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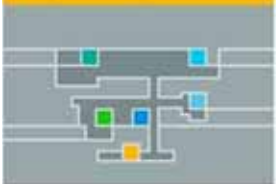


# Review of appliance energy savings in light of South Africa's delayed Standards & Labelling (S&L) Programme

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## Overview

- Role of Standards & Labelling (S&L) to promote energy efficiency
- SA's S&L Timeline and delayed implementation
- Refrigeration market in SA:
  - Saving potential;
  - Proposed MEPS & SA's national standard for refrigeration;
  - Energy Efficiency Index & Energy Classes
- Comparison of 2010 Baseline & 2014 market survey data
  - Conclusions
- Findings and recommendations

**Acknowledgements (SANEDI)**

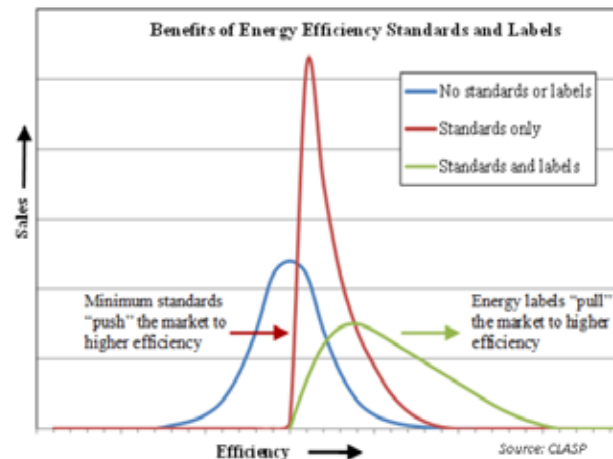


# Introduction

**Minimum Energy Performance Standards (MEPS) and labelling**  
jointly referred to as ***Standards and Labelling (S&L)***

## Role of MEPS and S&L:

- Drivers of market transformation:



- A residential energy conservation tool:

- Labelling Programmes

- Designed to modify the selection criteria of consumers by drawing attention to the energy consumption of household appliances.

- Performance requirements

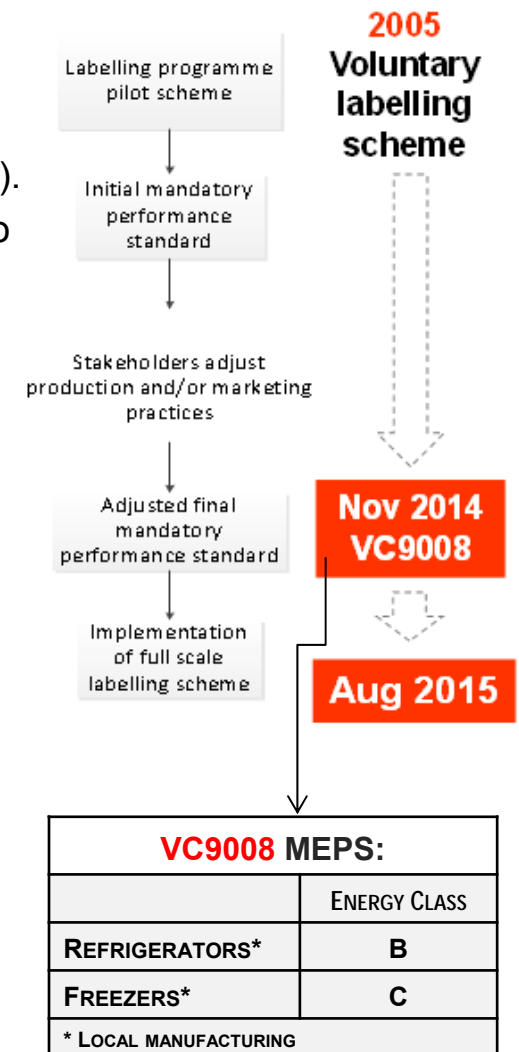
- Imposing MEPS improves the energy efficiency of new appliances.



# Implementing MEPS and S&L in SA

- **1998:**
  - Government commitment → Energy White Paper: “introduce a domestic appliance-labelling programme”
- **2005:**
  - DoE issued a National Energy Efficiency Strategy: **voluntary target** of 12% EE improvement by 2015 (using a 2000 baseline).
  - DoE introduced a **voluntary labelling scheme** - precursor to a mandatory S&L Programme.
- **2007:**
  - DoE & UNDP country office submitted joint application for financial support to Global Environment Facility (GEF) to **implement mandatory S&L programme**.
  - DTI commissioned **impact study** sponsored by *Fund for Research into Industrial Dev., Growth & Equity* (FRIDGE).
- **2008:**
  - SABS formed Working Group to develop SA National Standard “**SANS 941** - Energy Efficiency for Electrical and Electronic Apparatus”.
- **2012:**
  - Findings of the FRIDGE study → benchmark for the MEPS to be adopted.  
*Initial implementation planned for 2012.*

## Timeline:



# Savings potential

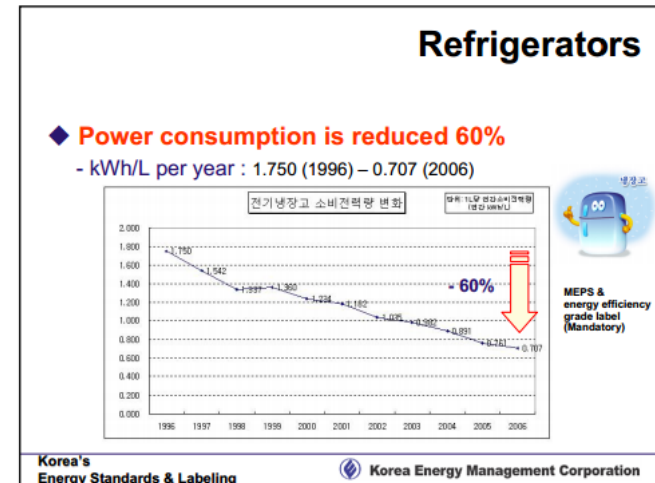
## Implementation of MEPS programme for residential appliances:

- Demand side management (DSM) intervention:
  - Far more cost effective than new generation, regardless of fuel source.
- Implementation with the necessary controls (e.g. regular revision of standard) can yield large energy savings over reasonably short time.

## Refrigeration appliances (freezers, combination fridge-freezers, refrigerators):

- Refrigerators have very high household penetration rate;
- Lifespan of 10 years +;
- 24/7 operation.
- *Significant savings potential.*

Example: Electricity consumption of refrigerators in Korea decreased by 60% over 10 year period.

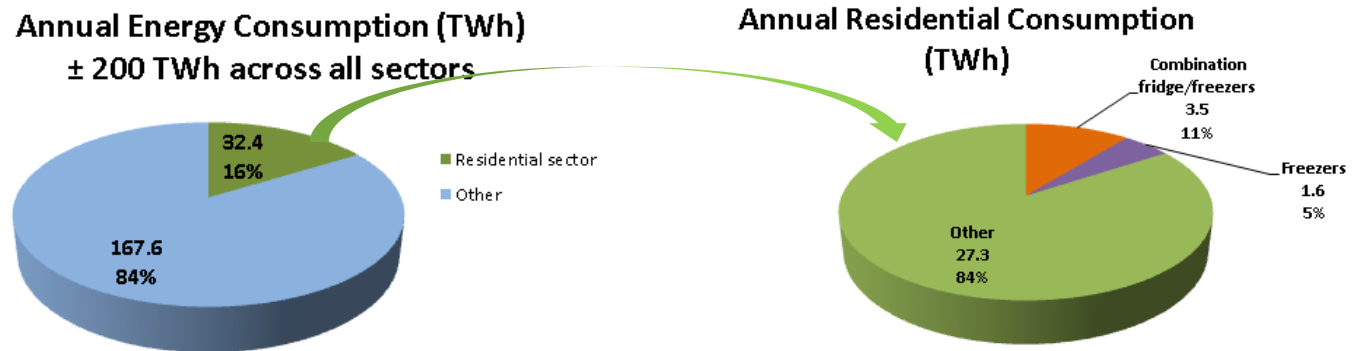


Source: Korea Energy Management Corporation

# Saving potential for SA's residential refrigeration market

## 2010 Baseline:

- ± 7.4 million fridge/freezers; 3.5 million freezers in use in SA.
- Ave. annual consumption of ± 472 kWh per unit.

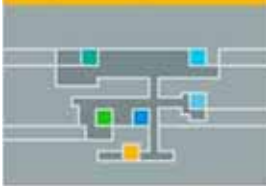


- Enormous efficiency improvements achieved if old inefficient models are replaced by modern efficient ones.

**SA market:** Segmented/two-tier market: Income inequality, understanding of EE → selection criteria.

## SA's Freezer market:

- Until 2010 almost exclusively supplied by local manufacturers.
- In recent years:
  - Local manufacturers have upgraded products to improve efficiency.
  - International companies increased market share.



# Proposed MEPS & National Standard

MEPS proposed:			
APPLIANCE	CONSULTATION	BUENAS	VC9008
REFRIGERATORS*	B	B	<b>B</b>
FREEZERS*	C	C	<b>C</b>
WASHING MACHINES	A	A+	A
TUMBLE DRYERS*	C	B	D
DISHWASHERS	A	A+	A
...			
* LOCAL MANUFACTURING			

National standard for the refrigeration category:

**SANS 62552:2008** covers **Refrigerators (Fridges), Freezers** and **combination Fridge/Freezers**.

Each sub-category is divided into a size/carrying capacity subcategory:

- **Small** < 340 litres (<5 cubic feet) .
- **Medium** 340 – 510 litres (5-12 cubic feet).
- **Large** > 510 litres (>12 cubic feet).

1. *Provide indicators of consumption for these MEPS levels (Energy Classes);*
2. *Evaluate the market: compare **2014 survey data** against **2010 baseline data**.*

# Energy Efficiency Index & Energy Classes

## Energy Efficiency Index (I):

- Indicator to compare **energy consumption** to appliance's **internal volume**;
- Demonstrate: how efficient it is for its size?

SANS 62552:2008 for refrigeration	
ENERGY EFFICIENCY INDEX (I)	ENERGY EFFICIENCY CLASS (RATING)
$I < 30$	A++
$30 \leq I < 42$	A+
$42 \leq I < 55$	A
<b><math>55 \leq I &lt; 75</math></b>	<b>B</b>
<b><math>75 \leq I &lt; 90</math></b>	<b>C</b>
$90 \leq I < 100$	D
$100 \leq I < 110$	E
$110 \leq I < 125$	F
$2 \geq 125$	G

Acc. to MEPS in the **VC9008**:  
 Class **B** set for refrigerators  
 Class **C** for freezers.

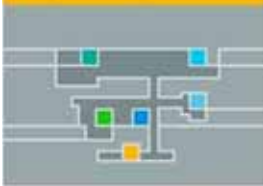
## Consumption indicators:

calculated **Annual Energy Consumption (kWh/yr)** for most common capacities (based on survey data) for Small, Medium & Large:

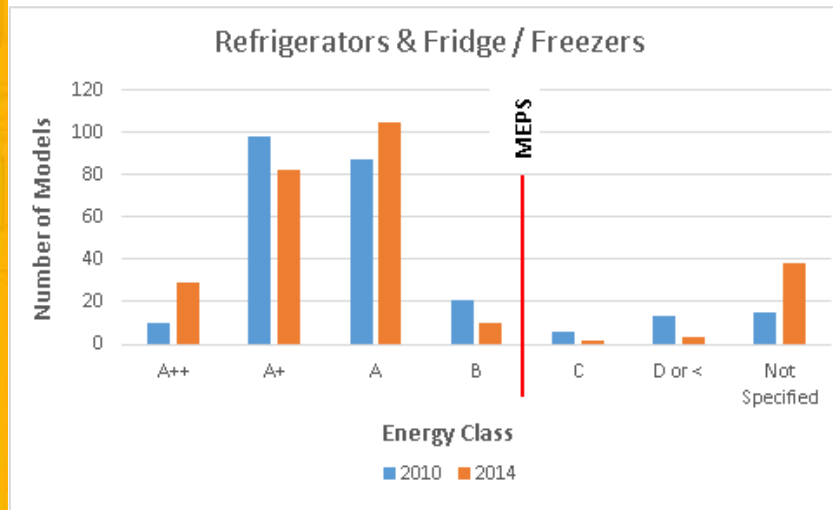
Comb. fridge/freezers:				
CLASS	INDEX	APPLIANCE ENERGY CONSUMPTION, AC, (IN kWh/YEAR) PER ENERGY CLASS		
		SMALL	MEDIUM	LARGE
<b>B</b>	<b><math>55 \leq I &lt; 75</math></b>	<b><math>430 \leq AC &lt; 585</math></b>	<b><math>460 \leq AC &lt; 635</math></b>	<b><math>655 \leq AC &lt; 890</math></b>

Freezers:				
CLASS	INDEX	APPLIANCE ENERGY CONSUMPTION, AC, (IN kWh/YEAR) PER ENERGY CLASS		
		SMALL	MEDIUM	LARGE
<b>C</b>	<b><math>75 \leq I &lt; 90</math></b>	<b><math>310 \leq AC &lt; 375</math></b>	<b><math>515 \leq AC &lt; 615</math></b>	<b><math>595 \leq AC &lt; 715</math></b>





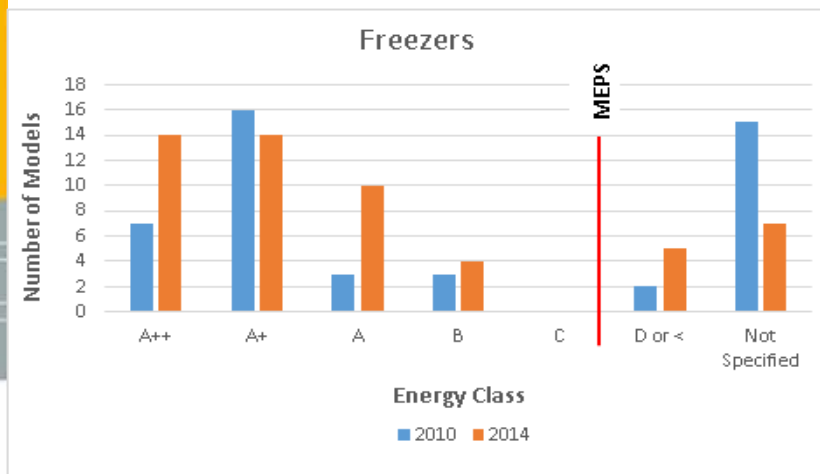
# Comparing 2010 Baseline against 2014 survey data



## REFRIGERATORS & COMB. FRIDGE/FREEZERS:

**2010:** 216 qualifying models, 19 which did not and 15 unspecified.

**2014:** 226 models meet the MEPS, 5 do not and 38 unspecified.



## FREEZERS:

**2010:** 29 qualifying models, 2 which did not and 7 unspecified.

**2014:** 42 models qualify, 5 models do not; 7 unspecified.



# Market comparison conclusions:

## A++ models:

- For **freezers**: doubled to **14** models;
- For **fridges and fridge/freezers**: almost tripled **10** in 2010, **29** in 2014.

## vs. **Non-qualifying** models (do not meet the MEPS):

- More than halved for all category types (excl. not-specified models) :
  - **21** models in 2010; **10** in 2014.
- Small % of the total no. of models available.
  - possible reason is that the manufacturers have started phasing out models which do not meet the MEPS.

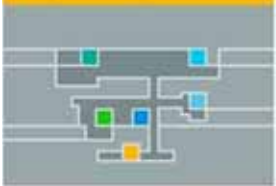
## Freezers:

- Marked decrease in no. of unspecified models:
  - **15** in 2010 to **7** in 2014.
- Increases in A and B energy classes. Improved to meet the MEPS?
- High no. of unspecified models in 2010 → locally manufactured models:
  - never been tested as there was no requirement to do so;
  - no accredited testing laboratory existed.
  - Manufacturers accepted these units would fare poorly (class E or <).

VC9008 MEPS:	
	ENERGY CLASS
FREEZERS	C



- *MEPS set at class C (and not B) → aimed at supporting the local manufacturing.*
- *Survey data: no models in C category → **MEPS of B for freezers possible.***



## Findings & recommendations

- Delay has **safeguarded the local manufacturing** industry;
- Notable market share of appliances whose energy rating is unknown or unspecified;
- Adequate evidence to support impression that the market has already shifted;
  - Should not really be expecting any material reduction in energy consumption from residential refrigeration appliances when programme does come into effect;
  - S&L programme should now have **higher level of compliance** had it been implemented in 2012;
  - **An upward revision** of the MEPS can be expedited since market seems to already contain efficient appliances on or above proposed MEPS;
- An upward revision should not hold any considerable cost implications as when initially introducing more efficient appliances into the market.



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