Report On

Compliance monitoring and Data collection

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By Renewable Energy, Energy Efficiency & Climate Change Directorate

Energy Efficiency Project Team

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1.0 Introduction

Standards and Labelling for appliances was introduced in Ghana in 2011 to enable customers to make informed choices when buying regulated appliances. Also, when customers are well informed, Standards and Labelling stimulates competition to provide patrons with the most efficient appliances. Furthermore, labelling of appliances supports enforcement of the standards by allowing regulators to spot anomalies if the regulated appliances are un-labelled or mis-labelled.

In 2012 the refrigerator Rebate project was implemented to promote the standards and labelling. The scheme encouraged consumers to exchange their old refrigerating appliances for new and efficient ones, at a discounted price. This aided in the transformation of the appliance market from inefficient one to a more energy efficient one. The refrigerator rebate scheme has also contributed significantly to promoting refrigerating appliances with the energy efficiency labels.

The propensity for retailers to buy and sell appliances without test reports and to mis-label or in our local circumstance not label the regulated appliances therefore requires persistent market surveillance to check compliance to the standards. This market surveillance and compliance monitoring has been part of main activities of the Energy Commission which yielded some progress in the transformation of the appliance market. Over the years between 2015-2016, reports from market surveillance and compliance monitoring indicated that inefficient appliances were still making inroads onto the Ghanaian market hence short changing consumers at various distribution and retail shops.

As part of the strategy to ensure that retailers and consumers detect and acquire only appliances that meet the minimum efficiency standard, the Energy Commission established web-based database with related application (APP) for the regulated appliances. This application (APP) enables consumers to verify whether the appliances meet the minimum standard set by the Commission by entering the model number of the appliances into the search pane and compare specifications of the appliances on the APP with the ones displayed on the labels before acquisition.

The APP also equips users to find the nearest distributing and retail outlets via google map or phone contact, know compliance performance of each distribution or retail shop, search for specific appliances and energy efficiency and conservation tips for the regulated appliances.

In 2019, the objective was to update the appliances database with related application (APP) to include lighting appliances, compliances performance of existing and new distributing and retail shops and energy efficiency and conservation tips for lighting appliances. It was also imperative to gauge the progress made in terms of the transformation of the appliance market especially after the implementation of eMDA portal at the port.

1.1 Objective

The overall objective of this exercise was to establish the baseline market data for lighting appliances which will guide creation and populating of the database for lighting appliances, update of existing database on air conditioners and refrigerating appliances with related application (APP).

The project team also used the opportunity to conduct additional activities planned for the year under this project including;

- Capture types of lighting appliances currently on major appliances markets (Accra, Kumasi and Takoradi)
- Collection of data on new appliance retail shops and make them available in the database and related app,
- Compute compliance level of each appliance shop for subsequent update in the APP.
- Introduce and explain the concept of the updated appliance database with related app to distribution and retails shops owners to assist then acquire approved models from importers.
- Educate shop attendants and managers in distribution and retail outlets on standards and labelling if necessary.
- Distribution of energy guide and "use electricity wisely" flyers.

1.2 Methodology

The Country was divided into four zones and each zone was covered in each quarter.

The team visited every distribution and retail outlet in the various regions across the Country and shops owners were assisted to download the app from google play store and educated in the usage of the updated app to assist them verify appliances before acquisition from importers.

The specific indicators that were examined during the exercise are as follows:

1.3 Inventory

The team took inventory of all air conditioners and refrigerating appliance being sold at the shops by questionnaire administration and checked availability of test reports and labelling status of each unique model available on display. Information on all unique lighting appliances in selected shops were also captured.

The inventory aided in evaluating the compliance level of each appliance available on the market and inventory of all new appliance shops, (name, address, contact number, location and characteristics) will also be captured.

1.4 Expected Output

Reports on the whole exercise covering first to fourth quarter, the appliances database with related application (APP) updated and available for download.

2.0 Summary of Key Findings

- The data collection exercise covered all 10 regions and involved 303 distributing and retail outlets in 91 cities/towns.

- Compliance level of Test Report availability of all refrigerating appliances identified on the market is 99.62 %.

- Test Report availability compliance level for all models of Air conditioners identified is 99.37%

- Refrigerating appliances labelling compliance level in all retail outlets or shops is 97.34% while that for air conditioners is 97.80%

- A total of 6198 refrigerating appliances and 541 air conditioners were surveyed in all the distribution and retail outlets across the Country.

- A total of 110 shop attendants and managers were trained in standards and labelling.

- A total of 119 "use electricity wisely" and "Refrigerating Appliance Standards and Labelling" flyers were distributed in all the distribution and retail shops.

- 17 shop managers and attendants were assisted in downloading the Certified Refrigerating APP.

- 20 non-compliant refrigerating appliances comprising of 10 unique brands with 18 unique models identified.

- 8 non-compliant air conditioners comprising of 7 brands and 7 unique models identified.

2.1 Locations of Shops Visited

Figure 1.0 shows a map depicting the geographical location of each of the retail outlets by plotting the GPS coordinate of the outlets or shops on google map. It can be deduced from the map that sales of refrigerating appliances and air conditioners are concentrated mostly in the southern part of the country. Greater Accra and Ashanti Regions are leading regions in the sale of refrigerators and air conditioners. Appliance shops were mostly located in regional capitals as well as border towns such as Paga, Elubo, Aflao and Bawku.

Figure 2.1.1 Geographical Location of Appliance Retail Outlets or Shops

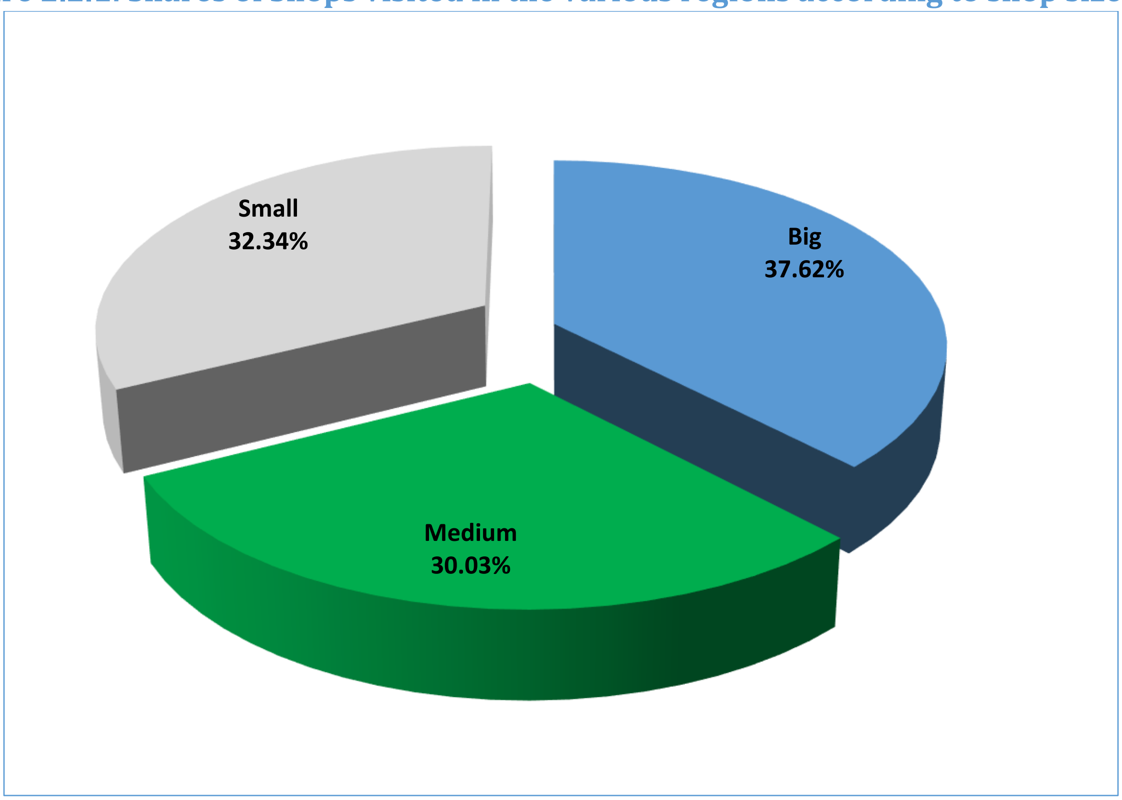
2.2 Characteristics of Shops Visited

Classifications of the appliance shops and retail outlets were done according to size and availability of number of appliances on display in the showroom. Shops with total appliances below 10 is classified as small, between 10 and 20 is classified as medium and shops with appliances above 20 were classified as big shops. 37.62% of the appliances shops surveyed were big category, 30.03% were medium and the remaining 32.34 were small shops.

25 new distributing and retail shops were identified and their demographic data captured and updated in the database. These new shops were mainly located in the Ashanti Region.

Figure 2.2.1 show share of the appliances shops in terms of number of appliances available in showrooms.

Figure 2.2.1: Shares of Shops visited in the various regions according to shop size



3.0 Details of Surveyed Appliances on Sale

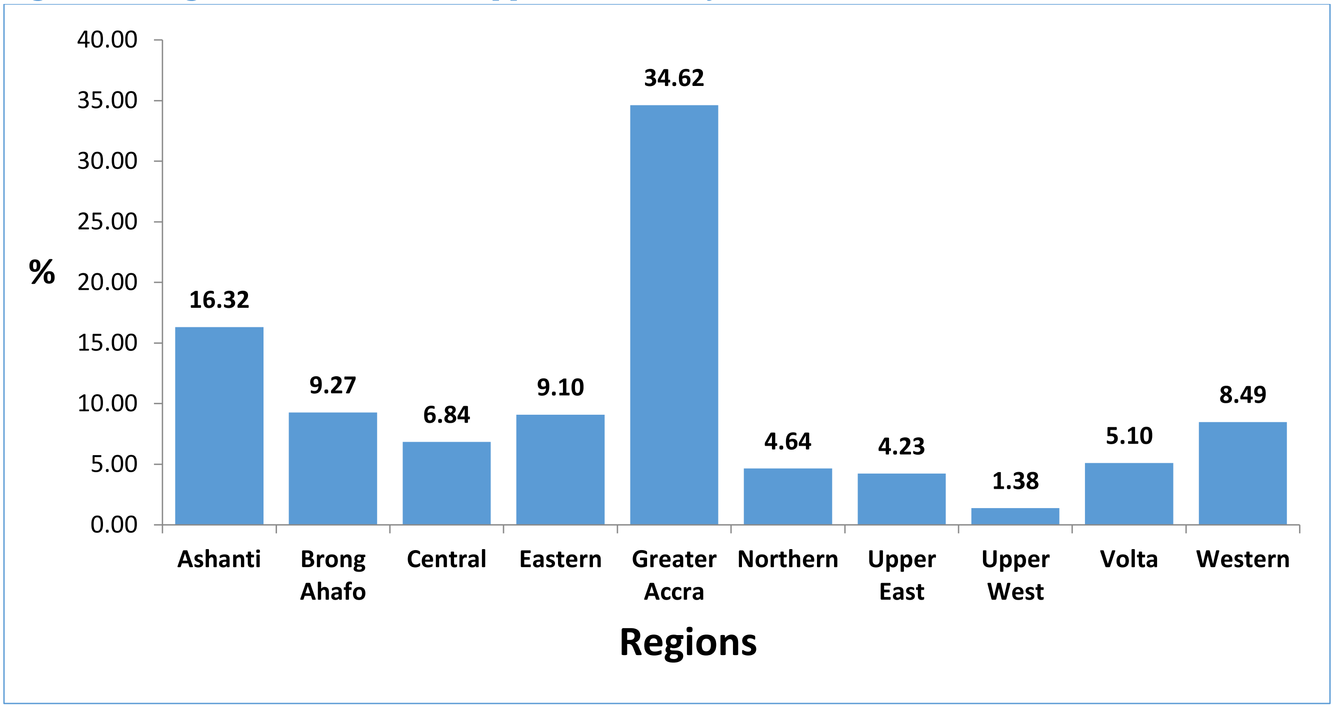
A total of 6739 appliances were surveyed comprising 6198 refrigerating appliances and 541 air conditioners out of which 34.62% were from Greater Accra Region making it the predominant appliance market. Ashanti Region recorded 16.32% making it the 2nd dominant appliance market in country.

Table 3.1 and figure 3.1 show total number of appliances surveyed in various shops and their respective regional shares.

Table 3.1 Regional breakdown of Appliances Surveyed

Region	Refrigerators		Air Conditioners		Total Appliances	Share
	Number of Shops	Total Refrigerators	Number of Shops	Total Air-Conditioners		
Ashanti	40	1022	23	78	1100	16.32
Brong Ahafo	45	609	7	16	625	9.27
Central	17	420	10	41	461	6.84
Eastern	40	597	4	16	613	9.10
Greater Accra	70	2101	47	232	2333	34.62
Northern	16	273	11	40	313	4.64
Upper East	14	272	6	13	285	4.23
Upper West	6	86	2	7	93	1.38
Volta	25	309	7	35	344	5.10
Western	30	509	20	63	572	8.49
Total	**303**	**6198**	**137**	**541**	**6739**	**100**

Figure 3.1 Regional Share of Total Appliances Surveyed.

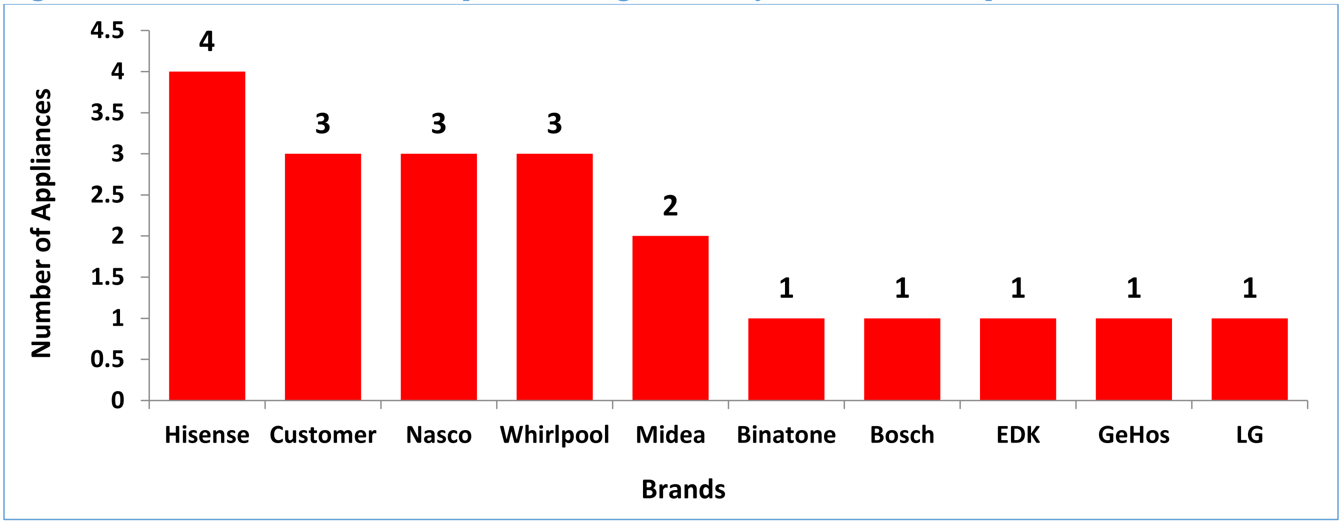


4.0 Compliance Level Analysis

4.1 Test Report Compliance Level for Refrigerating Appliances

Out of the 6198 total refrigerating appliances surveyed, 6177 constituting 99.67% had test reports and 20 constituting 0.33% had no test reports hence cannot be verified as to whether they meet minimum standards required of refrigerating appliances on the Ghanaian market. These 20 non-compliant refrigerating appliances comprise of 10 unique brands with 18 unique models. Figure 4.1.1 show details of test report non-compliance by brand and unique models.

Figure 4.1.1 Number of Non- Compliant Refrigerators by Brand and Unique Models

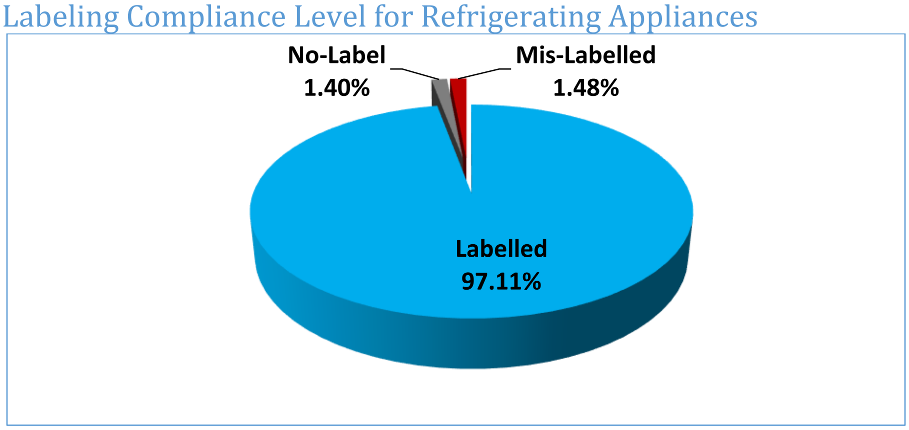


4.2 Labelling Compliance Level for Refrigerating Appliance Models

Labelling compliance play a key role in the appliance market transformation hence critical attention is required to spot abnormalities on the information available on the labels displayed on each appliance.

6019 refrigerating appliances constituting 97.11% out of the 6198 were properly labelled, 87 constituting 1.4% had no labels at all and 92 constituting 1.48% were mis-labelled. Figure 4.2.1 show shares of labelling compliance level of the refrigerating appliances.

Figure 4.2.1 Labeling Compliance Level for Refrigerating Appliances

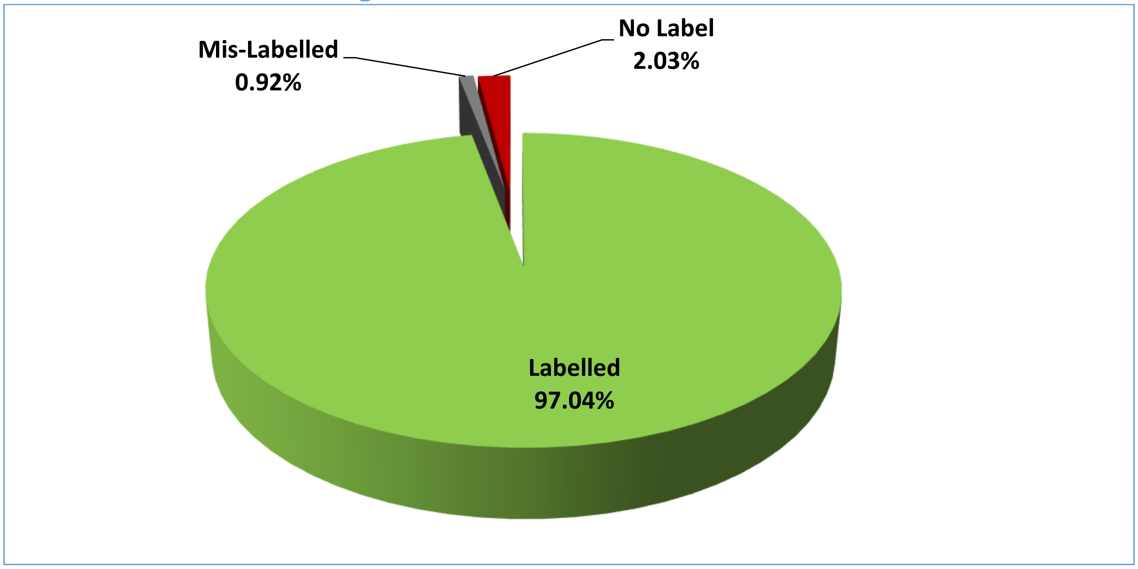


4.3 Test Report and Labelling Compliance Level for Air Conditioners

Out of the 541 total air conditioners surveyed, 533 constituting 98.52% had test reports and 8 constituting 1.48% had no test reports hence cannot be verified as to whether they meet minimum standards required of refrigerating appliances on the Ghanaian market.

With respect to labelling, 525 appliances out of the 541 were properly labelled, 11 constituting 2.03% had no labels at all and 5 constituting 0.92% were mis-labelled. Figure 4.3 show shares of labelling compliance level for air conditioners.

Figure 4.3.1 Shares of Labelling Characteristics of Air Conditioners



4.4 Labelling and Test Report Compliance of Refrigerating Appliances by Retail Shops

Test report compliance level for a retail shop is expressed as the sum of appliances with approved test reports available as a percentage of total appliances displayed in the shop. This measure is to boost customer confidence in patronizing appliances sold by shops with high test report availability, labelling and overall compliance levels.

Labelling compliance level was measured on the basis of labelling status of each refrigerating appliance physically displayed in the shop. The overall appliance shop compliances is determined by finding the average compliance levels with respect to test reports and labelling.

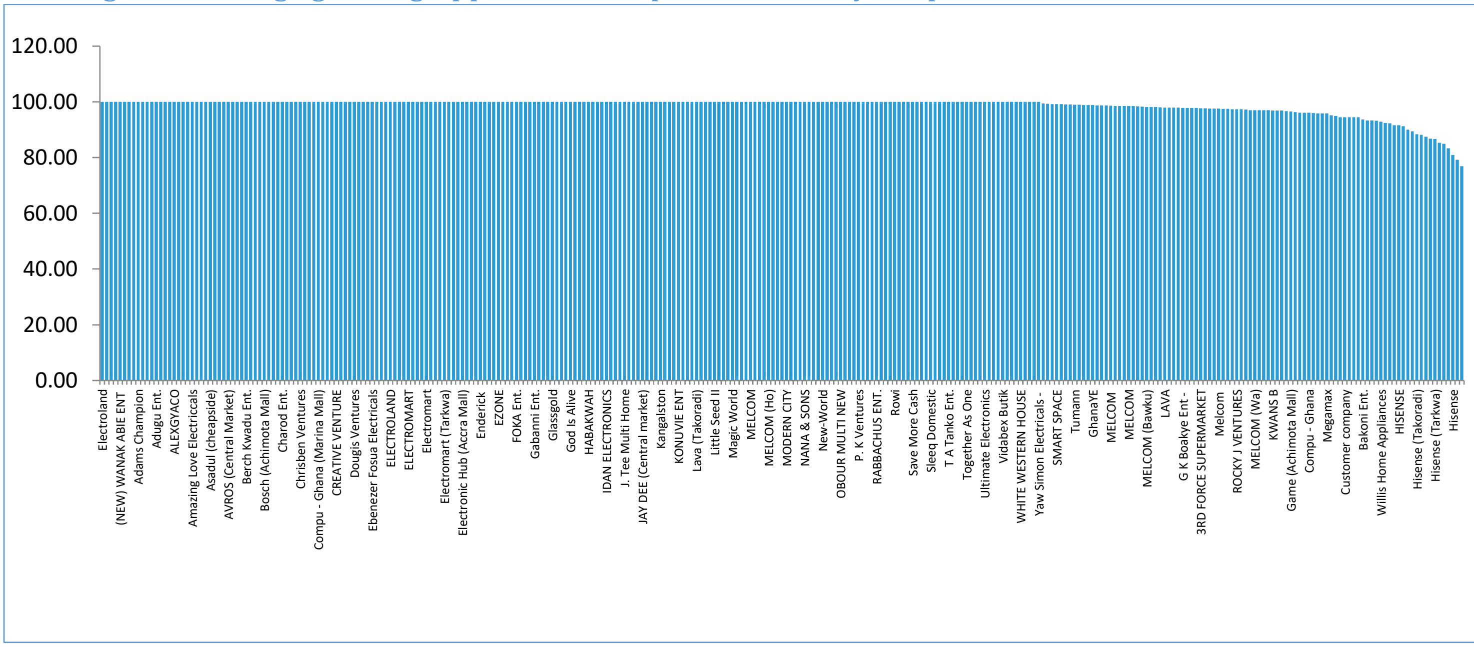
Nationally, as shown in table 4.4, the overall compliance level of a shop is 98.51%. This trend is well represented in all the regions. None of the regions recorded below 95% overall compliance level. The overall performance by shops was impacted by labelling noncompliance levels since test report compliance was significantly high across the regions. Six regions recorded 100% test report compliance and the remaining 4 recorded 99% and above.

The mis-labelled appliances were mostly in terms of difference in the star ratings and annual power rating as compared to that in the test reports available at the Commission. As depicted by figure 4.4.1, no shop dealing in refrigerating appliances recorded below 70% over all compliance.

Table 4.4.1 National and Regional Retail Shops Labelling and Test Report Compliance Levels

Region	Number of Shops	Refrigerators	Average Compliance Level (%)		
			Test Report	labelling	Overall
Ashanti	40	1022	100.00	96.77	98.38
Brong Ahafo	45	609	99.53	98.81	99.17
Central	17	420	100.00	96.45	98.23
Eastern	40	597	100.00	98.29	99.14
Greater Accra	70	2101	99.24	96.84	98.04
Northern	16	273	99.69	97.79	98.74
Upper East	14	272	100.00	95.26	97.63
Upper West	6	86	100.00	99.02	99.51
Volta	25	309	100.00	98.91	99.46
Western	30	509	99.39	95.43	97.41
National	**303**	**6198**	**99.68**	**97.34**	**98.51**

Figure 4.4.1Regrigerating Appliances Compliance Level by Shops



4.5 Test Report and labeling Compliance of Air Conditioners by Retail Shops

High compliance level in retail shops or outlets dealing in the sale of Air Conditioners was recorded in the similar vein as the refrigerating appliances.

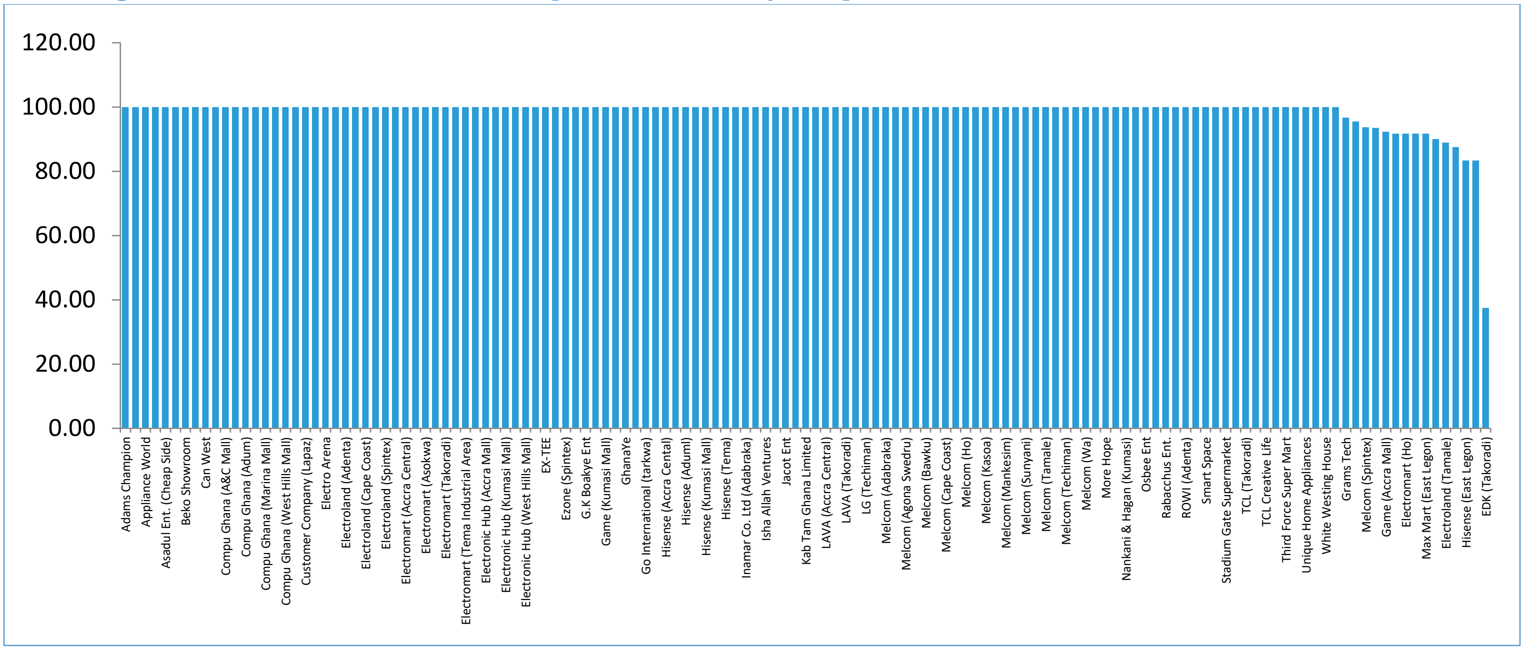
The overall compliance level of a retail shop on a national level is 98.58%. It was quite impressive that about six regions recorded 100% overall compliance and the remaining 4 regions did not record below 94% overall compliance.

As shown in both table 4.5.1 and figure 4.5.1 compliance level of a shop dealing in the sale of air conditioners is above 80% except Enderick Takoradi branch with compliance level of 37.5%.

Table 4.5.1 National and Regional Compliance Levels of Dealers of Air Conditioners

Region	Number of Shops	Air-Conditioners	Average Compliance Level (%)		
			Test Report	labelling	Overall
Ashanti	23	78	100.00	100.00	100.00
Brong Ahafo	7	16	100.00	100.00	100.00
Central	10	41	100.00	100.00	100.00
Eastern	4	16	100.00	100.00	100.00
Greater Accra	47	232	99.39	96.94	98.16
Northern	11	40	97.98	98.48	98.23
Upper East	6	13	100.00	100.00	100.00
Upper West	2	7	100.00	100.00	100.00
Volta	7	35	98.48	97.22	97.85
Western	20	63	98.75	94.00	96.38
National	**137**	**541**	**99.37**	**97.80**	**98.58**

Figure 4.5.1 Air Conditioners Compliance Levels by Shops



5.0 Star Ratings, Refrigerants and Climatic Classes for Refrigerating Appliances

About 37.25% and 28.14% of the approved refrigerating appliances were of 2-Star and 1-Star ratings respectively making them predominant stars rating appliances on the market. 20.54% were rated 4-Star, 13.85% were 3-Star and 0.22% was 5-Star. 84.74% of all refrigerating appliances had ST climatic Class while 15.26% had T climatic class specification.

With respect to refrigerants, three main refrigerants were identified in the refrigerating appliances. These were R600a, R134a and R290 refrigerants. R600a was available in 85.92% of the refrigerating appliances making it the predominant refrigerant on the market. R134a accounted for 13.31% and R290 accounted for 0.76%.

Figures 5.1.1, 5.1.2 and 5.1.3 show the shares of the refrigerating appliances according to star ratings, climatic class and refrigerants respectively..

Figure 5.1.1: Share of Star Ratings of Refrigerating Appliances

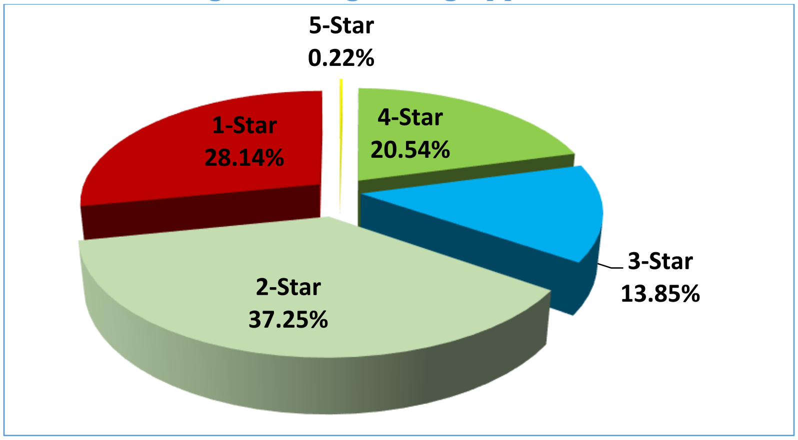


Figure 5.1.2: Share of Climatic Classes of Refrigerating Appliances

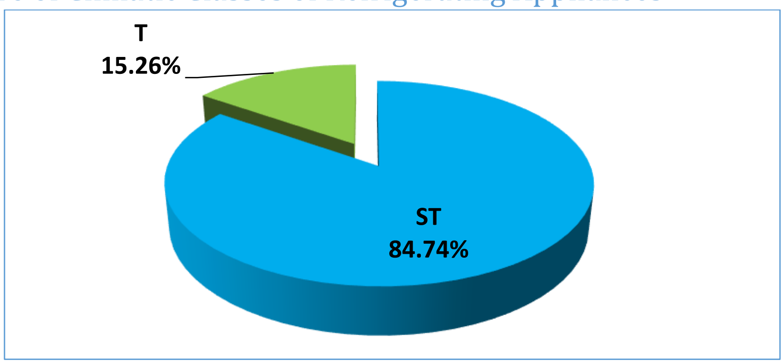
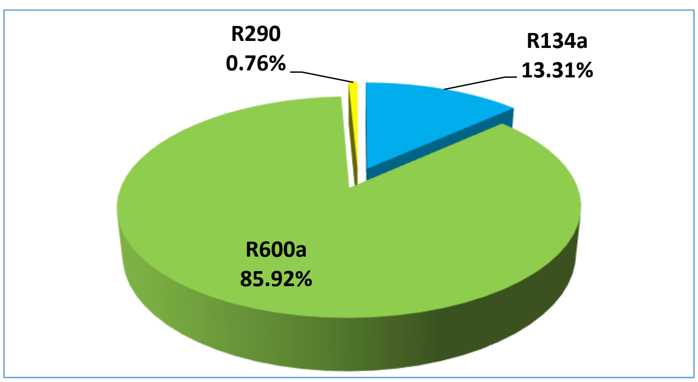


Figure 5.1.3 Share of Refrigerants in Refrigerating Appliances



6.0 Star Ratings and Refrigerants Air Conditioners

There were no 5-Star rated air conditioners identified on the market. 1.74 however were rated 4-Star, 15.50% were 3-star rated, 17.05 were of 2-Star rated category and 65.70% were rated 1-Star. This makes the 1-Star the predominant rated air conditioners available on the Ghanaian appliance market. Figure 4.3.2 show shares of star ratings of air conditioners surveyed on the market. Refrigerants available in Air Conditioners however are either R22 or R410a. R410a accounted for 36.67% while R22 accounted for 63.33% of refrigerants available in Air conditioners. Figures 6.1.1 and 6.1.2 show shares of air conditioners according to star ratings and refrigerants respectively.

Figure 6.1.1: Share of Star Ratings for Air Conditioners

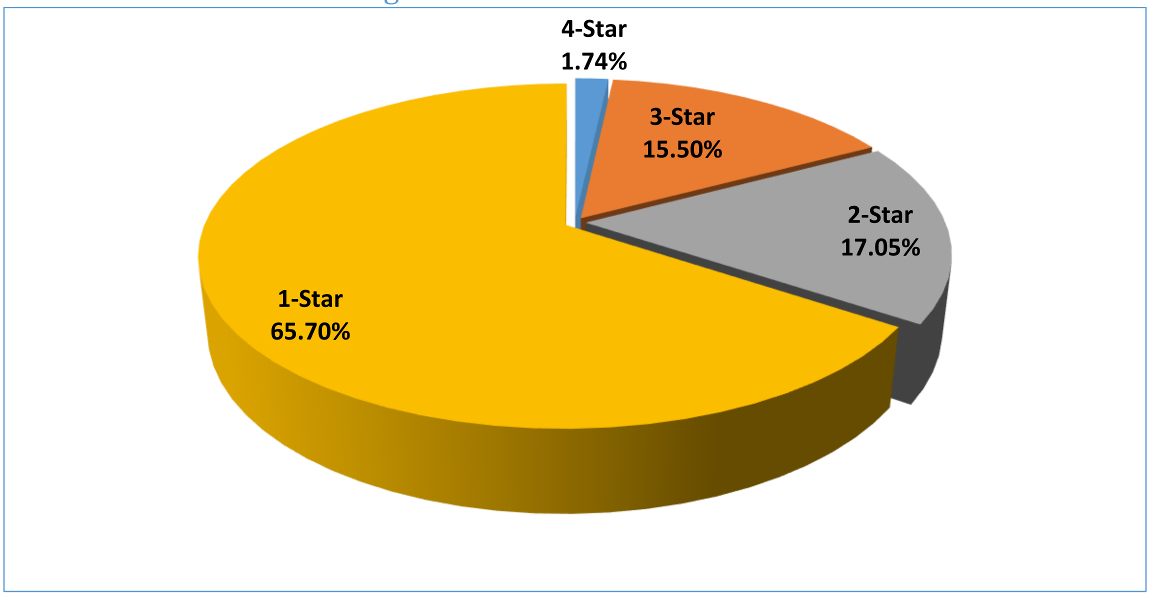
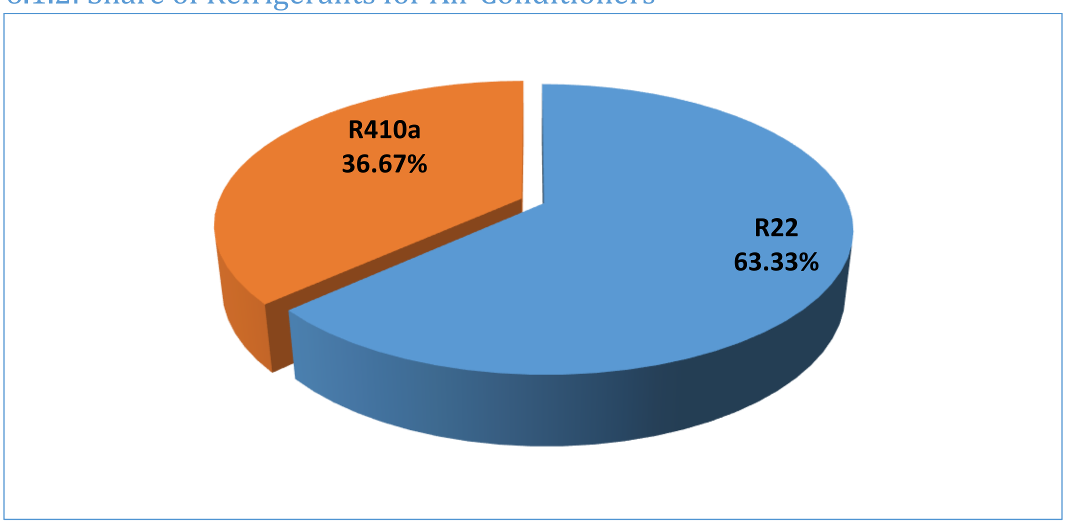


Figure 6.1.2: Share of Refrigerants for Air Conditioners



7.0 Lighting Appliances

As part of the process to include lighting appliances in the appliance database and related application, market data collection exercise on lighting appliances was carried out in selected regional capitals (Accra, Kumasi and Takoradi). This was to aid the project team on the kind of lighting appliances on the market and the kind of attributes required to be included in the lighting database.

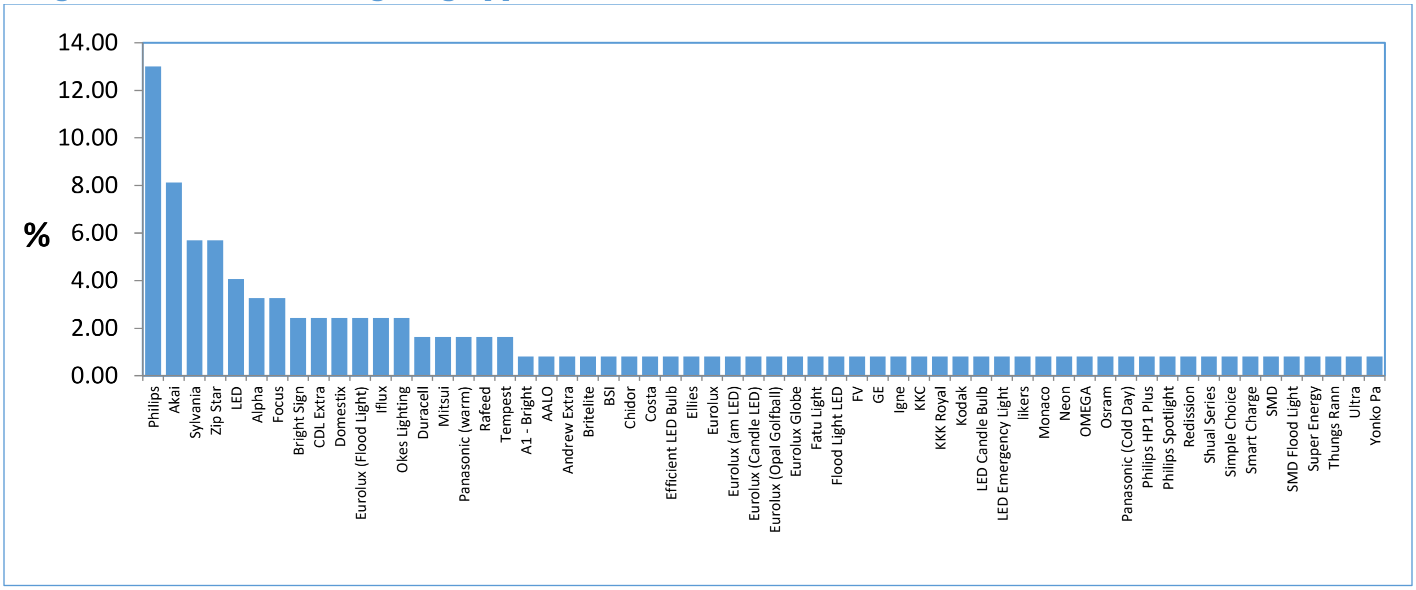
A total of 129 lighting appliances with 123 unique models were surveyed and the attributes identified include brand, type, input power, luminous flux, lamp life, lamp efficacy, rated annual power consumption, country of origin and fitting type (Screw or Hook). About 13.01% of the lighting appliances were "Philips" brand making is the predominant lighting appliances on the market as shown in the figure 7.1.1.

Out of the 129 appliances, 58.33% were LED, 39.17% were CFL and 2.50% were Halogen Bulbs.

In terms of Country of origin, bulbs coming from China accounted for 90.98%, 8.20% from South Africa and 0.82% from Germany.

There were 7 different types of fittings identified with the surveyed lighting appliances. 44.30% were B22 (Hook), 43.04% were E27 (screw), IP65, E14, IP66 and MR-16 recoded 3.8%, 2.53%, 2.53%, 2.53% and 1.27% respectively.

Figure 7.1.1: Brands of Lighting Appliances on the Market



8.0 Refrigerating Appliances and Air Conditioners Market Overview.

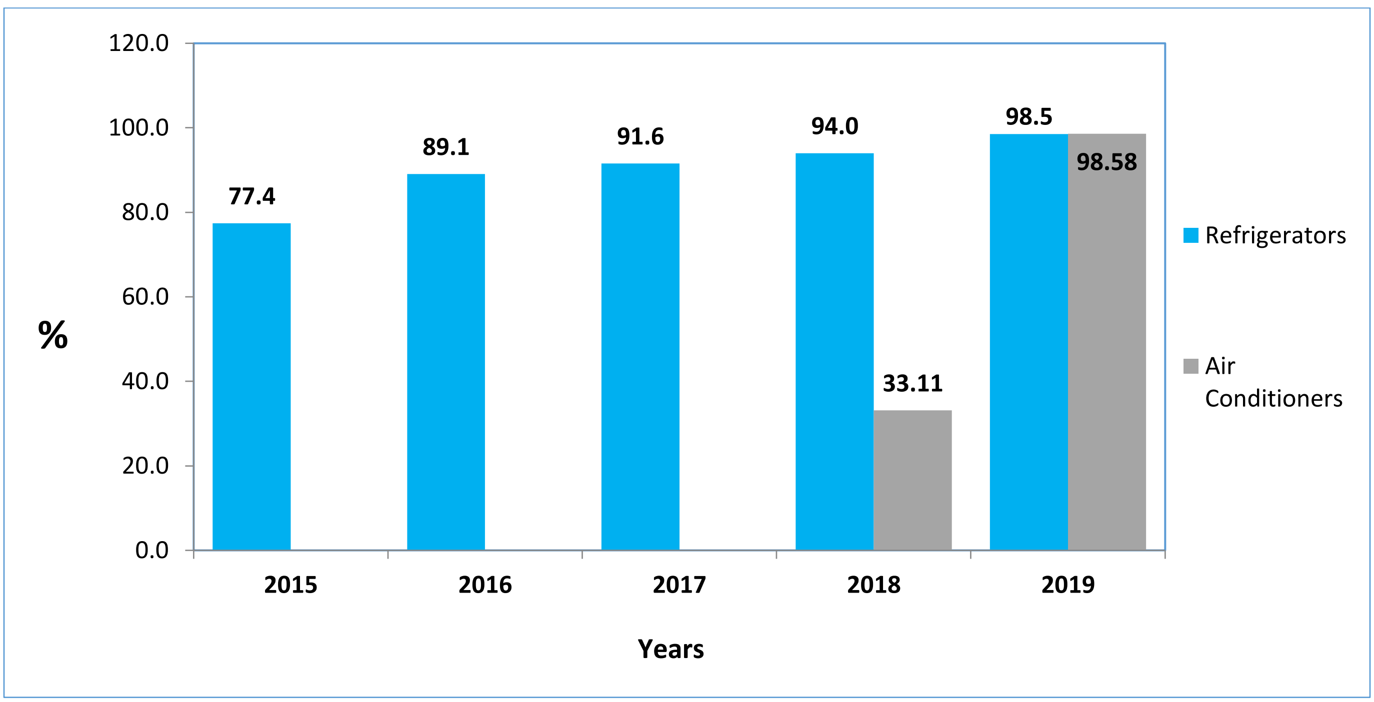
The results obtained from this exercise show significant progress made in the appliances market transformation in Ghana. Compliance levels of regulated appliances have improved over the years and 2019 has seen a complete and transformed market in relation to regulated appliances (Refrigerating Appliances and Air Conditioners).

Results obtained from 2018 exercise recorded compliance level for refrigerating appliances of 90.24% and that of Air Conditioners was 33.11%. In 2019 however, compliance for refrigerating appliances and air conditioners are 99.68% and 99.37% respectively.

Factors contributing to achieving this transformation include regular market surveillance exercises, compliance monitoring, establishment of the appliance database with related application (APP) and especially the operationalization of GCNet digital portal for importation of goods including regulated appliances at the ports of entry.

This impacts positively on the confidence level of consumers in the patronization these regulated appliances on the market. Figure 8.1.1 show trend of national compliance levels for refrigerating appliances and air conditioners from 2015 to 2019.

Figure 8.1.1: Compliance Level Trend for Refrigerating Appliances and ACs from 2015 to 2019



9.0 Conclusions.

The appliance database and certified appliance App will be updated to include lighting appliance.

Importers of Non-Compliant appliances have been contacted to submit appropriate documentations and duly properly label mislabeled ones. As at December 20th 2019, two companies (Hisense and Enderick) have responded and submitted test reports for six (6) unique models. Electroland and Hisense once again have made great efforts to properly label the mislabeled appliances both refrigerating appliances and air conditioners.

With much improvement in the appliance market in terms of conformity to standards and labeling, it is recommended that recognition is given to importers who deal in very efficient appliances. Hence, as part of the project activities for 2020, the project team will organize awards workshop to identify and rewards dealers in efficient regulated appliances. Energy efficient ratios and Energy Efficiency Indexes will be evaluated for various refrigerating volumes or sizes, air conditioners types whichever apply. Attributes including star ratings, annual power consumption, lamp life, luminous flux and lamp efficacy will be used to evaluating and grading efficient lighting appliances.

The compliance rate of 99% for cooling appliances is a clear indication that consumers in Ghana have developed taste for energy efficient appliances and increasingly demand to buy air conditioning and refrigerating appliances that are energy efficient. For air conditioners, although the 1-star and 2-star rating are the commonest on the market, consumers have started asking for 3-star and possibly, 4-star rated ones, according to information gathered from the retailers. There is therefore the need to stimulate and encourage importers and retailers to introduce higher energy efficient refrigerators and air conditioning appliances into the market.