

Case study n°4

Climate Change Mitigation through Electrical Appliance Market Transformation

Country: Ghana

Level: National

SDG Addressed: SDG 13 – Climate Action



Summary

The objective of this case study is to prove that Minimum Energy Performance Standards (MEPS) are effective means to reduce carbon emissions, as well as that deliberate market intervention policies facilitate the uptake of energy efficient appliances. More specifically, the case study takes into account the retrofit for both the energy efficient lighting and the household refrigerator markets put into place by the government of Ghana. The resulting drastic reduction in consumption benefitted consumers in terms of avoided bill payments, while it had even more evident positive implications on the environment and the economy of Ghana at large.

Background

In the early 1990s, population growth, economic expansion and draught-induced low output of the hydro dams, coupled with a thriving appliance market generated a gap between demand and supply of power. Such a discrepancy was worsened by the use of second-hand, inefficient appliances imported from Europe and elsewhere, which resulted in an estimated loss amounting to the 30 per cent of total generated electricity. Mandatory energy efficiency standards and labelling programmes were introduced to solve the problem.

Strategy

Minimum Energy Performance Standards (MEPS) were developed for lighting and air-conditioning appliances in 2005, followed by refrigerating appliance in 2008. The MEPS for lighting, air-conditioners and refrigerators were set, respectively, at 33 lumens per watt, an energy efficiency ratio (EER) of 2.8 and 600kWh per year. Additionally, authorities imposed a ban on the importation of used refrigerating appliances, used air-conditioners and incandescent lamps.

Between 2007 and 2008, the government of Ghana also designed and implemented targeted market intervention and fiscal policy measures, including the import of six million of Compact Fluorescent Lights (CFLs) to be distributed at no cost to consumers as a replacement for incandescent bulbs. Furthermore, a rebate scheme was put in place with the aim of facilitating the switch from used, inefficient refrigerators to brand-new, efficient ones. Additional personnel were posted to the main ports so as to enforce the ban on importation of the prohibited electrical appliances and lighting devices.

Results and Impact

The lighting retrofit resulted in reducing the peak load by 124MW, in saving 452MWh of energy per day (which translates into US\$ 39.5M per year), and in saving 105,000 tons of CO₂. Additionally, between September 2007 and September 2009,

the penetration rate of energy efficient lighting technology increased exponentially, from 3 per cent to 79 per cent, whilst that of incandescent bulbs decreased from 58 per cent to 3 per cent.

The refrigerator rebate scheme led to the replacement of 10,000 second-hand, inefficient refrigerators, the saving of 4000GWh of electricity and of 1.1 million tons of CO₂. Finally, between November 2012 and December 2015, the average annual refrigerator consumption dropped from 1,2000kWh per unit to 385kWh.

Challenges and Lessons Learned

The government of Ghana had to face a number of challenges when implementing the MEPS. These included insufficient institutional collaboration between the organisations concerned, such as the Energy Commission, the Ghana Standards Authority, and other stakeholders whose support would have been instrumental to the success of the program; the lack of laboratories to perform verification tests on the appliances; frequent bribery attempts and political interferences.

The lessons learned, on the other hand, were many, and featured, inter alia, a strengthened system leadership and institutional engagement. This was achieved by including officials from several institutions into the steering committees of various undergoing projects, who then became the gatekeepers for the Energy Commission in their respective host organisations. Furthermore, the Energy Commission managed to adapt existing structures to carry out the aforementioned tests, instead of waiting for new laboratories to be established.

Potential for Replication

The experience is replicable in several developing countries, yet Sub-Saharan Africa, due to similar socio-economic and cultural issue, represents a fertile ground for the replication of the strategies implemented to increase the uptake of energy efficient products in Ghana. Following this lead, Nigeria and Senegal have indeed adopted MEPS, establishing themselves as the only countries in West Africa to have done so.