

Green Building Movement in the Region



Context 1

East African countries are prone to natural and human inflicted hazards. Floods, drought, epidemics, and conflict are the most commonly reported.

There is a risk of extreme weather events increasing as result of climate change (CC).

- ✓ **More than 70% of 'natural' disasters in Kenya are related to extreme climate events.**
- ✓ **On average, CC caused 56.7 deaths and GDP losses of 0.33% per year in Kenya between 1998 and 2017.**
- ✓ **In Uganda, extreme weather events related to CC caused a loss of 16% of the total value of crops and livestock in GDP in 2011.**

People in poverty are likely to be left behind in the absence of adequate investment in disaster risk reduction (DRR) and CC adaptation.

Context 2: Current NDC Scenario Sub Saharan Africa

Under current NDC scenario, the world will fall short of the Paris Climate Agreement objective of ensuring global warming is within 1.5°C by 2050. Thus, Countries must raise their NDC ambitions including massive scale up of targets for access to clean cooking solutions and technologies.

Households across Africa, including very poor households, spend a significant portion of their income on energy

Lack of equal access to energy reinforces disparities in health and education

Context 3

Currently 840 million and 3 billion people lack access to electricity and clean cooking fuels and technologies respectively.

70 million people in the developing world move to urban areas each year. Consequently, cities are increasingly stretched to provide urban infrastructure, services, and safe land including energy. One billion people already live in slums, and this is projected to double by 2030.

By 2050, Africa will be home to 1.3 billion more people than it is today (more than half of the world's projected population growth of 2.4 billion people). This means a huge demand for buildings – with 80 per cent of those that will exist in 2050, yet to be built.

Business As Usual



Energy use in buildings in Sub Saharan Africa

Majority of modern buildings in most African countries with tropical climates - **are replica of building designs from western and developed countries** with cold and temperate climates.

Modern cities are **fossil fuel driven cities**.

Very few **urban planners** take into consideration **bioclimatic elements or passive methods** in their new urban plans. New buildings are aligned along main roads, rivers and the resulting settlements are **high energy dependent**.



Rapid provision of housing on large scales that are not always environmental friendly.

- Mass housing with poor environmental considerations:
- Poor orientation, no sun shading devices, poor ventilation and day lighting, poor use of building material;
- No green spaces and open.
- Emphasis is put on **quantity** and not **quality**.



1. Baseline data and Benchmarking on energy use in buildings

- Assess energy consumption trends in buildings.
- Conduct energy audits in residential, public and commercial buildings.
- Establish energy consumption benchmarks per categories and typologies of buildings and climatic zones.
- Identify Saving Potentials.



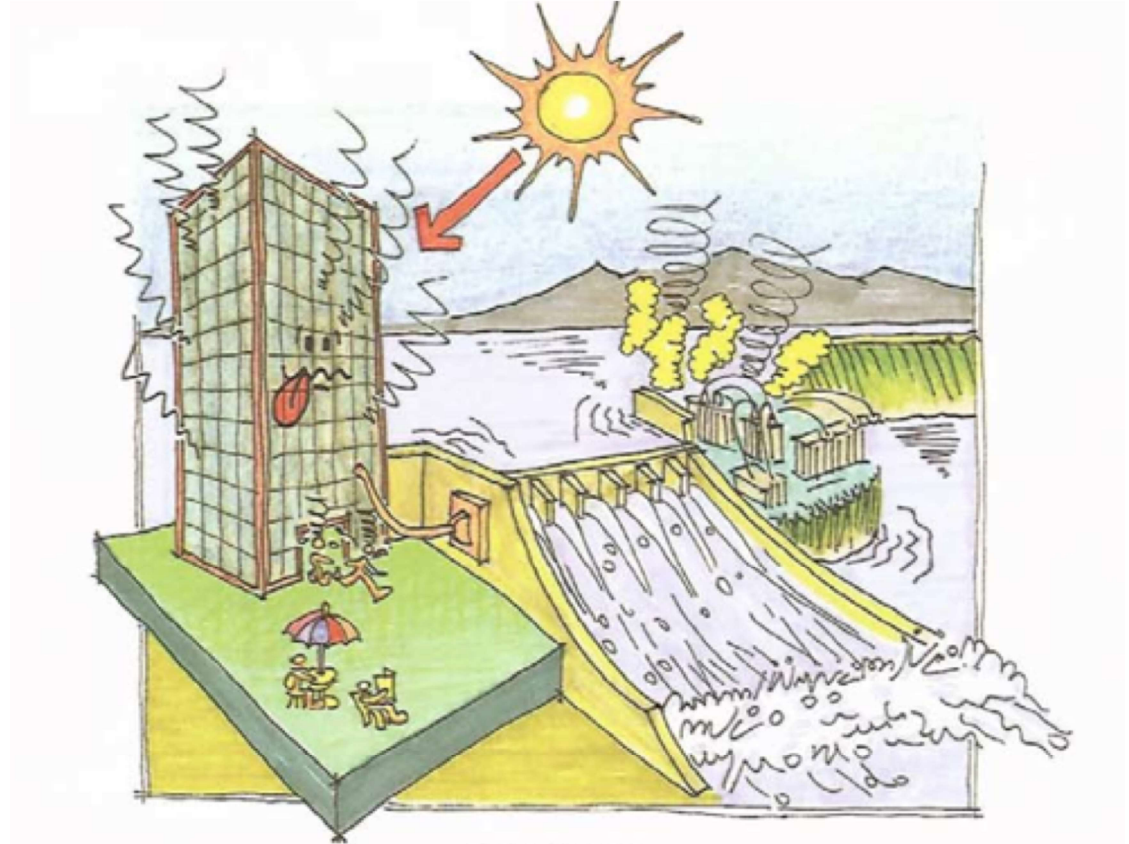
Eastgate: Sustainable building in Harare.



Energy use in buildings in Sub Saharan Africa



Energy used in buildings in Africa is estimated at **56% of the total national electricity** consumption.



Over 70% of energy is consumed in cities alone and in some cases, more than 50% of the national energy is used in the capital city alone.

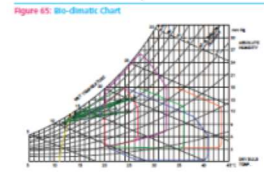
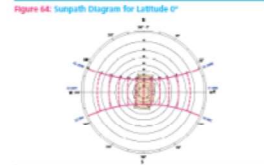
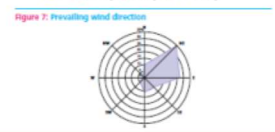
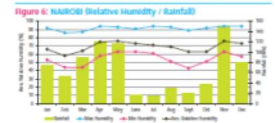
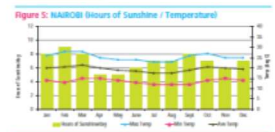
3. Education: Awareness creation and capacity building in EEB

The Journal of **SUSTAINABLE BUILDING DESIGNS**

Multi dwelling housing

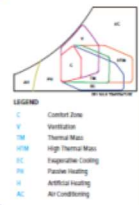
CLIMATIC ZONE 1: Sub Tropical Highland climate

Climatic Zone 1: Sub Tropical Highland climate	
Location	Nairobi, Kenya
Latitude	1°12' S
Longitude	36° 48' E
Altitude	1000 m above sea level
Temperature	Min average temp 17.7°C Max average temp 26°C
Humidity	Average 70%mm - 80%mm
Humidity	Average annual humidity is 75.2%
Prevalent wind direction	North East and East prevailing winds

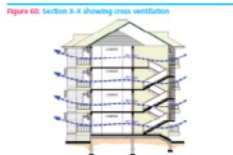


INTERPRETATION

- All year round:
 - The mean temperature falls in the passive heating zone (PH). The use of passive solar heating is recommended for this region. This can be achieved by having openings face the sun in favourable orientations.
 - The maximum temperature throughout the year are lower than 32°C, at night, in these cases the use of artificial heating (AH) is suitable to enable indoor thermal comfort.



CLIMATIC ZONE 1: Sub Tropical Highland climate



DESIGN RESPONSES

- Orientation:** The building's major axis is optimally oriented along the east-west axis.
- Passive heating:** All the rooms are naturally lit during the day by the provision of windows. This reduces energy consumption required for artificial lighting. During the cool months, the openings on the east and west facing walls contribute to warm the building through heat gain from the morning and afternoon sun respectively.
- Roof overhangs:** North and south facing windows are protected from the high midday sun by the provision of horizontal, but horizontal window overhangs and roof overhangs on the top level.
- Roof overhangs:** North and south facing windows are protected from the high midday sun by the provision of horizontal, but horizontal window overhangs and roof overhangs on the top level.
- Building materials:** Passive heating is desired in this type of climate, therefore more insulation are recommended.

Urban Energy Technical Note

Guidelines for Green Building Design

Over 70% of the world energy generation is consumed in human settlements, resulting in an emission of more than two thirds of CO2 that contributes to climate change. Widespread energy poverty and the increasing cost of fossil fuels are impacting negatively on the economic development and the living conditions of people.

The way buildings are planned and designed today has a direct implication on their energy bills.

To address the global challenges of climate change and the high cost of energy it is essential to adopt urban planning and building design methodologies that are energy conscious and environmentally friendly. This document acts as a guideline

to provide some of the mandatory criteria that should be taken into consideration. These criteria include:

- Optimization of the structure's energy efficiency;
- Minimization of the energy demand of buildings;
- Maximization of the efficiency of energy supply;
- Maximization of the share of renewable energy sources.

To design an energy efficient built environment involves minimizing the wastage of resources while maximizing the use of renewable energy sources and passive building design options.

This technical note introduces a simplified path to sustainable design, accessible through 7 Steps.

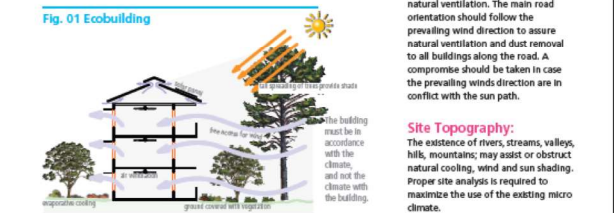
Step 1: Site Analysis

Site analysis helps to identify opportunities or constraints which will influence the outcome of the urban design.

Sun Path: Understanding the movement of the sun during the day and throughout the year allows for a qualitative analysis of the sunlight or shading of a site or part of a building. It is very useful for estimating the effects of the neighbouring buildings' shading or sunscreen needs, in the tropics, the orientation of the main road path should be developed along the East-West axis.

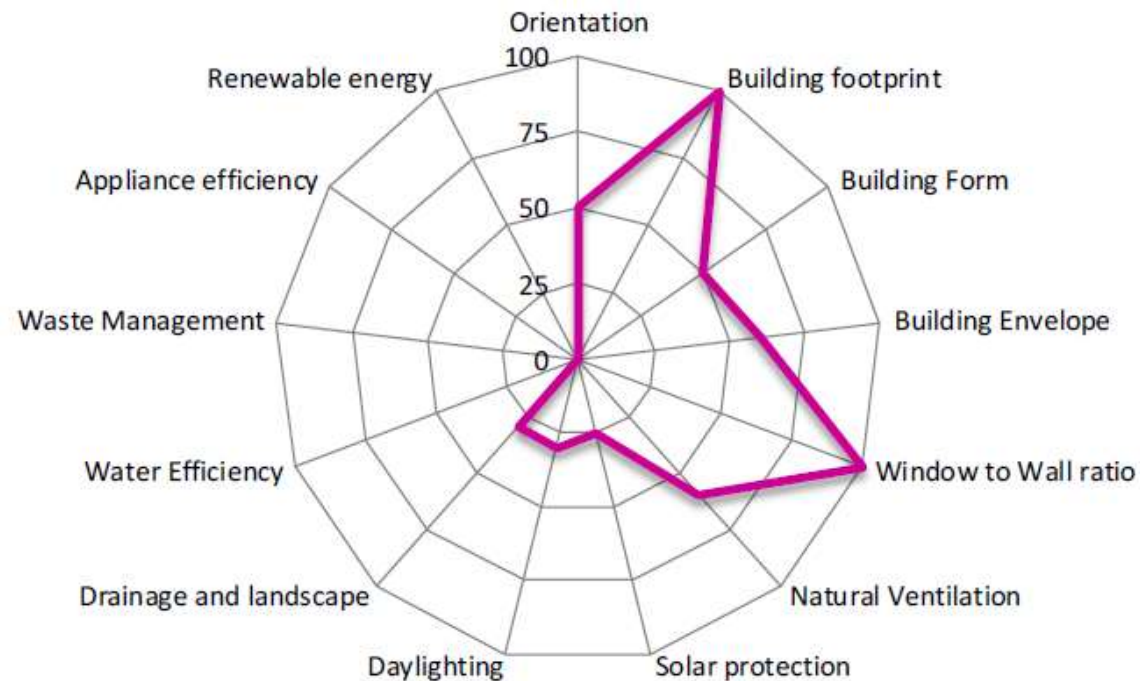
Prevailing Winds: Knowledge of the speed and directions of the prevailing winds will facilitate natural ventilation. The main road orientation should follow the prevailing wind direction to assure natural ventilation and dust removal to all buildings along the road. A compromise should be taken in case the prevailing winds direction are in conflict with the sun path.

Site Topography: The existence of rivers, streams, valleys, hills, mountains; may assist or obstruct natural cooling, wind and sun shading. Proper site analysis is required to maximize the use of the existing micro climate.



Development of tools such as handbooks on sustainable building design and technical notes to promote passive building measures.

A radar table to assess the sustainable performance of the building.

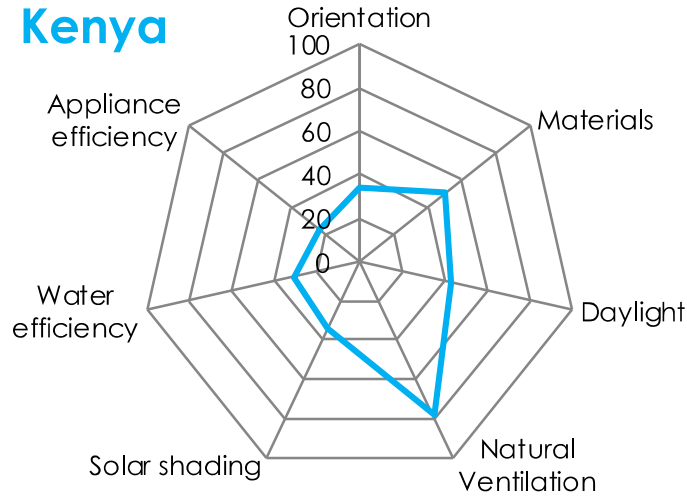


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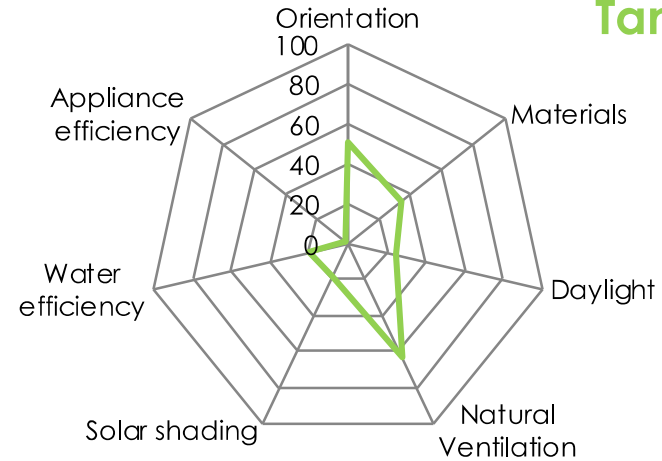
- 0 – 25 Sustainable design measure not considered
- 25 – 50 Sustainable design considered but not effective
- 50 – 75 Sustainable design measure considered and effective
- 75 – 100 Sustainable design measure considered and combined with secondary function / innovative

Audit findings: Current situation

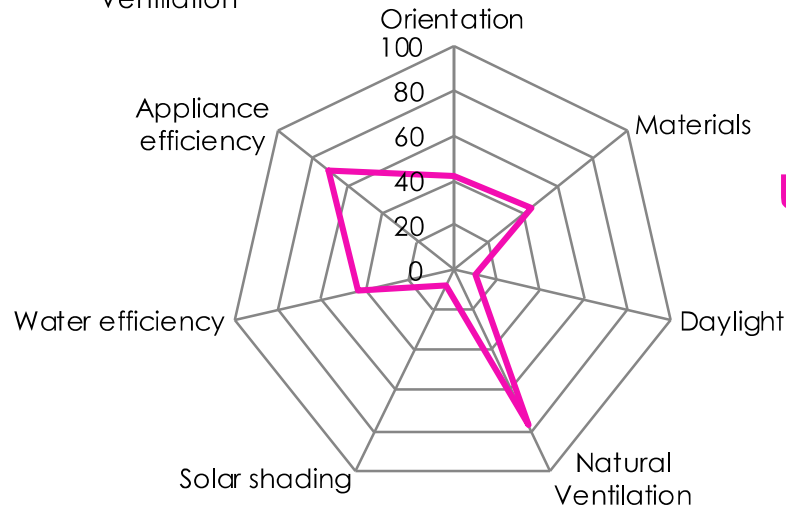
Kenya



Tanzania



Uganda



Sample size:
1,086 Buildings

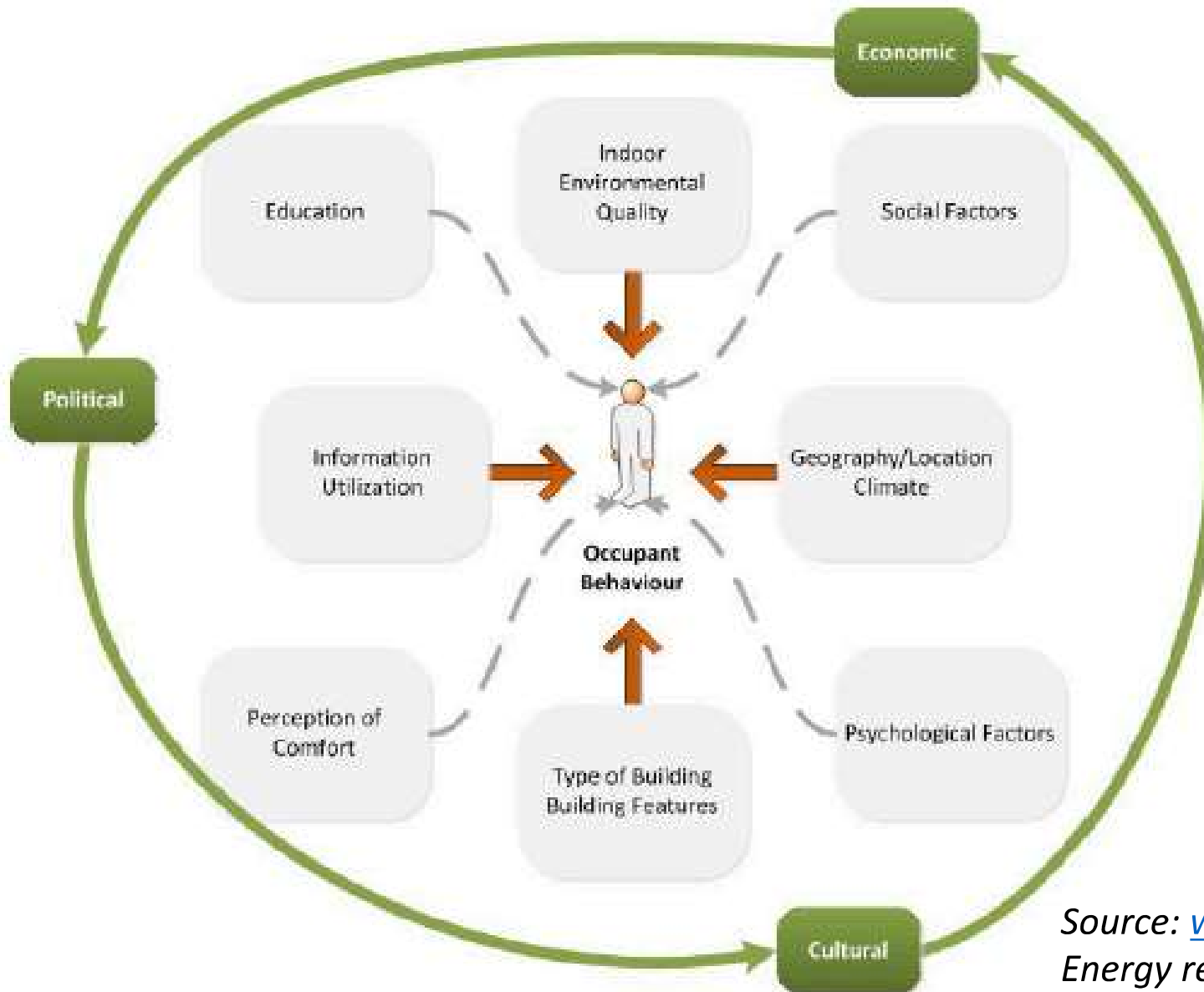


Figure 1. Influential factors on occupant behaviour.

Source: www.mdpi.com/;
*Energy related occupant behavior and its
 implications in Energy Use; A
 Chronological Review*

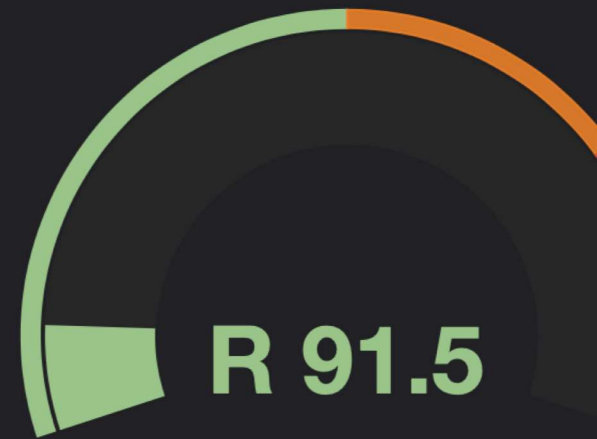
MONTHLY ENERGY - COST SO FAR

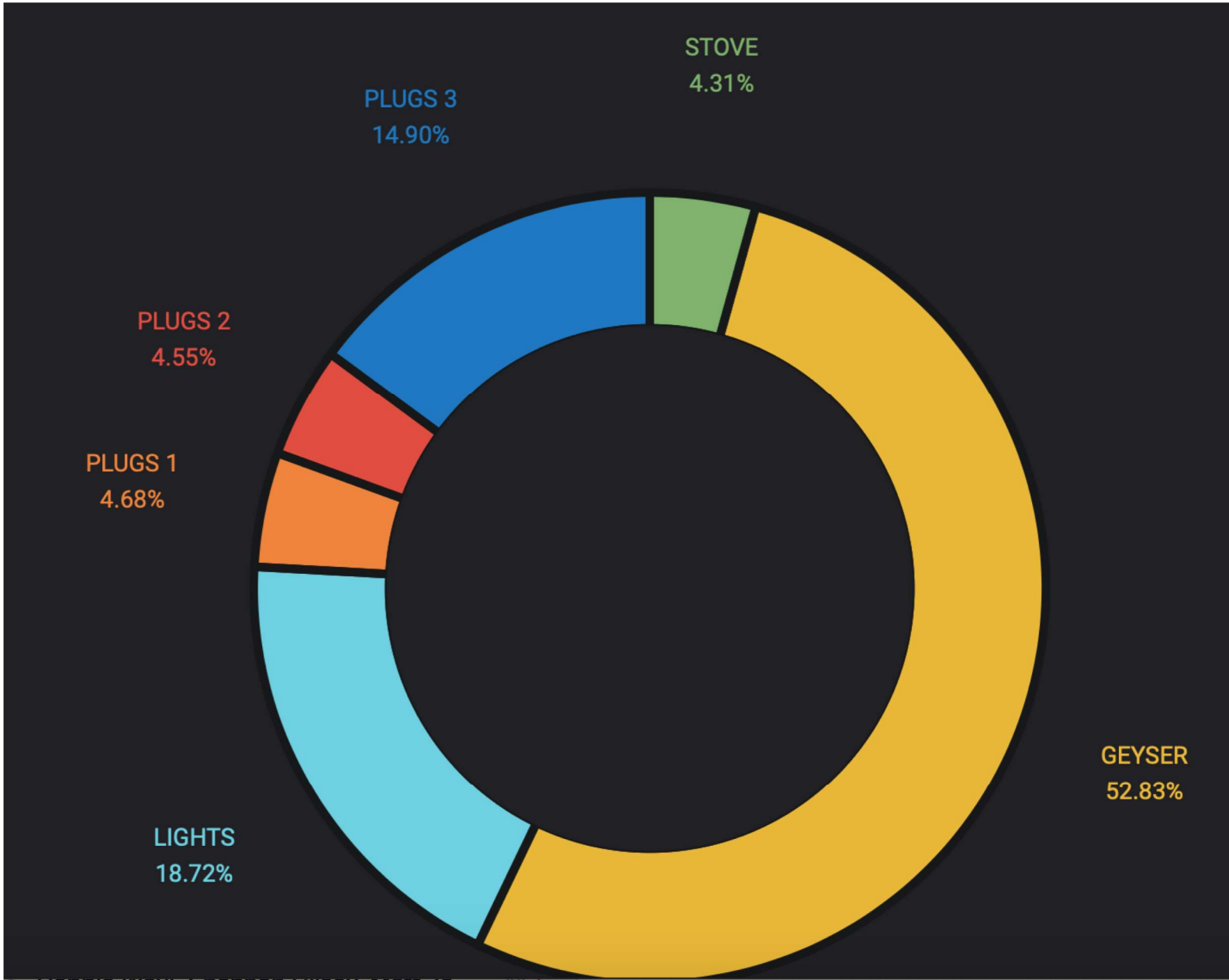


MONTHLY ENERGY - STATUS

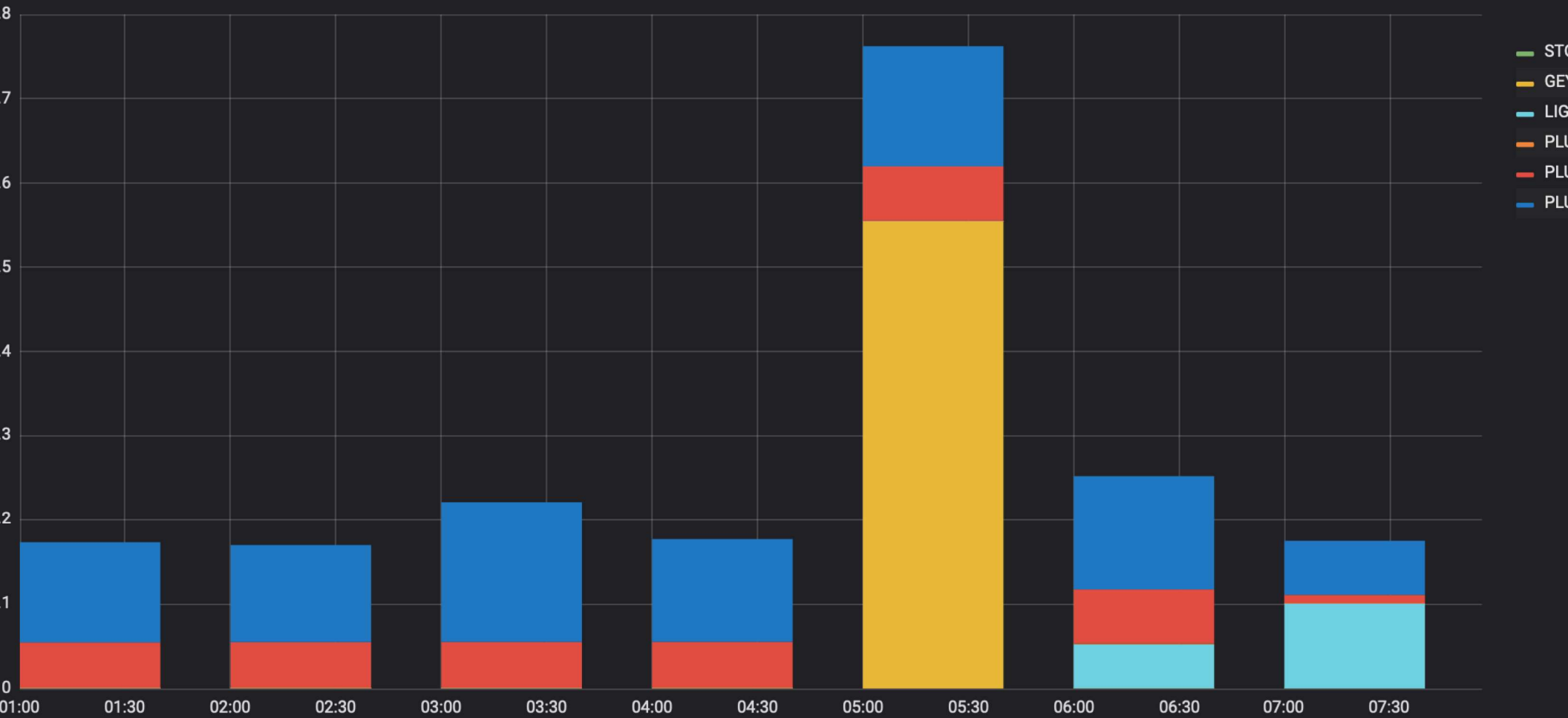
GOOD

MONTHLY ENERGY - COST SO FAR



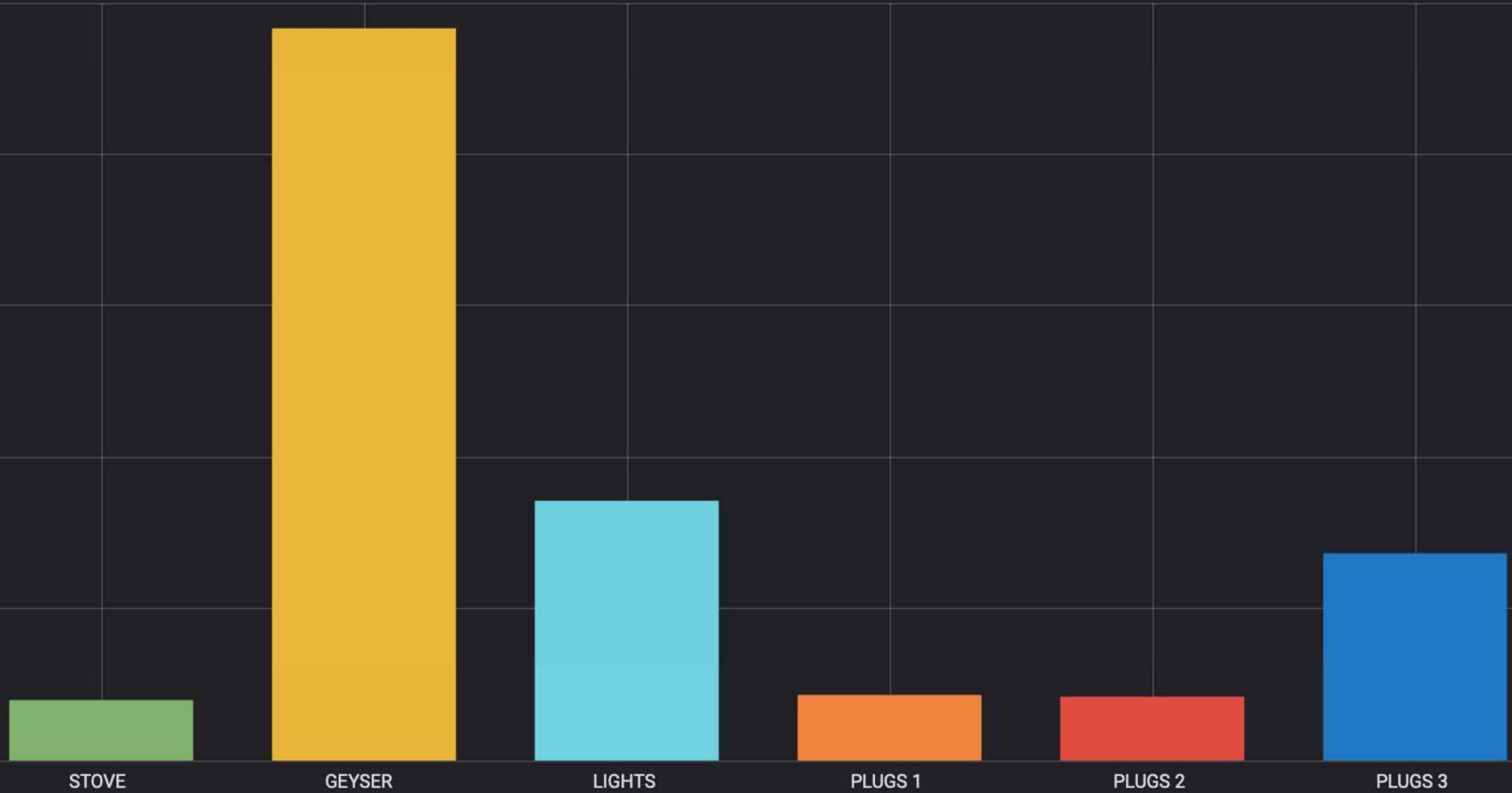


HOURLY ENERGY COST - TODAY SO FAR



HOURLY ENERGY COST - TODAY SO FAR

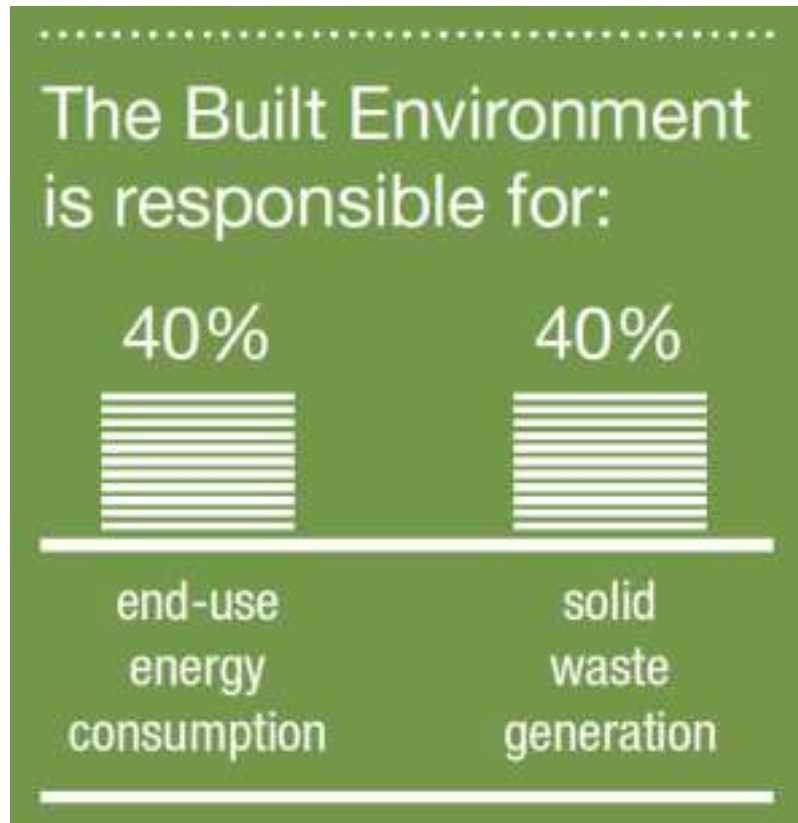
DAILY ENERGY COST - LAST 7 DAYS



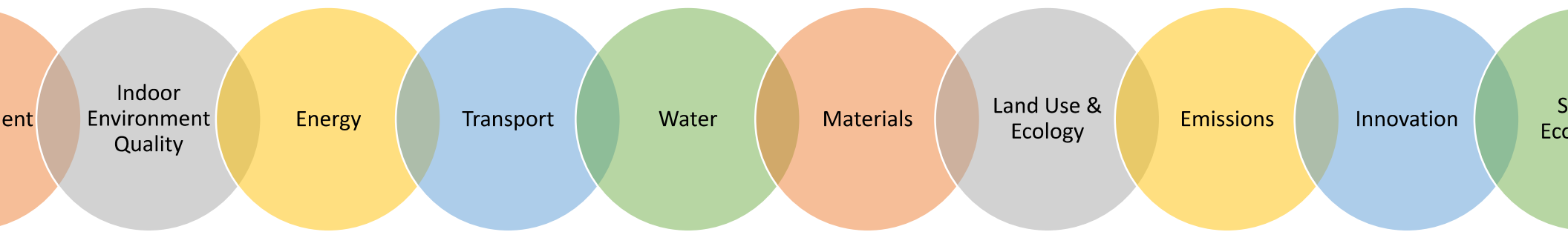
Building responsibly is imperative

By 2050, urban areas in sub-Saharan Africa will be home to 800 million more people than in 2014, according to New Climate Economy, and these will all live, work and study in buildings.

Future growth in Africa presents a tremendous opportunity to reinvent the way we build – to benefit the economy, society and enable humanity and nature to thrive together.



...to achieve an efficient & resilient green built environment

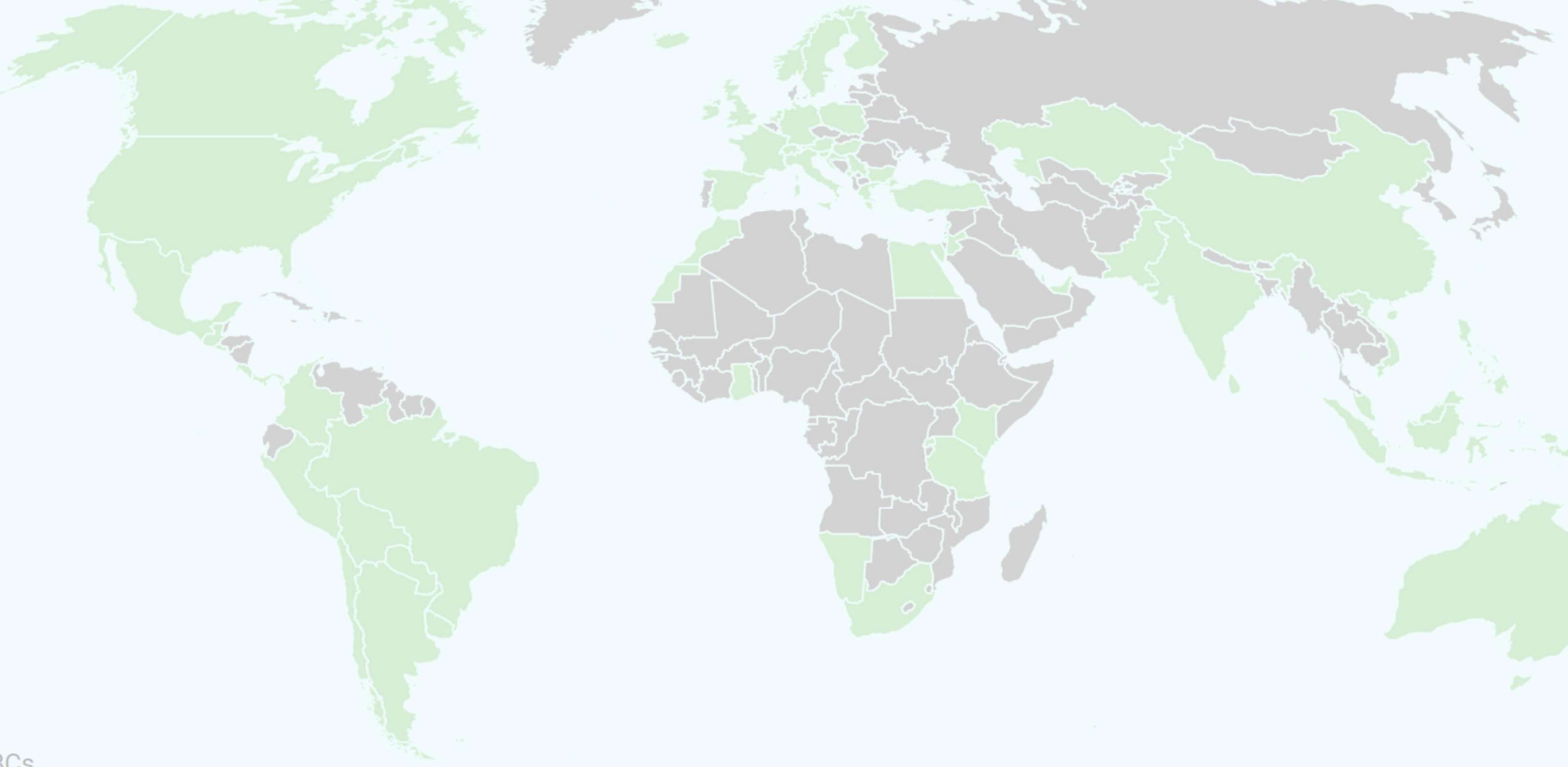


**WORLD GREEN
BUILDING WEEK**
4 - 30 SEPT 2018

AFRICA REGIONAL NETWORK  **WORLD GREEN BUILDING COUNCIL**

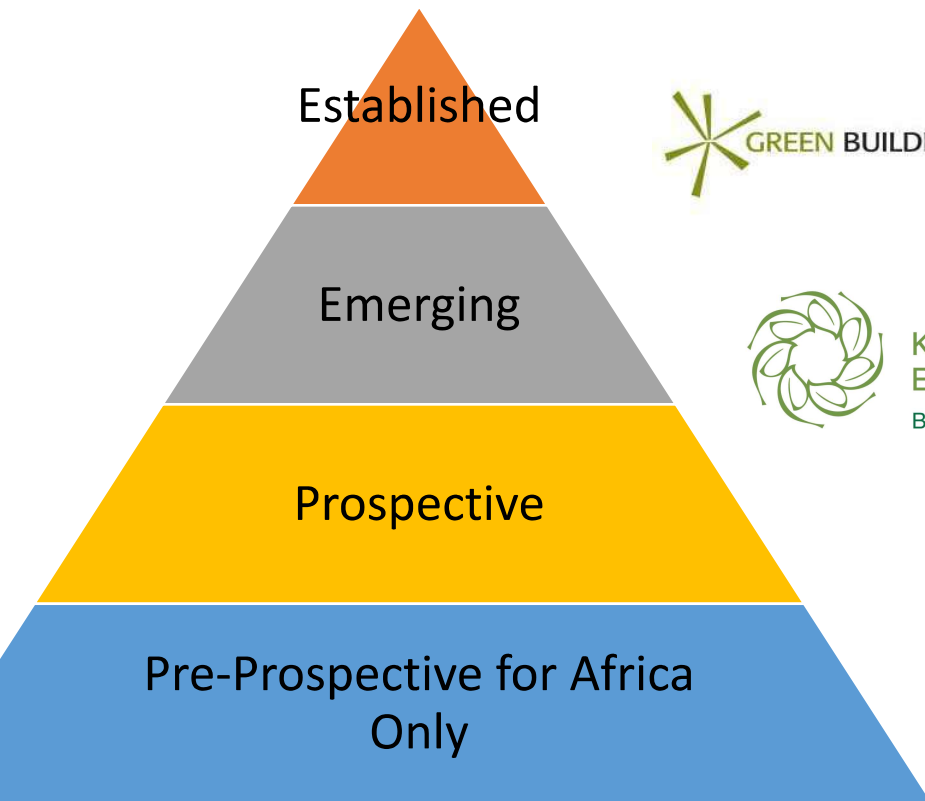
#OurHe

Africa's nascent green building movement



GBCs

There are currently 7 WGBC registered green building councils in sub-Saharan Africa



Showing Interest

- Botswana
- Cameroon
- Democratic Republic of Congo
- Ivory Coast
- Libya
- Nigeria
- Senegal
- Sudan
- Tunisia
- Uganda
- Ethiopia

www.worldgbc.org

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AFRICA REGIONAL NETWORK



WORLD GREEN BUILDING COUNCIL

#OurHe

Typical GBC: About Kenya Green Building Society

Who

Independent

Non-profit

Non-political

Member-based organization

“Emerging” status member of the World Green Building Council

What

Lead the transformation of the built environment in Kenya toward environmentally sustainable buildings

Build a green economy value chain

How

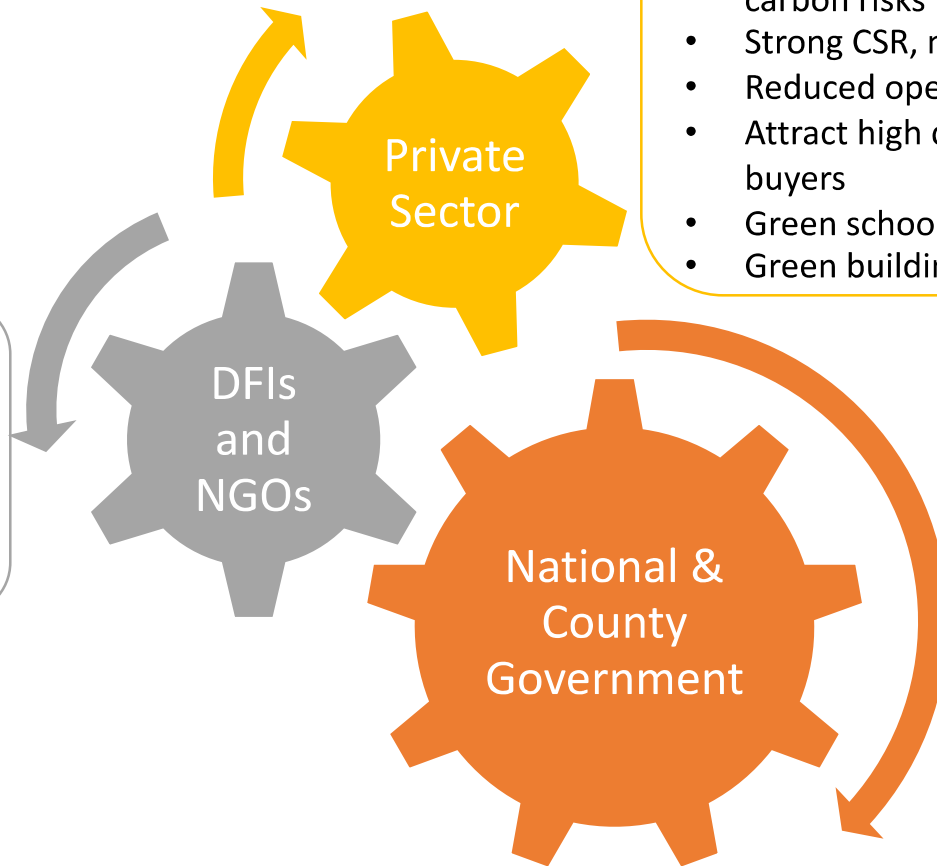
Advocacy

Education

Certification of green buildings

Our Theory of Change

- Collaborate with complementary organisations
- Unlock green finance
- Capacity building within public and private sector
- Boost a circular green economy



- Corporate & individual engagement
- Assets of high quality and value
- Long-term resiliency to mitigate carbon risks
- Strong CSR, market recognition
- Reduced operating costs, good ROI
- Attract high quality tenants & buyers
- Green schools initiative
- Green buildings for everyone

- Achieve Paris Agreement commitments for GHG emissions
- Advocate for built environment solutions to achieve national climate change agenda at national and county level
- Align Kenya's Medium Term Plan 3 and Green Economic Strategy Implementation
- Benchmark & track green building data





Reaching Net Zero

Reaching Net Zero is WorldGBC's project which aims to ensure that all buildings are "net zero carbon" by 2050.

Reaching Net Zero Carbon Buildings
Climate change challenges companies, cities and regions to reach Net Zero carbon emissions in their portfolios by 2050. WorldGBC aims to advocate for all buildings to reach net zero in operation by 2050.



Better Places for People

Better Places for People aims to create a world of green buildings which support healthy, happy and productive lives.

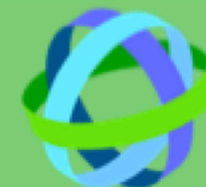


Cities and the Building Efficiency Accelerator

The Building Efficiency Accelerator (BEA) is a public-private collaboration that speeds the development and implementation of building efficiency policies and practices in cities around the world. Led by the World Resources Institute, in support of the UN Sustainable Energy for All (SE4ALL) initiative.

Global Projects

WORLD GREEN BUILDING WEEK
24 - 30 SEPT 2018



WORLD GREEN BUILDING COUNCIL

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Green Materials make Green Buildings



MARKS SHOWN ARE FOR ILLUSTRATIVE PURPOSES ONLY



On 23rd September 2019, the Secretary-General of the United Nations hosted the Climate Action Summit in New York with the objective of boosting ambition and rapidly accelerate action to implement the Paris Agreement. The S-G aimed to demonstrate a leadership of collective national political ambition and massive emission movements in the real economy by:

- **1. Raising national ambition:** Countries are asked to present concrete, realistic plans, compatible with the latest Special Report on Global Warming of 1.5°C from the Intergovernmental Panel on Climate Change, to enhance their Nationally Determined Contributions by 2020, reduce greenhouse gas emissions by 45 per cent over the next decade, and to net zero by 2050.

Implementing transformative changes needed to support the implementation of these plans in the areas of energy transition; infrastructure, cities and local action; industry transition; resilience and adaptation; nature-based solutions; climate finance and carbon pricing.

Generating political momentum through enhanced social and political drivers as well as youth and people's movement.



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SUSTAINABLE
DEVELOPMENT
GOALS

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WORLD GREEN
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BUILDING WEEK

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Sustainability
Imperative for the
Big 4 Agenda



KENYA GREEN
BUILDING SOCIETY
Build Green Save Kenya

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KGBS' effort is focused on demand/supply transparency for financing of global SDGs...

The new 2015 Sustainable Development Goals (SDGs) and Paris Climate Agreement have made it more clear than ever that the **finance sector now has a vital role to play in driving sustainable development.** This increasing role opens doors to new opportunities for finance institutions, governments and other sustainability players in business and in catalyzing change.



Countries and citizens of the world together have embarked on a path to improve the lives of people everywhere. The KGBS is at the forefront of leading in the education and driving the realisation of the goals. Green buildings directly contribute to the realisation of a number of these goals, and indirectly to almost all seventeen Sustainable Development Goals.



**Join us in Ghana for the
Africa Green Building
Summit in 2020**

THANK YOU FOR YOUR ATTENTION

ELIZABETH WANGECI CHEGE

CHAIRPERSON- KENYA GREEN BUILDING SOCIETY

***WORLD GREEN BUILDING COUNCIL AFRICA REGIONAL NETWORK –
CONTACT***

CEO OF WEB LIMITED; SUSTAINABLE DEVELOPMENT CONSULTANCY

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