, CAP. 326B, the Commission is empowered to address this issue, if it falls within the ambit of the Consumer Protection Act, CAP. 326D (the Act).

3.3 Prior to determining whether or not the issue can be addressed under the Act, several pertinent legislation<sup>21</sup> was taken into consideration to determine the applicability and key stakeholders were interviewed.

However, it was noted that the legislation examined did not stipulate the specific electrical configuration for appliances imported into Barbados.

3.4 The BNSI does not have a specific criterion addressing the type of electrical configuration for appliances that should be imported into Barbados. In the absence of such standards, the BNSI stated that they take guidance from the Sale of Goods Act and the Consumer Guarantees Act, CAP. 326E (CGA)<sup>22</sup>.

3.5 The BNSI and the Office of Public Counsel rely on Section 8 (1) of the CGA which states:

*"..that the goods are reasonably fit for any particular purpose that the consumer makes known, expressly, or by implication, to the supplier as the purpose for which the goods are being acquired by the consumer;*

*(b) that the goods are reasonably fit for any particular purpose for which the supplier represents that they are fit or will be fit"*

3.6 During an interview with Mr Eli Edwards, Public Counsel, with regards to whether or not an appliance with a different electrical configuration is defective and breaches the CGA. Mr Edwards stated, *"A bicycle's bell is a warning device for when the bicycle is ridden on the road and the bell is not integral to the functioning of the bicycle. A supplier who sold a bicycle separately from the bell would not be in breach of the Consumer Guarantees Act CAP 326E.*

*In cases where transformers are integral to the functioning of electrical appliances, the consumer should be informed at the time of selection of the appliance that a transformer is necessary for the appliance to function or to function effectively and*

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<sup>21</sup> The Consumer Protection Act, CAP. 326D, the Consumer Guarantees Act, CAP. 326E, the Sales and Goods Act and the Utility Regulations Act, CAP. 282.

<sup>22</sup> Administered by the Office of Public Counsel

*that the transformer is sold separately. The consumer at that stage will decide whether or not he or she wants to buy the appliance.*

*Where the appliance is not sold separately from the transformer by the manufacturer, the consumer should not be required to pay separately for the transformer.*

Mr Edwards further stated, *“If a refrigerator is not of the same configuration of the Barbados’ electrical system and it simply needs a transformer to operate, then the refrigerator cannot be said to be defective. The real issue is that a transformer is needed.”*

- 3.7 Mr Edwards also gave the example of a cell phone and a charger. He said, *“Cell phones, Laptops, Tablets etc. need electrical power to function and chargers are provided for that purpose. It follows therefore that consumers should be told that chargers are integral to the device in order for them to function, but without them it does not mean that the devices are defected since both device and charger are made separately. The principle relating to the electrical transformer i.e. if sold by the manufacturer as one should not require the consumer to pay for them as two separate goods.”*
- 3.8 The Utility Regulations Act, CAP. 282, regulates the operations of the BL&P. but it does not address the issue of transformers being used with electrical appliances. The legislation is concerned with issues relating to tariffs, including rate setting, adherence to these tariffs and the quality of service provided to consumers.
- 3.9 It should be noted that the legislation referred to above does not address the issue as to what is the specific configuration for electrical appliances imported into Barbados. Therefore, suppliers importing appliances outside the range of Barbados’ electrical configuration are not in breach of any of the legislation previously quoted.
- 3.10 According to the Consumer Protection Act, CAP. 326D, at Section 12 (1), *“A person shall not, in trade or commerce as a supplier, engage in conduct that is, or is likely to be, misleading or deceptive.”*

In light of the aforementioned section of the Act, this investigation will seek to determine whether or not suppliers are misleading consumers and breaching the Act, by importing appliances into Barbados that will not work efficiently without transformers.

- 3.11 The Act requires a supplier to provide consumers with all the information that is pertinent to the product that is being purchased. Hence, where a consumer intends to purchase an electrical appliance with a different electrical configuration to Barbados', the supplier should inform the consumer of the necessity to purchase a transformer, prior to the onset of the contract.

Where a supplier does not inform the consumer that it is necessary to purchase a transformer, the supplier has breached Section 12 of the Act<sup>23</sup>.

- 3.12 It should be noted that Section 13 (j) of the Act further states:

*"A person shall not, in trade or commerce as a supplier, make false or misleading representations concerning the existence, exclusion or effect of any condition, warranty, guarantee, right or remedy relating to goods or services."*

Where a supplier makes a false statement, for example, if the supplier should inform the consumer that the appliance will not be affected in any way, if it is used without a transformer, the statement is misleading, and the supplier will be in breach of the Act. Therefore, the Act will only be applicable in instances where the consumer is misled by the supplier about the functionality of the appliance or the supplier makes a statement regarding the appliance that is incorrect.

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<sup>23</sup> Please refer to Paragraph 3.10



## 4.0 FINDINGS AND ANALYSIS

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4.1 To address the issue being investigated, interviews were conducted with key stakeholders.

4.2 The stakeholders interviewed were:

- Suppliers of electrical appliances in Barbados
- The Barbados Light & Power Company Limited, and
- Governmental agencies

For ease of reference, this section of the report has been divided into the following areas:

- General findings in terms of research and interviews, and
- Perspectives from each stakeholder

### GENERAL FINDINGS

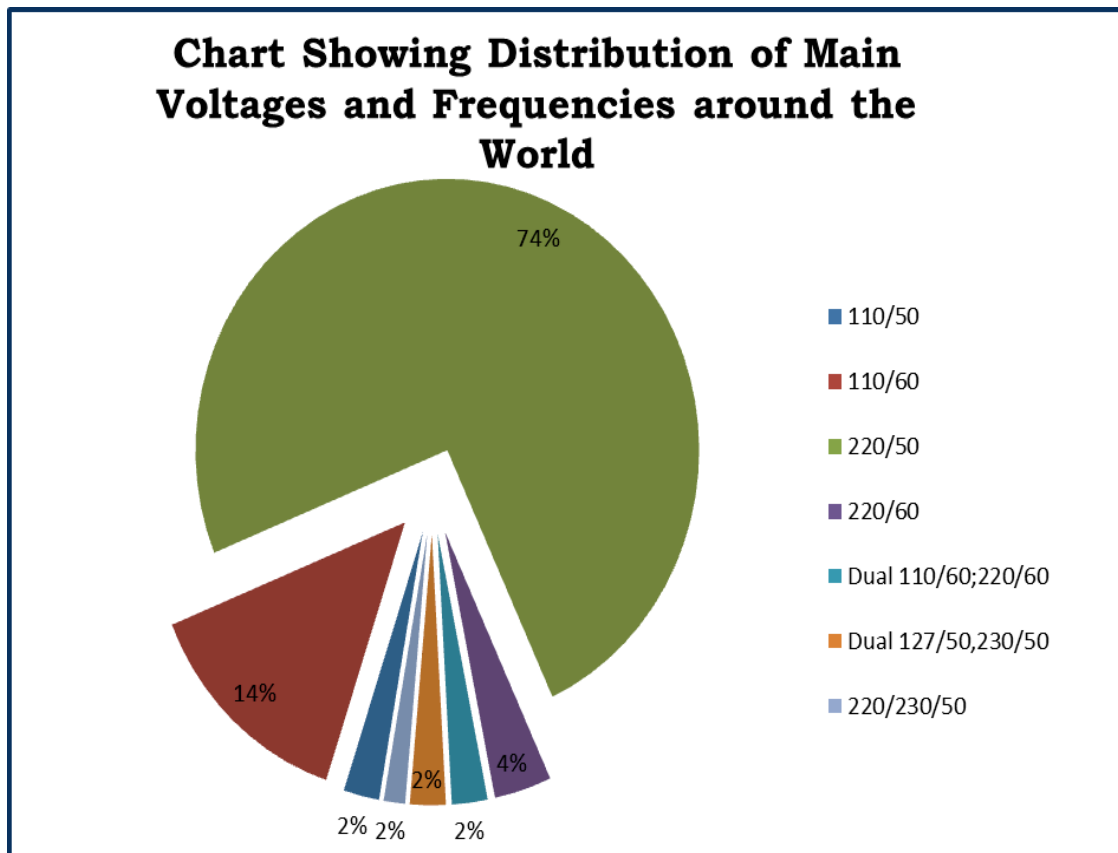
4.3 Motorised appliances that are not designed for Barbados' electrical configuration generally manifest problems. The main problem is that the appliances will operate less efficiently and their life spans will be shortened. For example, they may run slower and may overheat. Operating less efficiently, translates into greater energy consumption.

4.4 Refrigerators, freezers and stoves generally experience the above deficiencies, as they are being operated in an environment in which they were not designed to operate and so, the internal operating voltage increases to compensate for the frequency loss.

4.5 Appliances with built-in clocks will not keep time accurately. For example, an electric stove with a timer, if set for one hour, the timer will not be accurate and therefore is unreliable if being used for cooking and baking.

4.6 Some appliances are marked 50Hz/60Hz indicating that the appliance can work on either frequency. An example of a dual frequency appliance is a laptop.

Figure 1



4.7 Figure 1<sup>24</sup> shows that approximately two percent (2%) of the world's population utilises the singular electrical configuration of 110V/50Hz. Barbados is included in the two percent (2%). The chart also shows that seventy-four (74%) of the world uses the electrical configuration of 220V/50Hz and that Barbados' electrical configuration is at variance with the majority of the world. The configuration of 220V/50Hz is mainly found in Europe. However, this system is also operational in countries such as the Cameroon, South Africa, Bangladesh, Martinique and many other countries

<sup>24</sup> <http://www.kropla.com/electric2.htm> - Electric Power Around the World.

around the world. It should be noted that some countries have a dual system in place. These countries are as follows:-

- Lebanon 110V or 220V/50Hz
- Monaco 127V or 220V/50Hz
- Netherlands Antilles 127V or 220V/50Hz
- Indonesia 127V or 230V/50Hz
- Morocco 127V or 220V/50Hz

Japan has a voltage of 110V but the frequency is 50Hz on the Eastern side and 60Hz on the Western side and that Vietnam is currently converting to 220V.

4.8 As a result of Barbados' unique electrical configuration, there is difficulty in acquiring electrical appliances with the electrical configuration of 110V/50Hz for our marketplace at a reasonable cost.

The investigation revealed that suppliers in Barbados stock electrical appliances that are 110V/60Hz for a variety of reasons including:-

- I. Cost
- II. Accessibility to the US market, and
- III. Consumer familiarity and preferences

4.9 To help rectify Barbados' electrical configuration problem, it has been forwarded that houses should be wired with two phases to give 220V/50Hz. Homes built in Barbados in the last ten (10) years, tend to have this wiring in the kitchen and the laundry rooms because these are the areas where large appliances requiring 220V - 240V, are used, for example, refrigerators and washing machines.

4.10 There are different types of transformers. A "Step-Up" transformer is needed to change the 110V to 220V<sup>25</sup>. However, this would only accommodate

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<sup>25</sup> [http://www.beoworld.org/faq\\_view.asp?id=72](http://www.beoworld.org/faq_view.asp?id=72)

appliances where the voltage is higher than that of Barbados. For example appliances imported from Europe with a voltage of 220V. Appliances imported from the USA with the same voltage as Barbados (110V) but with a frequency of 60Hz will need another type of transformer to convert the frequency.

- 4.11 Cycles became a critical issue with washing machines because of the load. Deficiencies in washing machines would only be seen, if the top speed is 100km per hour. The deficiency would be reflected in the time it took to complete a load. Deficiencies would not be noticeable to the naked eye in a refrigerator but there is usually a seventeen percent (17%) deficiency because of the cycle. According to Standard Distributors, the cycle for the refrigerator is not as critical in its performance as with a washing machine.
- 4.12 In order to change the cycle of the appliance, the wiring of the motor must be changed. Changing the motor is possible with some small appliances, for example, hair trimmers. However, motors in large appliances are sealed and cannot be rewired. Therefore, appliances with an electrical configuration of 110V/60Hz or 220V/50Hz will only respond to the specific configuration for which the mother board and the circuit board would have been specifically designed.

Please find below, a succinct account of the interviews with key stakeholders.

#### **SUPPLIERS' PERSPECTIVE**

- 4.13 The suppliers identified the USA, Mexico and Latin American markets, as the locations where most of the appliances were sourced for Barbados. Suppliers

further stated that on occasion, appliances were bought from the European and the Asian markets. For example, the WestPoint line of appliances which operate on a 50Hz cycle are purchased and imported from France, but Whirlpool and Frigidaire are purchased from the USA and they operate on the 60Hz cycle.

4.14 When suppliers were asked “*Do you inform each consumer that a transformer is required prior to the purchase of an appliance?*” The suppliers stated that their Sales Clerks are trained to advice consumers about the necessity to purchase a transformer, before the purchase of the appliance.

4.15 Suppliers maintained that because Barbados’ demand for electrical appliances was very small, Barbados could not influence manufacturers into producing appliances with an electrical configuration of 110V/50Hz. It should also be noted that only two percent (2%)<sup>26</sup> of the world’s consumers use this electrical configuration and it is highly unlikely that this percentage will affect market trends.

According to the suppliers, they have no option but to accept electrical appliances that are available in external markets and they are usually 110V/60Hz. Suppliers further stated that it would be costly to change the specifications of the appliances as such a task would require manufacturers to retool their plants. In addition, given the small number of countries with the 110V/50Hz cycle, it would be uneconomical for manufacturers to retool their plants.

4.16 A supplier stated that he formed an alliance with their sister company in Jamaica, in order to account for a larger share of the market and negotiated with a manufacturer to get washing machines that were 110V/50Hz. However, he further stated that it was not feasible for manufacturers to produce appliances with the 110V/50Hz as a result of the low demand.

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<sup>26</sup> Please refer to Figure 1 at page 18

4.17 Suppliers stated that as a result of consumers being exposed to USA products through television and travel, consumers were demanding specific brands of electrical appliances and these brands utilise the electrical configuration of 110V/60Hz which is dissimilar to Barbados' configuration. Hence, suppliers were meeting consumers' demand.

However, suppliers stated that occasionally, they could source unknown brands with the electrical configuration of 110V/50Hz but consumers were unfamiliar with these brands and so, they did not sell as quickly. Consequently, the suppliers were left with a stock of unsold appliances.

4.18 Suppliers further stated where the appliance will be used outside the recommended cycle specification the manufacturer does not provide a guarantee on the appliance. However, Barbadian suppliers stated that they provided consumers with warranties.

4.19 A pertinent question that was asked by most persons interviewed was *"Why doesn't the Barbados Light & Power change their specification to conform to the rest of the world?"*

#### **BARBADOS LIGHT & POWER COMPANY LIMITED'S PERSPECTIVE**

4.20 The major question that was forwarded to the BL&P for their comment was *"Whether or not the BL&P can change its electrical configuration, to conform to the USA or the European electrical configuration system?"*

The BL&P cited the following reasons that prohibited them from changing Barbados' electrical configuration.

- There is no evidence to indicate that any country had totally changed its electrical configuration in recent times.

The submission by BL&P that no country has changed its electrical configuration in recent times seems contrary to that stated in the Global Electric Phone Directory. The said directory indicates that countries such as

Vietnam and Morocco are changing their system to 220V/50Hz whilst Indonesia is changing to 230V/50Hz<sup>27</sup>.

- The costs to BL&P would be exorbitant and therefore prohibitive.

This statement seems plausible since the USA found the cost of replacing electrical appliances such as refrigerators, stoves, washing machines etc., costly and so, did not change their configuration. However, should the BL&P consider changing its configuration in the future, the question as to “*Who would be liable to manufacturers and householders for replacing these appliances?*” will become applicable.

A changeover of BL&P’s system to 110V/60Hz or 220V/50Hz would require the acquisition of replacement equipment, at an exorbitant price. The impact may result in increased rates which could be passed on to consumers.

#### **GOVERNMENTAL AGENCIES PERSPECTIVE**

##### **4.21 The Ministry of Commerce and Trade (The Ministry)**

4.22 The Ministry stated that suppliers were not legally prohibited from importing electrical appliances into Barbados with an electrical configuration of 110V/60Hz or 220V/50Hz.

4.23 **The Government Electrical Engineering Department** GEED stated that they do not regulate this aspect of electricity.

##### **4.24 The Barbados National Standards Institute (BNSI)**

BNSI stated that there are no standards governing the importation of appliances. However, the Sale of Goods Act is a means of determining whether or not goods are accurately described for their purposes and are of satisfactory quality.

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<sup>27</sup> <http://www.kropla.com/electric2.htm>

The BNSI said that they were not aware of any specific legislation which made it an offence, to sell appliances of an electrical configuration that is different to Barbados' electrical configuration. BNSI further stated that if the consumer is told that a transformer must be purchased and the consumer elects not to do so, the Act is not contravened.

4.24 BNSI said that traditionally, returning nationals from Europe may need a transformer (step-down), since appliances brought from Europe and used on Barbados' electrical system, experienced power shifts. A transformer is used to maintain the voltage/frequency ratio when an appliance is used on an electrical configuration that is different from the environment for which it was designed.

4.25 BNSI further stated that some stores readily replaced appliances because they tended to burn out due to being used on the 60Hz frequency. An example of such an appliance was the hair dryer.

4.26 According to the BNSI, it has become more prevalent for homeowners to wire their homes with 110V as well as 220V, in rooms such as the kitchen and laundry rooms, to facilitate large appliances, e.g. stoves, refrigerators, washing machines and dryers.

#### 4.27 **The Office of Public Counsel (OPC)**

The OPC is responsible for the administration of the Consumer Guarantees Act, CAP. 326E (CGA). Public Counsel stated that the CGA was not applicable to the matter. However, he further said that where an appliance (e.g. refrigerator) has a configuration that is dissimilar to that of Barbados and the instructions states that a transformer is needed to operate the appliance, then a transformer should be provided at no additional cost to the consumer. In this scenario, the transformer is perceived as being part of the appliance and the cost of the transformer should be included (*bundled*) in the total cost of the appliance.



4.28 Public Counsel used the analogy of a bicycle. He said that a bell was not integral to the functioning of the bicycle and therefore, suppliers were not in contravention of the CGA, if they sold the bicycle and the bell separately.

In a case where the instructions do not state that a transformer is needed but the supplier advises the consumer that a transformer is required and it is purchased then, the law has not been contravened. Public Counsel also cited the example of a cell phone and a charger. He said that they must be sold together, since the phone cannot be functional without being charged. Therefore, the charger must be considered an integral part of the cell phone.

4.29 Public Counsel stated that in order for the transformer to be considered a part of the appliance, the manufacturer would have to make this stipulation. Public Counsel cited another example. He stated that a refrigerator and transformer are two different things and if either were defective, the store had a responsibility to replace them. However, if a store failed to provide the transformer but informed the consumer prior to the appliance being purchased that it was necessary to acquire one, then the store would not be in contravention of the law.

4.30 Public Counsel further stated that consumers should inspect and ask the supplier questions, prior to purchasing an electrical appliance. In doing so, they will be able to make informed decisions about the items being bought. Public Counsel explained that in a case where the appliance is not fit for its purpose in Barbados and is not of an acceptable quality, then the supplier can be held responsible.

### **Dual Voltage Appliances**

4.31 It was noted that some electrical appliances<sup>28</sup> were labelled 110V/60Hz/50Hz and it was queried whether suppliers could source refrigerators and washing

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<sup>28</sup> Laptops

machines that carried the same type of labels. In order for that setup to work, electrical appliances would require two (2) motors or two (2) transformers.

#### **CONSUMERS' PERSPECTIVE**

- 4.32 When consumers were questioned about their experiences when purchasing major appliances, approximately sixty percent (60%) of the respondents indicated that they have purchased appliances that were operational with transformers. They also stated that the sale clerks had informed them of the necessity to purchase a transformer.

Of all the respondents participating in the survey, only one (1) person stated that she was not informed of the need to purchase a transformer.

#### **4.33 JAMAICA's PERSPECTIVE**

In light of the fact that Jamaica utilises the configuration of 110V/50Hz and is in our region and yet imports electrical appliances with a different configuration, the Commission contacted the Ministry of Industry, Investment and Commerce and several businesses in the said country. The purpose of this exercise was to gain their perspectives on how the issue is treated in Jamaica.

Unfortunately, the Commission did not receive responses from the aforementioned persons.

## 5.0 CONCLUSION

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5.1 Suppliers stated that it was extremely difficult for them to purchase appliances with the correct voltage and frequency on the world market. They cited several reasons for buying electrical appliances with a configuration of 110V/60Hz. The reasons are:

- Only two percent (2%) of the world utilises the same configuration as Barbados. Therefore, the market is very small for sourcing appliances.
- Suppliers stated that for them to source the appropriate voltage and frequency, manufacturers would have to retool their plants to 110V/50Hz and this would be uneconomical, since only on a small proportion of the world utilises the 110V/50Hz.
- Suppliers also stated that Barbadian consumers are accustomed to specific brands of appliances. To meet the demands of consumers, suppliers stated that they were forced to buy such brands. However, these brands' voltages and frequencies are dissimilar to Barbados'.
- Transformers can be used to convert the voltage and frequency of electricity, thus allowing an electrical appliance with a dissimilar voltage and frequency to work efficiently.

5.2 Based on the investigation, the failure of suppliers to supply an electrical appliance that is 110V/50Hz is not a contravention of the Act, since the Act does not address the issue of the specific voltage or frequency of electrical appliances imported into Barbados. However, it should be noted that Sections 12 and 13 of the Act, respectively states:

*"A person shall not, in trade or commerce as a supplier, engage in conduct that is, or is likely to be, misleading or deceptive."*

Section 13(j) of the Act also states:

*“A person shall not, in trade or commerce as a supplier, ...make false or misleading representations concerning the existence, exclusion or effect of any condition, warranty, guarantee, right or remedy relating to goods or services.”*

Therefore, if the supplier does not inform the consumer that a transformer must be purchased to make the appliance work more efficiently, the supplier would have contravened the Act, by omitting to provide the consumer with the information necessary to make an informed purchasing decision. Additionally, if the supplier makes a false statement about the appliance, Section 13(j) of the Act is breached by the supplier.

5.3 In summation, the GEED stated that they do not regulate this aspect of electricity. BNSI said that it does not fall under the standards they currently administer and the OPC is of the view that as long as the transformer and the appliance are not defective, then the matter does not fall under the ambit of the CGA. However, Public Counsel felt that it was necessary for suppliers to inform consumers of the necessity to purchase a transformer. The Ministry of Commerce said that Import Regulations do not make it illegal for suppliers to import electrical appliances that are of a different configuration.

Although, the aforementioned stakeholders stated that the issue does not fall under their ambit, it is important for consumers to be informed of the effects of using an electrical appliance with a different electrical configuration to Barbados', especially when major electrical appliances are to be purchased.

5.4 This research revealed that while the issue of suppliers importing electrical appliances into Barbados with a different configuration, affect all consumers, suppliers have little option when purchasing electrical appliances for usage in Barbados on the world market. Furthermore, there is no legislation prohibiting suppliers from importing appliances into Barbados with a different configuration

## 6.0 RECOMMENDATIONS

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- 6.1 Several solutions have been identified by stakeholders as a means to resolve the issue being discussed. The solutions forwarded are listed below.
- 6.2 It has been advanced that the BL&P should change its electrical configuration from 110V/50Hz to conform to the majority of the world<sup>29</sup>. It should be noted that seventy-four percent (74%) of the world utilises the 220V/50Hz configuration and only fourteen percent (14%), operate on the 110V/60HZ configuration<sup>30</sup>.
- 6.3 It should be mandated that new houses being built in Barbados should include the dual-phase wiring<sup>31</sup>. This would enable consumers to acquire electrical appliances that would not need transformers.
- Upgrading in this manner may help to lessen the sudden impact cost that consumers would have to incur. It should also be noted that when Europe changed its system in the 1950s from 120V, the USA was unable to do so due to the cost of replacing appliances and buying new equipment for its manufacturing plants to comply with a different configuration<sup>32</sup>.
- 6.4 Consumers should be educated about the need for transformers, enabling them to be aware of all the issues associated with purchasing electrical appliances that need transformers.
- 6.5 To help alleviate the current problem, it is suggested that an electrical appliance should be sold with a transformer. Supplying the transformer as part of the electrical appliance will prevent consumers being misled about the need for a transformer. If this suggestion is not feasible, then the onus should

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<sup>29</sup> Please refer to Figure 1 at page 19

<sup>30</sup> *ibid*

<sup>31</sup> Please refer to Paragraph 2.4

<sup>32</sup> Please refer to Paragraph 2.4

be placed on suppliers, selling such equipment, to ensure that signs are clearly displayed in stores informing consumers of the necessity to purchase a transformer.

6.6 Finally, the Consumer Protection Act does not prohibit suppliers from selling appliances that are of a different configuration. However, the Act requires suppliers to refrain from engaging in conduct that misleads consumers. Therefore, suppliers should ensure that consumers are aware of the necessity to purchase a transformer prior to entering into contracts with businesses to purchase an appliance with a different electrical configuration. Suppliers informing consumers of this pertinent information will reduce the likelihood of contravening the Act.

6.7 The research suggests that there is a need for the development and implementation of legislation and/or standards for appliances imported into Barbados to eliminate the current issue. However, the Commission's investigation also highlights the difficulty suppliers experience when trying to source electrical appliances for usage in Barbados. There is also the issue of changing Barbados' electrical configuration. However, the cost of doing so, according to BL&P is prohibitive. The issue seems to be paradoxical.

However, the Commission having completed this investigation recommends that:

- Consumers should be educated about the use of appliances with a different configuration to that of Barbados and the necessity to purchase transformers.
- Transformers being essential to the effective operation of appliances with a different electrical configuration should be provided with the appliance, thus, eliminating the current problems that exist.

- Consumers who are either renovating or building a new home should have their homes also wired with 220V in essential areas, e.g. kitchen and laundry. The Government Electrical Engineering Department should be consulted on this matter to determine the feasibility of conducting this exercise. Furthermore, it is suggested that a Building Code for Barbados should reflect the need for houses to be wired with 220V/50Hz.

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## **Persons Interviewed**



Charles Broomes,  
Chief Electrical Officer (Ag.)  
Government Electrical Engineering Department

Eli Edwards  
Public Counsel  
Officer of Public Counsel

Jeffrey Kellman  
Director (Ag.)  
Ministry of Commerce

Mr Rickie Neblett  
Service Manger  
Standards Distributors

Wayne Odle  
Product Manager  
Dacosta Mannings

Mr Andre Padmore  
Assistant Product Manager  
Dacosta Mannings

Simon Prince  
Buying Director  
Courts (Barbados) Limited

Carson Rawlins  
Technical Officer  
Barbados National Standards Institute

Stephen Worme  
Marketing Manager  
Barbados Light & Power

## LIST OF ABBREVIATIONS

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ac - alternating current

BL&P - Barbados Light & Power Co. Ltd.

BNSI - Barbados National Standards Institute

CGA - Consumer Guarantees Act, CAP. 326E

CPA - Consumer Protection Act, CAP. 326D

dc - direct current

FTC/the Commission - Fair Trading Commission

GEED - Government Electrical Engineering Department

Hz - frequency

OPC - Office of Public Council

URA - Utility Regulation Act, CAP. 282

USA - United States of America

V - voltage

**Retailers Questionnaires**

1. Where do you purchase your appliances?
2. Are they compatible with the Barbados Cycle?
3. Are transformers sold separately or with the appliance?
4. Why they are not purchased from a country offering the same frequency?
5. Are you aware of the problems that can occur with the appliance as a result of a different frequency?
6. Are consumers made aware of the potential difficulties?

**Consumers' Questionnaire**

1. Have you purchased a major appliance in the past year? If yes what was the appliance?
2. Where was the appliance purchased?
3. Did it need a transformer?
4. Were you told that it would need a transformer?
5. Was the transformer given to you as a part of the appliance or were you required to purchase the transformer separately?
6. Have you noticed any difference in the performance of the appliance with the previous appliance?

## **APPENDIX B**

<b>Region</b>	<b>V</b>	<b>Hz</b>	<b>Region</b>	<b>V</b>	<b>Hz</b>	<b>Region</b>	<b>V</b>	<b>Hz</b>	<b>Region</b>	<b>V</b>	<b>Hz</b>
Afghanistan	220	50	Czech Republic	230	50	Kuwait	240	50	Réunion Island	220	50
Albania	220	50	Denmark	230	50	Laos	230	50	Romania	230	50
Algeria	230	50	Djibouti	220	50	Latvia	220	50	Russian Federation	220	50
American Samoa	120	60	Dominica	230	50	Lebanon	110/220	50	Rwanda	230	50
Andorra	230	50	Dominican Republic	110	60	Lesotho	220	50	St. Kitts and Nevis	230	60
Angola	220	50	East Timor	220	50	Liberia	120	60	St. Lucia	240	50
Anguilla	110	60	Ecuador	120-127	60	Libya	127	50	St. Vincent	230	50
Antigua	230	60	Egypt	220	50	Lithuania	220	50	Samoa	230	50
Argentina	220	50	El Salvador	115	60	Liechtenstein	230	50	Saudi Arabia	127/220	60
Armenia	220	50	Equatorial Guinea	220	50	Luxembourg	220	50	Senegal	230	50
Aruba	127	60	Eritrea	220	50	Macau S.A.R. of China	220	50	Serbia	220	50
Australia	240	50	Estonia	230	50	Macedonia	220	50	Seychelles	240	50
Austria	230	50	Ethiopia	220	50	Madagascar	220	50	Sierra Leone	230	50
Azerbaijan	220	50	Faroe Islands	220	50	Madeira	220	50	Singapore	230	50
Azores	220	50	Falkland Islands	240	50	Malawi	230	50	Slovak Republic	230	50
Bahamas	120	60	Fiji	240	50	Malaysia	240	50	Slovenia	220	50
Bahrain	230	50	Finland	230	50	Maldives	230	50	Somalia	220	50
Balearic Islands	220	50	France	230	50	Mali	220	50	South Africa	220/230	50
Bangladesh	220	50	French Guiana	220	50	Malta	240	50	Spain	230	50
Barbados	115	50	Gaza	230	50	Martinique	220	50	Sri Lanka	230	50
Belarus	220	50	Gabon	220	50	Mauritania	220	50	Sudan	230	50
Belgium	230	50	Gambia	230	50	Mauritius	230	50	Suriname	127	60
Belize	110/220	60	Georgia	220	50	Mexico	127	60	Swaziland	230	50
Benin	220	50	Germany	230	50	Micronesia	120	60	Sweden	230	50
Bermuda	120	60	Ghana	230	50	Monaco	127/220	50	Switzerland	230	50

Region	V	Hz	Region	V	Hz	Region	V	Hz	Region	V	Hz
Bhutan	230	50	Gibraltar	240	50	Mongolia	220	50	Syria	220	50
Bolivia	220/230	50	Greece	220	50	Montenegro	220	50	Tahiti	220	60
Bosnia	220	50	Greenland	220	50	Montserrat	230	60	Taiwan	110	60
Botswana	231	50	Grenada	230	50	Morocco	127/220	50	Tajikistan	220	50
Brazil	110/220	60	Guadeloupe	230	50	Mozambique	220	50	Tanzania	230	50
Brunei	240	50	Guam	110	60	Myanmar(Burma)	230	50	Thailand	220	50
Bulgaria	230	50	Guatemala	120	60	Namibia	220	50	Togo	220	50
Burkina Faso	220	50	Guinea	220	50	Nauru	240	50	Tongo	240	50
Burundi	220	50	Guinea-Bissau	220	50	Nepal	230	50	Trinidad and Tobago	115	60
Cambodia	230	50	Guyana	240	60	Netherlands	230	50	Tunisia	230	50
Cameroon	220	50	Haiti	110	60	Netherlands Antilles	127/220	50	Turkey	230	50
Canada	120	60	Honduras	110	60	New Caledonia	220	50	Turkmenistan	220	50
Canary Islands	220	50	Hong Kong	220	50	New Zealand	230	50	Uganda	240	50
Cape Verde	220	50	Hungary	230	50	Nicaragua	120	60	Ukraine	220	50
Cayman Islands	120	60	Iceland	220	50	Niger	220	50	United Arab Emirates	220	50
Central African Republic	220	50	India	230	50	Nigeria	240	50	United Kingdom	230	50
Chad	220	50	Indonesia	127/230	50	Norway	230	50	United States of America	120	60
Channel Islands	230	50	Iran	230	50	Okinawa	100	60	Uruguay	220	50
Chile	220	50	Iraq	230	50	Oman	240	50	Uzbekistan	220	50
China	220	50	Ireland	230	50	Pakistan	220	50	Vanuatu	230	50
Colombia	110	60	Isle of Man	240	50	Palmyra Atoll	120	60	Venezuela	120	60
Comoros	220	50	Israel	220	50	Panama	110	60	Vietnam	127/220	50
Congo- People's Rep. of	230	50	Italy	230	50	Papua New Guinea	240	50	Virgin Islands	115	60
Congo, Dem. Rep of	220	50	Jamaica	110	50	Paraguay	220	50	Yemen	220/230	50
Cook Islands	240	50	Japan	100	50/60	Peru	220	60	Zambia	230	50

Region	V	Hz	Region	V	Hz	Region	V	Hz	Region	V	Hz
Costa Rica	120	60	Jordan	230	50	Philippines	220	60	Zimbabwe	220	50
Cote d'Ivoire	220	50	Kazakhstan	220	50	Poland	230	50			
Croatia	230	50	Kenya	240	50	Portugal	230	50			
Cuba	110/220	60	Kiribati	240	50	Puerto Rico	120	60			
Cyprus	240	50	Korea, South	220	60	Qatar	240	50			

Source: Global Electric & Phone Directory – <http://www.kropla.com/electric2.htm>