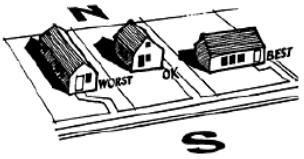
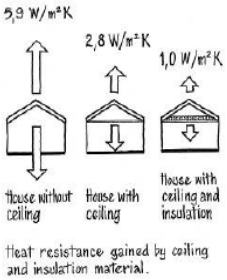
Executive Summary

REEECAP

Renewable Energy and Energy Efficiency Capacity Building Project





Report Title: Revision of Namibian Building Codes to incorporate Renewable Energy and Energy Efficiency

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Buildings in the past have been constructed with minor consideration for energy efficiency, with building codes focusing primarily on health and safety issues. There is currently an increasing global trend to reconsider and analyse the way buildings are constructed from an energy saving perspective. This is largely due to heightening issues such as climate change, diminishing traditional energy resources and the associated rapidly increasing cost of energy.

There are many energy efficiency (EE) and renewable energy (RE) interventions which can be incorporated into a building to diminish and 'green' its overall energy consumption. Some interventions come with no additional cost or even cost less than the equivalent traditional building. Others cost more but pay for themselves in energy saved over a short period of time, while still others make good environmental sense but poor financial sense.

Countries around the world are incorporating energy efficiency and renewable energy interventions into their building codes which make sense to their specific environment. The research from this report found that many of these interventions were common to each country studied, and suggest that they may be relevant to Namibia. These are:

- Insulating the building envelope effectively
- Sealing the building envelope
- Allowing the free flow of natural air through buildings
- Efficient lighting – intelligent daylighting control systems and efficient lighting technology
- Efficient Heating, Ventilation and Air Conditioning (HVAC) systems
- Solar water heating

In many countries, tightening up of building codes to include energy efficiency (mandatory intervention) will go hand in hand with a green building rating system (voluntary intervention) which sets standards for best practice in the field, most of which exceed the mandatory requirements.

Namibia currently follows the South African SANS0400 building code. South Africa has initiated work for an additional standard for energy efficiency in buildings which Namibia could follow once legislated. The building code legislation process is a slow one though, and is expected to be implemented in three to four years. It should be noted that the current electricity crisis in South Africa may accelerate this process.

This report is the product of an extensive consultative and stakeholder process to determine, assess and recommend which EE and RE interventions could potentially be included in the Namibian Building Codes. Those interventions which are not incorporated can be form part of either a voluntary minimum RE and EE building standards document (to be held by the Institute of Architects) or a green building rating system or best practices document.

Each intervention was evaluated under varying climatic conditions found in Namibia for a low income household, a mid-high income household or office block where relevant, The following tables serve as a summary of the intervention recommendations from the report. Note that the term (GP) relates to government projects only, and (SN) refers to Southern Namibia only.

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	Low Income Household			Mid-Hi Income			Office Block		
Intervention	Building Codes	Minimum Voluntary RE & EE Code	Best Practice	Building Codes	Minimum Voluntary RE & EE Code	Best Practice	Building Codes	Minimum Voluntary RE & EE Code	Best Practice
Passive Solar									
Orientation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ceilings	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-
Insulation	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-
Concrete blocks	No	Yes	Yes	-	-	-	-	-	-
Clay tiles	No	Yes	Yes	Yes (GP)	Yes	Yes	-	-	-
2 skin walls w/ airgaps	No	Yes	Yes	Yes (GP, SN)	Yes	Yes	Yes	Yes	Yes
Clay walls	No	Yes	Yes	No	Yes	Yes	-	-	-
Shading	Yes (GP)	Yes	Yes	Yes (GP)	Yes	Yes	No	Yes	Yes
Light wall colour	Yes (GP)	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Double Glazing	-	-	-	No	No	Yes	No	No	Yes
Natural Ventilation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Window Size	No	No	Yes	No	No	Yes	No	No	Yes

Intervention	Building Codes	Minimum Voluntary RE & EE Code	Best Practice	Additional Comments
Daylighting	No	Yes	Yes	40% for minimum document, 60%+ for best practice
Solar Rights	Yes	Yes	Yes	
Embodied Energy	No	No	Yes	Possible legislation to require suppliers to provide embodied energy of materials
Solar Water Heaters	Yes	Yes	Yes	Apply to mid-hi income + commercial buildings, run with sensible financing scheme
Efficient HVAC and Lighting	No	Yes	Yes	Awareness raising critical
Photo Voltaics	No	No	Yes	
Wind Electricity Generation	No	No	Yes	

- A strong case was made for various passive solar interventions, particularly orientation, ceilings, insulation, natural ventilation and 2 skin brick walls with airgaps to be included in the building codes where relevant. A strong case was also made for solar water heaters and solar rights.

- Clay wall and buildings are cost effective and energy efficient structures and should be encouraged wherever feasible. Clay tiles are also more efficient than corrugated iron, and should be used wherever feasible.

- Awareness raising around efficient HVAC and lighting is critical, particularly around evaporative cooling, compact fluorescent lighting, behavior modification and building management systems.

- Daylighting is difficult to legislate, but should always form part of any architect's design considerations, as huge artificial lighting savings can be realized.

- Awareness raising around embodied energy of the building material used is a critical issue, and legislating suppliers to declare the embodied energy of their materials is a consideration.

The report provides an addendum for the National Building Standards SABS 0400, to be used temporarily until the standards are revised by South Africa in the next 3 to 4 years. A checklist of minimum EE and RE requirements to be held by the Institute of Architects is provided for low income houses, mid-high income houses and office blocks.

This report produces a strong argument for several energy efficiency and renewable energy interventions to be included in the Namibian Building Codes. It is anticipated that it will be used to support the drive for more energy efficient buildings in Namibia in the future