

## The Success Story of the Ghana Refrigerator Efficiency Project Implemented by the Energy Commission

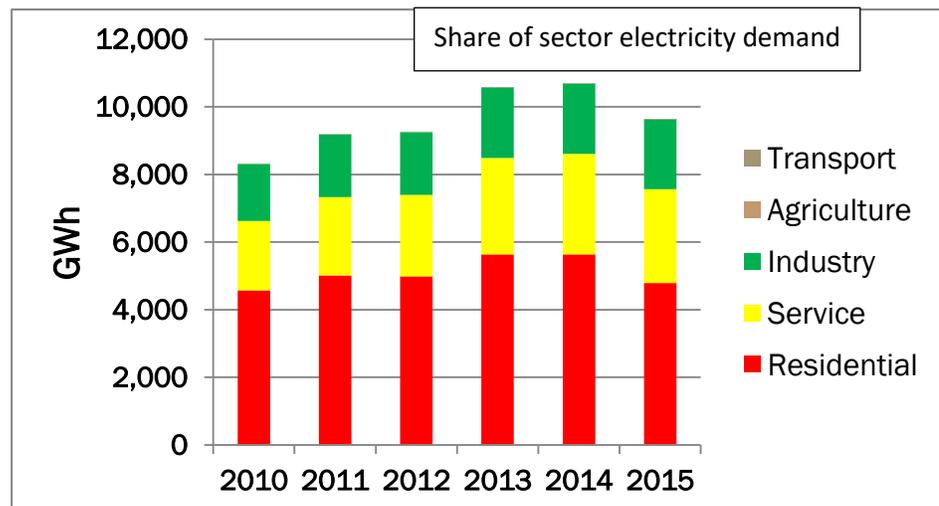


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### Background

Ghana has experienced several periods of power inadequacies since 1984. The most recent stretched over several years, from 2012 to 2015, with its attendant incessant load shedding. The causes of the power shortfalls had been attributed to the natural phenomenon of prolonged draught at the upper course of the Volta River which affected water inflow into the Akosombo dam. Another major cause of the power shortages, which can easily pass without notice, is the increase in demand without a commensurate generation capacity expansion. Electricity access in Ghana is around 84%<sup>1</sup> and is one of the highest in sub-Saharan Africa. Domestic electricity demand for instance has risen over the years; on the average, it accounts for 42% of total generation. Sadly enough, a chunk of the domestic demand is wasted

on the use of old, obsolete and inefficient appliances, discarded in Europe and imported by unsuspecting businessmen. A study conducted by the Energy Foundation in 2003, identified refrigeration as one of the major



electricity consuming household appliances that could be targeted for significant electricity savings. In 2006-2007 the Council for Scientific and Industrial Research (CSIR) under the auspices of the Energy Commission conducted detailed study of the energy consumption patterns of refrigerating appliances in the residential sector, which revealed that the average domestic refrigerator in Ghana consumed 1,200kWh a year compared to 500kWh and 400kWh a year in Europe and the USA respectively. With this revelation, there was urgent need to quickly put measures in place to ensure that demand for electricity grew at a reducing rate. What made the situation scary was the fact that by 2009 the contribution of the cheap hydro power had reduced from 100% to 50% in the generation basket. Ghana had begun to experience the unpleasant choice of thermal complementation with all its attendant financial and environmental consequences in 1997 when it became obvious that the hydro was woefully

<sup>1</sup> December 2016 access rate

inadequate to meet demand. A cue was therefore taken from the developed countries where robust energy efficiency standards and labelling regimes that had been implemented had proven to be very effective in checking demand growth and ensuring energy cost reduction for consumers.

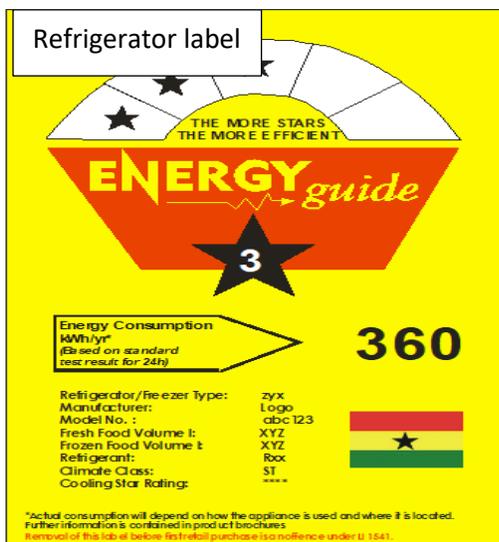
### The Case of Refrigerator as a High Household Energy Consumer

Refrigerating appliances are high energy consuming due to the fact that they run 24 hours a day, even when the user is not present. In homes without air-conditions, they account for about 70% of the electricity bill. The refrigerating appliance market was dominated by used and inefficient ones imported from Europe and elsewhere. These appliances had outlived their technical and economic usefulness in their countries of origin but they were imported into Ghana to begin a new life. This accounted for their high electricity consumption.



They usually come in with faulty compressors, thermostats and weak door and lid seals. Beyond that they were manufactured for use in the cold climatic zones which makes them unsuitable for the tropical climate. The market share of the used refrigerating appliance market was over 70% as against 30% for new and efficient units. This trend accounted for the excessive energy consumption of refrigerators in Ghana prior to 2010. Unfortunately, there was always a ready market for them due to the expansion of electricity access and the general economic improvement in the country, people could afford them.

To reverse this trend, there was the need to put standards and regulations in place to serve as



benchmarks and catalysts. The Ghana Standards Authority, working with the Energy Commission came out with GS IEC 62552:2007 as the standards to be used for refrigerating appliances whether imported or manufactured locally for use in Ghana. To give the standards the needed legal backing, the Minister for Energy, on the advice of the Energy Commission caused to be enacted by parliament two legislative instruments (LIs). The first to be passed in 2008 was “Energy Efficiency (Prohibition of Manufacture, Sale or Importation of Incandescent Filament Lamp, Used

*Refrigerator, Used Refrigerator-Freezer, Used Freezer and Used Air-conditioner) Regulations 2008” (LI 1932). This legislative instrument made it illegal to import any used refrigerating appliance into the country. It was soon followed by the “Energy Efficiency Standards and Labelling (Household Refrigerating Appliances) Regulations, 2009” (LI1958) as amended in LI 1970. This legislative instrument gave legal backing to the standards GS IEC 62552:2007. The primary objectives of the instruments were as follows;*

- i. To prevent Ghana from becoming a dumping ground for obsolete and discarded refrigerating appliances;
- ii. To stimulate economic growth with little or limited investment in more electricity production infrastructure;
- iii. To put money in the pockets of consumers: monies which would have gone into bills as a result of the use of inefficient refrigerators would remain in the pockets of consumers; and
- iv. To phase out inefficient refrigerators from the market.

With this solid background work, the Global Environment Facility (GEF) accepted a funding proposal to check the ever rising demand for electricity due to the influx of used refrigerating appliances by adopting and enforcing a robust standards and labelling programme. GEF in collaboration with UNDP accepted to provide financial and technical support to the tune of USD2.1 million with the government of Ghana providing a counterpart funding of USD1 million to roll out a project that was to become a flagship market transformation project in Africa and the rest of the world. The project kick started in 2011 and ended successfully in 2015.

### **Objectives of the Project and targets**

The project titled “Promoting of Appliance Energy Efficiency and Transformation of Refrigerating Appliance Market in Ghana” had the following objectives;

- i. To promote energy efficiency in refrigerating appliances;
- ii. To transform the refrigerating appliance market from used and inefficient appliances to new and efficient ones;
- iii. To reduce energy demand in households; and
- iv. To reduce Ghana’s energy related CO<sub>2</sub> and ozone depleting substances (ODS) emissions.

With the aforementioned objectives, the following targets were set to be met by the end of the project implementation period:

- i. To reduce the average annual electricity consumption of refrigerating appliances from 1,200kWh to 600kWh;

- ii. To transform the refrigerating appliance market from used and inefficient appliances to that of new and efficient units;
- iii. To reverse the market share of 70% old and used appliances against 30% new appliances; and finally
- iv. To remove 15,000 used and inefficient refrigerating appliances from homes and replace same with new and efficient ones.



Mobile degassing plant

### **Achievements**

To a very large extent, the lofty objectives of the project were met satisfactorily. To be able to remove the 15,000 target, a rebate scheme was put in place to serve as a special purpose vehicle to get used and inefficient fridges from homes and replace them with new and efficient ones. The scheme required that consumers who volunteered to turn in their old fridges

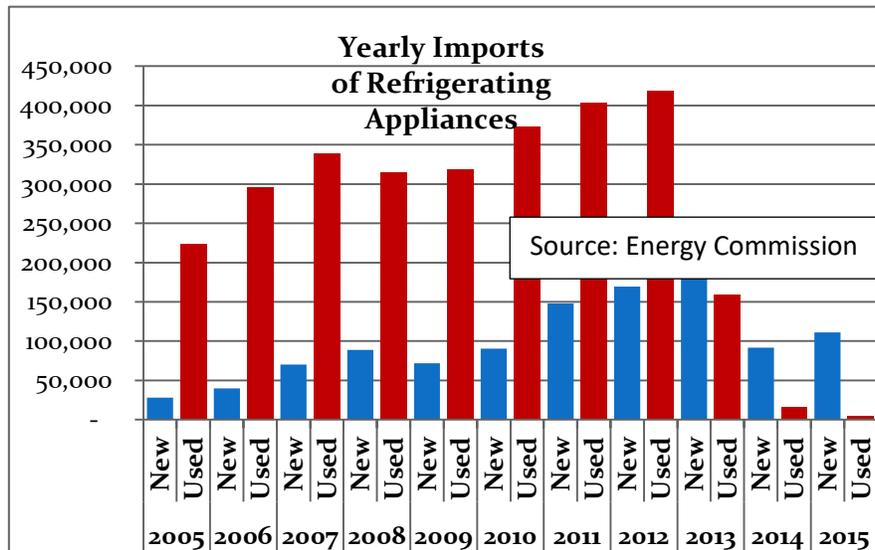
were given a coupon with a monetary face value to enable them purchase new and efficient fridges. The coupon rate ranged from GHS150 (US\$50) to GHS300 (US\$100) depending on the efficiency star rating of the new appliance. The more the stars (i.e. the higher the efficiency level), the more money by way of rebate the consumer received. The rebate scheme was implemented in collaboration with refrigerating appliance dealers, who were willing to participate. The programme was launched in the national capital in November 2012 and by December 2013, the scheme had been up scaled to all the 10 regional capitals. By December 2015 when the project was officially brought to an end, 10,000 new and efficient fridges had replaced the old and inefficient ones in the homes through the rebate scheme alone. Many others, who had the financial means, replaced their appliances without applying for the rebate.

The law prohibiting the importation of used fridges was also vigorously enforced resulting in confiscation of 30,000 pieces of used appliances between July 2013 and December 2015 and still counting because recalcitrant importers continue to trade in the illegal product.

As part of the energy efficiency objective, the Commission was also mindful of the menace of fluorochlorocarbons (CFC), used as refrigerants in the old appliances, on the environment. The used refrigerators were mostly CFC laden as that was the technology at the time of manufacture. The Energy Commission partnered with two private companies to dismantle and scrap refrigerating appliances voluntarily turned in and those that were confiscated. The CFCs were recovered from the appliances before they were dismantled and results showed that about 1,500kg of CFCs were recovered. Besides, 1.1 million tons of CO<sub>2</sub> was saved. Total

electricity savings was about 400GWh, equivalent to 40% of the annual output of the Bui Hydroelectric Power Plant.

The average refrigerator consumption has indeed been reduced from 1,200kWh a year to 600kWh a year globally. However, beneficiaries of the rebate scheme on the average benefitted from a reduced consumption of 385kWh per year translating into a mean household savings on electricity bills of USD140 a year.



### Project Outcome

The refrigerating appliance market has been transformed from mostly used and inefficient refrigerators to new and efficient ones. The share of new refrigerating appliances is now over 90% of the market. With the encouraging trend, one nascent refrigerating appliance assembly plant has been established in Ghana. To ensure a robust enforcement of the standards, a modern refrigerator test laboratory has been established at the Ghana Standards Authority.

A good number of those who hitherto traded in used refrigerating appliances have changed to new and efficient ones. The Commission engineered the creation of an Association of Old Refrigerator Dealers to enable the Commission deal with them as a body but not as individuals. They were then given technical and financial assistance to switch from the sale of used refrigerators to new ones. This eventually saw them launching their own brand of refrigerating appliances in 2013.



Bubbling refrigerator assembly plant at the free zone enclave

## Challenges

The aforementioned achievements did not come without thorny challenges. The used refrigerator market was huge, old and widespread and to bring it down was not an easy task. There was fierce resistance to the change sometimes putting the lives of the Commission's officers in danger as the traders at certain times made unruly advances at the enforcement officers. Despite the strong barrier mounted at the entry ports to search and seize illegal appliances, the importers have become very sophisticated and thereby evading prying official eyes with innovative means of getting the appliances to the market. Another major challenge being faced is the recovered foam from the dismantled fridges. There are piles of them without any use. The Energy Commission is still investigating to find either an off taker or someone who may have use for it either locally or abroad.



The Commission has an enviable track record in project implementation and spurred by that, it intends to lead the development of standards, rules and labels for twenty types of electricity consuming appliances within the next five years. The primary objective is to reduce the system load, most especially, peak load which occurs in the evenings. The Millennium Development Authority (MiDA) is the partner and major financier of this new project. The oars of the Energy Commission will only rest when the economy of Ghana becomes an energy efficient one.