

Energy Efficiency as a Solution to Power Consumption in South Africa

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Abstract – The aim of the study is to determine energy efficiency importance in South Africa. Several people and businesses (like mines), are immigrating to South Africa and require electricity to survive. This causes a crisis in the country having insufficient capacity of electricity to supply the population and businesses. At some stage, the country faces load shedding, as mitigation to help the country to avoid power blackout.

This paper presents a review of energy efficiency of air conditioners imported and manufactured in South Africa.

Index Terms – energy efficiency, proof of compliance, standardisation, technical regulation

I. INTRODUCTION

Energy efficiency is explained, using less energy to provide the same service.^[4] Define energy efficiency as the goal to reduce the amount of energy required to provide products and services. Electricity plays an important role to companies and to people as various companies use electricity as a source of energy to produce products and provide services.

South African government under the ministry of Trade and Industry (DTI), put policies in place to deal with energy efficiency and labelling of electrical and electronic apparatus^[1]. The DTI appointed the National Regulator for Compulsory Specifications (NRCS), as agency to deal with energy efficiency of electrical and electronic apparatus, with the support of the Department of Energy (DoE).

The draft Energy Bill 2004, gives the Minister of Minerals and Energy substantial authority to make standards compulsory to deal with energy efficiency of electrical and electronic apparatus^[4].

The government identifies these as electrical and electronic apparatus, consuming more power:

- Air conditioners
- Audio and video equipment
- Dishwashers
- Electric ovens
- Refrigerators and freezers
- Tumble dryers
- Washer-dryer combinations
- Washing machines

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The NRCS received a mandate to regulate these products because of its high consumption of power. NRCS developed compulsory specifications (technical regulations) number VC 9008, to regulate these products^[1].

The NRCS uses European Standard (EN) 14511-3, adopted by the South African Bureau of Standard to regulate air conditioners. The EN conducts energy efficiency requirements of electrical and electronic apparatus.

The research focuses on energy efficiency related to air conditioners.

II. RESEARCH PROBLEM STATEMENT, AND RESEARCH OBJECTIVE

Certain air conditioners (imported and manufactured in South Africa); do not meet the requirements of energy efficiency as stipulated in standard SANS 54511-3. This affects the economy of South Africa since many services and production depend on electricity as the source of energy. If consumption of energy it is not controlled by introducing energy efficiency in the country, it will suffer power blackouts due to the high demand of energy.

As a research problem statement, the following research objectives are considered:

- Determining ways to manage the energy efficiency of air conditioners in South Africa.
- Determining compliance of air conditioners in South Africa.

III. OVERVIEW OF ENERGY EFFICIENCY

^[2] shows that energy plays a significant role in the economic, environmental and social dimensions of suitable development in a country.^[3] State that, energy efficiency enhancement by technology can play a vital role in promoting economic growth.^[3] State, reducing energy consumption can be achieved through the use of technologies (by maximum demand controllers), or by shifting the time of energy consumption. Energy efficiency is the key to minimise energy consumption^[4].

A. Testing

Air conditioners must be tested according to the requirements of VC 9008 before it can enter the market. The test laboratories in South Africa have no facilities to test the air conditioner to the full requirement of VC 9008. Most air conditioners, do not comply with the specified requirements.

B. Regulations

NRCS as an inspection body (regulatory authority), during inspection, requires proof of compliance as evidence that air conditioners meet the requirements of VC 9008. If proof of compliance is not provided during the inspection, the air conditioner will be confiscated, or returned to the country of origin. The product can be allowed to enter the market if the client can provide satisfying corrective actions.

The NRCS knows no accredited testing laboratories exist in South Africa, able to test to the full scope of the compulsory specification for energy efficiency and labelling of electrical and electronic apparatus (VC 9008). An agreement was entered with the air conditioners association, South African Air Conditioning Suppliers Association (SAASA), stipulating they can put air conditioners in the market by the short-term conditions (stipulated under sales permit). The NRCS provides a sales permit to an association member where air conditioners meet the requirements of safety, but do not meet the requirements of energy efficiency, in terms of section 14(4) of NRCS Act No.5 of 2008 [6].

C. Energy efficiency labelling

Figures 1 and 2 show the type of energy efficiency labels air conditioners can carry showing the efficiency. When the arrow indicated in Fig.2, points A+++, it means the air conditioner is more efficient; when it points to D, it means the air conditioner is less efficient. The labels will help the consumer during purchasing to determine the energy efficiency of air conditioners.

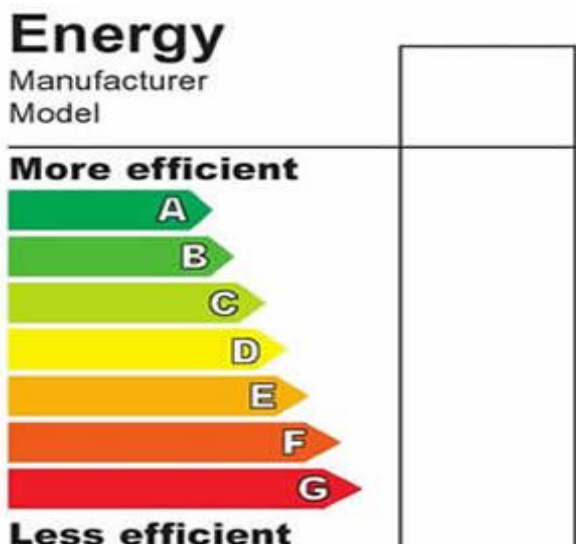


Fig. 1. Energy Efficiency label 1

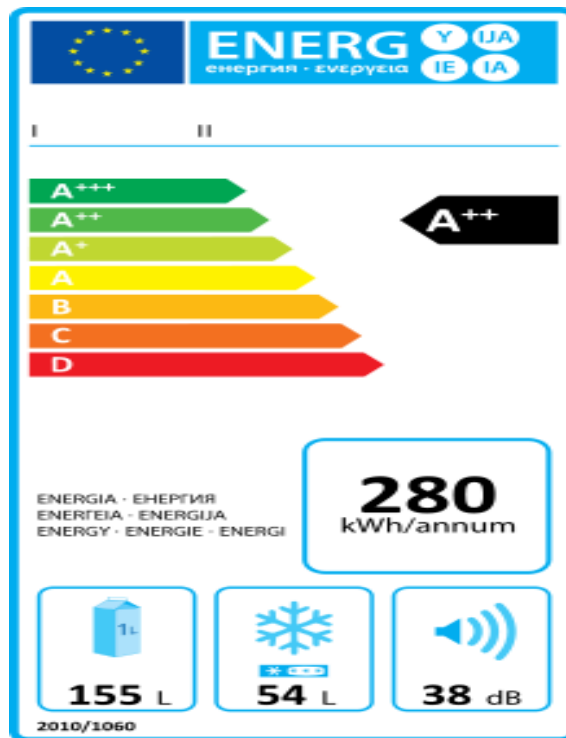


Fig. 2. Energy Efficiency label 2

IV. RESEARCH METHODOLOGY

The research methodology is a technique systematically solving the research problem as identified [5].

Data was collected by obtaining and studying the applications submitted by importers and manufacturers for energy efficiency of air conditioners for approval purpose. Collecting data supports the study compliance of the energy efficiency of electrical and electronic apparatus imported and manufactured in South Africa.

V. RESEARCH FINDINGS AND ANALYSIS

A summary of the findings:

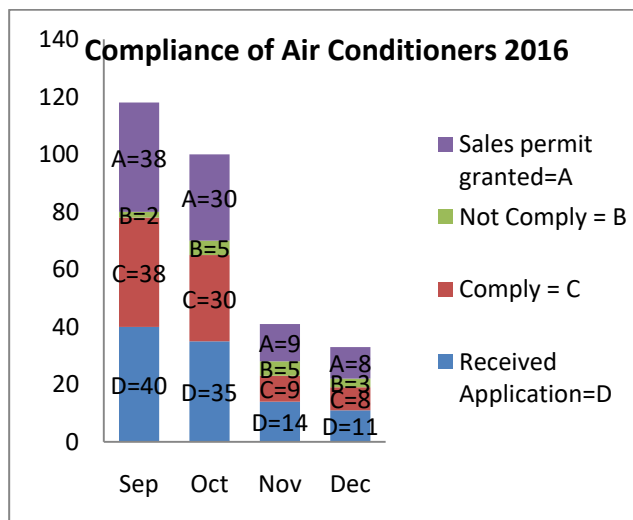


Fig 3. Compliance of air conditioners

Fig 3 shows in September, 40 applications were received; 38 applications complied with the requirements of sales permit; and two applications failed to meet the requirements of sales permit; and only 38 applications were granted sales permits.

Fig 3 shows in October, 35 applications were received; 30 applications complied with the requirements of sales permit; and five applications failed to meet the requirements of the sales permit. Only 30 applications were granted a sales permit.

Fig 3 shows in November, 14 applications were received; nine applications complied with the requirements of sales permit; five applications failed to meet the requirements of a sales permit; and only nine applications were granted a sales permit.

Fig 3 shows in December, 11 applications were received; eight applications complied with the requirements of a sales permit; and three applications failed to meet the requirements of the sales permit. Only eight applications were granted a sales permit.

VI. CONCLUSIONS AND RECOMMENDATIONS

Fig 3 shows about 85 sales permits were granted in four months, whereas 15 applications were not granted a sales permit. This means 85% of air conditioners were allowed to enter the market since it does not expose a safety risk to consumers, but contributes in more energy consumption, affecting the energy efficiency policies under the DoE.

The DoE and the DTI, as government ministries, have to assist testing laboratories with funds to build the facilities equipped energy efficiency testing air conditioners. The investment from both ministries will ultimately reap the benefit as most air conditioners not meeting the energy efficiency requirements; will not be allowed on the market. This will relieve the national grid of the South African power utility, known as the Electricity Supply Commission (Eskom).

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