TECHNICAL EXPERTISE DURABLE SOLUTIONS

PRELIMINARY ANALYSIS OF DATA

Household Socio Economic and Energy Use Baseline Survey, Bartica, Guyana

Prepared for Caribbean Community Climate Change Centre

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Background

The Household Socio-Economic and Energy Use Baseline Survey for Bartica was conducted in July 2018. In particular, the data were collected between July 16 - 27, 2018 and this includes data collected from households and from a few businesses. The household data were collected from a sample of 339 at a response rate of approximately 98.5% whereas the sample size for the business is 22 and this sample was surveyed at a response rate of 100%. This preliminary report is focused on the household data and more specifically on the socio-demographic and attitude components and not on energy consumption.

The Guyana Bureau of Statistics estimates the population of the Bartica Township to be 8004 individuals distributed over 2219 households. The household survey targeted a sample of 328 because this sample size was determined to be adequate to allow estimates with 95% confidence while maintaining a margin of error of at most 5%. However, the realised sample size exceeds this target by 11 because there was some oversampling to compensate for potential nonresponse and because the sample size could not be monitored in real time.

In the absence of a list of households from which to select to constitute the sample, the approach was taken to distribute the sample over the geographic area. This distribution was based on the 17 enumeration districts employed by the Bureau of statistics and the aim was to distribute the sample equally across the enumeration districts. However, with respect to the original target of 328, 19 households were allocated to some enumeration districts at random whereas 20 were allocated to others since 17 is not a factor of 328 (the original target sample). As mentioned before, there was some oversampling to compensate for potential nonresponse and with nonresponse being a rare phenomenon, the final sample contains 11 more respondents than the initial target.

A component of the agreement under which the survey was conducted is that interviewers from Bartica would be utilised. This was done and a total of 8 local interviewers executed the data collection. The data were collected using tablet devices equipped with the offline survey tool KoBoCollect which interfaces with the KoBoToolbox platform.

The survey questionnaires (See Appendix) were developed by The Consultancy Group Inc. as one of the project deliverables. The main foci of the household instrument were estimating household energy consumption by facilitating aggregation of consumption by equipment and appliances, lights and energy used for other purposes. Much of the questionnaire was dedicated to identifying energy consumers in the home, determining their power ratings and establishing how much they are used. The questionnaire also included items to capture demographic and socio-economic information and it also focused on knowledge and attitudes towards energy use and energy conservation.

Socio-Demographic Data

Respondent Information

The household data includes responses from 339 individuals (and households) and of this total, 56.93% are either the exclusive heads of the households or share this role with someone else (Figure 1). Though the approach to respondent selection was to first interview the heads of the households, this was not a strict requirement. The individual selected needed to know about the household's energy use.

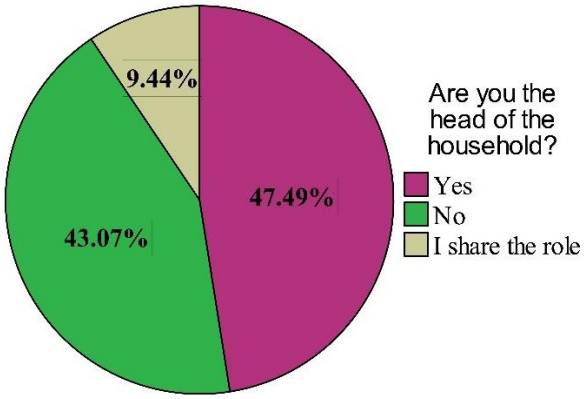

Figure 1 Respondent is Head of the Household

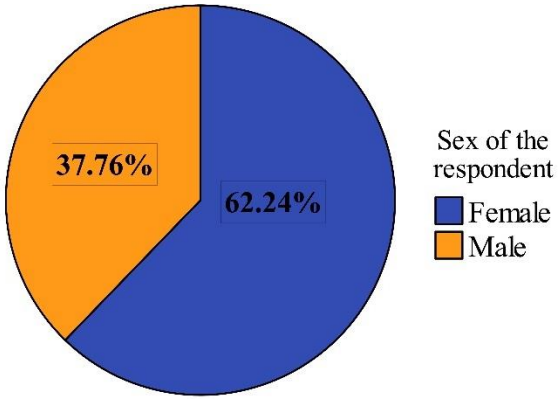

Figure 2 Sex of Respondent

Table 1 Age of Respondents

	n	Mean (years)	SD
What is your age?	335	43.56	17.28

Approximately 62.24% of the respondents are females (Figure 2) and the entire group of respondents has an average age of 43.56 years (Table 1) (age missing for three individuals). A majority of the respondents (63.72%) completed at most secondary schooling. The next category with respect to popularity is primary education (23.6%) and relatively few respondents (4.72%) completed a university programme (Figure 3). The level of education of the respondents is therefore somewhat low overall.

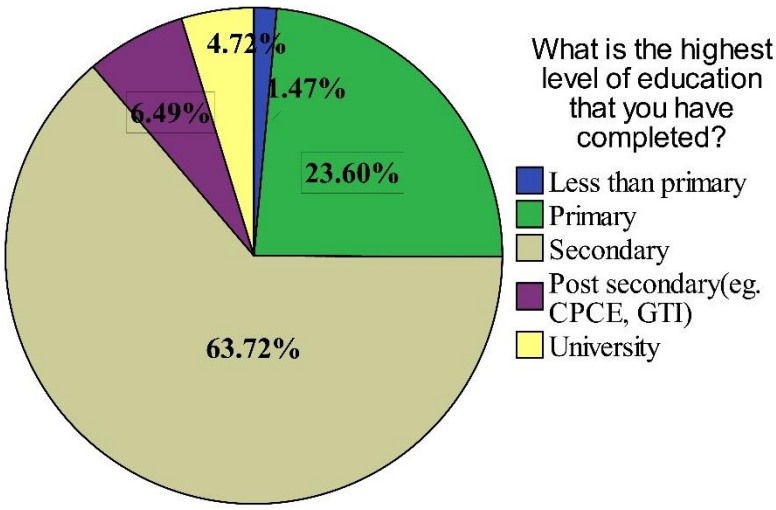

Figure 3 Respondent's Education

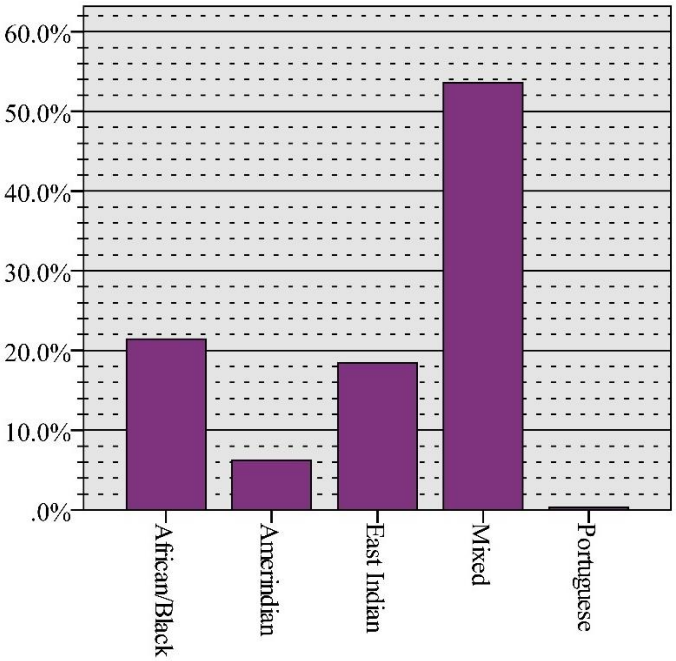

Figure 4 Ethnicity of Respondent

Most of the respondents (~54%) identified themselves as mixed (Figure 4). Following this group in popularity are the African (~21.5%) and the East Indian (~18%) ethnicities. A few respondents also identified themselves as Amerindian (~6%) and as Portuguese (~0.5%) with the Portuguese ethnicity being least popular overall.

House and Household Characteristics

Almost all of the households live in single detached houses with a small proportion of the houses (~9%) built on stilts (see Figure 5). A large majority of these houses were built after 1960 (Figure 6).

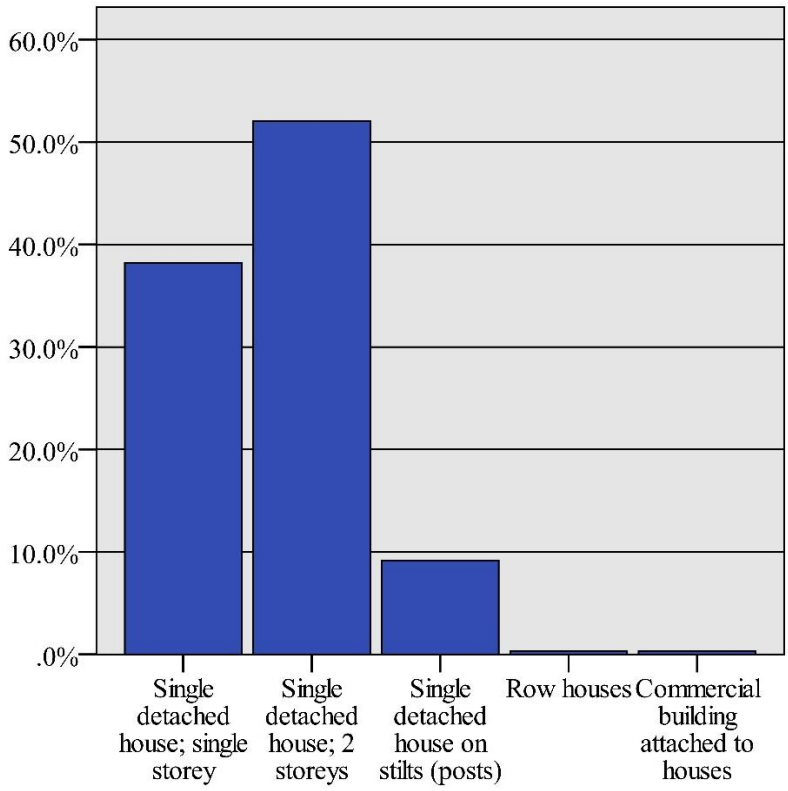

Figure 5 Type of Dwelling

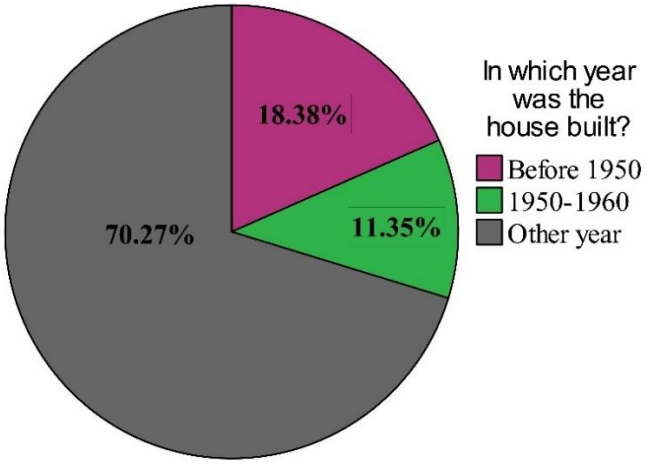

Figure 6 Age of House

Approximately 34.81% of the respondents own the houses in which they live (Figure 7). In approximately 60.63% of the remaining cases (non-owners of the houses), the house is owned by someone who resides in the household (Figure 8). In the cases where the respondent is the owner of the house, ownership was achieved through inheritance by 44.92% of them whereas 24.58% of them bought the house and 27.12% built the house (Figure 9).

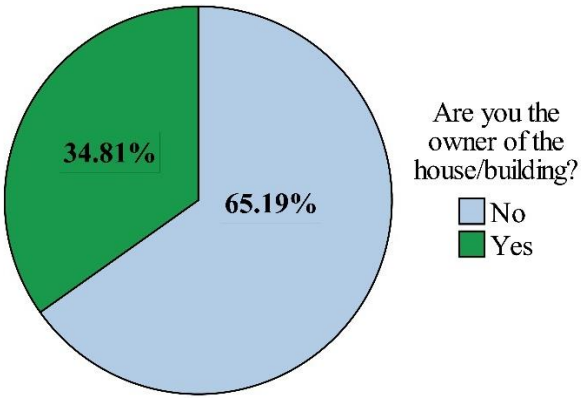

Figure 7 Ownership of House

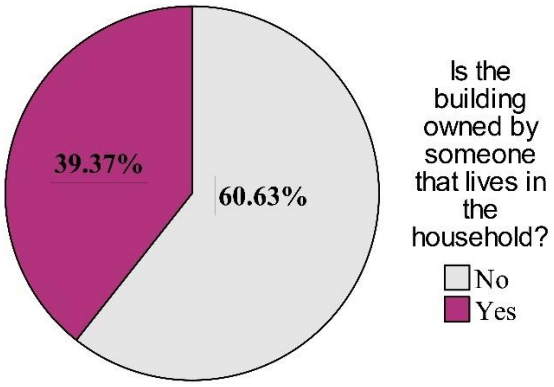

Figure 8 House Owned by a Resident

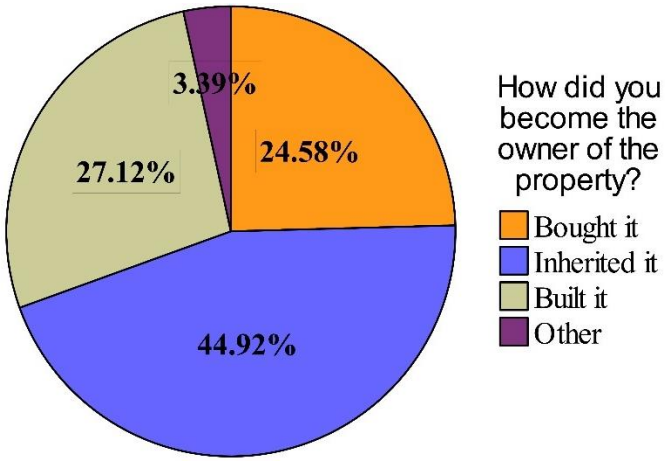

Figure 9 How the Respondent Became Owner of Property

Most of the households (~75%) have been living in their current homes for more than five years (Figure 10). However, some have been occupying the houses for much longer. In particular,

approximately 14% have lived in the same house for more than 20 but less than 30 years and approximately 20% have lived in the house for more than 30 years.

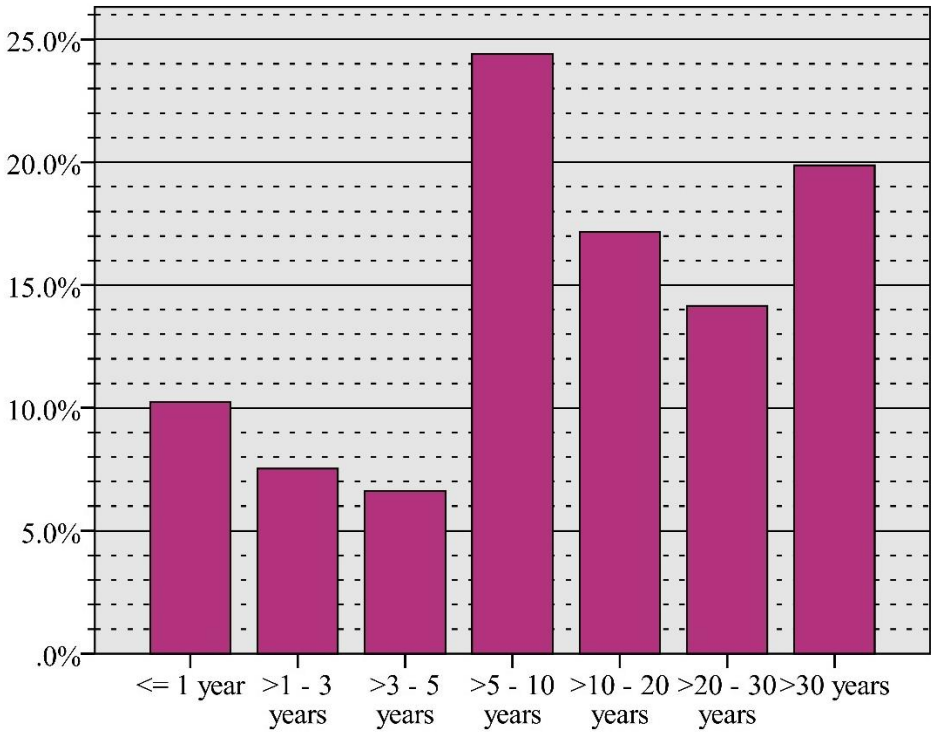

Figure 10 When Respondent Moved to the Building

Table 2 Household Composition

	n	Minimum	Maximum	Mean	SD
How many adults are in the household?	339	1	8	2.90	1.25
How many children are in the household?	338	0	9	1.44	1.53
Household size	339	1	14	4.34	2.13

On average, 2.90 adults and 1.44 children live in the households in Bartica and the average household size overall is approximately 4.34 individuals (Table 2). In addition to this approximately 19.5% of the households have at least one person working in it but who does not reside there. Close to 20% of the households therefore offer employment to other individuals. The average number of persons that are so employed per household where this is relevant is 1.65.

The highest level of education completed in a majority of the households is secondary schooling (Figure 11). This is true for approximately 69.62% of the households. In addition to this, approximately 12.39% of the households has as the highest level of education completed, post-secondary training in a technical institution such as the teacher training college or the Guyana Technical Institute. Approximately 10.91% of the households have someone who completed university and the highest level of education in 6.78% of the households is primary schooling. These results go beyond the education of the respondents to show the highest levels in the entire household. As in the case of the education of the respondent, the highest level of education in the households in general is somewhat low in the sense that relatively few households (10.91%) include at least one university graduate.

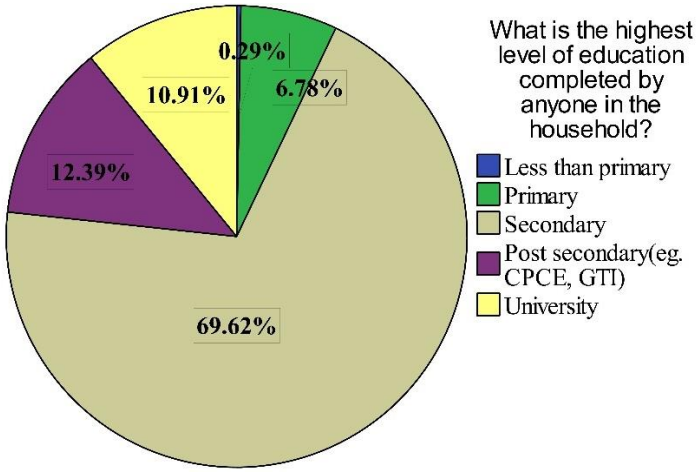

Figure 11 Highest Level of Education in Household

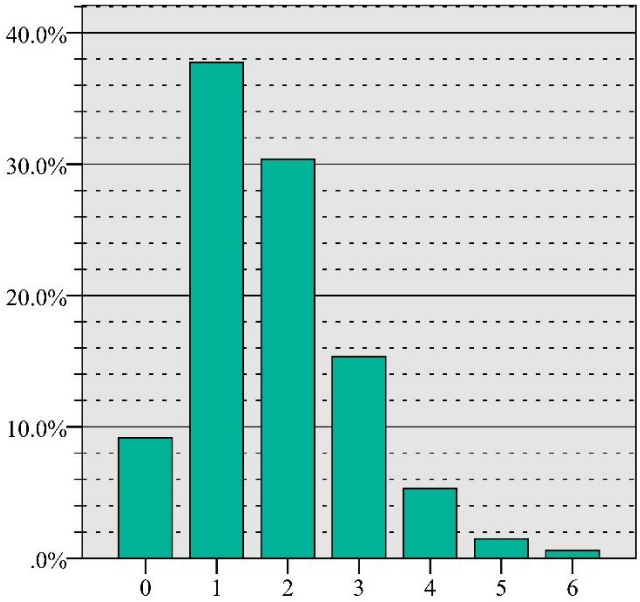

Figure 12 Family Members Earning a Salary

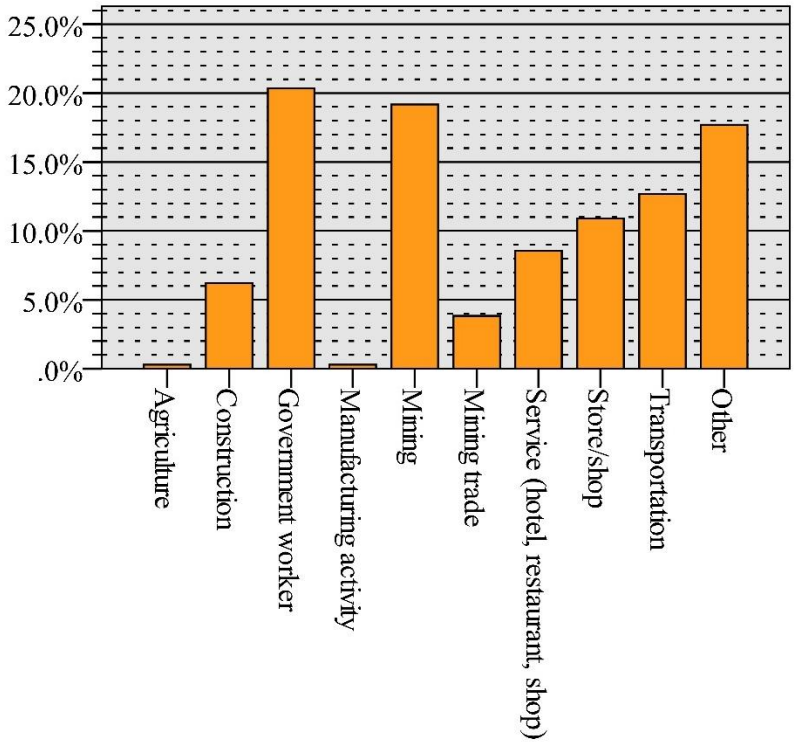

Figure 13 Main Economic Activity of Main Contributor to Household Income

For approximately 68% of the households, one (~38%) or two (~30%) individuals earn a salary whereas for approximately 15% of them, three individuals earn a salary (Figure 12). It was established earlier that an average of approximately 2.90 adults reside in the households. Against

this backdrop, the number of individuals that contribute to the household income would seem to suggest that some adults are not employed in salaried jobs which tend to be government jobs or that they are not employed at all. For example, people employed in gold mining and who have their own businesses might not record their earnings as salary but they cannot be considered as unemployed.

When asked about the economic activity of the main contributor to the household income, a variety of categories were identified with the most popular being government worker (~20%) followed by mining (~19%) (Figure 13). Both the government (salaried worker) and the mining industry therefore are important contributors to household income in Bartica. In contrast, agriculture and manufacturing are especially unpopular as the main contributors to household income given that they were each so identified by less than 1% of the households. Working in the transportation sector (~13%) and operating a store or shop (~11%) are the only remaining categories that were identified by more than 10% (but fewer than 13%) of the households (Figure 13).

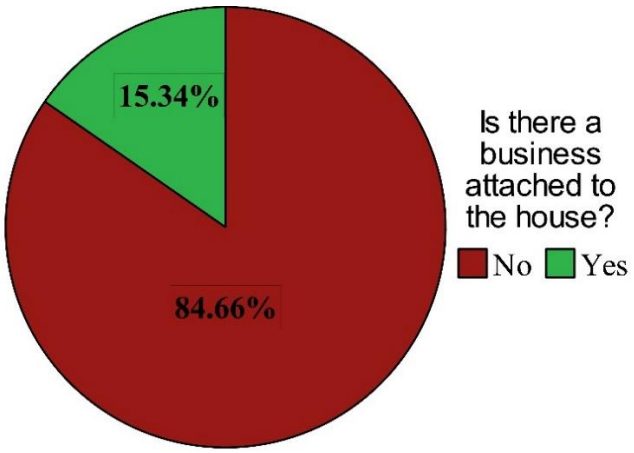

Figure 14 Business on Property

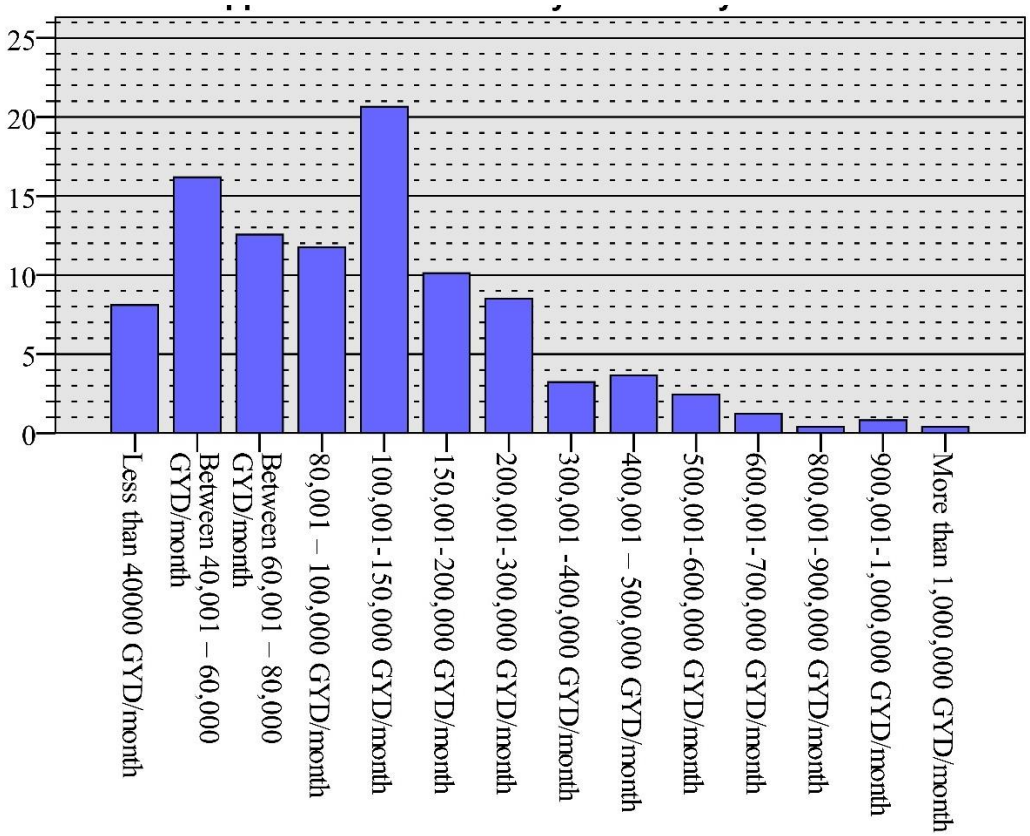

Figure 15 Household Monthly Income

Approximately 15.34% of the households have a business attached to the property. These businesses are likely to be shops or stores but may also include other types such as mechanical workshops. However, it is worth highlighting that shops and stores were identified as the main source of income by approximately 11% of the households which is close to the proportion of households with businesses on the property. It therefore seems reasonable to conclude that a large proportion of the businesses attached to the houses are shops or stores.

The responses to the question about monthly income of the household from all sources are summarised in Figure 15. This graph of monthly household income (see Figure 15) indicates that the two largest categories are G$100,001 – 150,000 (~20.5%) and G$40,001 – 60,000 (~16%). Only three other categories account for at least 10% (and up to 12.5%) of the households. These are two categories between G$60,000 G$150,000 and the category G$150,001 – 200,000. There are much fewer households (less than 4%) that earn monthly incomes above G$300,000. Household income therefore appears to cluster at the lower end. In particular, if some categories

were to be combined, it can be determined that approximately 48% of the households earn at most G$100,000 per month whereas approximately 39% earn between G$100,001 and 300000 and the remainder, approximately 13% earn more than G$300,000 per month.

Energy Sources

The main source of electricity for the households in Bartica is the Guyana Power and Light (GPL) grid (~96.17%) (Figure 16). Although other sources such as off-grid or grid-tied solar and generators were identified, they were identified altogether by fewer than 3% of the households.

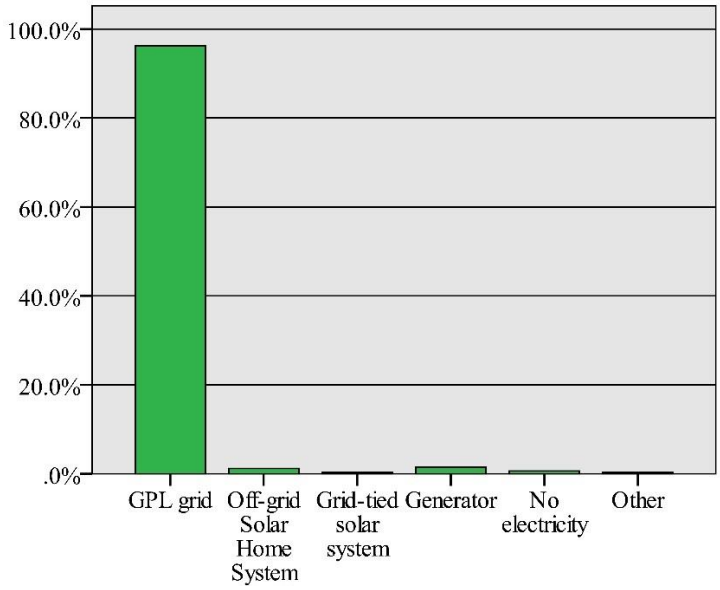

Figure 16 Main Source of Electricity for Household

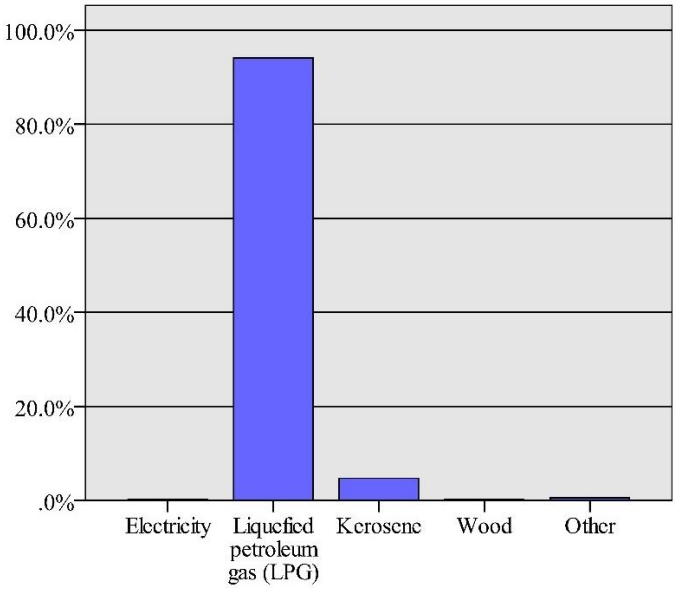

Figure 17 Main Source of Energy for Cooking

The main source of energy for cooking is liquefied petroleum gas (LPG). This is the main source of energy for cooking for approximately 94.1% of the households (Figure 17). The use of kerosene as the main source of energy for cooking holds for approximately 4.72% of the households and the other sources, including electricity and wood are the main sources for just approximately 1.18% of the households. Apart from LPG, the other sources of energy for cooking are especially unpopular.

Some households have water heating systems and some have air-conditioning units installed. Before checking on the sources of energy/electricity for these systems, it was important to determine which households have them. Overall, approximately 2.95% and 7.96% of the households have a water heating system and air-conditioning respectively (see Figure 18 and Figure 19). These are small percentages and this indicates that these systems in households in Bartica are uncommon.

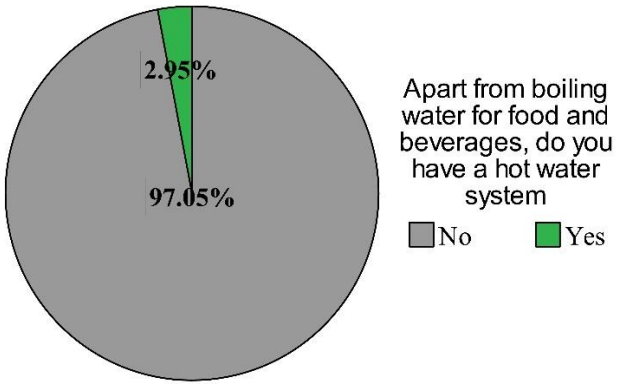

Figure 18 Domestic Hot Water System

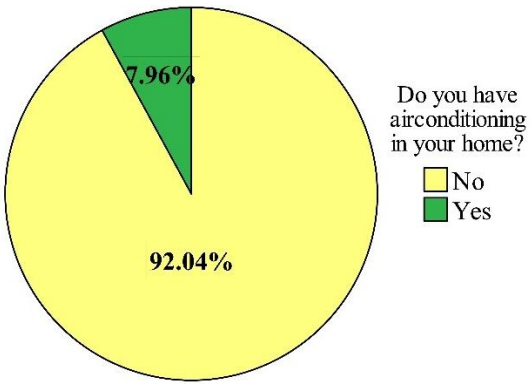

Figure 19 Air-conditioning in the Home

Of the households with air-conditioning units installed, approximately 81% have split units whereas approximately 2% have compact or portable units and approximately 17% have window units (Figure 20).

The source of electricity for air-conditioning is exclusively the GPL grid (Figure 22) and this is the main source for water heating systems (~70%) (Figure 21). The remainder of the households with domestic hot water systems (30%) use solar energy to power them. The chart for water heating (Figure 21) show, in addition to the sources of energy, the type of water heating system installed.

It indicates that approximately 60% of the homes in which water heating systems are installed, have instant heaters attached to showerheads or faucets as appropriate. The remaining 40% of the relevant households have water heating systems with deposit.

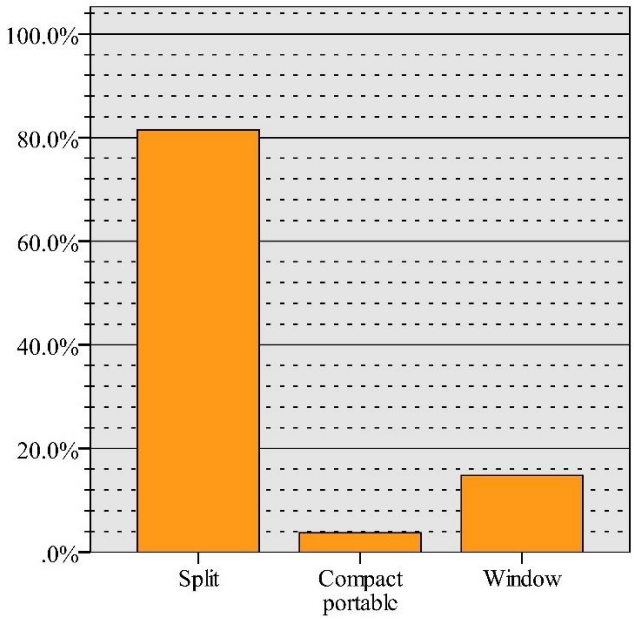

Figure 20 Type of Air-Conditioning Units

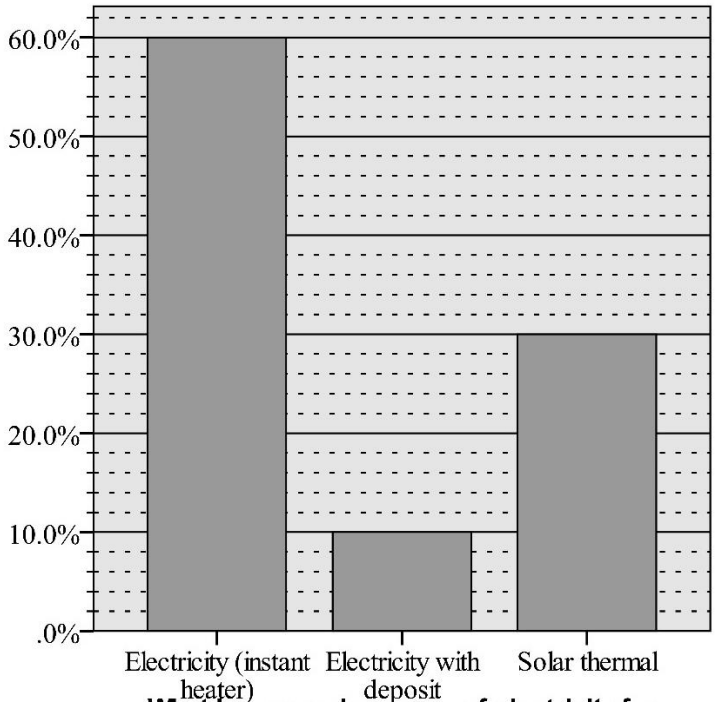

Figure 21 Main Source of Electricity for Domestic Hot Water System

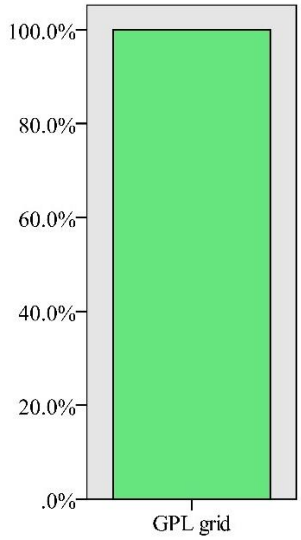

Figure 22 Main Source of Electricity for Air-Conditioning

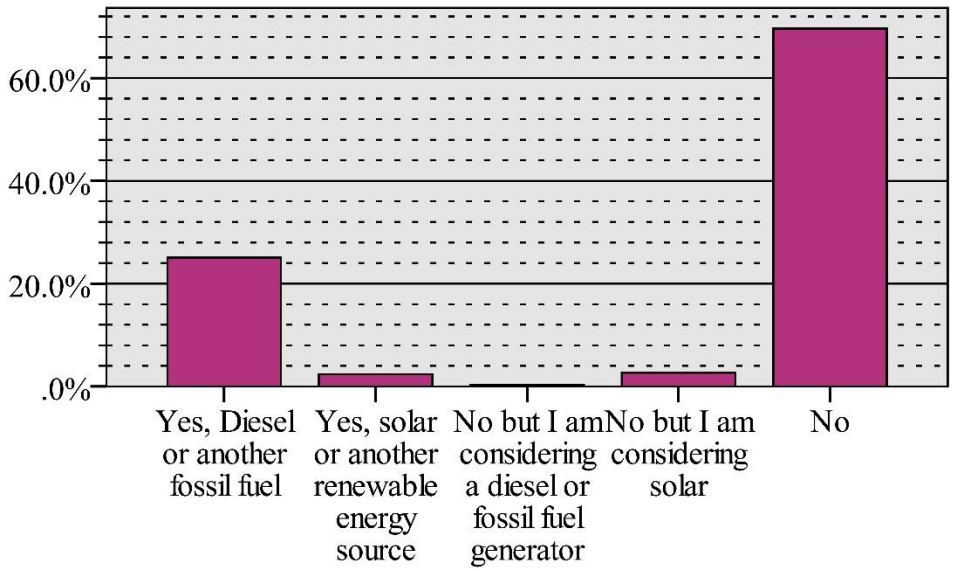

Figure 23 Backup Electricity Sources

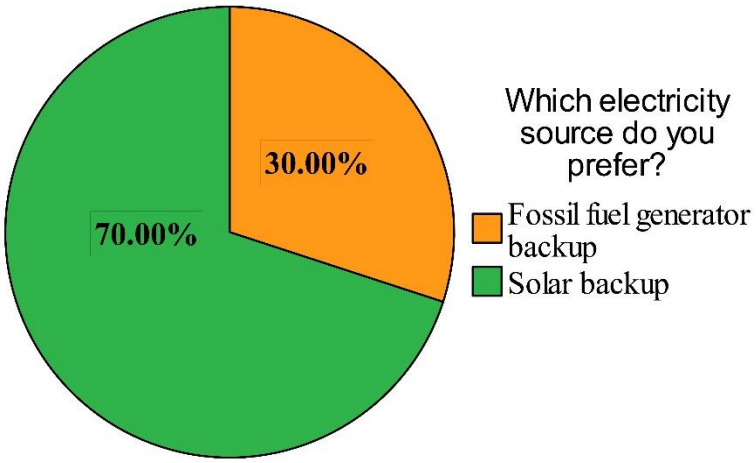

Figure 24 Backup Electricity Sources: Preference for Fossil Fuel versus Solar

In the Bartica Township, approximately 67% of the households have no backup electricity generator. However, some of the households without electricity generators are considering obtaining one (Figure 23). Approximately 70% of the households that are considering acquiring a backup electricity generator prefer one that is powered by solar energy and the remaining 30% prefer one that is powered by fossil fuel (Figure 24). The reasons for the preferences were not established in the survey. However, it seems promising that most of the households considering a backup generator prefers one that makes use of renewable energy.

Of the households with backup generators, fossil fuel generators are more popular. In particular, approximately 22% of the households overall have generators that consume fossil fuel whereas approximately 1% of the households have solar electricity generators (Figure 23).

Table 3 Electricity Blackouts Per Week

	n	Mean	SD
About how many times per week do you get blackout?	339	15.38	31.83
About how long (in hours) per week do these blackouts last on average?	324	11.81	16.82

The motivation for obtaining an electricity generator as a backup is apparent when the frequency and duration of blackouts are examined (Table 3). The households reported on average that there

are 15.38 electricity blackouts per week. This is an average of more than two per day if one wishes to look at it in this way. On a weekly basis, the blackouts last an average of approximately 11.81 hours based on the reports (Table 3).

Appliances in the Home

The Bartica households own a variety of appliances with the most popular being the stove which is owned by approximately 97% of them (Figure 25). Between 85% and 96% of the households have at least one refrigerator, television, portable fan, iron and mobile phone. There is a noticeable drop in popularity between this group of appliances and the others. The next grouping of appliances with regard to popularity contains the microwave oven and washing machine which are each owned by approximately 56% of the households and stereo system which is owned by approximately 49% of the households. All of the other appliances are owned by less than 40% of the households in the township. Computers or laptops and tablet devices are owned by between 32% and 36% of the households whereas approximately 21% have a water pump and approximately 12% have a freezer, ceiling fan or video game. Finally, approximately 8% of the households have an air-conditioning unit installed (Figure 25).

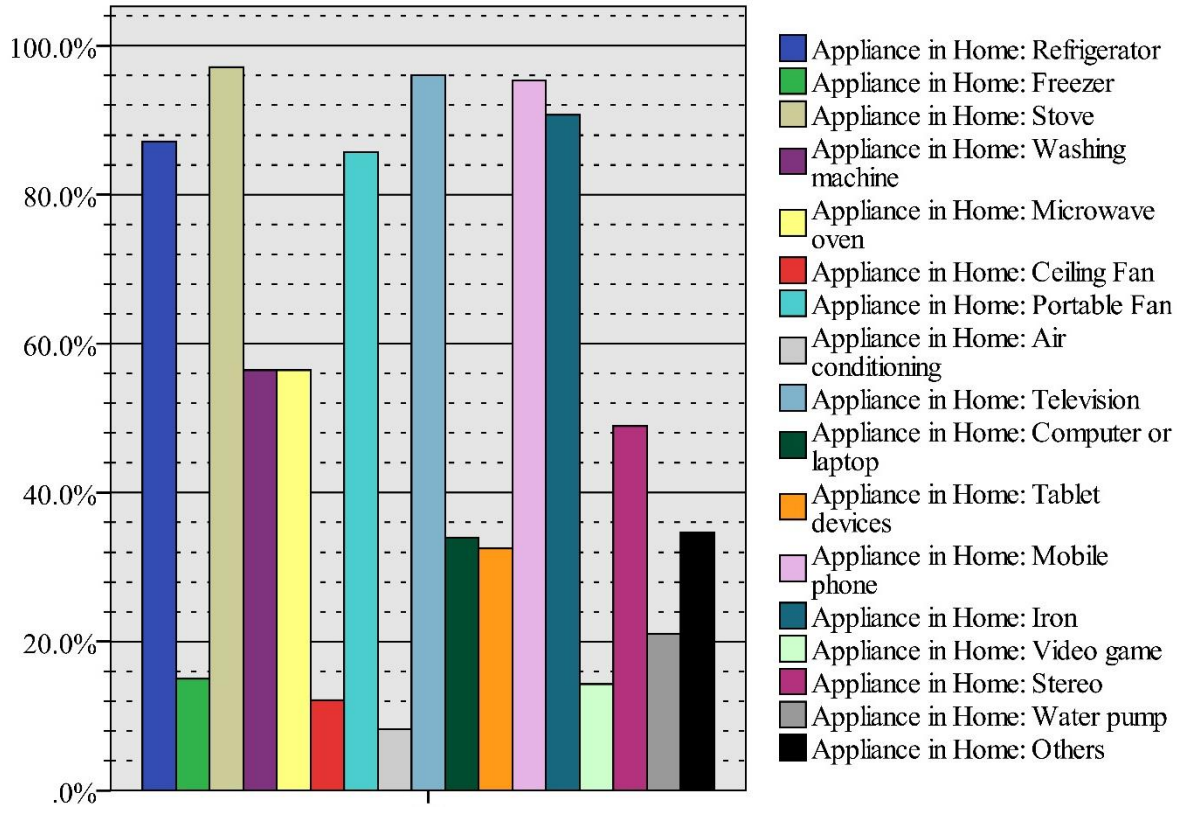

Figure 25 Appliances and Equipment Present in the Home

The group of most popular appliances appear to capture those that seem essential to the functioning of the households and includes a combination of appliances that are related to food preparation and storage, communication and entertainment in addition to appliances that might be essential to keeping cool and preparing clothing (iron) before wearing them. Important appliances are found in each of the groupings with respect to popularity. However, the differences in popularity might evidence differences in socio-economic status. For example, whereas a washing machine is important, it might be more affordable to household that are more in the middle and upper classes in society.

Table 4 Average Number of Appliances in the Home

Appliance in the Home	n	Minimum	Maximum	Mean	SD
Refrigerator	339	0	2	0.92	0.43
Freezer	339	0	4	0.20	0.49
Stove	339	0	4	1.08	0.41
Washing machine	339	0	2	0.56	0.51
Microwave oven	339	0	2	0.58	0.53
Ceiling Fan	339	0	4	0.17	0.56
Portable Fan	339	0	6	1.64	1.19
Air-conditioning unit	339	0	5	0.12	0.48
Television	339	0	6	1.32	0.79
Computer or laptop	339	0	7	0.49	0.81
Tablet devices	339	0	3	0.42	0.70
Mobile phone	339	0	10	2.96	1.85
Iron	339	0	10	1.05	0.76
Video game	339	0	3	0.15	0.41
Stereo	339	0	3	0.52	0.57
Water pump	339	0	1	0.21	0.41
Others	280	0	4	0.46	0.76

The relatively low popularity of computers or laptops and tablet devices is interesting. Such devices might be owned by the more highly educated who see them as essential to their work. In this regard, it was discussed earlier that the level of education in the households appear to be relatively low and dominated mainly by secondary education. It may also be that the popularity of the devices is related to their usefulness in a context were Internet connectivity proves to be a bit challenging. In the process of conducting the survey, the team encountered many challenges with internet connectivity, especially when attempting to use mobile data. A final observation on this matter is that many of the households indicated that their monthly income is below G$100,000. Perhaps it is also the financial requirements that limit access to laptops and tablet devices.

At the lower end of popularity, appliances that might be viewed as luxuries appear. This includes air-conditioning units, ceiling fans, freezers and water pumps. It may be that the cost of these equipment results in only few households being able to afford them.

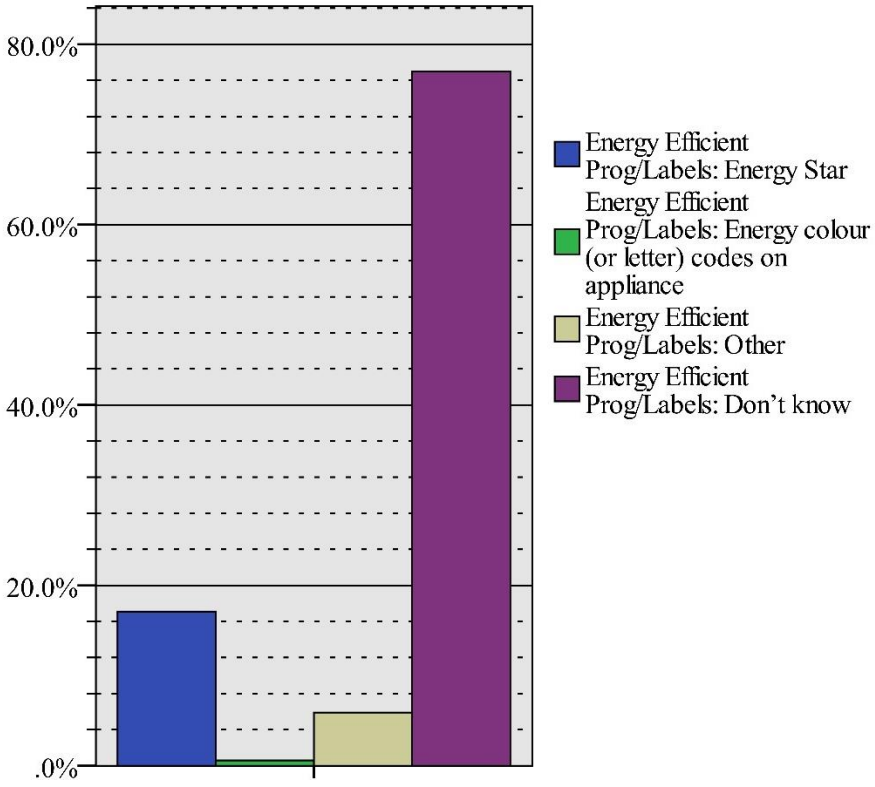

Figure 26 Knowledge of Energy Efficiency Labels and Programmes

Notwithstanding that many households may not own various appliances, the average number of the various appliances per household was calculated and presented in Table 4.

Apart from stove, portable fan, television, mobile phone and iron, the average number of devices per household is less than one (1). That the averages for stove, portable fan, television mobile phone and iron are greater than one (1) suggest that several such items are owned per household where they exist.

With respect to appliances, it was also of interest to know whether the households are aware of energy efficiency and in particular of programmes or labels that indicate that appliances are energy efficient. Approximately 77% of the respondents indicated spontaneously that they are unaware of any energy efficiency labels or programmes (Figure 26). Though this might be more representative of the respondent and not of the households in general, the extent of lack of awareness is too great to ignore. It is likely that the households themselves are unaware of such labels and programmes and have not talked about them and ultimately do not seek out energy efficient appliances whenever the make purchases. Only approximately 17% of the respondents were able to spontaneously identify the Energy Star as indicative of energy efficiency and less than 1% knew of the colour coded labels that appear on appliances. Another perspective on this matter is to consider the extent to which the stores stock appliances with the energy efficiency labels. If they don't, this might be contributing to the low awareness.

Energy Efficiency Attitudes and Practices

To find out about their attitudes, beliefs and practices in relation to energy consumption and how it impacts on the environment, the respondents were asked several questions in the survey and they were required to provide their responses as ratings on various rating scales. Attempts to arrive at factors based on the responses to the items generally failed. The factors were either difficult to interpret given the items that loaded on them or had low validity overall when subjected to confirmatory factor analysis. Furthermore, even the Cronbach alpha coefficient for the anticipated scales were low (below 0.60 except for one scale). The decision was therefore made to analyse the items individually but to present them in groupings based on the salient themes. The averages of the items are presented using bar charts but they are also presented in tabular form which allows the standard deviations and the confidence intervals to be inspected.

Conservation Behaviours and Choices

With respect to energy conservation behaviour, five items were presented and the responses were scored on a 4-point scale (*1 – Never, 2 – Sometimes, 3 – Often, 4 – Always*). The averages are of the items are summarised in Figure 27 and in Table 5. An important point to note is that the third item (*How often do you leave the air-conditioning on when no one is expected to use the room?)* in the group was presented to only the individuals whose houses have air-conditioning units installed. The other items were presented to all the respondents.

As it relates to unplugging appliance and turning off lights when they are not in use, the average scores are between the scale points 3 and 4 which is interpreted as between often and always (Figure 27). This is corroborated by the confidence intervals for the mean of the responses (Table 5). It therefore appears that the households are aware that appliances continue use energy even when they are turned off and are taking appropriate measures to avoid this. The households also appear to conserve on electricity by turning off the lights when they are not being used. A potential problem with these kinds of questions is that people might attempt to create a better impression of themselves than what exists in reality. That notwithstanding, the trend through the responses is strong.

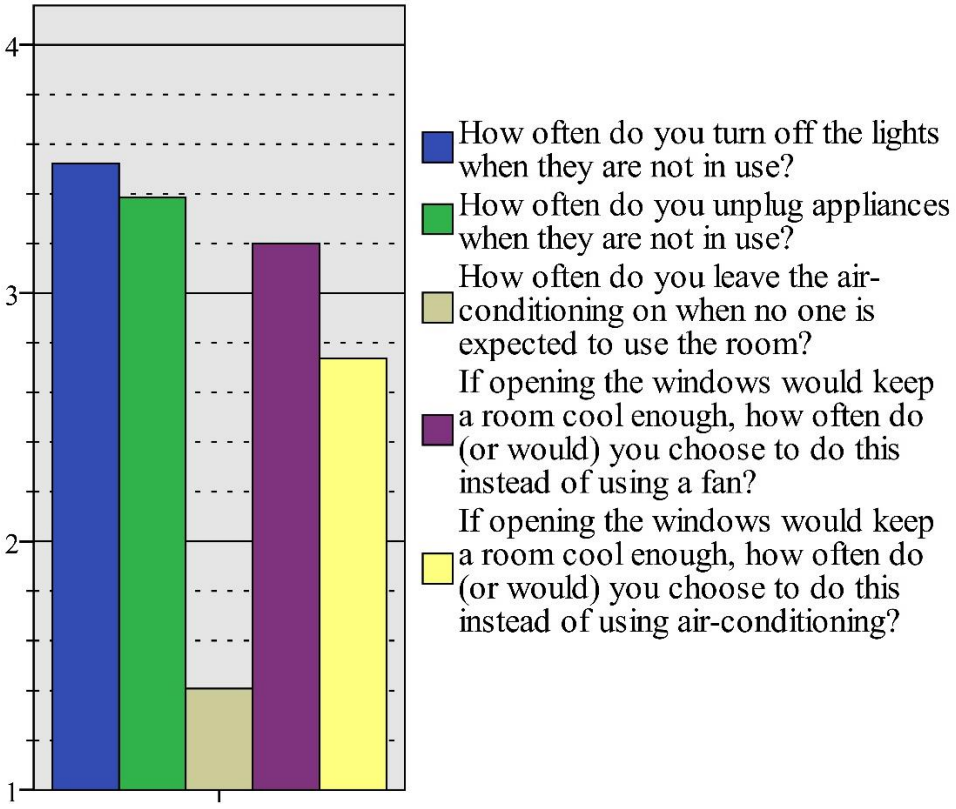

Figure 27 Energy Conservation Behaviours and Preferences

Table 5 Energy Conservation Behaviours and Preferences

	n	Mean	SD	95% CI	
				Lower	Upper
How often do you turn off the lights when they are not in use?	339	3.52	0.74	3.44	3.60
How often do you unplug appliances when they are not in use?	339	3.39	0.86	3.30	3.48
How often do you leave the air-conditioning on when no one is expected to use the room?	27	1.41	1.01	1.01	1.81
If opening the windows would keep a room cool enough, how often do (or would) you choose to do this instead of using a fan?	339	3.20	1.04	3.09	3.31
If opening the windows would keep a room cool enough, how often do (or would) you choose to do this instead of using air-conditioning?	339	2.74	1.25	2.61	2.87

Scale: 1 – Never, 2 – Sometimes, 3 – Often, 4 – Always

The third item in the group addresses the issue of leaving air-conditioning units on when the room is not expected to be used. Those who have such units indicated that they do this somewhere between never (1) and sometimes (2). Leaving the air-conditioning units on when the room is not expected to be used does not appear to be a very common behaviour among those who have such units at home.

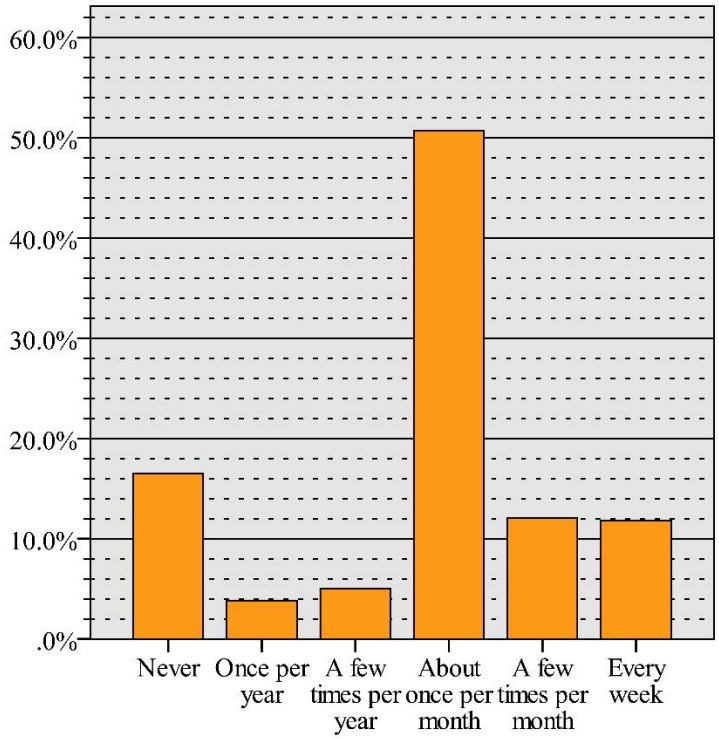

Figure 28 Tracking Energy Consumption by Checking Meter

The fourth and fifth items in this grouping focus on preference for keeping cool using natural air circulation versus artificial means; specifically, fan and air-conditioning respectively. The questions were asked in such a way that they were applicable to everyone including those who might not have the particular appliances at home. The averages for these items are above 3 (often) for choosing natural circulation to using a fan and between 2 (sometimes) and 3 (often) for choosing natural circulation to using air-conditioning (Figure 27) and these observations are supported by the confidence intervals for the respective means (Table 5). Whereas natural circulation is likely to be chosen over using a fan when natural circulation would do the job, it appears that air-conditioning will be chosen over natural circulation in the same circumstances.

This preference for air-conditioning suggests that the choice made when a fan is involved is not necessarily due to the preference for natural circulation in general. It might be that the fan is not seen as being very effective at helping to keep cool but air-conditioning is.

In addition to the foregoing items, the residents were asked how often they track energy consumption in the household by checking their energy meters. The most popular response was selected by approximately 50% of the individuals and it indicates that tracking is done once per month (Figure 28). This coincides with the expected frequency with which the Guyana Power and Light company would provide bills for electricity consumption. In addition to this, approximately 24% of the respondents indicated that they check more often (a few times per month and once per week). Together therefore, approximately 64% of the households appear to check their energy consumption at least once per month. However, many (~16%) still have never tracked their consumption (Figure 28) and might therefore not be particularly interested in conserving energy.

Energy Conservation and Economic Considerations

Economic Motivation for Energy Conservation

To provide some understanding of the extent to which energy conservation is motivated by economic considerations, the respondents were presented with five questions. These items were scored on 5-point fully labelled, agree/disagree rating scales (*1 – Strongly disagree, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Strongly agree*) and the results are summarised[1] in Figure 29 and Table 6.

A first observation from Figure 29 is that the mean of each item is above the scale midpoint which indicates some general tendency to agree with the item. Furthermore, with the exception of the first item (*I would conserve energy only if I could not afford to pay for it*) for which the mean is lower, the respective confidence intervals for the items are all above the scale midpoint (Table 6) which indicates that the initial observation of a tendency to agree is supported. The first item is reverse worded in comparison to the others and therefore the lower mean is supporting the

[1] As noted earlier, the items did not combine well to form factors and are hence presented separately.

same tendency as that indicated by the other items. Overall, economic considerations appear important to decisions about conserving energy.

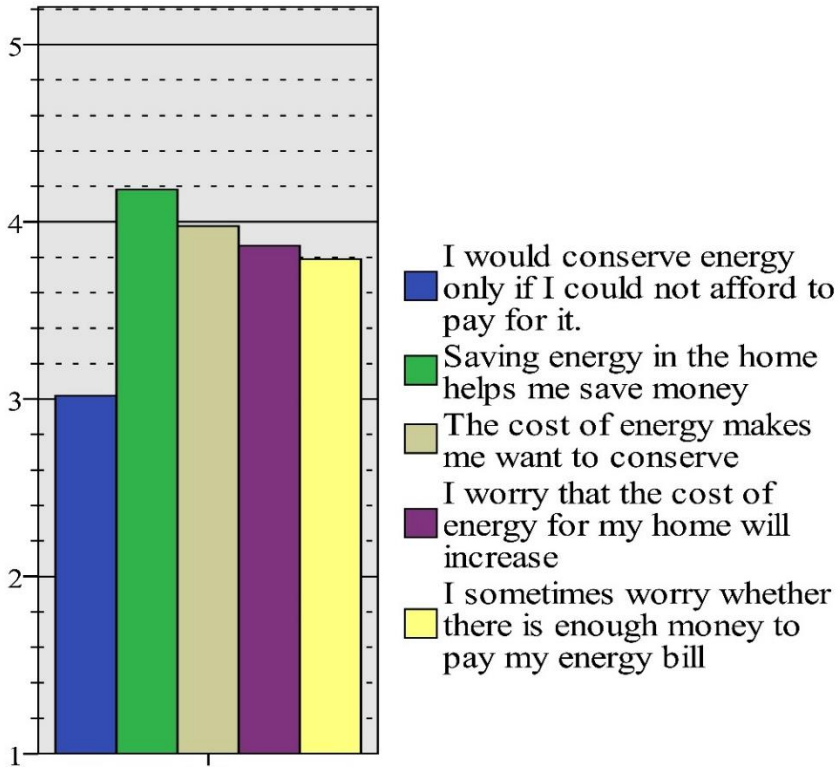

Figure 29 Energy Conservation Motivated by Economic Considerations

Table 6 Energy Conservation Motivated by Economic Considerations

	n	Mean	SD	95% Confidence	
				Lower	Upper
I would conserve energy only if I could not afford to pay for it.	339	3.02	1.06	2.91	3.13
Saving energy in the home helps me save money	339	4.18	0.56	4.12	4.24
The cost of energy makes me want to conserve	339	3.98	0.54	3.92	4.04
I worry that the cost of energy for my home will increase	339	3.86	0.75	3.78	3.94
I sometimes worry whether there is enough money to pay my energy bill	339	3.79	0.79	3.71	3.87

Scale: 1 – Strongly disagree, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Strongly agree

It appears therefore, that promoting energy conservation in the population should address economic issues in addition to addressing intrinsic value of conservation. Addressing the economic issues might capture interest following which the intrinsic values might be addressed more effectively.

Environmental Considerations for Energy Conservation

To what extent do people see intrinsic value in conserving energy and in conservation in general? This question is addressed in this subsection.

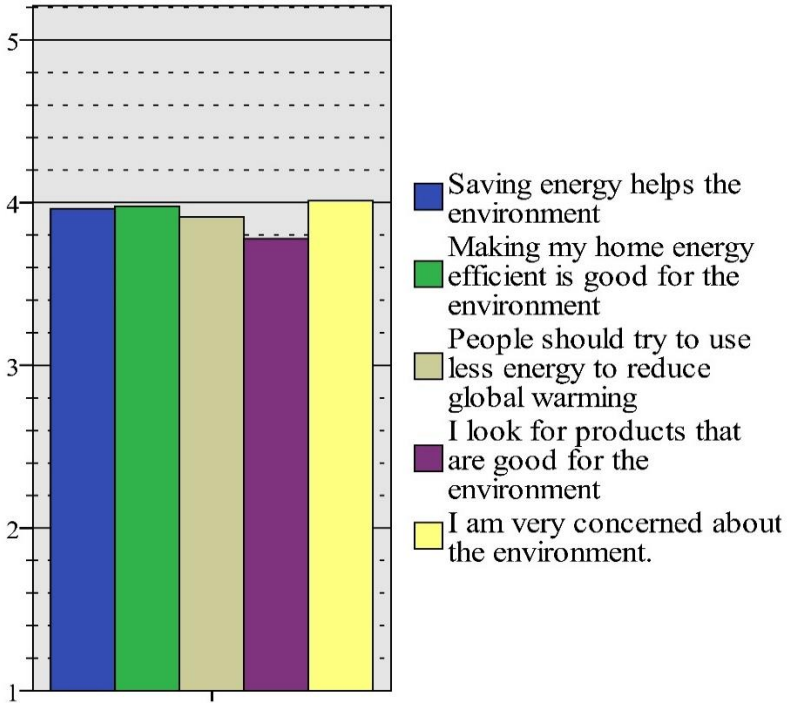

Figure 30 Attitude to Energy Conservation and Conservation in General

Table 7 Attitude to Energy Conservation and Conservation in General

	n	Mean	SD	95% Confidence	
				Lower	Upper
Saving energy helps the environment	339	3.96	0.53	3.90	4.02
Making my home energy efficient is good for the environment	339	3.98	0.43	3.93	4.03
People should try to use less energy to reduce global warming	339	3.91	0.64	3.84	3.98

I look for products that are good for the environment	339	3.78	0.62	3.71	3.85
I am very concerned about the environment.	339	4.01	0.47	3.96	4.06

Scale: 1 – Strongly disagree, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Strongly agree

As can be observed in Figure 30, the average ratings for the items about conserving for the sake of the environment are consistent and quite close to the scale value 4 (Agree). Furthermore, the confidence intervals for the means of three of the five capture the scale value 4 (Agree) and the intervals for the remaining two items lie between 3 (neither agree nor disagree) and 4 (agree) (Table 7). There is therefore a general tendency to agree with the items but agreement is stronger for some than others. The respondents clearly agree on average that saving energy helps the environment, that making their homes energy efficient is good for the environment and that they are concerned about the environment and they agree to lesser extent on average that people should try to use less energy to reduce global warming and that they look for products that are good for the environment. The difference here might be between what they understand conceptually and what they are willing to put into action. The items that relate to explicit action appear to have been endorsed less strongly on average than those that focus on conceptual issues.

General Attitudes to Energy Conservation

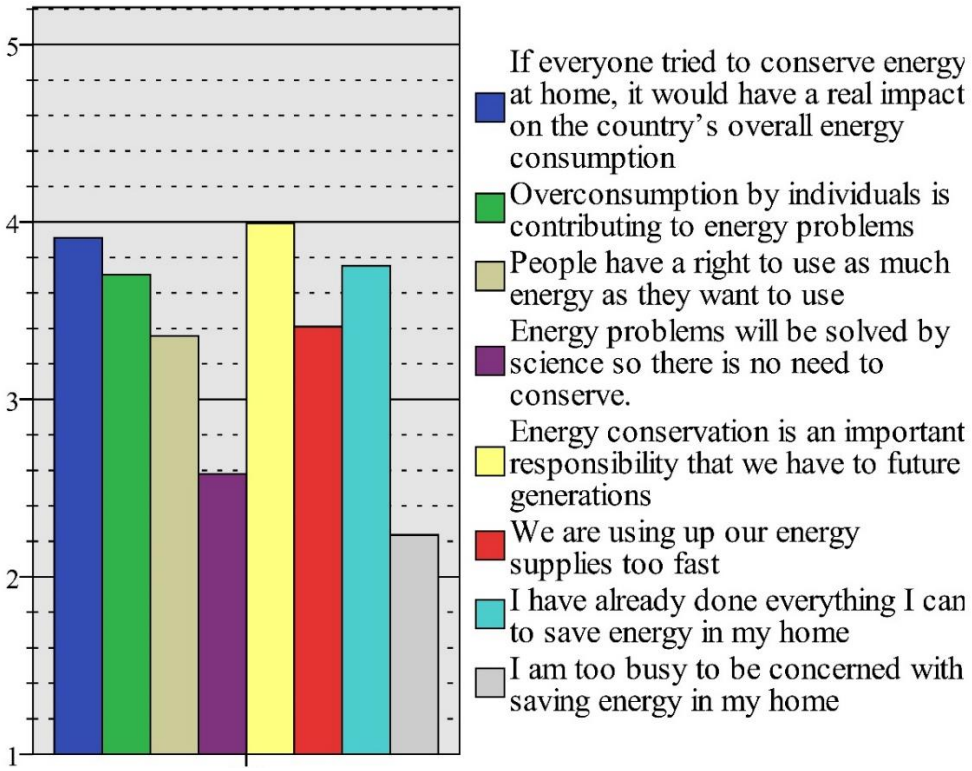

Figure 31 Beliefs about Energy Conservation

The group of items capturing general attitudes towards energy conservation consists of eight statements that were all scored on 5-point, fully labelled, agree/disagree rating scales. The first six items focus on people in general and their interaction with the issues involved and may therefore be regarded as more outward looking (with the respondent included). The remaining two statements focus more narrowly on the individual responding to the items (see item wordings in Figure 31).

It can be immediately discerned that the means of all but two of the items are between 3 (neither agree nor disagree) and 4 (agree). The means of two items fall below the scale value 3 and the respective confidence intervals indicate that they are indeed between 2 (disagree) and 3 (neither agree nor disagree). The two items for which there is more disagreement are "*energy problems will be solved by science so there is no need to conserve*" and "*I am too busy to be concerned with saving energy in my home*". That there is more disagreement than agreement with the content of these two items is an indication of a more positive attitude towards energy conservation.

Table 8 Beliefs about Energy Conservation

	n	Mean	SD	95% Confidence	
				Lower	Upper
If everyone tried to conserve energy at home, it would have a real impact on the country's overall energy consumption	339	3.91	0.62	3.84	3.98
Overconsumption by individuals is contributing to energy problems	339	3.70	0.78	3.62	3.78
People have a right to use as much energy as they want to use	339	3.36	0.99	3.25	3.47
Energy problems will be solved by science so there is no need to conserve.	339	2.58	0.94	2.48	2.68
Energy conservation is an important responsibility that we have to future generations	339	3.99	0.49	3.94	4.04
We are using up our energy supplies too fast	339	3.41	0.87	3.32	3.50
I have already done everything I can to save energy in my home	339	3.75	0.81	3.66	3.84
I am too busy to be concerned with saving energy in my home	339	2.24	0.88	2.15	2.33

Scale: 1 – Strongly disagree, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Strongly agree

Against, this backdrop, it however, interesting to observe that the relatively high mean for the item "*I have already done everything I can to save energy in my home*" (Figure 31). The confidence interval for this mean places it between 3 and 4 (Table 8). This latter result suggests that there is the prevailing belief that the households have already done whatever they could have done to conserve energy. This could, on the one hand indicate that high standards of energy efficient are practiced, but it might, on the other hand, evidence more impression management or even a lack of awareness of what can be done to become more energy efficient. New information on how households can become more energy efficient might therefore serve the residents well.

The residents also tend to disagree, though mildly, that energy problems will be solved by science thus negating the need for conservation (Table 8). This is some indication that they believe that human intervention and intervention by everyone is necessary. This result is corroborated by the relatively large means for the remaining items in this grouping. In particular, the means of items

1, 2, 3 and 6 are all between 3 (neither agree nor disagree) and 4 (agree) while the confidence interval for the mean of item 5 (*"Energy conservation is an important responsibility that we have to future generations"*) includes the scale value 4 (agree) (Table 8). Overall, positive attitudes towards energy conservation are indicated by the results for this group of items.

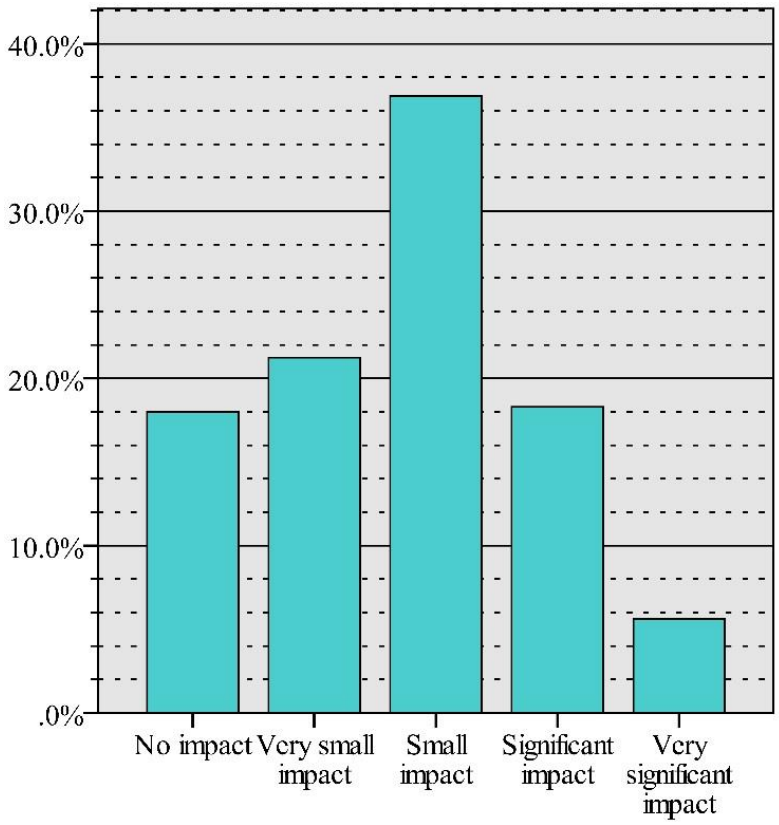

Figure 32 Belief that Own Action has Impact on The Environment

A final item presented to the respondents in relation to conservation issues, was that of the extent to which they believe that their actions have an impact on global warming. If individuals believe their actions have no impact, they might not be inclined to become engaged in actions directed at addressing this phenomenon and might believe that others (e.g. large industries) have to address it. Approximately 37% of the individuals believe that their actions have a small impact whereas approximately 18% believe that the impact is significant and approximately 5.5% believe that their impact is very significant (Figure 32). In addition to this, approximately 21% of them believe that they have a very small impact. A large majority of the individuals therefore believe

their actions can have an impact on global warming. This is promising since it indicates that people in the municipality might be inclined to becoming engaged in activities that are designed to reduce their impact on global warming.

Appendix

Survey Questionnaires