

Using Energy Efficiency to maximize energy savings in South Africa



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1. Introduction

The White Paper on Energy Policy (1998) gives a mandate to the Department of Minerals and Energy (DME) to promote Energy Efficiency. Abundant low-cost coal, low energy taxes, and little accounting for externalities have contributed to low energy prices in South Africa. This in turn led to a low priority in energy efficiency by industry and household in South Africa (International Energy Agency, 1996). Although government's present capacity to undertake Energy Efficiency programmes is limited, the DME is prepared to finalise and consolidate consideration to ensure appropriate implementation in the sector. As a results of the dialogue between the DME and the Danish government (through the Capacity Building in Energy Efficiency and the renewable Energy project known as CaBEERE project) over the years 1991 to 2001, the national Energy Efficiency Strategy was formulated and signed by the Minister of Minerals and Energy, Phumzile Mlambo Ngcuka in March 2005. The Energy Efficiency Strategy prescribes sectoral Energy Efficiency targets for the next 10 years. The targets make allowance for the forecast growth, and are defined as the percentage reductions in the predicted end-usage at 2014. The targets are further aggregated and weighted to the overall national target of 12% improvement by the end of the year 2015. The DME accepts although the targets are challenging, international experience shows that the targets are achievable. To show the commitment of the DME and the Stakeholders, an Energy Efficiency Accord was signed during the Energy Efficiency month of May with large industry business association with the commitment to achieve Energy Efficiency targets in industry.

1.1 The need for saving energy

The report published by the University of Cape Town entitled Energy Efficiency Earnings stated that energy brings prosperity and gives us a comfortable life. But our use of energy also has a disadvantage that is mainly environmental pollution that leads to climate change – which have already assumed serious proportions. To reduce energy demand for all sectors of the economy will lead to reduced environmental problems and also alleviate poverty. Energy demand can be achieved by using energy as efficiently as possible. There are four reasons that make energy saving necessary and these are as follows:

Energy should be saved to save money because energy savings are amongst the easiest to make and can greatly cut costs. It is because of the cheap energy in the past that made Energy Efficiency not to be a priority but hopefully the situation will soon change because of the high demand for energy and the low capacity of Eskom over the next couple of years. In all sectors of the economy, improving Energy Management could save a substantial amount of money.

Energy savings improves the environment. Energy efficiency reduces pollution because to do the same job, you use less energy and therefore reduces fewer emissions. This would help to solve the problem of global warming and greenhouse gases.

1.2 Energy Efficiency sector implementation

1.2.1 Industrial energy sector

The Department of Minerals and Energy of South Africa is responsible for formulating strategies and drafting legislation for the South African energy sector including the industry sector. The Project aims at enhancing DME's capacity and performance by assisting through developing implementation approach for energy efficiency with the co-operation of the relevant stakeholders. The industrial energy efficiency project was made possible through the dialogue between the DME and the Danish government. The industrial energy sector is consist of three projects namely the Industrial Norms and Standards project, the Industrial monitoring of Targets project and Energy Management in Industry project. All these Projects are still up and running.

The overall aim of these projects is to achieve the industrial energy target by 2015.

□ Industrial Norms and Standards

The Energy Efficiency Strategy of South Africa made a provision for the use of the Norms and Standards for horizontal technologies within the industrial sector programme. The term "horizontal technology" applies to any technology that is applicable within a wide range of industries or applications. These technologies are limited to the non-utility steam raising boilers, fired by fossil fuel; AC electric motors and thermal insulation of hot paperwork. The objective of this project is to ensure that appropriate standards for energy efficiency are identified, adopted and adhered to by industry, thereby yielding improvements in operational energy efficiency. It has been widely demonstrated in Europe and elsewhere that the adoption of the minimum efficiency standards for these technologies results in rapid efficiency improvements, and therefore cost savings. The use of standards therefore is one of the key issues behind the general approach to the Industrial Sector Programme in South Africa.

- Monitoring and Targeting

The Energy Efficiency Strategy also prescribed sectoral energy efficiency targets for the next 10 years. It is therefore imperative that regular reporting takes place to ensure that the sectoral programmes are on track to meet the prescribed targets. The strategy also states that systems would be put in place to ensure that these monitoring is carried out and publicised. At present, however, the information available for sectoral energy usage data gathering are sketchy and disaggregated. This project assessed where data is lacking, where it is currently available and where it is missing and more importantly identifies how data can be filled.

- Industrial Energy Management

The Energy Efficiency Strategy also make a provision for the use of Energy Management within the industrial sector, the objective being to identify and to implement cost effective efficiency intervention within the sector. The predetermined national standards for Energy Management would be done and appropriate certification would be made available in order to demonstrate this project. The primary output of the project is to design a “Corporate Energy Management Best Practice” programme for the South African industrial sector and to initiate case studies, as well as to develop and publicise the case studies. Alongside these activities, a certificate course for training was developed to train the Service Providers. Training was developed in a modular format and delivered to the trial panel of trainees, and industry to gain feedback on its content and usability. The unit standards was developed and submitted to ESETA and SAQA for approval within certificate curricula.

1.2.2 Residential Sector

Appliance Labelling Programme

As part of its overall energy efficiency strategy SA's government has initiated an energy information appliance-labelling program. Previously, the only organized labelling program undertaken in South Africa was under the framework of Efficient Lighting Initiative a voluntary endorsement-labelling scheme focused on globes. The Department of Minerals and Energy formally announced energy efficiency labelling of appliances in May 2004. At a ceremony in Cape Town, a label design based on the European A-G was released. In the coming years, the new label is intended to be placed on a range of products

Main electric appliances in the residential and buildings sector include refrigerators, washing machines and tumble dryers, dishwashers, air conditioners, electric stoves and hot plates,

electric space heaters, air conditioning and water heaters. Opportunities for improving energy efficiency lie in the supply of more efficient models of these appliances. For example, highly energy-efficient refrigerator models have thicker insulation and increased thermal capacity of the evaporator and condenser and have better door sealing. A general market characteristic in South Africa is that appliances are penetrating urban and peri-urban rapidly, but generally speaking high-efficiency models have a small market share.

A number of barriers exist that block the widespread introduction of more energy efficient appliances (not only in the residential and buildings sectors, but also in other sectors):

Awareness barriers:

- Lack of knowledge and understanding amongst consumers of energy consumption and energy efficiency improvement opportunities of appliances, making energy efficiency not a top-of-mind factor in their purchase decision
- Uncertainty about market demand of high-efficiency models, making manufacturers reluctant to tie up financial resources in more costly plant and equipment and making dealer/retailer reluctant to stock energy-efficient models

Information and policy barriers:

- Difficulty to take informed decisions and make appropriate regulation, due to insufficiency of market data on appliance supply and stocks, on the energy consumption of most appliances and on the potential for improving the energy efficiency of appliances
- Lack of appropriate regulation, allowing domestic production and imports of highly inefficient appliance:

Cost barrier:

- The low unit price of coal and electricity in South Africa influences the mind-set of consumers and companies with the argument that the higher initial investment cost cannot be justified due to lengthy payback times
- Low purchasing power of the majority of South African households.

Conducive policy and policy instruments regarding Energy Efficient appliances

Baseline study and market survey – full analysis

Various gaps in information exist that need to be filled before legislation can specify the norm for a label, and a MEPS, and before awareness campaigns can be launched.

Here, GEF intervention is needed to close the existing data gap

- *Market data about appliances in South Africa:* This activity will continue the information gathering of the PDF-B phase, concentrating on the market penetration of appliances, consumer behavior and consumer buying preferences. There is also a need for sector-wide information on segmentation of the appliance market, based on household income, education, and distribution in terms of rural and urban areas.
- *Baseline energy use for appliances:* The energy used by most common household appliances is insufficiently known or documented. Appliance are not tested and little disaggregated data exist on residential electricity demand. This information is needed to establish a baseline for program design and for evaluating the impact of the campaign.
- *Energy efficiency improvement potential for selected appliances:* Little information is available about the potential for improving the energy efficiency of domestic appliances on the South African market. This will be addressed through international benchmarking and engineering analysis of the products targeted for the programme (such as dish washers, stoves, washing machines, space heaters, refrigerators, air conditioners).

Implementation Plan

- Engage relevant stakeholders - manufacturers, retailers, ABS and consumers.
- Introduction of minimum efficiency performance standard (MEPS) and codes of practice.
- Voluntary labeling for refrigerators in 2005
- Mandatory labeling and standard for refrigerators, air conditioners, dishwashers, clothes washers /dryers and space heating will be initiated in during 2006 – 2007.
- Regulation - labeling of refrigerators, washing machines and Driers will be made mandatory in in the Energy Act in 2006–2007.
- Mandatory labeling and standards for geysers and stoves will be initiated during 2006-2007At a later stage labeling and standards for non- electricity using appliances may be also considered.

Regulation and legislation

The labelling scheme will first be introduced on a voluntary basis in the first year through the pilot launching of the label for refrigerators under this Phase - the Project Development Facility B (PDF-B) phase. The historically low unit price of energy, coupled with limited awareness on energy savings potential, may result in only modest success arising from voluntary measures and other non-legislative instruments. Also, while South African industry may voluntary adopt the energy efficiency label to be competitive, when goods are imported,

as is often the case in South Africa, importers may bring in goods without the label at lower prices and poorer performance. For this reason, the Energy Efficiency Strategy aims to go into mandatory labelling of products quickly. This requires that the product performance specification regarding energy levels of consumption and labels is made compulsory by legislation.

With GEF support the framework plan for introduction of labels, will be expanded and enacted into a framework, specifying:

- Overall objectives of standards and labelling programme
- Types of intervention (labelling and/or mandatory minimum energy performance standards)
- General criteria for selection of appliances (and products and processes) for labels and/or standards and type of market transaction (covering locally produced as well as imported products)
- Envisioned implementation timeframe
- Rules and procedures and deadlines
- Monitoring and evaluation

Incentives and financial issues

The Energy Efficiency Strategy stresses the elements of self-finance, because the majority of energy efficiency improvements will lead at the end of the day to positive savings for enterprises and customers. Also, the Government will already face costs relating to the awareness campaigns and coordination requirements, as well as of existing subsidy schemes through ESKOM's DSM Fund. Under these circumstances it is difficult to justify direct government subsidies for efficient appliances, e.g. in the form of rebates, and also because there are many other pressing needs elsewhere. Nonetheless, over time some fiscal reforms will be considered. GEF will support analysis into what incentives can be built in through the tax system, for example by reducing VAT on energy-efficient appliances or by applying higher duties on poor efficiency products, using the new appliance labeling scheme.

In principle, the higher investment cost of efficient appliances will be borne by the direct beneficiary, the customer, which is reasonable in view of the generally short payback periods. In cases where payback periods are less favourable or where lower-income groups will shun higher initial investments due to their limited purchasing power, 'innovative mechanisms' for financing shall be considered. One such scheme could be the utilisation of customer credit schemes (many customers buy on credit at the retailer's outlet) to equalise cost of poorer and more efficient equipment. Also, links with the Eskom's Demand Side Management (DSM) programme to cover appliances for the residential sector, will be investigated.

Capacity strengthening of main stakeholders

Developing a testing capability

The process of creating energy testing capability must begin before a labelling of standards programme is launched. The test procedure describes the method used to measure the energy performance of a product and a testing norm that references the appropriate testing procedures. The testing procedure is the foundation for the energy standards and label of a product. Selection (adoption) of existing test procedures is strongly preferable to inventing the wheel by designing new test protocols, e.g., the International Standards Organisation (ISO) and International Electrical Commission (IEC) are two international entities responsible for formulating internationally recognised appliance test procedures.

Test facilities are needed to perform energy tests. In South Africa, various (commercial) independent testing facilities exist. SABS/SANS has a Test House; in addition there are other test laboratories as well as the in-house test facilities of the manufacturers. One or several test houses should be accredited under the South African National Accreditation System (SANAS) system to develop energy measurements, so that local manufacturers can have their products tested and accepted for energy efficiency performance.

In time sequence energy performance testing is the first capability that must be in place, before starting a full labelling programme, let alone starting a national minimum standard programme.

Activities that will be taken are

- *Assessment of institutional skills of test laboratories, test protocols and certification and accreditation regimes.* This will include an assessment of national testing facilities and capabilities to test energy consumption, performance and energy efficiency levels, equipment certification and accreditation requirements, existing test procedures and test result agreements and compliance regimes
- *Technical assistance* in developing energy performance testing capabilities, including visit to test facilities overseas and training workshops.
- *Harmonization of testing standards* (starting with refrigerators and air conditioners)
- *Pilot energy performance testing* (of at least 10 refrigerator models selected among the top sellers).

- *Assessment of stakeholders*, i.e. a thorough examination of the various roles of market actors (manufacturers, distributors, retailers, consumers, utilities) in the technology implementation process
- *Analysis and design* of consumer awareness campaigning
- *Design of training and information* for manufacturers, distributors and retailers

2. Conclusion

The cheap price of energy in South Africa has caused many industries in South Africa to put lower priorities to energy efficiency, but this situation is likely to change in South Africa in some couple of years due to the diminishing energy resources in South Africa. The targets prescribed by the Energy Efficiency of South Africa for the 10 years period are challenging but the international experience showed that the targets are achievable. Implementation of the Energy Efficiency in South Africa is currently voluntary.

References

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