User Manual

Development of Green Building Standards for Zimbabwe

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Presented to:

The government of Zimbabwe

Presented by:

Contents

1 Introduction

This manual is designed to guide new users on how to effectively apply the green building standards and utilize the related tools provided to support sustainable construction practices in Zimbabwe. The standards aim to improve energy efficiency, reduce environmental impact, and promote sustainable building practices. This guide covers the key components of the standards, instructions on using the associated tools like calculators, and tips for integrating these requirements into your building projects.

2 Overview

The Green Building Standards are a set of recommendations and requirements developed to ensure that buildings are designed, constructed, and operated in an environmentally sustainable manner. They focus on key aspects of energy efficiency, but also can have impacts in water conservation, indoor environmental quality, and sustainable materials. These standards are applicable to various building types, including residential, commercial, and office structures.

Key Components of the Standards:

- **Energy Efficiency**: Requirements for reducing energy consumption through design strategies, efficient systems, and the integration of renewable energy.
- **Renewable energy**: Guidelines for minimizing water use via efficient fixtures, irrigation practices, and water recycling systems.
- **Material Sustainability (low-carbon construction)**: Standards for using materials with low environmental impact, such as those with recycled content or low emissions.

3 First steps

For professionals involved with the BEEC weather it is from the enforcement side or from the building sides, it would be useful to follow the next initial steps to support their ability to enforce/comply the requirements of the standards.

3.1 Step 1- Developing a working familiarity

It is important to develop a working familiarity with the BEEC beginning with a thorough review of the standards document to develop an understanding of the mandatory requirements and the optional measures that can enhance the sustainability of your project. As the same time, it is important to understand the philosophy and intent of the different requirements to enable the appropriate mind set to enable compliance and maximize the impacts including the co-benefits.

A greater effort should be focused on the sections that will be most relevant to the types of building type, (residential, commercial, or industrial) or the types of technology (or area of the building such as insulation or glazing) for the relevant stakeholder. This assumes that a variety of stakeholders, not just architects and builders, but also material supplier, importers, retailers, etc are aware of the standards and are able to cater to the needs of the supply chain for compliance.

3.2 Step 2 – Identification of specific requirements

Each stakeholder should identify all of the applicable requirements in the standards for their business or project at hand. Different building types or building projects can have a unique set of characteristics that may trigger different requirements. For this, it is recommended to develop a project checklist, aiming to break down the requirements of the standards into different categories (insulation, glazing, lighting, building controls, renewable energy, etc), to identify the applicable requirements for the specific project.

3.3 Step 3 – Planning for compliance

A plan to comply with the identified requirements should be developed in collaboration with the key project partners (stakeholders), including architects, engineers, and contractors, to integrate the standards into your design and construction processes.

This process includes the selection appropriate materials or technologies, designing energy-efficient systems, and ensuring that construction practices align with sustainability goals. This step can be aided by the data base of energy efficiency materials and technologies that was provided as part of the deliverables for the BEEC.

3.4 Step 4 - Model building performance

Modelling of building performance is am important step, not only for demonstrating compliance with the standards, but also to provide developers with a strong insight on the building performance and possibly develop strategies to improve it and generate further savings. For this, the BEEC provide Modelling Guidelines to guide users of possible tools and the key strategies to simulate energy performance, considering factors such as the building envelope, HVAC systems, lighting, and other internal loads.

This involves using certified modelling software to create simulations of both the proposed design and a reference building that meets baseline energy performance criteria. Input accurate data about materials, equipment capacities, operational schedules, and climate conditions to ensure realistic and reliable results.

4 Using tools

The use of tools can simplify the compliance with the standards by simplifying some of the complexities, bringing information to users, harmonizing understanding, and more. Some of the tools proposed in this section are provided by the BEEC, while others still need to be developed (or can be developed in an individual basis by each project) or can be sourced online. Some tools are available in the market from free, easy to use (yet generic) modelling tools, to costly models that can be accurate but require a lot of data.

4.1 Building performance modelling tools

Modelling tools simulate building performance providing an accurate measure of energy consumption in different end-uses supporting the identification of potential savings through the evaluating the impact of different building materials. These tools will also provide early information regarding compliance with the standards and facilitate permitting processes.

There are a variety of tools available in the market and the key steps for their application require some technical considerations. To facilitate this process, the BEEC has provided a modelling guidelines document so support tool identification and facilitate their use.

Some of the steps and uses of modelling tools include the following:

- **Input Data**: Enter basic information about your building, such as size, location, and type. Input details about energy systems, water usage, and materials.
- **Evaluate Performance**: The calculator provides an assessment of your building's performance in relation to the standards, highlighting areas where the building meets or exceeds requirements and where improvements are needed.
- **Scenario Analysis**: Use the scenario analysis feature to explore the impact of different design choices or operational changes on your building's performance. This helps identify the most effective strategies for meeting the standards.

4.2 Compliance checklists

Checklists can help to ensure that all aspects of the standards are considered throughout the project lifecycle. They include checklists for the design, construction, and operational phases, making it easier to track compliance. It is recommended that practitioners create checklists relevant to their types of projects by reviewing the entire standards and analysing the requirements according their needs by following the steps in chapter three.

Check lists can be broken down for different phases of the life of a project including:

- Design Phase: Verify that all sustainability measures are incorporated into your project plans.
- Construction Phase: Ensure that sustainable practices, such as waste management and the use of compliant materials, are followed on-site.
- Operational Phase: Use the operational checklist to monitor ongoing compliance, including the maintenance of energy systems and water-saving features.

4.3 Energy efficient technologies database

This database provides a list of energy-efficient technologies and useful information on the applications and options for each relevant level of building construction such as lighting, insulation, and glazing. This database can support decision-making by offering guidance on selecting technologies that align with the green building standards.

5 Tips for successful implementation

Some best practice tips for practitioners to successfully implement the standards and even lead the market include:

1. Involve all key stakeholders, including designers, contractors, and facility managers, early in the project to ensure a shared understanding of the standards and their roles in compliance.
2. Stay updated on the latest developments in green building practices and continuously seek opportunities to enhance your building's performance beyond the minimum requirements.
3. Explore available incentives, such as tax breaks or grants, that support compliance with the standards. Use the associated tools to document compliance and strengthen your applications for these incentives.
4. Conduct regular audits using the provided tools to ensure ongoing compliance. Use feedback to learn from each project and apply those lessons to future developments.