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

Theo Covary, ***Unlimited Energy (Pty) Ltd***

Katrien du Preez, ***Stellenbosch University***

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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)

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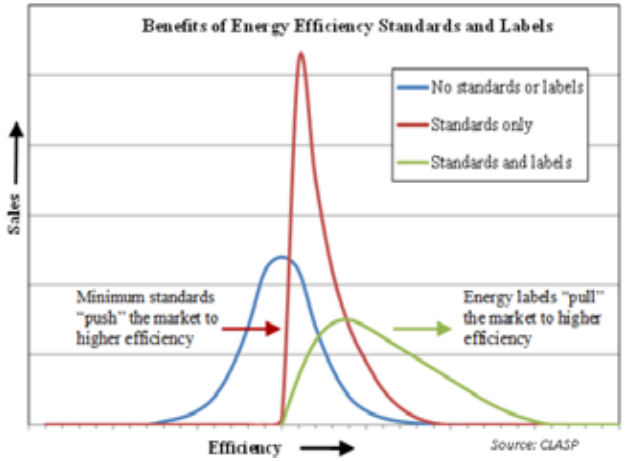
Introduction

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:



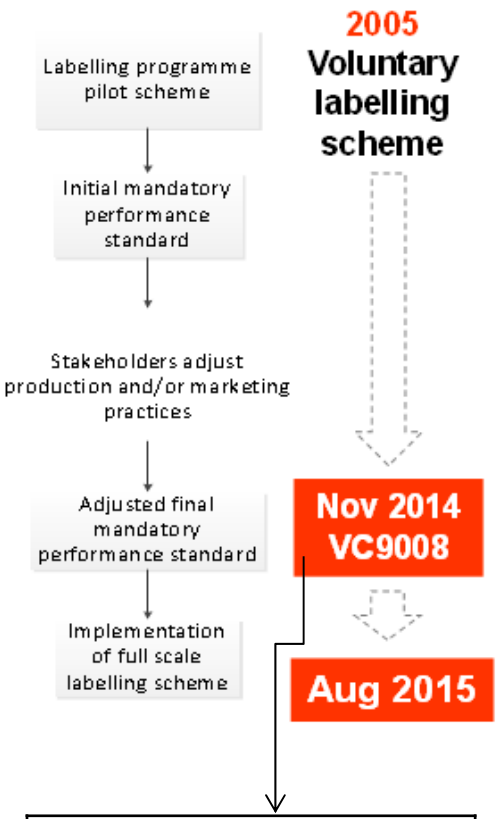
- A residential energy conservation tool:
  - Labelling Programmes
    - Designed to modify the selection criteria of consumers by drawing attention to the energy consumption of household appliances.
  - Performance requirements
    - Imposing MEPS improves the energy efficiency of new appliances.

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 fin.ancial 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:



VC9008 MEPS:	
	ENERGY CLASS
REFRIGERATORS*	B
FREEZERS*	C
* LOCAL MANUFACTURING	

Savings potential

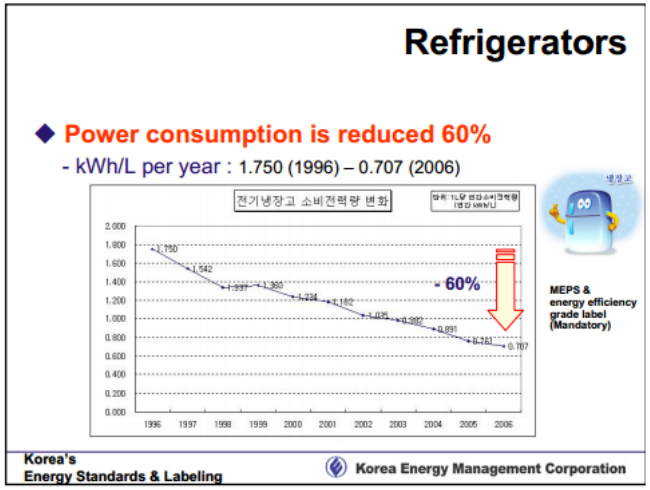
Implementation of MEPS programme for residential appliances:

- 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.

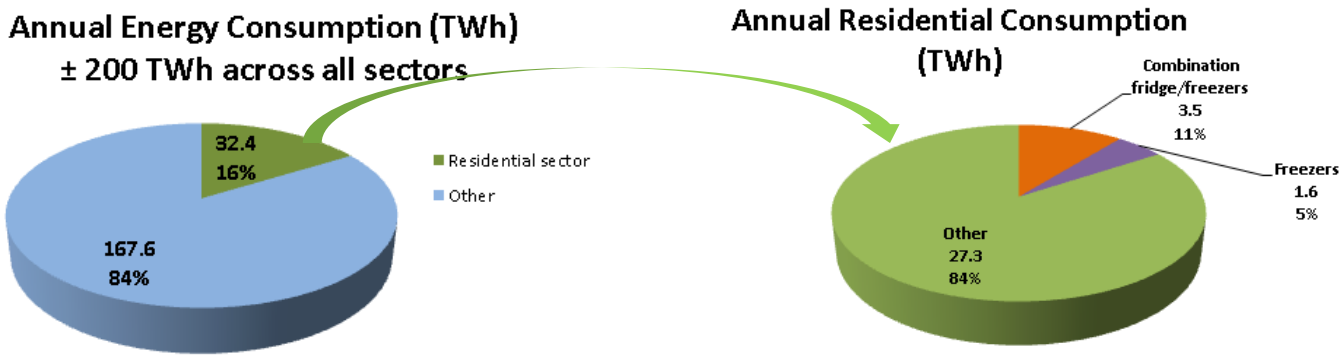


Source: Korea Energy ManagementCorporation

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.

- <u>SA's Freezer market:</u>
  - 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**
FREEZERS*	C	C	**C**
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**.*

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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 ≤ *I* < 42	A+
42 ≤ *I* < 55	A
55 ≤ *I* < 75	**B**
75 ≤ *I* < 90	**C**
90 ≤ *I* < 100	D
100 ≤ *I* < 110	E
110 ≤ *I* < 125	F
2 ≥ 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	**55 ≤ *I* < 75**	**430 ≤ AC < 585**	**460 ≤ AC < 635**	**655 ≤ AC < 890**

Freezers:				
CLASS	INDEX	APPLIANCE ENERGY CONSUMPTION, AC, (IN KWH/YEAR) PER ENERGY CLASS		
		SMALL	MEDIUM	LARGE
C	**75 ≤ *I*< 90**	**310 ≤ AC < 375**	**515 ≤ AC < 615**	**595 ≤ AC < 715**

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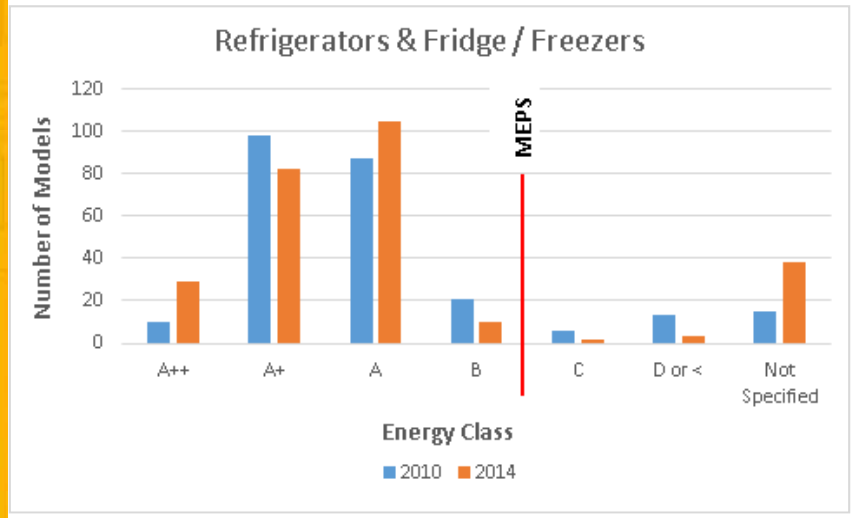
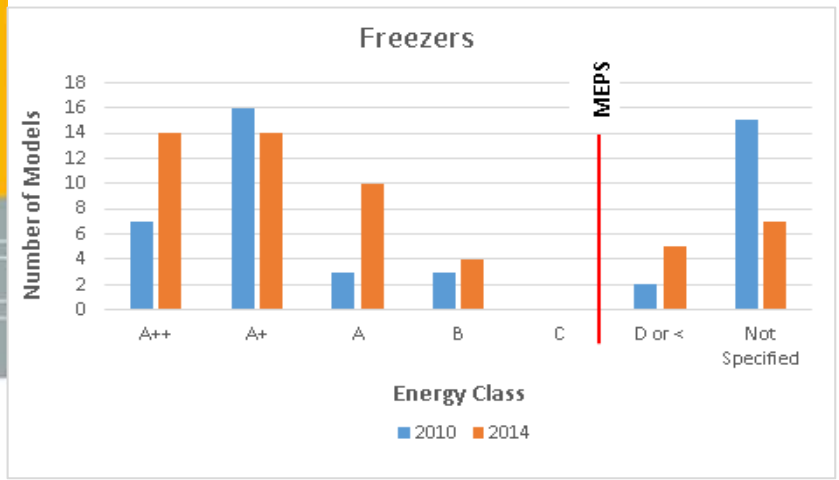
Comparing 2010 Baseline against 2014 survey data



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.

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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.*

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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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Thank you.