The Department of Minerals and Energy (DME) set Energy Efficiency goals in their Strategy in May 2004. These goals include energy savings for buildings.

South African energy efficiency standards for buildings

By L K Reynolds, Owens Corning

Before energy efficiency can be legislated, standards must be in place—a set of rules that all stakeholders in the building industry can follow to achieve the goals. An energy steering committee was established at the SABS to handle these tasks. It initially identified the need for two standards to be written:

- Energy efficiency in naturally ventilated buildings.
- Energy efficiency in artificially controlled buildings.

Two working groups were formed to draft these standards. This paper is a progress report on the evolution of the energy efficiency standards.

The following energy goals were set by the DME in their strategy:

- Final demand reduction of 12% by 2015.
- 15% reduction by 2015 of energy use in industry and mining.
- 15% reduction by 2015 of “parasitic” electrical usage.
- 15% reduction by 2015 of energy use in commercial and public building sector.
- 10% reduction by 2015 of energy use by the residential sector.
- 9% reduction by 2015 of energy used for transport.

Much voluntary energy saving had already occurred in the industrial and mining sectors; energy inefficiency and wastage are perceived to be costs that affect the bottom line. In the building sector, energy costs are often not considered as a major issue. It was agreed that legislative steps would be necessary to achieve the required energy savings in all building sectors. Legislation is generally a “broad brush” approach and for it to be effective, stakeholders would need recipes to achieve it. This is where the standards come in. A steering committee and two working groups were established at the SABS for this task.

Identification of the standards

Energy efficiency standards from a number of countries were read and researched before commencing the drafting of the standards. In some countries the standards are generic for all buildings and in others the standards are divided according to the occupancy of the building. The steering committee considered the options, the climatic conditions in South Africa and the way in which building design and construction are approached in the South African market. The initial conclusion reached was that there should be two solution standards for buildings in South Africa.

They were:

- Energy efficiency in artificially controlled buildings – SANS 204.

The two working groups were duly taskered with the drafting of these two standards. With any task of this type the
process evolves from an initial vision to a solution that fits. This evolution will be outlined.

**Background documents**
A number of research projects had been completed in the years preceding the writing of the standards, the SAEDES project and the NOVA/TIASA project (Prof. Holm et al). The SAEDES document mainly covered energy efficiency measures for artificially (mechanically) controlled buildings. The document from the NOVA/TIASA project covered housing with a strong emphasis on the affordable housing sector. Of all the international standards that were researched, the Australian building standards were considered to be most relevant to the South African situation due to the similarity in the climatic conditions of the two countries.

**Nordic structure for standards**
SABS 0400 (the building code) was being rewritten – SANS 10400 is due to be published this year. South Africa is part of the WTO and as such, clauses in the old building code had to be amended to be less restrictive and to incorporate the new openness of trade.

The building code was rewritten according to the Nordic structure - see Fig. 1.

Ultimately the energy efficiency standards will be part of the South African building code and thus would have to be written in the same format. The working groups had to balance the prescriptive rules against the necessity to allow innovation and creativity in building design.

The working groups realised that the envisaged standards did not incorporate Level 3 (performance requirements) of the Nordic structure. The standards had to evolve. Thus the set of standards was redesigned to include performance based parameters, which the two “deemed-to-satisfy” standards reference. The set of standards currently is structured as such:

- **SANS 204-1** – Energy efficiency performance parameters for buildings.
- **SANS 204-2** – Energy efficiency in naturally ventilated buildings (old SANS 283)
- **SANS 204-3** – Energy efficiency in artificially controlled buildings (old SANS 204).

Part 1 of this series could ultimately be part of the national building regulations. Parts 2 and 3 will become part of the national building code (SANS 10400).

**Progress of standards**
SANS 204-1 has generic guidelines for energy efficiency in buildings and contains two tables –

- Maximum energy usage for different occupancies (kWhr/ m²/annum).
- Maximum energy demand for different occupancies.

This standard is almost complete. There are working drafts for both of the other parts of the standard.

**Deemed-to-satisfy rules**
The deemed-to-satisfy rules take a holistic approach in the design of buildings. The interventions include correct orientation, shading, insulation, window design etc. There are rules for lighting, hot water cylinders, air-conditioning systems, lifts etc. The permanent electrical appliances are included in the standard for naturally ventilated buildings. The use of renewable energies is encouraged by the standards.

There are ‘no cost’ and ‘low cost’ interventions. These interventions are the only building materials and designs that have a payback. The cost of buildings is currently R4289/m². The costs of the interventions outlined in the standards do not add excessively to that cost.

**Conclusion**
Energy efficiency in buildings should start at the town planning level. Information and awareness are the key elements to achieve success in terms of changing South Africa into a more energy efficient society.

**References**
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