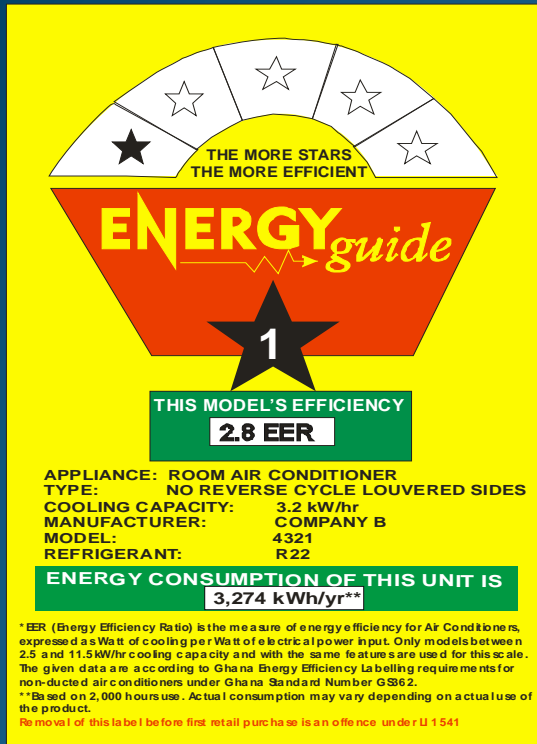


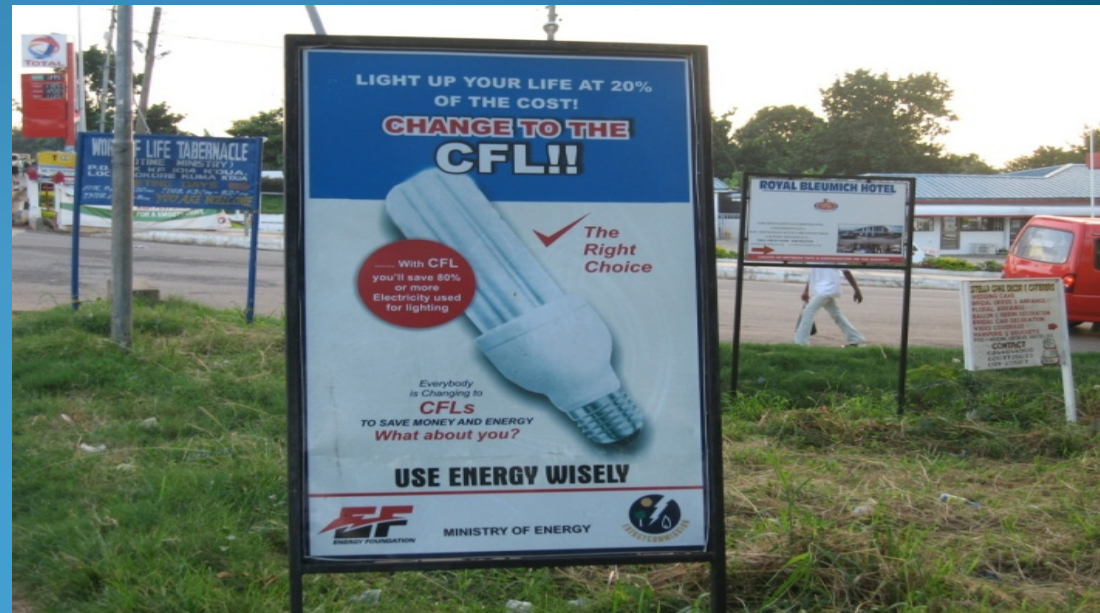
Energy Efficiency & Conservation, The Ghana Experience

USAID/NARUC West Africa Regional Partnership on Clean Energy

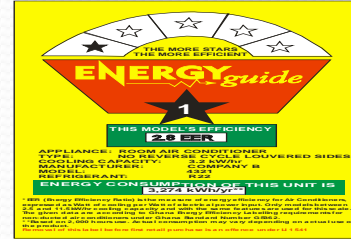
Cape Verde, May 21 -23



Kofi Agyarko
Energy Commission, Ghana



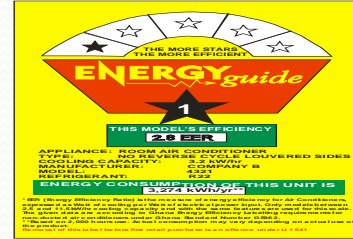
Presentation outline



- Background
- Preparation & Benchmarking
- The LIs
- What the LIs seek to achieve
- Achievements
- Institutional Energy Conservation
- Conclusion



Background

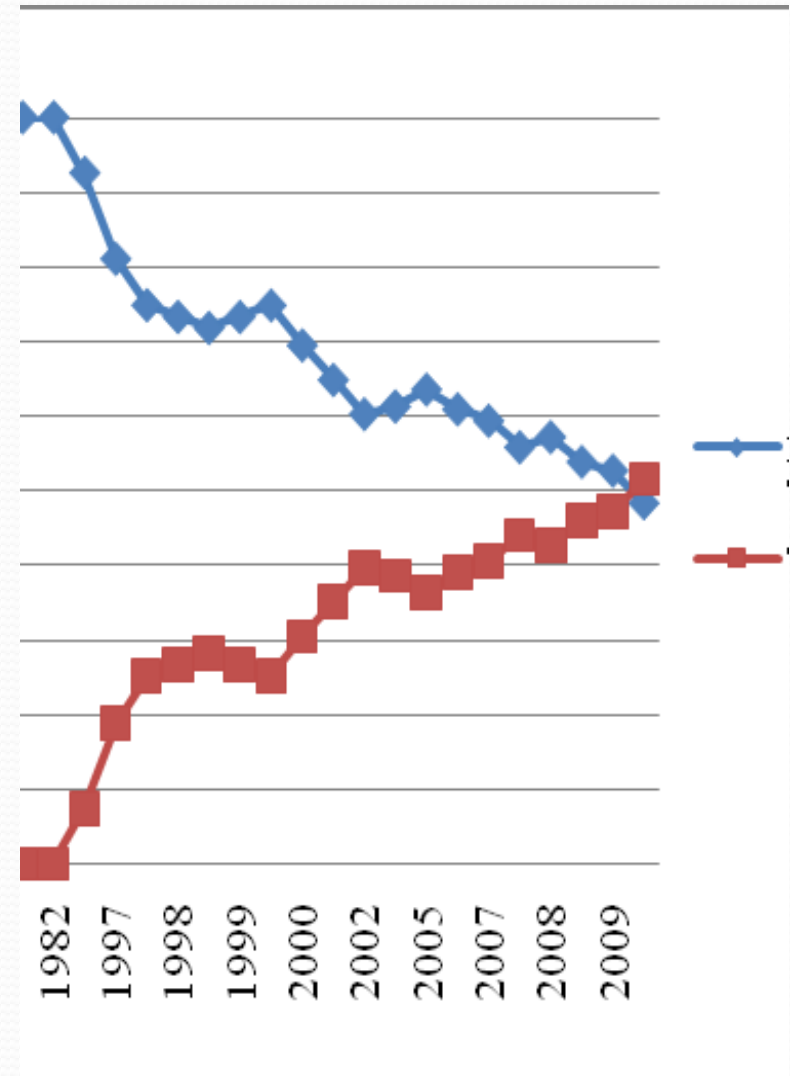


- Ghana has experienced several periods of power shortfalls: 1984, 1994, 1998 and 2007
- Domestic electricity demand is growing at 7% p.a. whereas generation is lacking. 2010 growth was 10.2% over 2009
- A significant proportion of total electricity generated goes waste as a result of the use of inefficient appliances.
- Energy production and consumption has cost and climate change implications
- Ghana is under obligation to phase out ODS.
- The most efficient tool for energy efficiency in an imperfect market is the adoption of Standards and Labelling Programme
- There are many successful cases of Appliance Standards and labels programmes worldwide



Background Conts.

- Annual production: 10,000GWh
- Access rate: 72% (MoEP)
- Connected: 64% (GLSSS 2010)
- Thermal capacity is gradually exceeding hydro
- Increasing cost of generation from more expensive fuels
- Increasing environmental impact from carbon-rich fuels

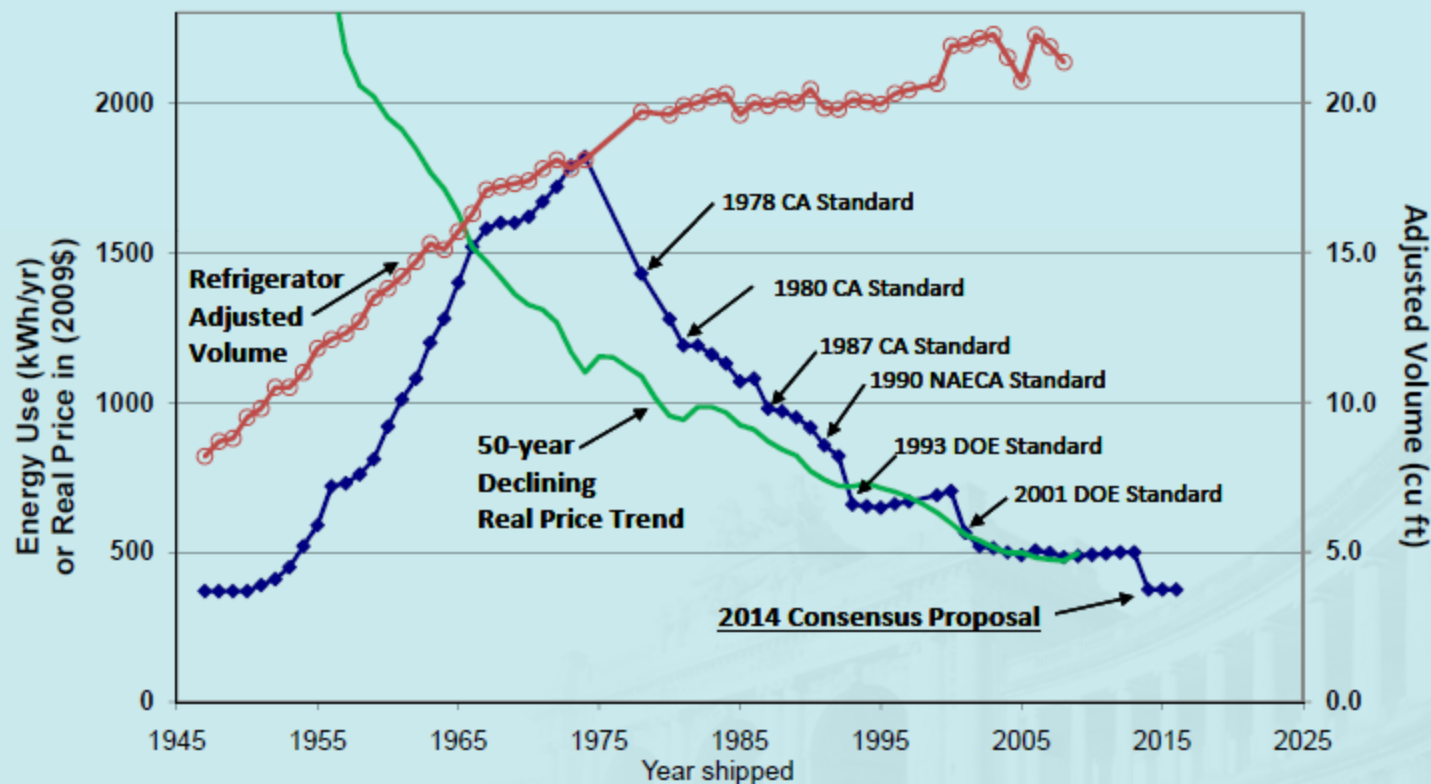


Effect of US Refrigerator Standards & Labeling Programme

Slide from Secretary Chu's Presentation at CEM2: The Power of Efficiency Standards

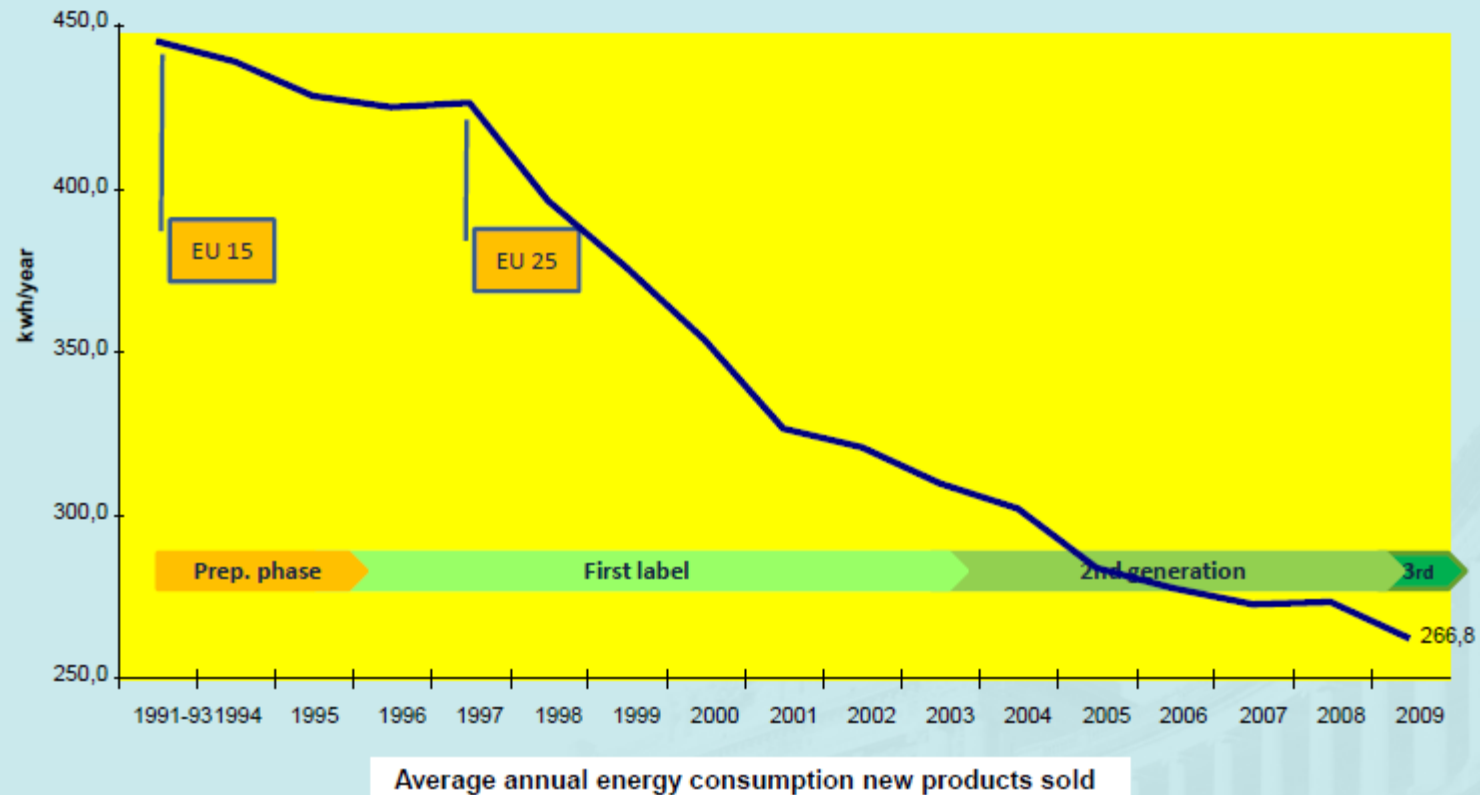
Annual Energy Use, Volume, and Real Price of New Refrigerators

Sources: AHAM Factbooks, Rosenfeld 1999 and Bureau of Labor Statistics



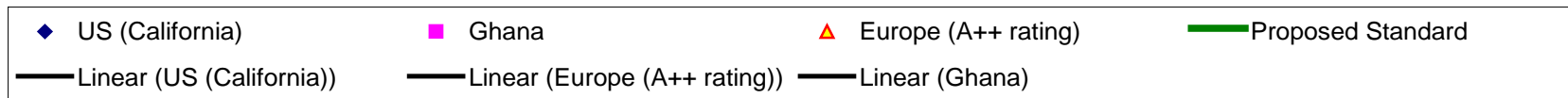
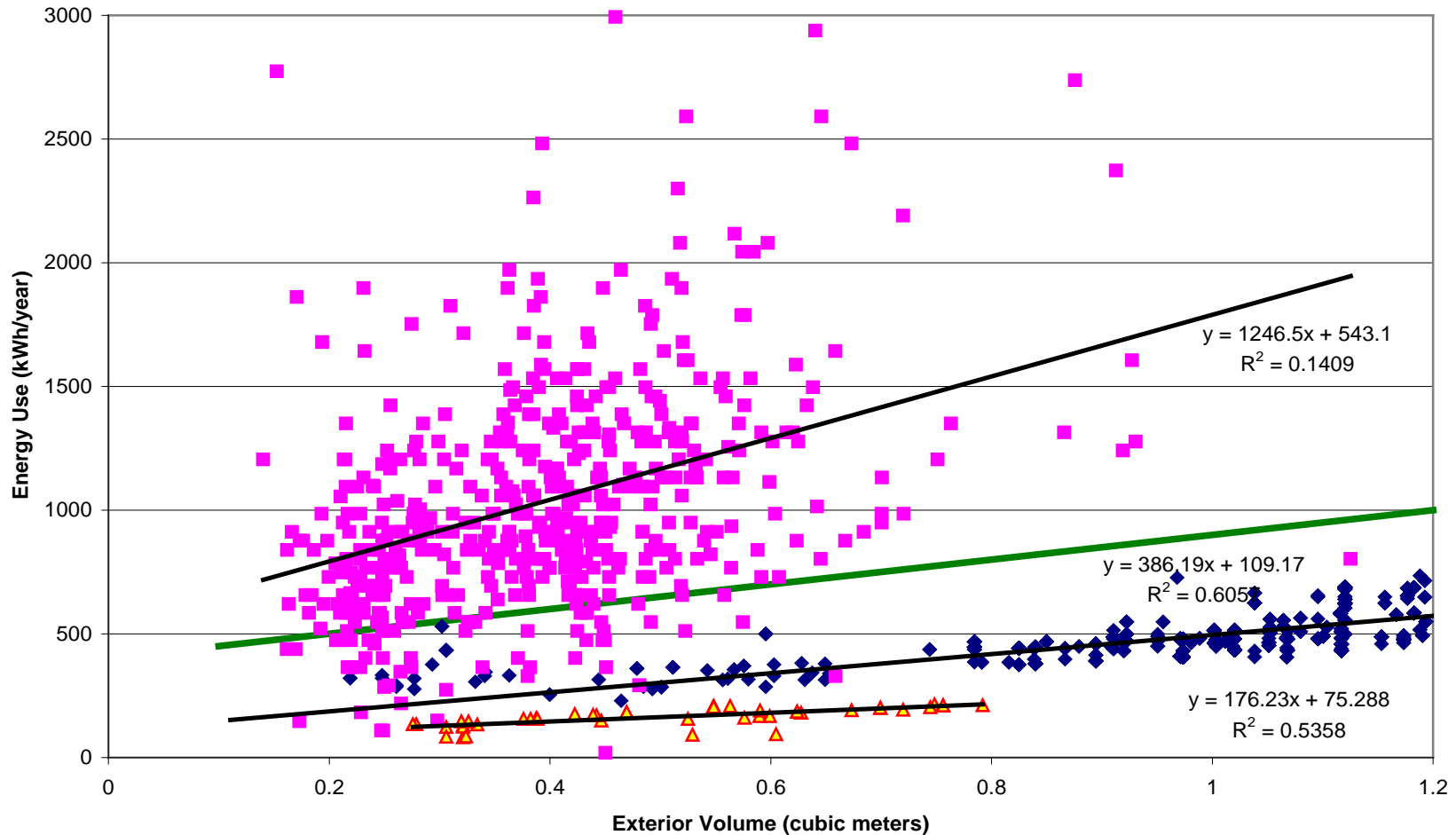
Effect of EU Energy Labeling Programme

Energy consumption evolution



Energy Consumption in Refrigeration in Ghana, 2006

Comparative Energy Use

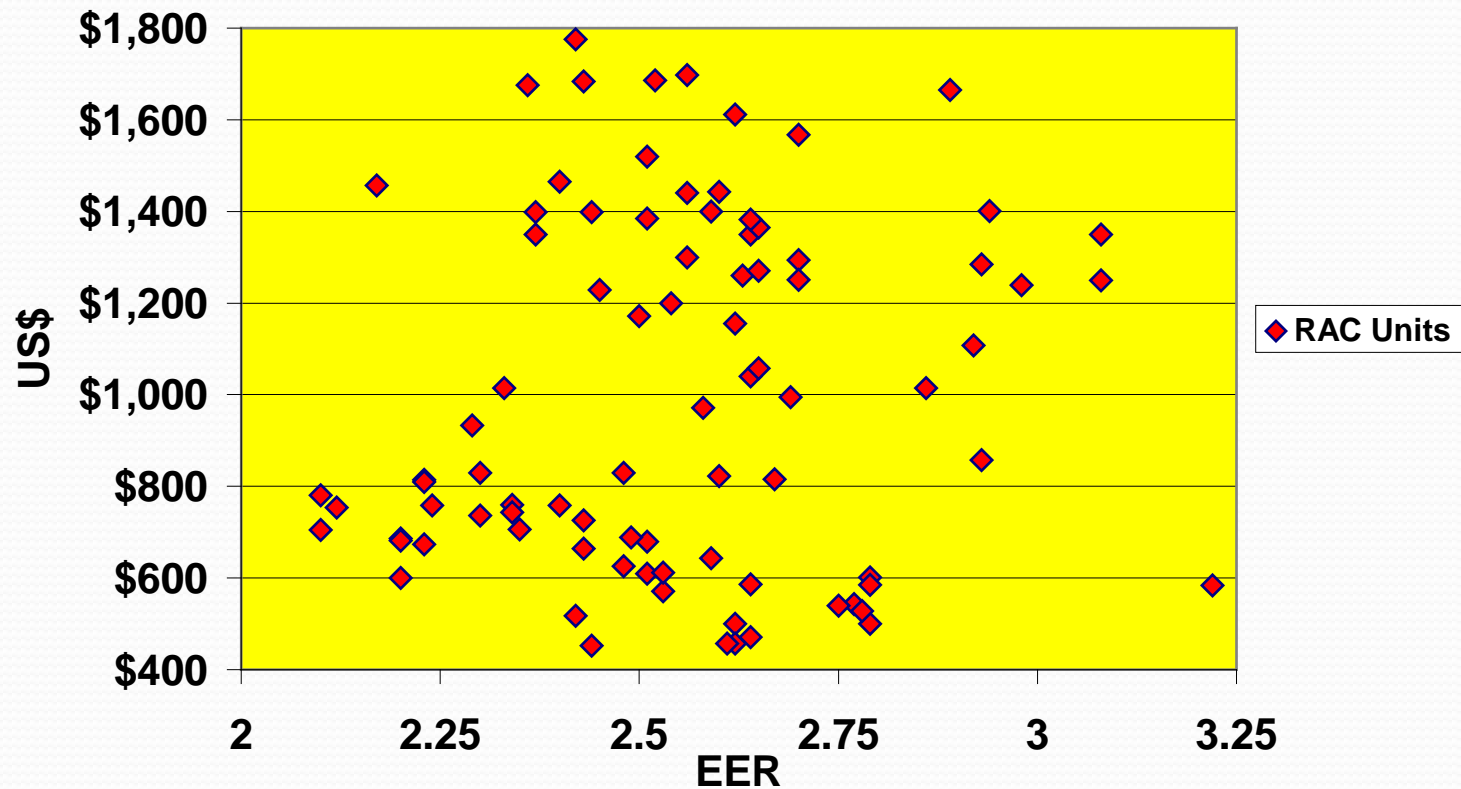


13-Aug-07

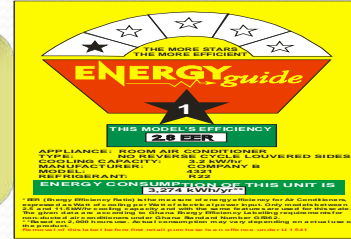
Energy Consumption of Refrigerators in Ghana

7

Room air-conditioners, 2003



The Legislative Instruments



- Energy Efficiency Standards and Labelling (Non-Ducted Air-conditioners and Self-Ballasted Fluorescent Lamps) Regulations, 2005 (LI 1815)
- 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)
- Energy Efficiency Standards and Labelling (Household Refrigerating Appliances) Regulations, 2009 (LI 1958) and LI 1970

THE MORE STARS THE MORE EFFICIENT

ENERGYguide

1

THIS MODEL'S EFFICIENCY

150 Btu/Day

APPLIANCE: REFRIGERATOR WITH FREEZER

SEASONAL ENERGY CONSUMPTION

150 Btu/Day

ENERGY CONSUMPTION OF THIS UNIT IS

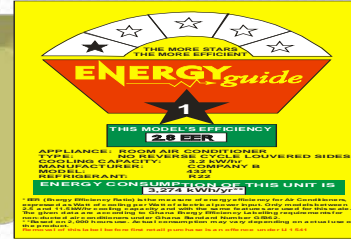
150 Btu/Day

Model No.	Energy Consumption (Btu/Day)
Model No. 1	Energy Consumption (Btu/Day) 150
Model No. 2	Energy Consumption (Btu/Day) 150

Energy consumption is based on a standard test procedure. Actual energy consumption may vary due to differences in usage and environmental conditions.

-
- A close-up photograph of a hand holding a fan of Ghanaian Cedi banknotes. The notes are fanned out, showing various denominations including One Cedi (pink and blue) and Five Cedi (blue). The word 'GHANA' is visible on the Five Cedi note. The background is slightly blurred, showing an indoor setting.

What the LIs seeks to achieve



- To prevent Ghana from being a dumping ground for energy inefficient appliances that have been discarded in other countries



THE MORE STARS THE MORE EFFICIENT

ENERGYguide

1

THIS MODEL'S EFFICIENCY
50%

APPLIANCE: REFRIGERATOR
COVERED SIZES: 18.0 CUBIC FEET TO 23.5 CUBIC FEET

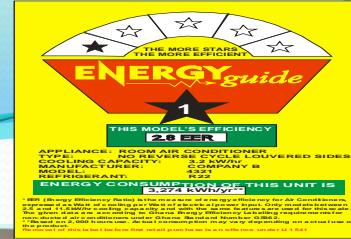
ELECTRICITY CONSUMPTION: 150 KWH/YR

ENERGY CONSUMPTION OF THIS UNIT IS
150 KWH/YR

ENERGY STAR APPLIANCE
ENERGY STAR CERTIFIED
ENERGY STAR QUALITY
ENERGY STAR WARRANTY
ENERGY STAR SUPPORT
ENERGY STAR INFORMATION
ENERGY STAR LABEL
ENERGY STAR MARKETING
ENERGY STAR DISTRIBUTION
ENERGY STAR RETAILER
ENERGY STAR INSTALLER
ENERGY STAR MAINTENANCE
ENERGY STAR REPAIR
ENERGY STAR REPLACEMENT PARTS
ENERGY STAR ACCESSORIES
ENERGY STAR DOCUMENTATION
ENERGY STAR TRAINING
ENERGY STAR CERTIFICATION
ENERGY STAR REGISTRATION
ENERGY STAR COMPLIANCE
ENERGY STAR MONITORING
ENERGY STAR REPORTING
ENERGY STAR EVALUATION
ENERGY STAR IMPROVEMENT
ENERGY STAR INNOVATION
ENERGY STAR RESEARCH
ENERGY STAR DEVELOPMENT
ENERGY STAR TESTING
ENERGY STAR ANALYSIS
ENERGY STAR DESIGN
ENERGY STAR CONSTRUCTION



The environment !



E-waste adds to filth in Odaw drain

W months ago, Ghana, together with MA, embarked on exercise to clear huge of solid waste from Odawna drain, viving a *Daily Graphic* cation on the filthy of the drain caused e dumping of solid e into it.

hile the clearing ise has not been fully oleted, scrap dealers operate close to the i have started dumping ste and refrigerator s into the river, adding o the huge volume of ic waste already in the n.

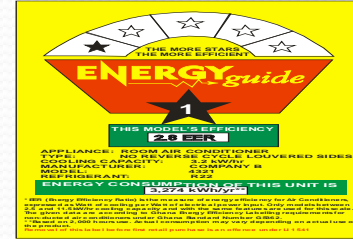
The area has also been ed into a site where the ple who live and rate there respond to call of nature.

The pungent stench n the drain has pelled companies and ividuals engaged in



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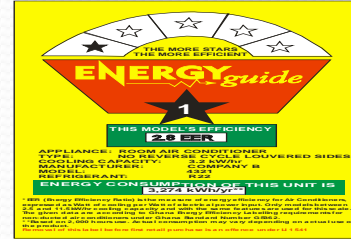
Appliance Labelling



- Information on package:
- All appliances will be affixed with a label giving the following :
 - Model
 - Manufacturer's name or trade mark
 - Annual electricity consumption
 - Energy efficiency star rating
 - type of refrigerant (refrigerators & air-conditioners)
 - climate class (ST or T)



Key labelling requirements

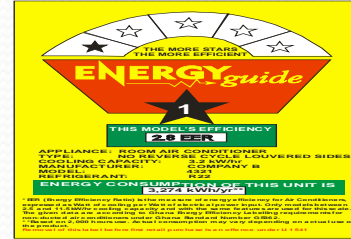


The Label Must Be :

- ❑ in the English language
- ❑ printed in colour on a water proof material with a gold background
- ❑ affixed conspicuously on both the refrigerators and the packages that contains the refrigerators
- ❑ affixed on the doors for refrigerators that open from the front and on the lids for refrigerators that open from the top
- ❖ All the stars on the label are black



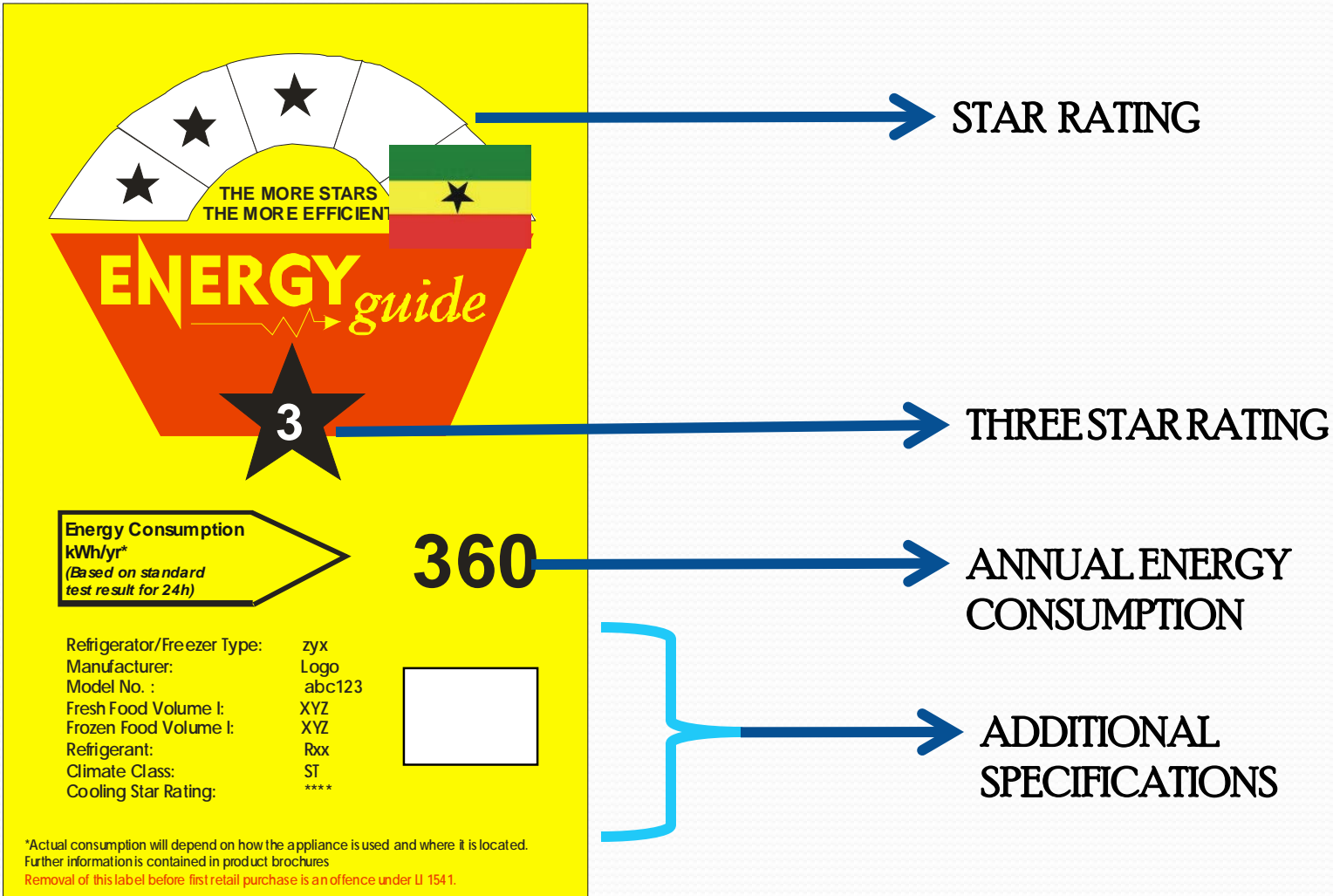
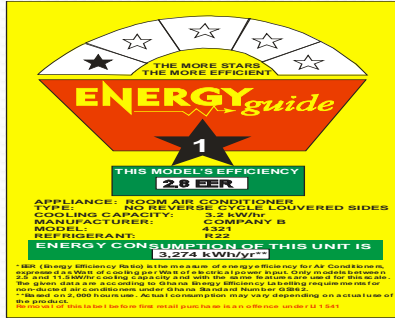
The star rating



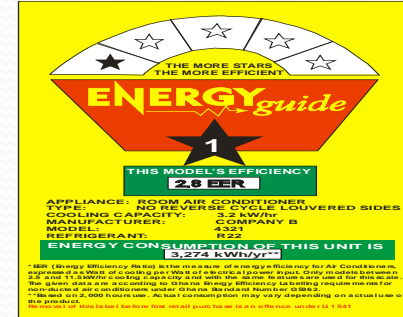
- There are **FIVE (5)** energy efficiency **CLASSES** for refrigerators
- These **CLASSES** are:

ONE STAR	★
TWO STARS	★ ★
THREE STARS	★ ★ ★
FOUR STARS	★ ★ ★ ★
FIVE STARS	★ ★ ★ ★ ★
- The energy efficiency levels of the appliance is indicated by the **NUMBER** of **BLACK STARS** on label

Key features of the label

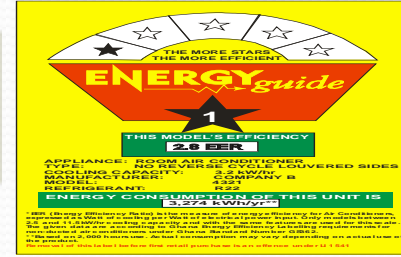


Economic benefits



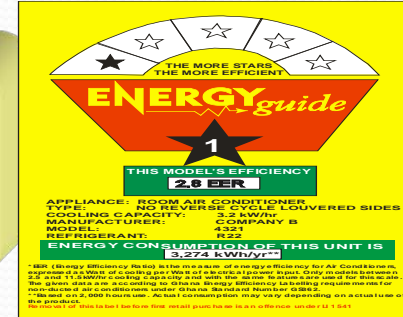
1. Improved efficiency results in lower demand for new power plants
2. Investments that would have gone into new power plant acquisition could be released for other developmental projects
 - RAC alone will save Ghana \$775m by 2020
 - 250MW of generating capacity can be freed by 2020
 - Refrigerators will also save Ghana \$72m p.a.
 - 600GWh expected to be freed

Achievements so far CFL Exchange programme



- Peak savings of 124 MW or 172.8GWh/annum through replacement of 6 million incandescent lamps with CFLs and switch to CFL as basic lighting technology
- Delay in thermal energy generation expansion investment of US\$105million
- CO₂ savings of about 112,320 tons per annum
- Reduction of 148,000 barrels of light crude oil for thermal electricity generation
- At an average crude oil price of US\$105 per barrel recorded between Oct. 2007 and Oct. 2008, the energy cost savings is estimated at US\$33.3million per annum.

Results – Consumer benefit



- Enhancement of consumer welfare
- Mean household income savings of about GHC_{31.00} in 25 districts across the country in over 6 months due to CFL



2010 EE Global Award



[illegible]

REFRIGERATOR ENERGY EFFICIENCY PROMO THE REBATE SCHEME

PANEL 1: DAN WANTS TO BUY A NEW FRIDGE, BUT HE DOESN'T HAVE ENOUGH MONEY.
 THIS FRIDGE IS CONSUMING TOO MUCH ENERGY.

PANEL 2: HE FINDS OUT ABOUT THE REBATE SCHEME PROMO THROUGH THE NEWSPAPERS.
 WOW, LET ME CHECK OUT THE WEBSITE TO SEE IF I QUALIFY.

PANEL 3: HE CHECKS HIS ELIGIBILITY...
 YES!! I AM ELIGIBLE!

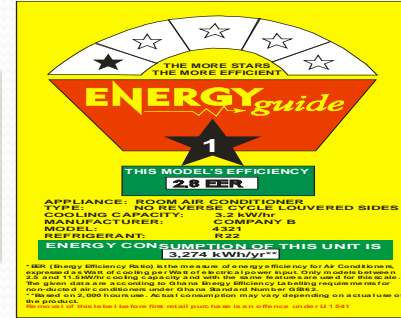
PANEL 4: QUICKLY HE TAKES HIS FUNCTIONING APPLIANCE TO THE PARTICIPATING RETAILER...
 LET ME SEND MY WORKING FRIDGE.
 PARTICIPATING SHOP
 HUGE DISCOUNTS!!

PANEL 5: HIS APPLIANCE PASSES THE TEST. HE GETS HIS REBATE COUPON AND TOPS UP WITH THE DIFFERENCE TO PURCHASE A NEW FRIDGE.
 RETURNING FRIDGE
 DISCOUNT COUPON

PANEL 6: SOON, DAN GETS HIS NEW FRIDGE. THANKS TO THE REBATE PROGRAM.
 WOW! THIS 5-STAR FRIDGE CONSUMES THE SAME AS A 100W BULB IN A YEAR. I AM SAVING OVER GH¢200 IN ELECTRICITY BILLS ANNUALLY.

- Limited to only citizens of Ghana - present passport, voters ID or National ID and electricity bill at retail shop for verification
- Discount vouchers will only be made available upon the delivery of an old functional refrigerator
- Discount vouchers are limited to one per individual
- Discount vouchers will be offered on a first-come first-served basis
- Discount vouchers will not be offered before and after the offer period

Stakeholder Engagement & Awareness Creation



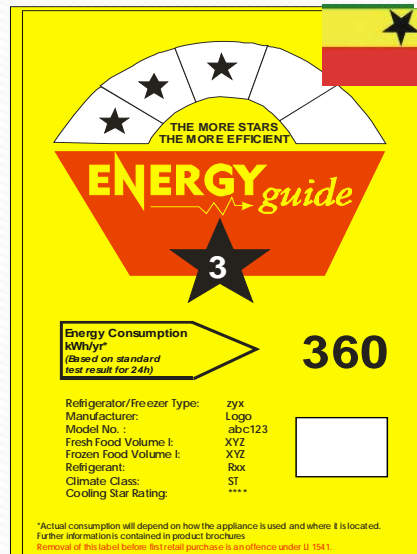
- ◆ Rigorous public education campaign on conservation
- ✓ Town hall meetings
- ✓ Radio jingles and TV documentaries
- ✓ Educational materials in post boxes
- ◆ Training of refrigerating mechanics
- ◆ Constant engagement of dealers in affected appliances
- ◆ Inter-ministerial round table discussions
- ◆ Constant engagement with Customs

IMPORTERS TO NOTE

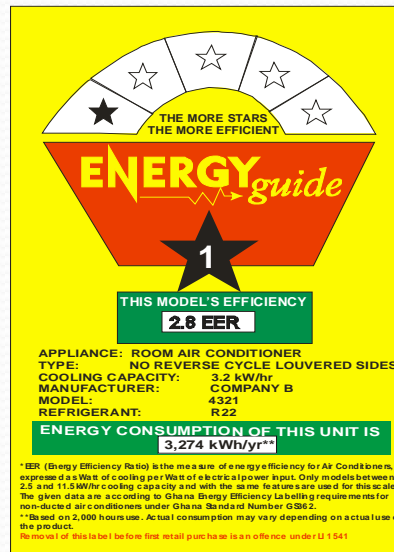
LABELLING REQUIREMENTS FOR IMPORTATION OF NEW REFRIGERATORS, AIR CONDITIONERS AND COMPACT FLUORESCENT LAMPS (CFLs)

ALL IMPORTED NEW REFRIGERATORS, AIR CONDITIONERS AND CFLs SHOULD BE PROPERLY LABELLED IN ACCORDANCE WITH THE PROVISIONS OF LI 1958 & 1815

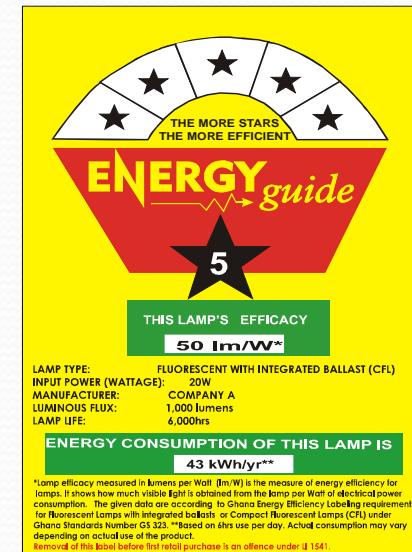
REFRIGERATORS



AIR CONDITIONERS



CFLs



THE IMPORTATION OF UNLABELLED NEW REFRIGERATORS, AIR CONDITIONERS AND CFLs IS PROHIBITED BY LAW

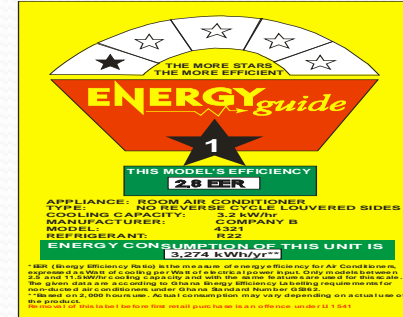


Energy Commission : Telephone: 0302-813756 / 7, Email: info@energycom.gov.gh, Website: www.energycom.gov.gh

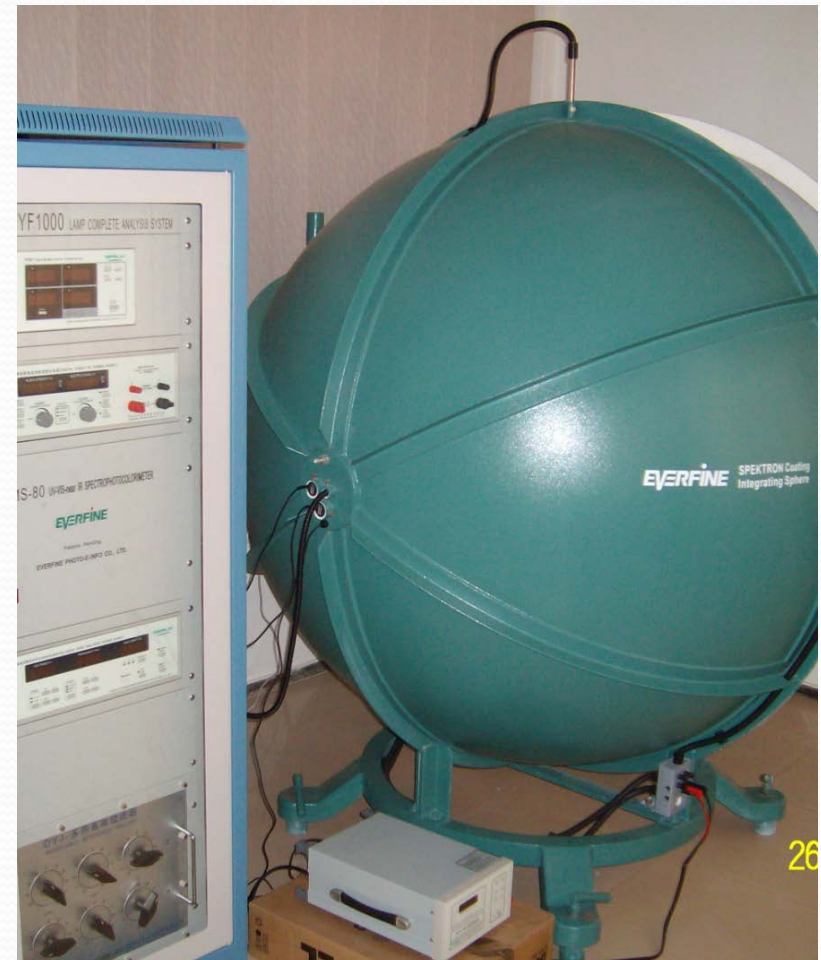
Ghana Standards Board: Telephone: 0302-500231, Email: info@gsb.gov.gh, Website: www.gsb.gov.gh

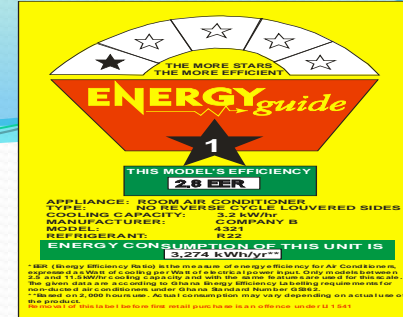


Enforcement difficulties



- ◆ Weak institutional collaboration
- ◆ Agitation from the affected group
- ◆ Test facilities
- ◆ Inadequate human capacity





Institutional Energy Conservation



Automatic Capacitor Bank



Institutional Energy Conservation

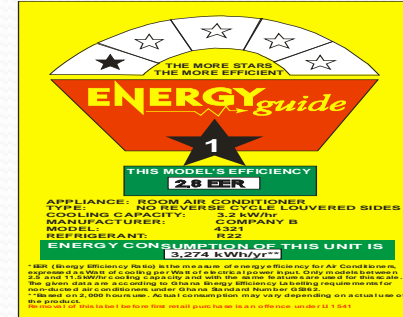
Installation of Capacitor Banks

- Office of the President
- State House
- Ministry of Defence
- Foods & Drugs Board,
- Accra Sports Stadium
- Korle Bu Teaching Hospital

Savings

- Total savings 1,851kva
- Total monetary savings
- (\$27,567/mth) (\$330,804/yr)
- Simple pay back period Based on project cost of \$258,200
(Less than 10 months)
- Capacitors Installed 7167kvar

Conclusion



- It is cheaper to conserve than to produce more electricity
- Appliance standards and labelling regime has proven to be the most effective tool in achieving energy efficient economy
- No label no good