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REPORT ON THE ENFORCEMENT OF ENERGY EFFICIENCY LEGISLATIVE INSTRUMENTS (1815, 1932 & 1958) AT PORTS OF ENTRY (With Relevant Indicators/Statistics)

JANUARY – DECEMBER 2021

JANUARY, 2022

|Securing Ghana's Future Energy Today

FOREWORD

The Energy Commission has the mandate to prepare, review and update periodically indicative national plans to ensure that reasonable demands for energy are met sustainably. In addition, the Energy Commission is mandated to secure and maintain a comprehensive database for national decision making for the efficient development and utilisation of energy resources available to the nation. In fulfilment of its mandates, the Commission has been compiling data on refrigerating and air-conditioning appliances at the ports of entry through the enforcement of Legislative Instruments 1815, 1932 and 1958.

Electricity demand has been increasing over the years as a result of increasing population, number of households, citing of more industries and the increase in commercial activities. Household electricity demand is also on the increase due to the continuous use of old, obsolete and inefficient electricity consuming household appliances such as used refrigerators and air conditioners. In 2019, household electricity demand accounted for about 47.0% of total generation.

The Ghana Statistical Services reported through the Ghana Living Standard Survey (GLSS 4, 5 and 6), that about two (2) million inefficient/used refrigerating appliances were in the country in 2012. The average annual consumption of a used refrigerator is about 1,200kWh per annum, whilst that of a used air conditioner is 4,200 kWh per annum.

To prevent these high energy consuming appliances from entering the country and ensure that only new and energy-efficient refrigerators and air-conditioners that meet the minimum energy performance standard (MEPS) enter the country's appliance market, there was the need to put standards and regulations in place to serve as benchmarks. Legislative Instruments 1815, 1932 and 1958 were then enacted and full enforcement commenced in 2012.

It is our expectation that the statistics contained in this publication would be useful to a wide range of users including planners, policy makers, researchers and students. We would appreciate very much any feedback by way of comments and suggestions from readers and users of the report.

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Summary of Key Findings

The Summary of Key Findings highlights the following:

S.1 Data on New Refrigerating Appliances Imports

1. A total of **643,942** units (about 4,427 containers) of new refrigerating appliances were imported and inspected at the Tema Port in accordance with L.I. 1958 in 2021, representing an increase of about 23.0% of the 2020 total imports.

2. Of this number, **632,341 units**, representing 98.2% of the total imports, were regulated appliances[1], while **11,601** units, accounting for 1.8% of the total imports, were unregulated appliances[2].

3. A total of **268,165 units**, accounting for 42.5% of the total regulated appliances, were fridge/freezers. The expected average annual consumption of each of these fridge/freezers is **326.1 kWh/year**.

4. A total of **253,610 units**, constituting about 40.1% of the total regulated appliances, were chest/upright freezers. The expected average annual consumption of each of these chest freezers is **391.7 kWh/year**.

5. A total of **110,566 units**, representing 17.5% of the total regulated appliances, were refrigerators. The expected average annual energy consumption of these refrigerators is about **200.0 kWh/year** per unit.

6. A total of **3,737,090** new refrigerating appliances (including showcases) were imported through the Port of Tema since 2005.

7. In terms of star ratings, about 34.0% of all the regulated appliances were 2-star rated, 27.1% were 1-stars, 20.6% were 3-stars, 17.2% were 4-stars and only 1.1% were 5-stars.

8. The **overall expected average** annual energy consumption of these new refrigerating appliances is **346.6 kWh/year** per unit.

9. About 98.5% of all the new refrigerating appliances were compliant in 2021.

S.2 Trends of New Versus Used Refrigerators Imports (2005 – 2021)

The importation of the new refrigerating appliances into the country has seen an upward trajectory over the years while that of the used fridges has seen a drastic reduction. Historical data suggests that there is a decline in the importation of used fridges from 2013, as a result

[1] Fridge/Freezer, Chest Freezer and Refrigerator as defined in L.I 1958
[2] Showcases (Beverage coolers and display cabinets/units)

of the implementation or enforcement of L.I. 1932. Figure S.1 shows how the refrigerating appliance market has transformed over the years, especially since 2013.

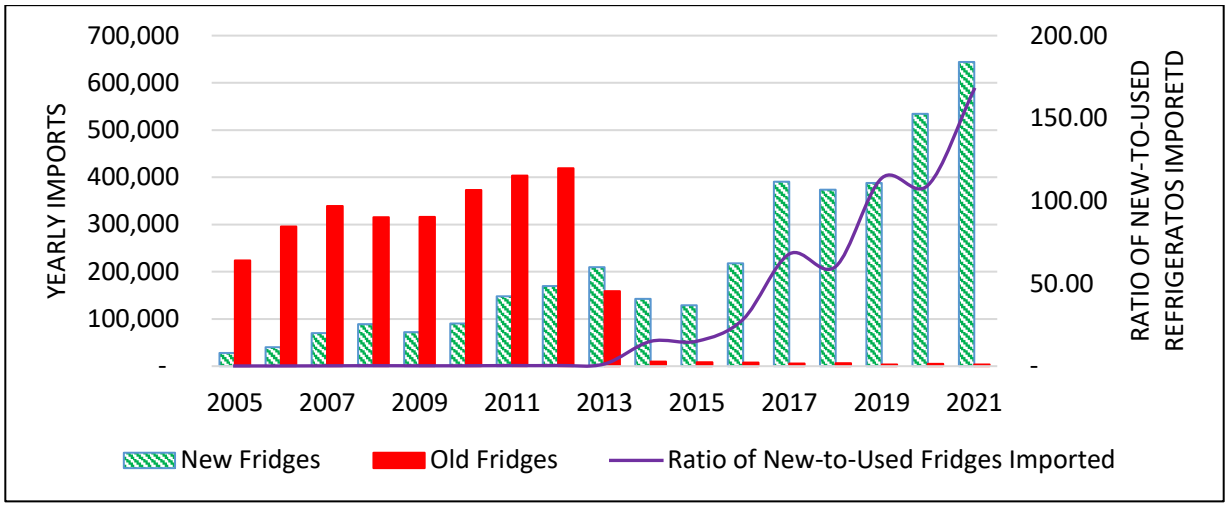

Figure S.1: Trends in New Versus Used Refrigerators Imports (2005 – 2021)

S.3 Major Importers and Popular Brands of Refrigerating Appliances

1. Electroland Ghana Limited was the largest importer of refrigerating appliances in 2021. It accounted for 21.6% of the total imports, followed by Sun Electronics Ltd. (12.4%), Shree Balaji Ltd (11.8%), Menkish Impex Ltd. (6.2%), Melcom (5.2%), Madson Japan (4.7%) and the rest of the percentages for the other remaining importers.

2. NASCO was the most imported refrigerating appliance or brand (14.5%), followed by Hisense (11.6%), Pearl (10.9%), Legacy (6.2%) and Neon (4.7%). The remaining percentages go to the rest of the brands.

S.4 Data on Non-ducted (New) Room Air conditioners (RACs) Imports

1. A total of **158,892** units (711 containers) of new RACs were inspected at the Port of Tema in 2021 in accordance with L.I. 1815, showing a drop of 6.8% over 2020 total imports. Of this number, **158,537** units, representing 99.8% of the total imports, were regulated appliances, while the remaining **355** units, accounting for just 0.2% of the total imports, were unregulated appliances (cassette/commercial and other ducted or commercial types).

2. About 52.6% of the regulated RACs were of 1-star rated, 19.1% were 2-stars, 27.8% were 3-stars, 0.2% were 4-stars and 0.2% were 5-star rated. The average EER of the RACs was 3.09W/W, which is above the MEPS of 2.80W/W. About **87.7%** of these RACs have cooling capacities between 12,000 and 18,000 BTU/hr (3.5 kW - 5.3 kW), with a weighted average cooling capacity of 4.85 kW based on the quantities inspected.

3. The overall average annual energy consumption of these RACs was **3,203.4 kWh**.

4. A total of **1,063,815** new RACs have been imported and inspected at the Port of Tema since 2014.
5. About 97.0% of the regulated RACs were compliant.

S.5 Major Importers and Popular Brands of RACs

1. Electroland Ghana Limited was the largest importer of RACs appliances in 2021. It accounted for over one-third (33.7%) of the total RACs imports, followed by Sun Electronics Ltd. (14.7%), Unique Home Appliances (5.9%), Somotex Ghana Ltd. (8.24.6%) and Shree Balaji (4.5%).
2. NASCO was the most popular brand (20.0%), followed by Hisense (14.8%), MIDEA (11.3%), BRUHM (4.6%) and Pearl (4.5%).

S.6 Data on Used Fridges and Used RACs Imports

1. A total of **3,098** used fridges and **747** RACs were seized in 2021.

2. A total of **49,764** old refrigerators and **11,750** RACs have been confiscated/intercepted at the ports of Tema and Takoradi since the inception of the enforcement of L.Is. 1932 in 2013.

3. A total of **10,472** units of old and inefficient refrigerators have also been turned-in through the National Refrigerator turn-in and Rebate Scheme which commenced in July 2012 and ended in 2016.

4. A total of **2,952,544** used fridges and RACs have been exported to Ghana since 2005 from Europe and elsewhere.

S.7 Impact of the Enforcement Activities in 2021

A total of **698.6 GWh** of electricity and a total of **279.4 kilotons of CO_2eq** have been saved in 2021 as a result of the enforcement of L.I.s 1815, 1932 and 1958. This electricity savings is reasonably close to twice the total electricity generated by ASKA Power Plant in 2021.

CHAPTER ONE: INTRODUCTION/BACKGROUND

1.0 Introduction

This chapter provides the background of the Energy Efficiency Project, which aims to enforce Legislative Instruments (L.I.s) 1815[3], 1932[4] and 1958[5], at the Tema and Takoradi Ports as well as the objectives and significance of the project.

1.1 Background

As consumers use inefficient appliances that consume excessive amounts of electricity, the demand for electricity will continue to grow thereby putting strain on the existing national electricity grid. The residential and service sectors' electricity demands have been on the increase over the years and it was believed that a sizable percentage of the demand is wasted on the use of old, obsolete and inefficient refrigerating appliances imported into the country[6]. In 2019, the residential and service sector's electricity demands accounted for 46% and 24%[7] respectively of total consumption.

The above claim that inefficient refrigerating appliances were responsible for the increases in the household electricity demand called for an investigation. So, in 2003, the Energy Foundation (EF) conducted a study into major electricity consuming household appliances in the country. The study confirmed the claim that the refrigerator was one of the major electricity consuming appliances in households. The Council for Scientific and Industrial Research - Institute of Industrial Research (CSIR-IIR), under the auspices of the Energy Commission (EC), conducted a detailed survey/study into the energy consumption patterns of refrigerating appliances in the residential sector from 2006 to 2007. The survey revealed that, indeed, these appliances consumed, on average, 1,200kWh per annum compared to 250kWh and 400kWh per annum in Europe and the USA respectively.

In 2010, there was an estimated 1.67 million inefficient used refrigerating appliances and about 1.14 million RACs units in the country[8]. To prevent these high energy consuming appliances from entering the country, the Energy Commission commenced the enforcement of L.I. 1932, passed in 2008, banning the importation or sale of used/illegal refrigerating appliances and RACs; first, at the Tema Port in 2011, and later at Takoradi Port in 2017.

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[3] Energy Efficiency Standards and Labelling (Non-Ducted RACs and Self-Ballasted Fluorescent Lamps) Regulations, 2005.

[4] Prohibition of Manufacture, Sale or Importation of Incandescent Filament Lamp, Used Refrigerator, Used Refrigerator-Freezer, Used Freezer and Used Air-Conditioner Regulations, 2008.

[5] Energy Efficiency Standards and Labelling (Household Refrigerating Appliances) Regulation, 2009.

[6] The Success Story of the Ghana Refrigerator Efficiency Project Implemented by the Energy Commission

[7] Ghana Energy Commission: National Energy Statistics (2000 – 2019)

[8] Ghana Statistical Service: Ghana Living Standard Survey 4, 5 and 6 Reports

To give more impetus to the enforcement of L.I. 1932, the Government of Ghana, in July 2012, through the EC, launched the National Refrigerator turn-in and Rebate Scheme with the support of the United Nation Development Programme (UNDP), Global Environment Facility (GEF) and Multilateral Fund of the Montreal Protocol (MFMP). The scheme, which encouraged consumers to exchange their old refrigerators for new and efficient ones, available at a discounted price, was to recover about 50,000 inefficient refrigerating appliances from homes and promote the use of more energy-efficient ones and transform the refrigerating appliances market in the country. By mid-June, 2016, a total of 10,472 units[9] of old energy-inefficient appliances have been replaced across the country with new energy-efficient ones, resulting in an annual electricity savings of 6.3 GWh. The ultimate goal of the scheme was to reduce national energy consumption, household electricity bills and its attendant environmental impacts.

To ensure that only energy efficient refrigerating appliances and RACs enter the country's refrigerating appliance market, the Energy Commission, in 2012, began the stringent enforcement of L.I.s 1815 and 1958 which mandate all regulated appliances imported into the country affixed with an energy efficiency label (energy guide). As part of the enforcement procedure, the energy efficiency test report of the appliances should be submitted to the EC for approval before the consignment arrives. The data in the test report are used to verify compliance with Minimum Energy Performance Standards (MEPS) at the port of entry by the Inspectors from EC (with specific attention given to the type of appliance, manufacturer, model number, refrigerant, climate class, annual energy consumption, fresh and frozen food volumes, energy star rating and cooling capacity). Appliances found to be compliant are released to the importer whilst non-compliant appliances are detained by the EC, pending compliance with the provision of the respective L.I.s.

1.2 Objectives of the Energy Efficiency Project

The objectives of the project are to:

i. ensure full and effective enforcement of regulations on standards and labelling of refrigerating appliances and RACs at points of entry (i.e. L.Is 1815 and 1958);
ii. achieve an overall compliance level for both refrigerating appliances and RACs of 100%;
iii. ensure full and effective enforcement of the ban on importation of used refrigerators and used RACs (L.I. 1932 & L.I. 1815); and
iv. assess the status of compliance with Energy Efficiency Regulations through continuous market surveillance.

[9] Ghana Energy Commission, 2016.

1.3 Significance of the Project

The project is intended to highlight the compliance level of all the refrigerating appliances and RACs entering the Ghanaian market. The compliance level includes energy efficiency star ratings, recommended refrigerants, climate class, refrigerator types and annual energy consumption patterns of all the regulated appliances. It will also highlight the number of unregulated appliances such as stock lots and coolers/display cabinets coming into the country and develop policies to deal with them. Finally, it will indicate the share of fridge/freezer, chest freezer and refrigerators entering the market.

CHAPTER TWO: ANALYSIS OF DATA AND KEY SUMMARY RESULTS

2.0 Refrigerating Appliances

The refrigerating appliances that were imported and inspected were categorized into three: Fridge/Freezers (fresh and frozen volumes), Chest or Upright Freezers (frozen volume only) and Refrigerators (fresh volume only). Each category was further broken down into three sub-categories depending on the size or carrying capacity (net volume in litres). These measures are listed below and for this report, these sub-categories will henceforth be referred to as "Small" (<= 340 litres), "Medium" (341 - 510 litres) and "Large" (> 510 litres).

2.1 Analysis of Data

2.1.1 Overall Summary Statistics of the New Refrigerating Appliances

A total of **643,942** units of new refrigerating appliances were imported and inspected at the Tema Port in 2021. This represents an increase of about 23.0% of the 2020 total imports. Figure 2.1 presents the monthly trends or breakdown of the total imports in 2021.

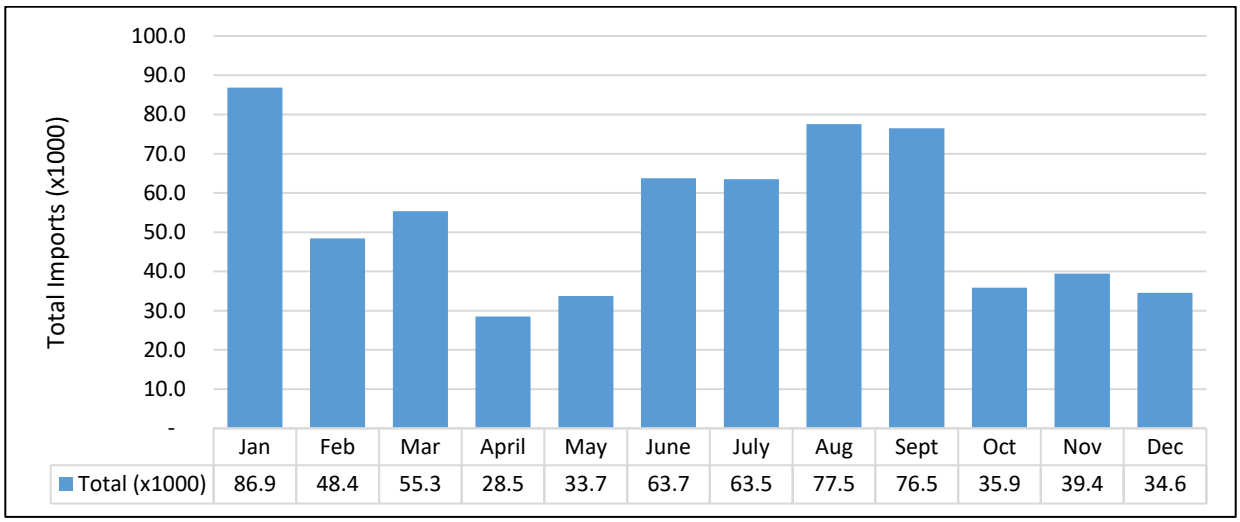


Figure 2.1: Trends in Monthly Imports of New Refrigerating Appliance in 2021

Of this number, 632,341 units, representing 98.2% of the total imports, were regulated appliances, while the remaining 11,601 units, accounting for 1.8% of the total imports, were unregulated appliances. Of the regulated appliances, 268,165 units (42.4%) were fridge/freezers, 253,610 units (40.1%) were chest freezers and 110,566 units (17.5%) were refrigerators. Figure 2.2 shows the share of the various categories.

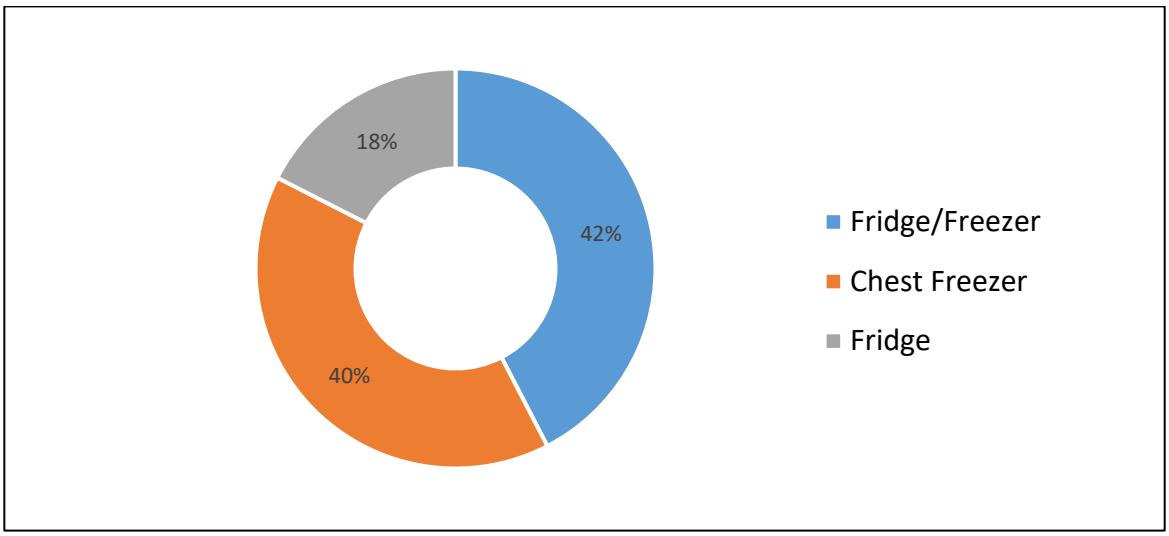
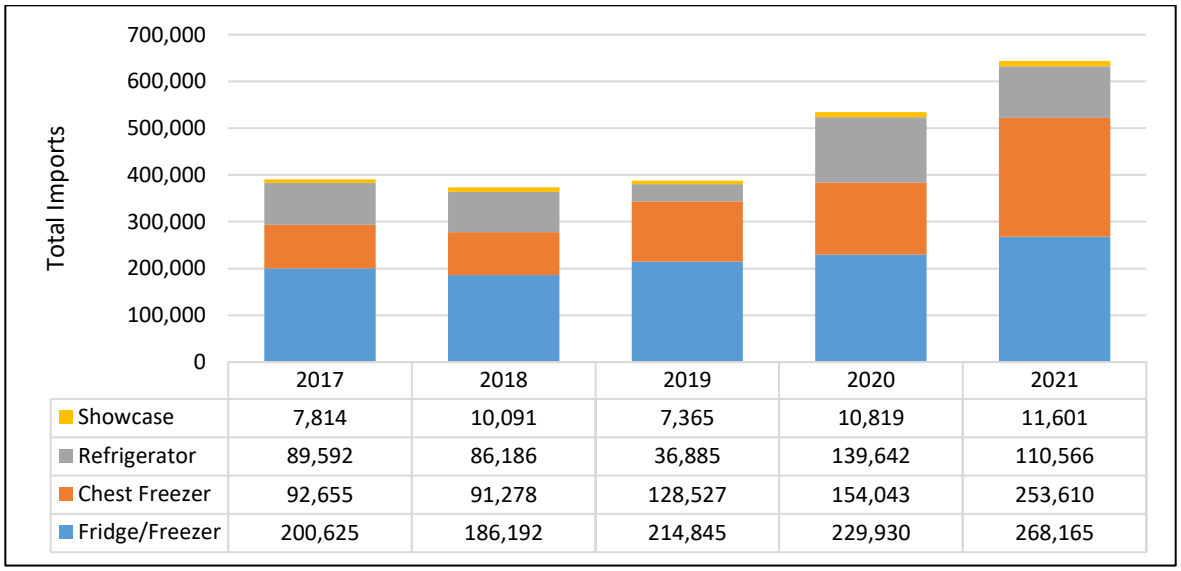


Figure 2.2: Share of Categories of New Refrigeration Appliances Imports in 2021

The trend and breakdown in the categories of the refrigerating appliances imported since 2017 is depicted in Figure 2.3.



	2017	2018	2019	2020	2021
Showcase	7,814	10,091	7,365	10,819	11,601
Refrigerator	89,592	86,186	36,885	139,642	110,566
Chest Freezer	92,655	91,278	128,527	154,043	253,610
Fridge/Freezer	200,625	186,192	214,845	229,930	268,165

Figure 2.3: Trends in Refrigerating Appliances Categorization since 2017

Figure 2.4 presents the yearly upward trajectory or trend of these appliances imported into the country from 2005 to 2021. A total of **3,737,090** new refrigerating appliances (including showcases) have been imported through the Port of Tema since 2005.

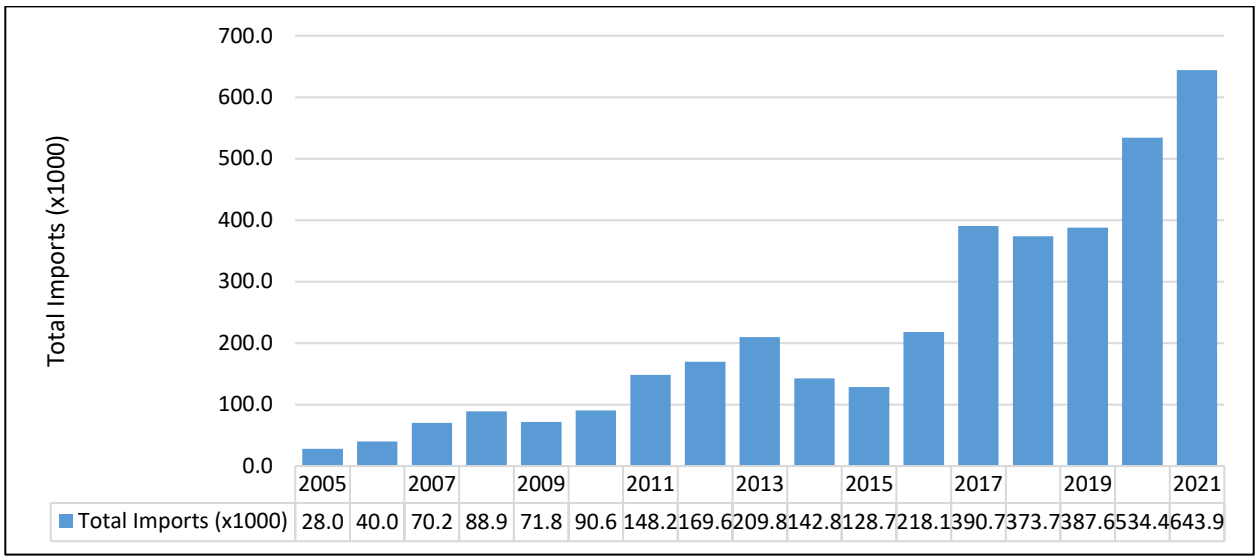


Figure 2.4: Trend in New Refrigerating Appliances Imports (2005 – 2021)

2.1.2 Overall Energy Efficiency Star Ratings of the New Regulated Refrigerating Appliances

The overall energy efficiency star ratings for the regulated refrigerating appliances in 2021 is presented in Figure 2.5. About 34.0% and 27.1% of the approved refrigerating appliances were 2- and 1-star rated respectively, thus making them the most predominant star rated appliances inspected. About 20.6% were 3-star rated, 17.2% were 4-star rated and only 1.1% were 5-star rated. Approximately 3 in 4 (73.0%) of all the regulated refrigerating appliances were either 2 or more star rated.

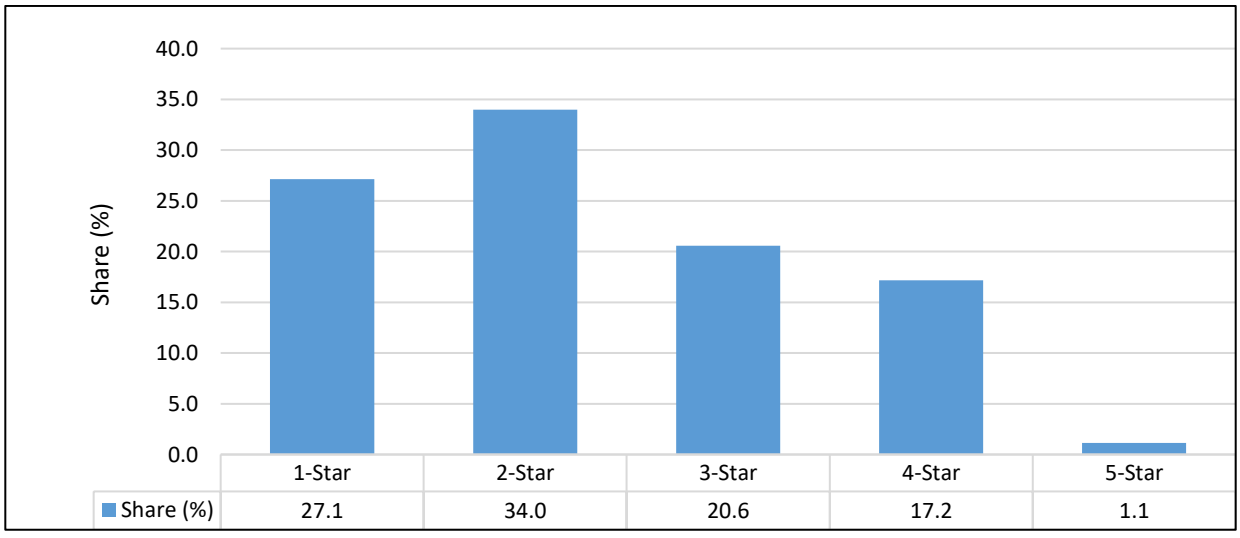


Figure 2.5: Overall Energy Efficiency Star Ratings for the New Refrigerating Appliances in 2021

2.1.3 Types of Refrigerants in Refrigerating Appliance imported and inspected

The types of refrigerants identified in the approved refrigerating appliances imported into the country included R600a, R134a and R290. A total of 598,195 (94.6%) compressors of the new

refrigerating appliances imported in 2021 were laden with R600a, which has low global warming potential (GWP), low ozone-depletion potential (ODP) and better cooling performance. About 26,558 (4.4%) compressors contained R134a and 7,588 (1.2%) compressors were filled with R290. Figure 2.6 shows the breakdown/share of the refrigerants in the refrigerating appliances inspected in 2021.

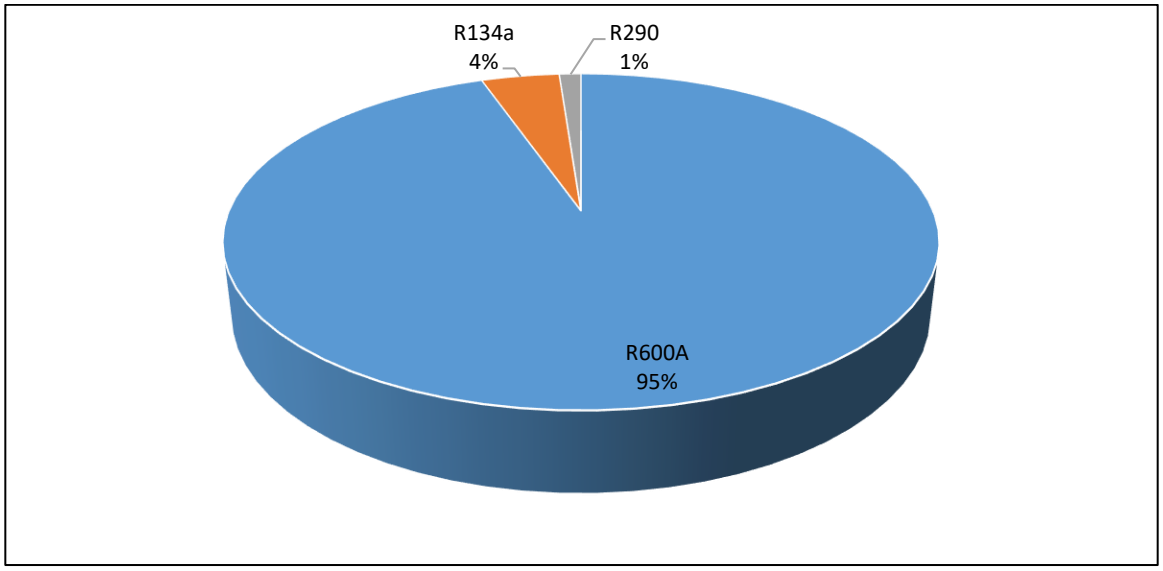


Figure 2.6: Share of Refrigerants in the Refrigerating Appliances imported and inspected in 2021

2.1.4 Climatic Classes for the Refrigerating Appliances

About 96.0% of the appliances imported and inspected were made for sub-tropical (ST) climatic condition while the remaining 4.0% were for tropical (T) climatic condition. The result is depicted in Figure 2.7.

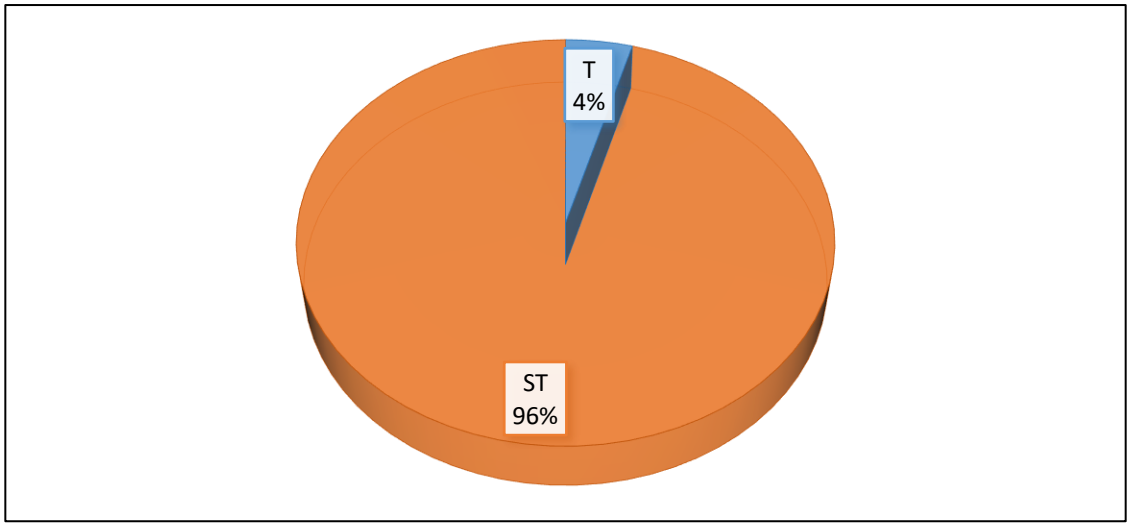


Figure 2.7: Shares of Climatic Classes of the Refrigerating Appliances imported

2.1.5 Expected Annual Energy Consumption Patterns of New Refrigerating Appliances

The expected annual energy consumption data for the various categories and sub-categories of the new regulated appliances in 2021 are presented in Table 2.1.

Table 2.1: Expected Annual Energy Consumption Patterns for New Refrigerating Appliances in kWh/year

Category	Fridge/Freezer			Chest Freezer			Fridge		
Sub-category	Small (<=340L)	Medium (341-510L)	Large (>510L)	Small (<=340L)	Medium (341-510L)	Large (>510L)	Small (<=340L)	Medium (341-510L)	Large (>510L)
Average	308.6	426.3	596.1	320.7	460.0	615.9	190.5	300.3	496.0
Category Average	326.1			391.7			200.0		
Overall Average	346.6								

2.1.6 Compliance Level

About 98.5% of the regulated refrigerating appliances were compliant at the point of inspection. The non-compliance cases, which range from no technical documentation to mislabelling, were forwarded to the market surveillance team for enforcement actions.

2.1.7 Largest Importers and Popular Brands of Refrigerating Appliances

Electroland Ghana Limited was the largest importer of refrigerating appliances in 2021, accounting for 21.6% of the total imports, followed by Sun Electronics Ltd. (12.4%), Shree Balaji Ltd (11.8%), Menkish Impex Ltd. (6.2%), Melcom (5.2%), Madson Japan (4.7%) and the rest of the percentages for the other remaining importers. The most dominant/popular imported brand was NASCO (11.6%), followed by Hisense (11.6%), Pearl (10.9%), Legacy (6.2%) and Neon (4.7%). The remaining percentages go to the rest of the brands.

2.1.8 Trends and Summary Statistics on Used Fridges and Used RACs

Since the enforcement of L.I. 1932 commenced in 2013, a total of **49,764** old refrigerators and **11,750** used RACs have been confiscated/intercepted at the ports of Tema and Takoradi. In 2021, seizures, totalling **3,098** used fridges and **747** used RACs were made at the Ports of Tema and Takoradi. Figure 2.8 presents the yearly downward trend in the seizures made between 2013 and 2021. Since 2005, a total of **2,952,544** used fridges have been exported to Ghana from Europe and elsewhere.

The average annual energy consumptions of new refrigerators and RACs are 346.6 kWh/unit and 3,240.7 kWh/unit respectively, compared with 1,200 kWh/unit[10] and 4,200 kWh/unit[11] for used fridge and used RAC respectively. The rigorous enforcement of L.I. 1932 yielded a total electricity savings of **6.86 GWh** in 2021.

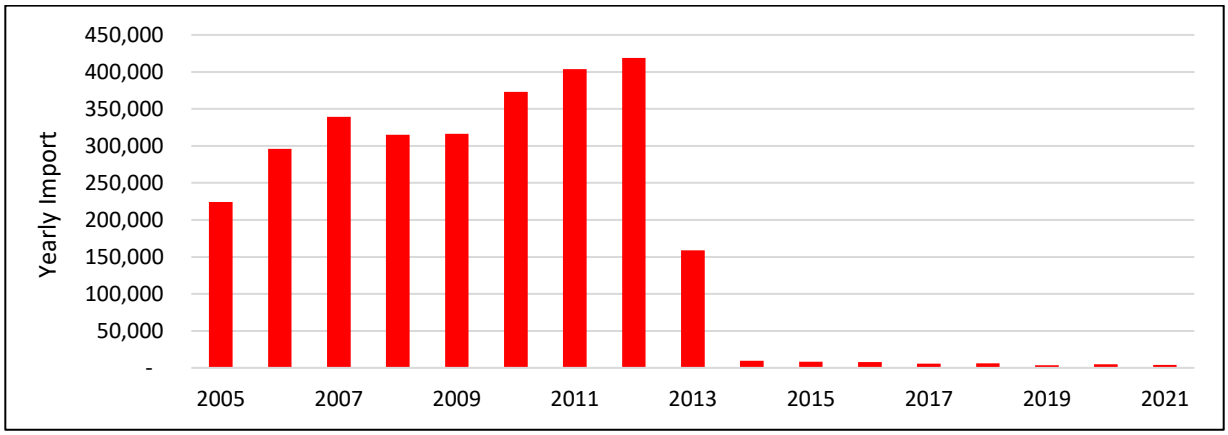


Figure 2.8: Yearly Trend of Used Fridges (2005 – 2021)

2.1.9 Top ten countries exporting used fridges to Ghana

The top ten (10) countries (out of 18) exporting used fridges and air conditioners into the country in 2021 are shown in Figure 2.9. The United Kingdom accounted for over a third (34.1%) of the total export, Italy (27.4%), the United States (8.5%), Belgium (7.5%), Denmark (5.4%), Spain (2.7%), Australia (2.6%), Finland (2.5%), Netherlands (1.8%) and South Korea (1.5%). The eight (8) remaining countries accounted for only 6% of the total import.

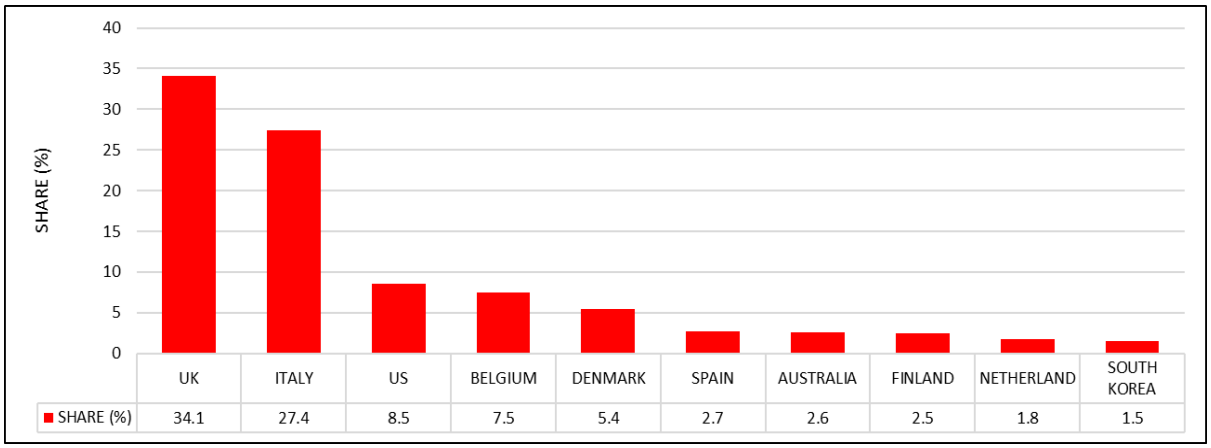


Figure 2.9: Top Ten Countries Exporting Used Fridges to Ghana in 2021

[10] Refrigerator efficiency in Ghana: Tailoring an appliance market transformation program design for Africa. Hagan and Ahenkorah, 2007.

[11] Energy efficiency and cost saving opportunities in public and commercial buildings in developing countries: The case of air-conditioners in Ghana. Opoku and Agyarko, 2019.

2.1.10 Trends of New Versus Used Refrigerators Imports (2005 – 2021)

The importation of the new refrigerating appliances into the country has seen an upward trend over the years, whilst that of the used fridges has seen a drastic reduction from 2013 due to the enforcement of L.I.s. 1958 and 1932 respectively. Fig. 2.10 shows the number of refrigerating appliances imported into the country from 2005 to 2021. It can be observed that the number of used refrigerators imported into the country peaked in 2012, after which it started to decline, giving way to the new refrigerators. The peaking was as a result of the transitional arrangement put in place for the importers of the used appliances to wind up their businesses. The number of new refrigerators imported into the country began to rise significantly from 2013. This rise in importation of new refrigerators is primarily due to robust enforcement of the regulations at the ports of entry to ensure that only appliances that meet the minimum energy performance standards (MEPS) are permitted into the Ghanaian market.

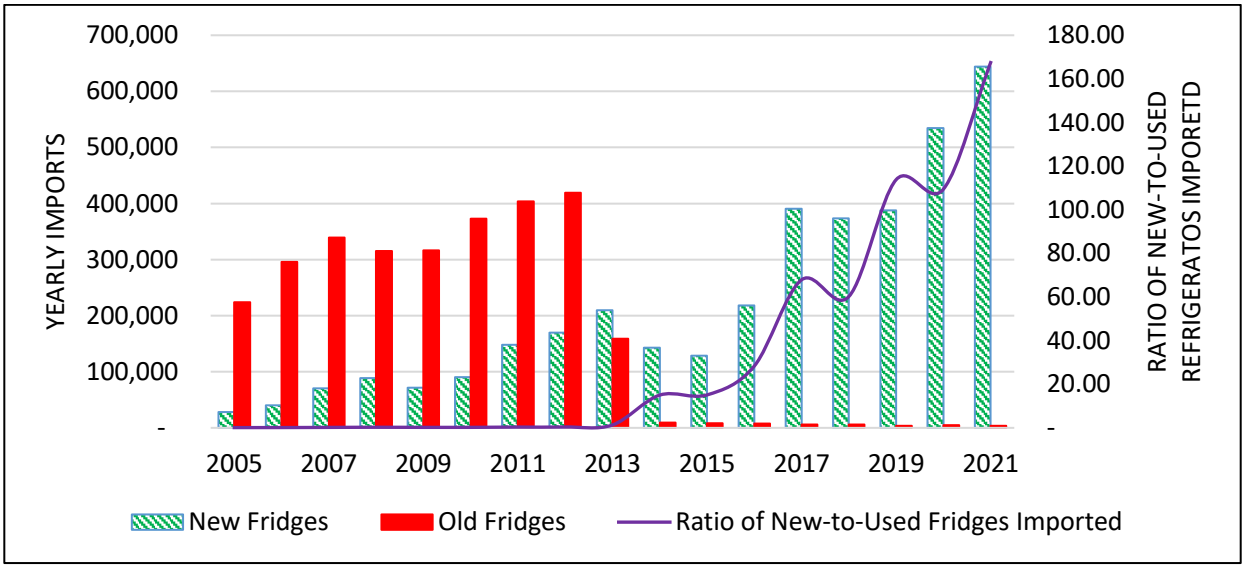


Figure 2.10: Trends in New Versus Used Refrigerators Imports (2005 – 2021)

2.2 Room Air Conditioning Appliances

2.2.1 Overall Summary Statistics on New RACs

A total of **158,892** units of new RACs were imported and inspected at the Tema Port in 2021. Of this number, **158,537 units**, representing 99.8% of the total imports, were regulated appliances (RACs), while the remaining **355** units, accounting for about 0.2% of the total imports, were unregulated appliances such as cassette/commercial or other ducted types. A total of **1,063,815** new RACs have been imported and inspected at the Port of Tema since 2014. Figure 2.11 presents the yearly trend of imported RACs.

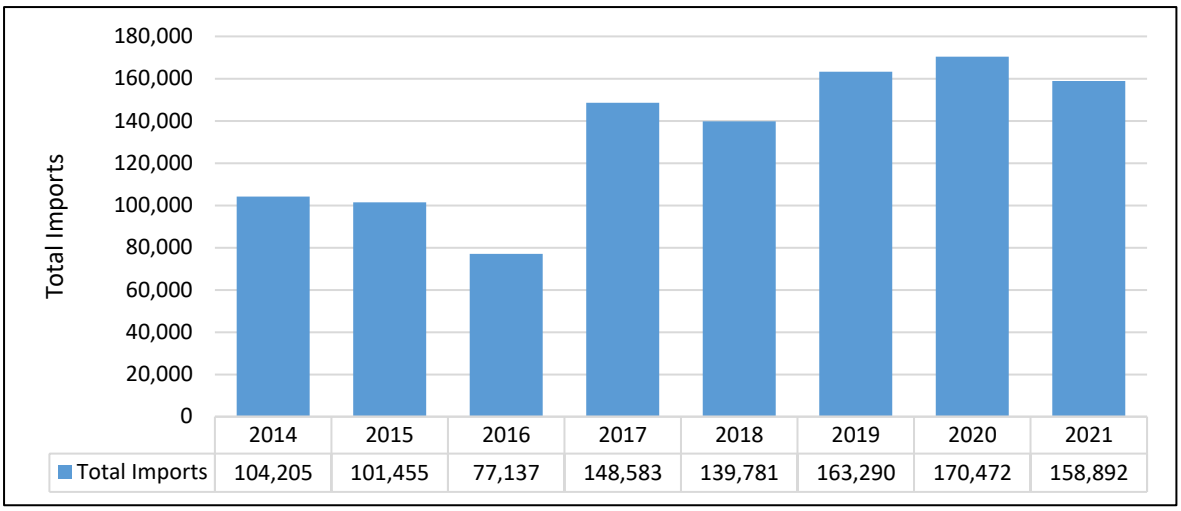


Figure 2.11: Yearly Trend in Air Conditioner Imports (2014 – 2021)

2.2.2 Overall Energy Efficiency Star Ratings of the New RACs

The overall energy efficiency star ratings for the regulated RACs in 2021 is presented in Figure 2.12. About 52.6% of the regulated RACs were of 1-star rated, 19.1% were 2-stars, 27.8% were 3-stars, 0.2% were 4-stars and 0.2% were 5-star rated. About 97.0% of all the imported RACs were compliant with L.I. 1815.

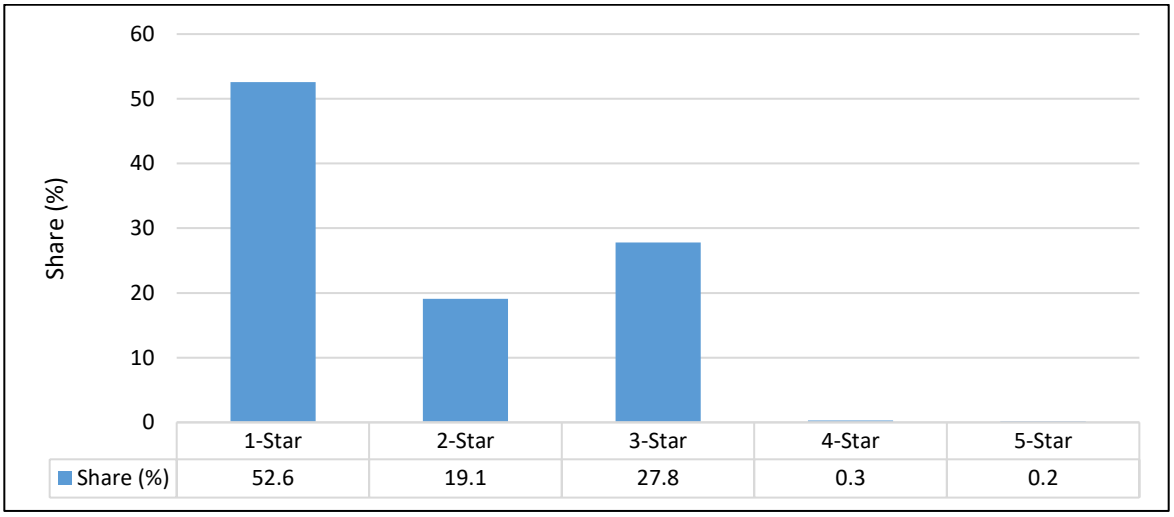


Figure 2.12: Overall Energy Efficiency Star Ratings of the New RACs in 2021

2.2.3 Types of Refrigerants in RACs imported and inspected

The types of refrigerants identified in the approved RACs imported into the country were R22 (30.7%), R410a (68.5%), and R32 (0.8). R410a has both low global warming potential (GWP) and low ozone-depletion potential (ODP) and is, therefore, more energy-efficient. Figure 2.13 shows the breakdown/share of the refrigerants in the RACs inspected in 2021.

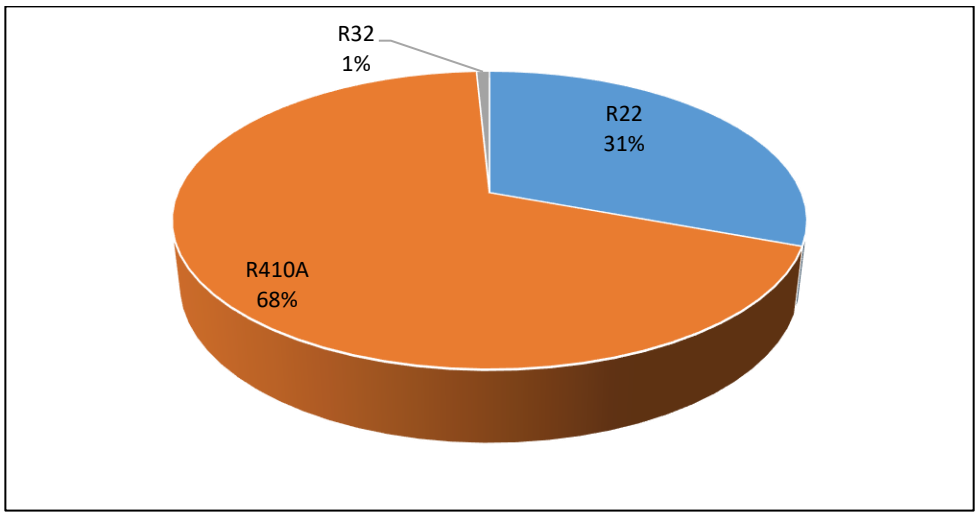


Figure 2.13: Share of Refrigerants in RACs in 2021

2.2.4 Expected Average Annual Energy Consumption of the new RACs

The expected annual energy consumption data of the new RACs are presented in Table 2.2 based on cooling capacities.

Table 2.2: Expected Annual Energy Consumption Patterns of New RACs

Cooling Capacity (kW or BTU/hr)	Share (%)	Star Rating	Average Annual Energy Consumption (KWh/yr)	Category Average Annual Energy Consumption (KWh/yr)	Overall Average Annual Energy Consumption (KWh/yr)
1.0 Hp (< 2.6 kW or 9,000 BTU/hr)	0.8	1-Star	1,822.0	1,822.0	3,203.4
		2-Star	-		
		3-Star	-		
		4-Star	-		
		5-Star	-		
1.5 Hp (3.0 - 3.6 kW or 12,000 BTU/hr)	67.4	1-Star	2,506.1	2,386.1	
		2-Star	2,243.5		
		3-Star	2,086.0		
		4-Star	1,760.0		
		5-Star	1,620.0		
2.0 Hp (4.9 - 5.3 kW or 18,000 BTU/hr)	20.3	1-Star	3,518.6	3,385.4	
		2-Star	3,211.3		
		3-Star	3,061.1		
		4-Star	2,636.0		
		5-Star	2,540.0		
2.5 Hp (6.9 - 7.05 kW or 24,000 BTU/hr)	10.9	1-Star	4,604.8	4,393.3	
		2-Star	4,056.0		
		3-Star	3,973.8		
		4-Star	3,680.0		
		5-Star	-		
3.0 or more Hp (> 8.6 kW or > 30,000 BTU/hr)	0.6	1-Star	6,080.0	6,080.0	
		2-Star	-		
		3-Star	-		
		4-Star	-		
		5-Star	-		
Hp = Horsepower, kW = kilowatt, BTU/hr = British Thermal Unit per hour					

The overall average annual energy consumption of these new RACs was found to be 3,203.4 kWh/yr. About **87.7%** of these RACs have cooling capacities between 12,000 and 18,000 BTU/hr (3.0 kW - 5.3 kW or 1.5 – 2.0 Hp), with a weighted average cooling capacity of 4.85 kW based on the quantities inspected.

2.2.5 RACs: Largest Importers and their brands

Electroland Ghana Limited was the largest importer of the RACs in 2021. It accounted for over one-third (about 33.7%) of the total RACs imported and inspected, followed by Sun Electronics Ltd. (14.7%), Unique Home Appliances (5.9%), Somotex Ghana Ltd. (4.6%) and Shree Balaji (4.5%). The most dominant/popular brand was NASCO (32.0%), followed by Hisense (14.8%), MIDEA (11.3%), BRUHM (4.6%) and Pearl (4.5%).

2.2.6 Compliance levels of Refrigerating Appliances and RACs

Generally, compliance levels of refrigerating appliances and RACs have gone up between 2017 and 2021. The compliance level of imported refrigerating appliances increased from 92.6% to 98.5%, compared with RACs, which also saw an increase from 79.2% to 97.0% within the same period. Figure 2.14 depicts the trends in the compliance levels of these appliances from 2017 to 2021.

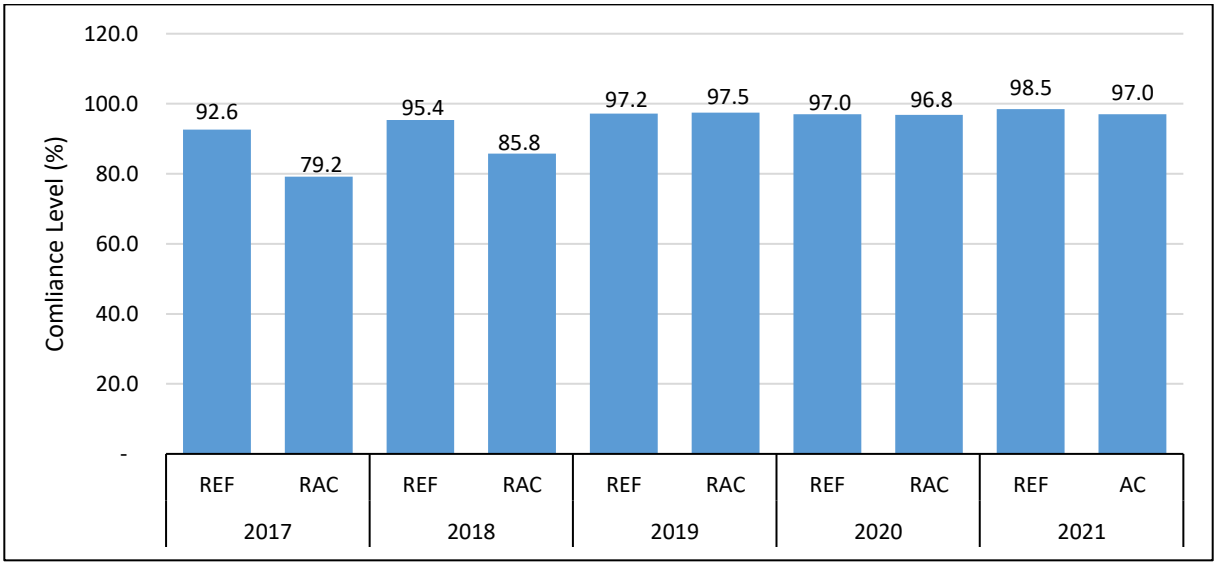


Figure 2.14: Compliance Levels for Refrigerating Appliances and RACs from 2017 to 2021

2.3 Impact of the Enforcement Activities in 2021

2.3.1 Electricity savings and CO_2 Emissions Reduction

During the year under review, **632,341 regulated** refrigerating appliances and **158,537 RACs** were imported and inspected at Tema Port. Also, **3,098** used fridges and **747** used RACs were also confiscated and evacuated for destruction. About **698.6 GWh** of electricity and a total of **279.4**

kilotons of CO_2eq have been saved as a result of the enforcement of L. I's 1815, 1932 and 1958 in 2021. This electricity savings is reasonably close to twice the total electricity generated by ASKA Power Plant in 2021.

2.3.2 Market Surveillance

Although COVID-19 has impacted negatively on our market surveillance activities, 353 shops and retail outlets were visited, where 8,876 refrigerating appliances and 1,104 RACs were inspected. About 98.0% of the refrigerating appliances found in the market were compliant with L.I. 1958 whilst 97.4% of RACs conformed with L.I. 1815. Importers of non-compliant appliances were directed to remove them from the showrooms until the appropriate documentation have been submitted for proper labelling. Full details can be found in the Appliance Market Performance Report 2021.

CHAPTER THREE: CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

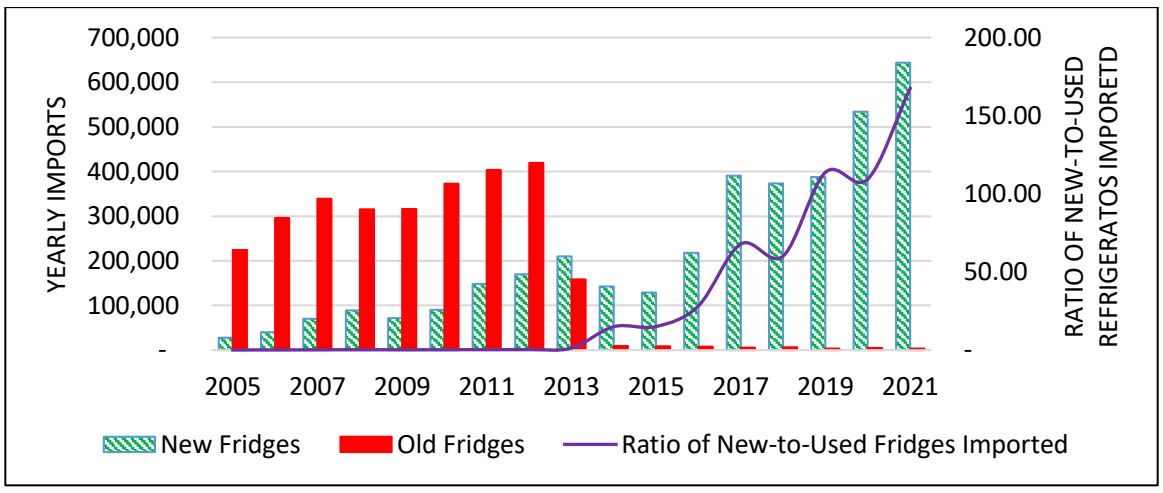
The Energy Efficiency Legislative Instruments (L.I.s 1815, 1932 and 1958) give legal backing to the enforcement of minimum energy performance standards (MEPS) for all the regulated appliances entering the country. The analysis of the enforcement activity at the ports of entry revealed that:

- About 98.2% of the total refrigerating appliances imports were regulated appliances, with a compliance level of about 98.5% in terms of labelling. In terms of star ratings, about 34.0% of all the regulated appliances were 2-star rated, 27.1% were 1-stars, 20.6% were 3-stars, 17.2% were 4-stars and only 1.1% were 5-stars. The overall expected average annual energy consumption of these new refrigerating appliances is **346.6 kWh/year** per unit.

- Also, about 99.8% of the total RACs imports were regulated appliances, with 97.0% of the regulated RACs being compliant. About 52.6% of the regulated RACs were of 1-star rated, 19.1% were 2-stars, 27.8% were 3-stars, 0.2% were 4-stars and 0.2% were 5-star rated. The average EER of the RACs was 3.09W/W, which is above the MEPS of 2.80W/W and with an average annual consumption of **3,203.4 kWh**. About **87.7%** of these RACs have cooling capacities between 12,000 and 18,000 BTU/hr (3.0 kW - 5.3 kW or 1.5 – 2.0 Hp), with a weighted average cooling capacity of 4.85 kW based on the quantities inspected.

- A total of **698.6 GWh** of electricity and a total of **279.4 kilotons of CO_2eq** have been saved in 2021. This electricity savings is reasonably close to twice the total electricity generated by ASKA Power Plant in 2021.

Due to the stringent enforcement at the entry points, the refrigerating appliance market in Ghana has enormously transformed from a used one to an entirely new refrigerating appliance market, especially from 2013, according to the figure below.

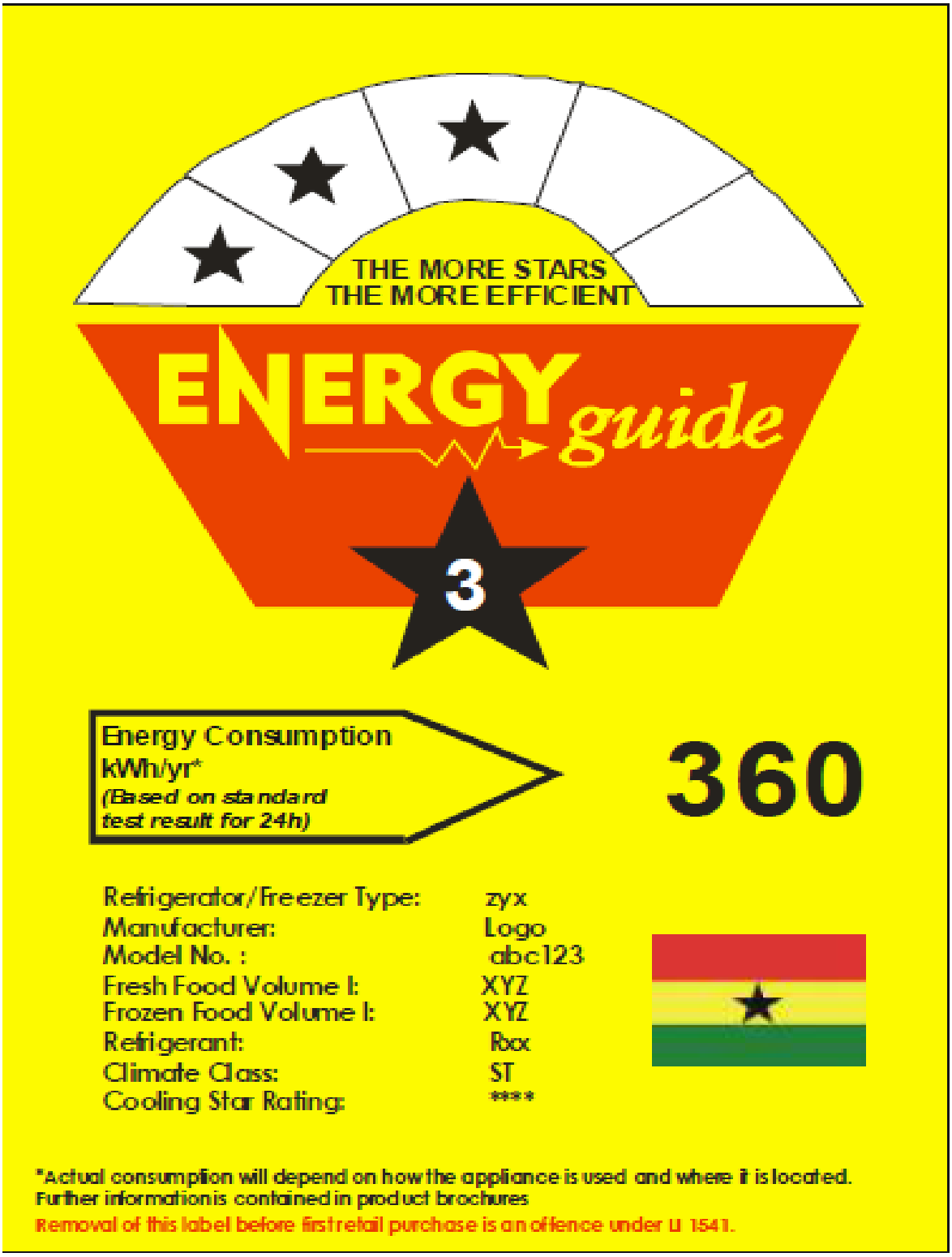


3.2 Recommendation

1. A total of **11,601** unregulated refrigerating appliances (display units/showcase), representing 1.8% of the total imports, were inspected at Tema Port in 2021. These appliances are projected to increase in the coming years as more supermarkets and shopping malls are built across the country. There is, therefore, the need to revise the existing standards and labelling regulations on household refrigerating appliances to cover that category of refrigerating appliances to have MEPS.
2. A total of **355** unregulated air-conditioners such as the duct and cassette types, accounting for 0.2% of the total imports, were also inspected. This needs to be equally regulated since the number of imports is gradually increasing.
3. Used fridges and used RACs are still being imported into the country, though the numbers seem to be decreasing over the years, probably as a result of the stringent measures being implemented at the port. The Commission should:
    i. Start prosecuting recalcitrant importers/agents as prescribed in L.I. 1932, to serve as a deterrent.
    ii. Involve the media during the process of enforcing L.I. 1932 at the ports of entry (how seizures are done, loading, transportation with escorts from GRA, offloading in secured premises and carrying out destructions under the supervision of EC and EPA at Afienya). The footage will then be shown to the general public to help demystify the suspicion that used fridges/RACs when seized, are sold in the market rather than being destroyed.
    iii. Adopt a naming and shaming approach by publishing the details of culprits.

APPENDICES

A.1: Energy Guide Label for Refrigerating Appliance



A.2: Energy Guide Label for Room Air Conditioner