GREEN STAR SA-TANZANIA

LOCAL CONTEXT REPORT

Applying Green Star SA in Tanzania
Revision 1 – August 2016

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1. Executive Summary

1.1. Overview of the Tanzania Local Context Report

"Africa, too, has no choice other than join hands to adapt and mitigate the effects of climate change. However, Africa can make a choice on how it can adapt and mitigate and when it can do so in terms of timeframe and pace. For Africa, this is both a challenge and an opportunity. If Africa focuses on smart choices, it can win investments in the next few decades in climate resilient and low emission development pathways" H.E. Jakaya Mrisho Kikwete, former President of the United Republic of Tanzania[1]

This report applies to the Green Star SA – Office v1.1 tool as well as rating tools for Green Star SA – Retail Centre v1, Green Star SA – Multi Unit Residential v1 and Green Star SA – Public & Education Building v1, and considers the applicability of the tool in Tanzania. Included in the report is a background analysis of Tanzania, as well as credit by credit analysis which considers the applicability of each credit to the local context.

The Green Building Council South Africa (GBCSA) is currently licensed by the Green Building Council of Australia (GBCA) to allow certification using the Green Star SA rating tools (Office v1 .1, Retail Centre v1, Multi Unit Residential v1, Public & Education Building v1) only in South Africa, Ghana, Namibia, Mauritius, Uganda, Nigeria, Kenya and Rwanda. Through this local context assessment, the GBCSA, in collaboration with the prospective Tanzania Green Building Council will allow for certification in Tanzania using all the Green Star SA rating tools (Office v1.1, Retail Centre v1, Multi Unit Residential v1, Public & Education Building v1) (with some minor adaptations recommended in this report).

The GBCSA would manage and allow the certification through its existing established processes, but call the certification Green Star SA - Tanzania. The GBCSA will then use the opportunity to allow capacity to grow in Tanzania through the prospective Tanzania GBC, by allowing selected Tanzanian professionals to be trained as Green Star SA - Tanzania assessors who would join the GBCSA assessor teams on Tanzanian projects. In addition, the GBCSA would deliver the Green Star SA Accredited Professional – New Buildings course in Tanzania, in collaboration with the prospective Tanzania Green Building Council, which would allow professionals in Tanzania to take the Green Star SA Accredited Professional online examination. The details would be agreed upon in a Green Star license agreement between the GBCSA and the prospective Tanzania GBC.

Office projects in Tanzania must use the Green Star SA – Office v1.1 as the base reference tool for Office projects in Tanzania (i.e. registration under Office v1 is no longer available) – except for Ene-0 and Ene-1,

[1] Power People Plant – Africa Progress Report 2015: http://app-cdn.acwupload.co.uk/wp-content/uploads/2015/06/APP_REPORT_2015_FINAL_low1.pdf

where Tanzanian office projects can still apply the Office v1 Energy Modelling Protocol becuase it is less stringent than Office v1.1. Refer to the Ene-1 section of this report.

Refer to the GBCSA website for a list of changes between Office v1 and Office v1.1 here:

https://www.gbcsa.org.za/wp-content/uploads/2013/05/Green-Star-SA-Office-v1.1-summary-of-changes-updated-June-2015.pdf

1.2. Recommendations

A summary of recommended credits requiring Credit Interpretation Requests (CIRs), Technical Clarifications (TCs) or adaptations can be found below (all other credits are proposed to remain unchanged, but where projects do want to propose changes these must be applied for through the TC/CIR process on the GBCSA website):

Credit	Recommendation
IEQ-1	If the project team wish to use an alternative standard (ASHRAE) then they should submit a CIR to the GBCSA.
IEQ-3	A CIR should be submitted to the GBCSA should the project team wish to use ASHRAE Standard 62.1 instead of CIBSE.
IEQ-6	Innovation point opportunity
IEQ-11	IEQ-11 to be kept in its current form. A CIR should be submitted, to be assessed by the GBCSA, should the project team wish to use an alternative set of Occupational Health and Safety (OH+S) regulations the South African Occupational Health and Safety Act (OH&S) should be used.
IEQ-12	The credit should be kept in its current form and no adjustments need to be made. A CIR should be submitted, to be assessed by the GBCSA, should the project team wish to use an alternative set of standards.
ENE-0	ENE- should be kept in its current form with a mandatory CIR to confirm eligibility. Reference must be made to the Green Star SA Energy Calculator & Modelling Protocol Guide current at the time of project submission. Where project teams are uncertain of the validity of the energy modelling programme used, an enquiry can be issued to the GBCSA for confirmation of validity.
ENE-1	Office v1.1 rating tool be applied to all other credits, calculations and protocols except the Energy modelling protocol for the ENE-0 and ENE-1: Greenhouse Gas Emissions credit, where the Office v1 Energy modelling protocol will be applicable to Tanzanian projects. ENE-1 should be kept in its current form with a mandatory CIR to confirm applicability.
ENE-7 (MUR)	Ene-7 the Green Star SA Multi Unit Residential v1 Hot Water Calculator would need to be adapted to reflect the relevant fuel factors in Tanzania. This would be project-specific and a mandatory CIR would need to be submitted to confirm applicability.

TRA-1	TRA-1 should be adapted to refer to the Tanzanian local, provincial or national authority planning allowances for the minimum or maximum values of car parking spaces provided for the project. For projects where the mandatory local parking requirements do not exist or are optional (or recommended), the technical manual refers to a set of 'alternative requirements' in the Additional Guidance which would be applicable to the project.
WAT-1 / WAT-1 (PEB)	As the Green Star SA Potable Water Calculator takes into account South African rainfall per region, the Green Star SA Potable Water Calculator would need to be adapted to reflect the rainfall values in the different regions in Tanzania. WAT-1 should be kept in its current form with a mandatory CIR to confirm applicability. The rainfall data should consist of 12 months of average monthly rainfall data in mm for the specific town/ city/ village.
MAT-7	Innovation point opportunity
MAT-11	It is recommended to adapt the credit so that: • One point is awarded where 20% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the member states of the EAC and SADC regions as defined by the EAC and SADC respectively. • An additional point is awarded where 10% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the Tanzanian borders. This promotes sourcing of materials in the East and Southern African regions which would be beneficial to the Tanzanian local context and regional and national economies. This will also reduce environmental impacts associated with long distance importing of goods and materials, as that is currently common practice in the Tanzanian construction industry.
ECO-0	Eco-0 to be kept in its current form with the inclusion of the additional environmentally sensitive areas listed in the Tanzania Environmental Management Act. A mandatory CIR will be required to assess the project's compliance with this Conditional Requirement based on site ecological maps, to ensure approval of this conditional requirement prior to the Round 1 submission.
ECO-2	The credit should be kept in its current form and no adjustments need to be made. A CIR must be submitted for projects targeting the second point referring to "urban edge.
ECO-4	Eco-4 to be kept in its current form. A mandatory CIR must be submitted to the GBCSA by projects to determine which South African bio-region is most applicable to the project.
INN-1	The credit should be kept in its current form with reference being made instead to the Tanzanian context, as opposed to the South African context.
INN-2	The credit should be kept in its current form with reference being made instead to awarding points to an innovative initiative where there has been a substantial improvement on an existing Green Star SA / Green Star SA-Tanzania credit

INN-3	The credit should be kept in its current form with reference being made instead to awarding points where an initiative in the project viably addresses a valid environmental concern outside of the current scope of this Green Star SA / Green Star SA-Tanzania tool.

Table 1: Summary of Green Star new building credits requiring CIRs or adaptations for use in Tanzania

It is recommended that the balance of the credits remain in their current format with no adjustments made.

No adaptations shall be made to the Spatial Differentiation, Space Use and Timing of Certification eligibility criteria of the Green Star SA rating tools. Recommendations for the Conditional Requirements eligibility criterion are included in the credit-by-credit review.

Green Star SA Category Weighting System

It has been agreed that the category weighting system should remain the same as that of the Green Star SA rating tools, until such a time as the Tanzanian Green Building Council has the capacity to facilitate a revision of the category environmental weighing system.

2. Contents

3. Acronyms

BCA	Building and Construction Authority
BMS	Building Management System
CIR	Credit Interpretation Request
DoEM	Department of Energy and Minerals
EAC	East African Community
ESD	Environmentally Sustainable Design
EWURA	Energy and Water Regulatory Authority
GBCSA	Green Building Council of South Africa
LEED	Leadership in Energy and Environmental Design
MUR	Multi-Unit Residential
NEMC	The National Environment Management Council
NLUPC	National Land Use Planning Commission
PEB	Public & Education Building
REZA	Renewable Energy Zanzibar Association
SADC	Southern African Development Community
TANESCO	Tanzania Electric Supply Company Limited
VOC	Volatile Organic Compound
WHO	World Health Organisation
ZECO	Zanzibar Electricity Corporation
ZMC	Zanzibar Municipal Council
ZURA	Zanzibar utilities regulatory authority

4. Introduction

The following report is a local context assessment to allow for the adoption of the Green Star SA certification scheme in Tanzania. The rating tools addressed are office, retail centre, multi-unit residential and public and education building projects. Currently the Green Building Council of South Africa (GBCSA) only allow certification via Green Star SA in South Africa, but through this local context report the GBCSA will assess for the use of this certification in Tanzania.

The GBCSA would manage and allow the certification through its existing established processes. The GBCSA will use this opportunity to allow capacity growth in Tanzania related to green building and transfer of knowledge.

The United Republic of Tanzania, situated on the Eastern seaboard of Africa, was formed through the union of two independent states, namely the Republic of Tanganyika and the People's Republic of Zanzibar. Zanzibar is an autonomous part of the United Republic, and it is made up of multiple small islands and two larger islands (Unguja and Pemba) situated in the territorial waters of the United Republic.[2]

Tanzania has a federal system of government, and Zanzibar is given a great deal of autonomy to determine its own laws and legal institutions through their own government. To this end, the following local context report will review the application of the Green Star SA rating tool in terms of both the Tanzanian and Zanzibar context, as different aspects may vary between the two.

5. Background – General

Tanzania is home to a population of 51.8 million[3] people and occupies 945 087 square kilometres of Sub-Saharan Africa. According to the World Bank statistics of 2014, 31% of the population lives in urban regions of the country with an urbanisation rate of 5.4% per year.[4]

Zanzibar is home to a population of 1.1 million people, and tens of thousands of tourists every year adding to the growing population.

[2] http://www.nyulawglobal.org/globalex/Tanzania.html
[3] The World Bank: http://data.worldbank.org/country/tanzania
[4] Central Intelligence Agency: https://www.cia.gov/library/publications/the-world-factbook/fields/2212.html

Figure 1: Tanzania[5]

5.1. Local Environment

5.1.1. Climate

The climate of Tanzania varies from tropical along the coast to temperate in the highlands of the country. The country's mean temperatures also range greatly from 24°C to 34°C, with annual rainfall ranging from below 500mm in arid and semi-arid areas to over 2500mm per annum in the more tropical regions.[6] April is the wettest month of the year, with an average of 19 rainy days. The long dry season, when rainfall is fairly unusual, lasts throughout June, July, August, September and October. During November and December there is usually another rainy season, termed the short rains, however, these are much lighter than the main rains in April and less reliable.

The coastal regions, specifically Zanzibar, experience high levels of relative humidity all year around, but particularly in conjunction with the rainy season of April.

[5] https://www.cia.gov/library/publications/the-world-factbook/geos/countrytemplate_tz.html
[6] Development of land use planning and land tenure systems in Tanzania: http://www.tzonline.org/pdf/areporttothefoodandagriculturalorganization.pdf

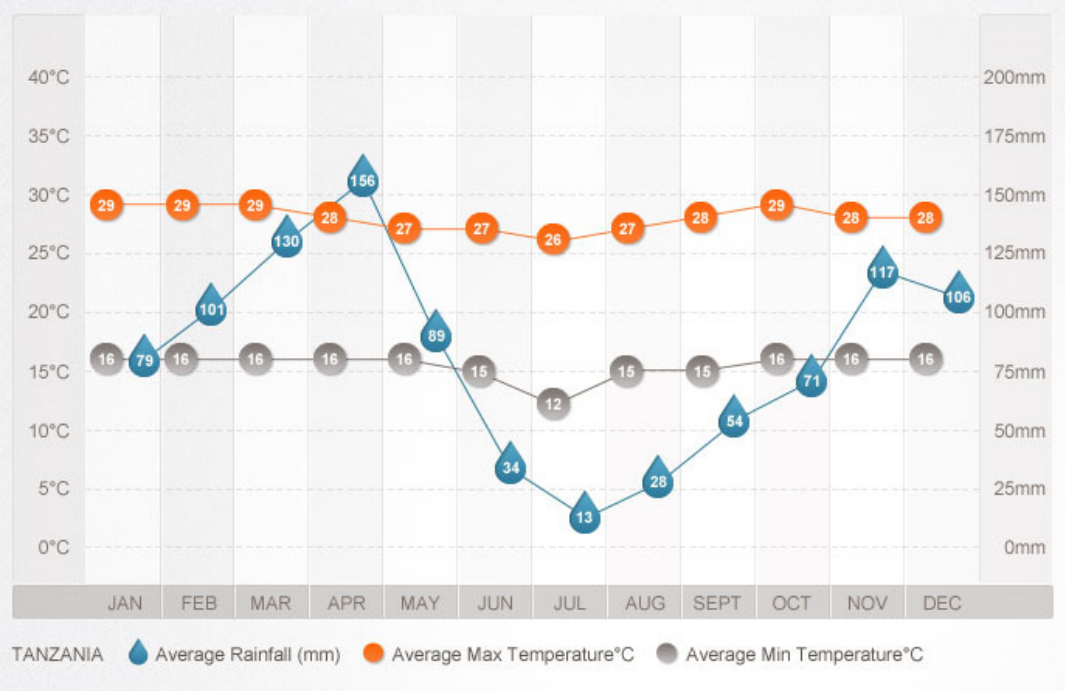

Figure 2: Tanzania monthly temperatures and rainfall

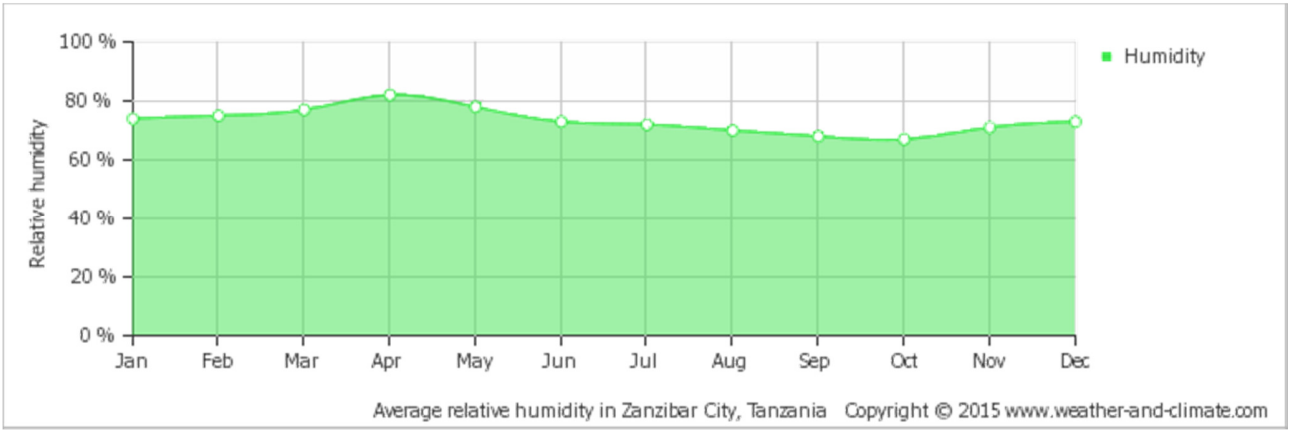

Figure 3: Zanzibar average relative humidity[7]

5.1.2. Land Use and Environmental Regions

Tanzania has five major climate classifications:

1. Tropical savanna climate
2. Subtropical highland oceanic climate
3. Hot semi-arid climates
4. Tropical monsoon climate

[7] https://weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,zanzibar-city,Tanzania

5. Humid subtropical climate[8]

Hydrologically, Tanzania is divided into five major drainage basins according to the recipient of the water bodies:

1. The Indian Oceans drainage system: comprised of the Pangani, Wami, Ruvu, Rufiji, Ruvuma and Lake Nyasa
2. The two Internal drainage systems: one to the north of Lake Eyasi, Manyara and Natron and the other into Laek Rukwa in the South West
3. The Atlantic Ocean Drainage: the Malagarasi basin into Lake Tanganyika
4. The Lake Victoria basin drainage via Nile River into the Mediterranean Sea.

Each of these basins include a network of rivers, lakes and wetlands.

5.2. Key Legislative Bodies for the Environment

The Division of Environment was established in 1991 under the Ministry of Natural Resources and Tourism in 1991. The Division of Environment is under the auspice of the Vice President of Tanzania and is responsible for the overall environmental policy and regulation, formulation, coordination and monitoring of environmental policy implementation in the country. Institutions with an enforcement role in environmental management include Sector Ministries, National Environment Management Council (NEMC) and Local Government Authorities. The Division of Environment is responsible for coordination of national and international matters related to environmental conservation and management.[9]

The NEMC was formed in 1983 when the Government of Tanzania enacted the National Environment Management Act No. 19 of 1983. NEMC was established with a broad mandate in response to the national need for such an institution to oversee environmental management issues and to implement the resolutions of the 1972 United Nations Conference in Stockholm. At this conference, all nations were called to establish and strengthen national environmental councils to advise governments and the international community on environmental issues.[10]

The National Land Use Planning Commission (NLUPC) was established in 2007 to prepare regional physical land use plans, formulate land use policies for implementation by the government and to specify standards, norms and criteria for protection of beneficial uses and maintenance of the quality of land. As an advisory body, the NLUPC is also to recommend measures to ensure that government policies, including those for the development and conservation of land, take adequate account of their effects on land use, stimulate public and private participation in programmes related to land use planning for the

[8] http://en.climate-data.org/country/132/
[9] The Vice-President's Office: http://www.vpo.go.tz/environment/utawala.php
[10] National Environment Management Council – Tanzania: http://www.nemc.or.tz/index.php?option=com_content&view=article&id=96&Itemid=186

national beneficial use of land, and seek advancement of scientific knowledge of changes in land use and encourage the development of technology to prevent adverse effects on human health or welfare.[11]

In Zanzibar the administration and final decision-making on environmental matters has been vested onto the Special Committee of the Revolutionary Council on Environment (the Committee). Headed by the Chief Minister (or a representative), members of the Committee are to be appointed by the President. The Committee's main roles include, among other things, resolving conflicts over environmental issues between the government and other institutions, approving national environmental action plans and making final decisions on all matters related to the environment as provided for the in the Environmental Management for Sustainable Development Act of 1996. In the course of undertaking the above functions, the Committee is empowered to conduct investigations, initiate inquiries and resolve conflicts related to implementation and/or violation of the provisions of the Act.[12]

5.3. Infrastructure

5.3.1. Electricity Supply and Infrastructure

Tanzania Electric Supply Company Limited (TANESCO) is the sole electricity provider in the country. TANESCO is wholly owned by the national government and is regulated by the Ministry of Energy and Minerals. TANESCO's core business includes the generation, transmission, distribution and supply of electricity in Tanzanian mainland and to sell bulk power to Zanzibar. Over the past few decades TANESCO has accumulated such a large amount of debt that it has compromised the country's entire budget, forcing the national government to undertake crippling fiscal adjustments.

A rising demand for electricity and under-investment in maintenance and operations has exacerbated the power shortages of the country. Power outages are more common during the dry season as the water levels drop in reservoirs that serve the hydropower stations. The reliance on emergency power provision has reinforced underlying economic problems of TANESCO. In 2011, TANESCO announced indefinite 12-hour power cuts as lower water levels reduced generation capacity at hydropower dams. The reduced energy levels will have knock on effects for growth, job creation and vulnerability to climate-change effects.

The following is a breakdown of the generation capacity in the interconnected grid system from 2012 figures:

- Total Hydro Power: 561 MW
- Total gas fired power plants: 544 MW (only 320 MW is operational)
- Total liquid fuel fired power plants: 210 MW with 50 MW capacity on short term rental basis

[11] The REDD desk: http://theredddesk.org/countries/laws/national-land-use-planning-commission-act-2007-tanzania

[12] http://www.lead-journal.org/content/05018.pdf

- Total of 18 isolated mini-grids with total installed capacity of 82 MW. Out of these, two mini-grids with installed capacity of 29 MW are running on natural gas while the remaining 16 mini-grids with total installed capacity of 53 MW are diesel generators.

Since 2012, power projects of between 100 kW and 10 MW are allowed to feed the national grid, following the approval of small power project guidelines by the Energy and Water Regulatory Authority (EWURA). This decision was made to accelerate electricity access and to promote the development of small power projects by local and foreign private investors. The guidelines also aim at promoting renewable energy in Tanzania, intended to supply commercial electricity to the national grid.[13] An example of one of these projects is the Songas gas-to-power project which provides Tanzania with around one-fifth of its grid-based electricity, reducing dependence on imported fuels and seasonal unreliability associated with hydropower. Approximately 30 industrial companies receive electricity from Songas.[14]

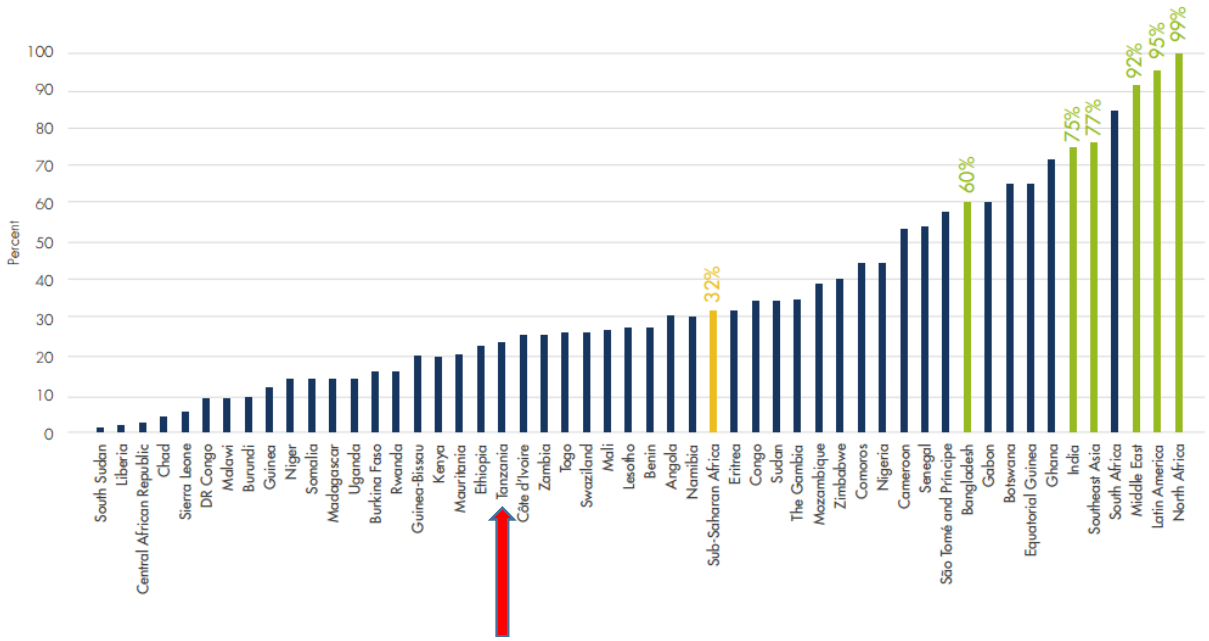

Figure 4: Access to electricity by country (2012)

Figure 4 displays that in 2012 only 23% of the Tanzanian population had access to electricity.[15]

[13] ESI Africa: http://www.esi-africa.com/news/facilitating-small-power-projects-in-tanzania/
[14] Power People Plant – Africa Progress Report 2015: http://app-cdn.acwupload.co.uk/wp-content/uploads/2015/06/APP_REPORT_2015_FINAL_low1.pdf
[15] Power, People, Planet- Africa Report 2015: http://app-cdn.acwupload.co.uk/wp-content/uploads/2015/06/APP_REPORT_2015_FINAL_low1.pdf

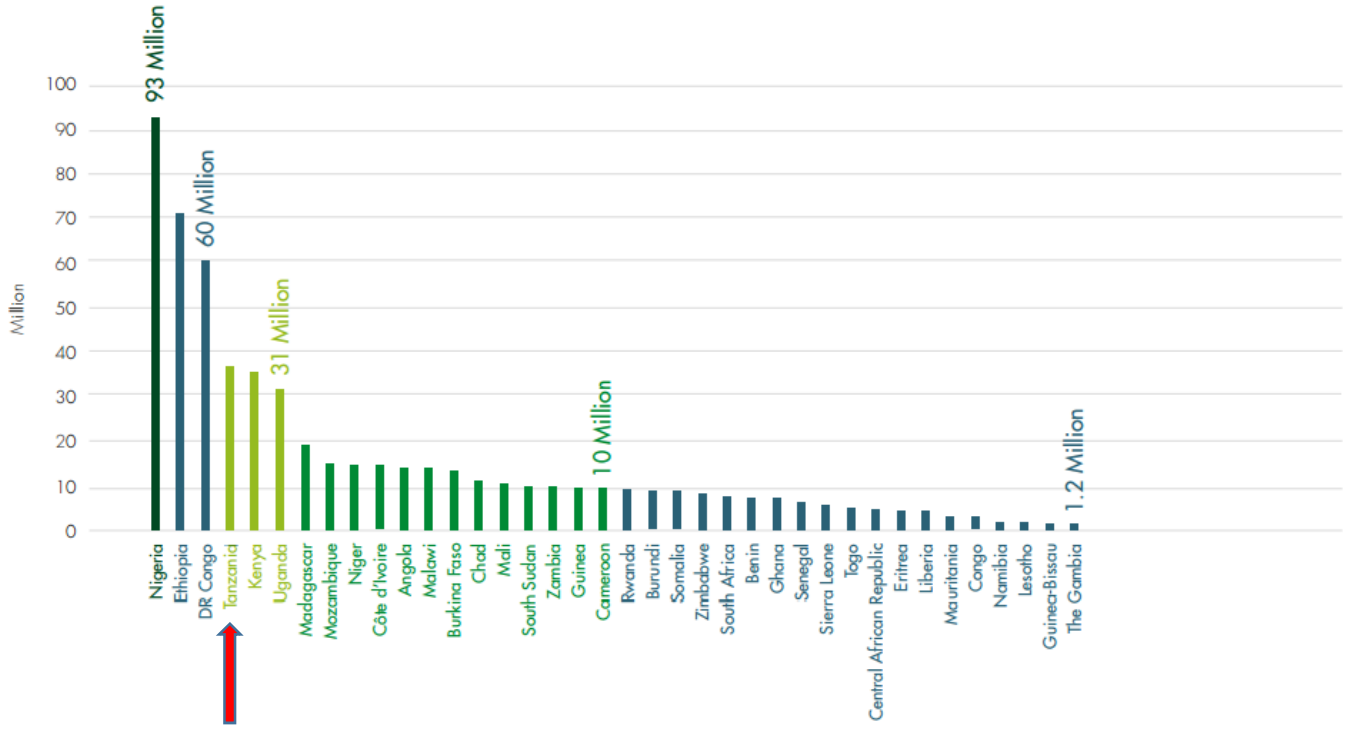

Figure 5: Population without access to electricity (2012)

Figure 5 shows that approximately 37 million people in Tanzania do not have access to electricity.[16] Over 90% of rural households in Tanzania rely on firewood and straw for cooking purposes. Urban households have more diverse sources of fuel, ranging from firewood and straw to charcoal and kerosene. The urban population of Tanzania is five time more likely to have access to energy than the rural areas.

The unreliable power supply within Tanzania has created a buoyant market in diesel-powered generators. Approximately 40% of businesses in the country operate their own generators to ensure stability. On average, electricity provided through diesel-fuelled back-up generators costs four time as much as power from the gird. Industry estimates suggest that the rental market for generators is growing at 13% per year, from a 2013 base of US$1.8 billion.

[16] Power, People, Planet- Africa Report 2015: http://app-cdn.acwupload.co.uk/wp-content/uploads/2015/06/APP_REPORT_2015_FINAL_low1.pdf

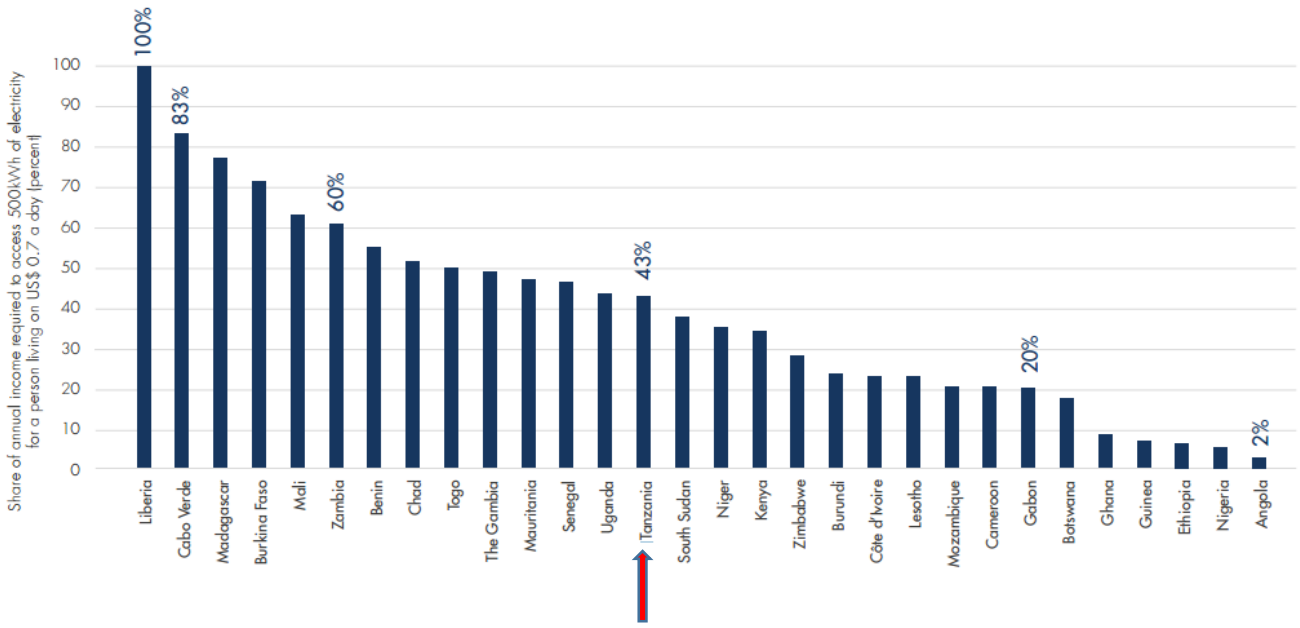

Figure 6: The cost of 500kWh of electricity as a share of income for the poorest households

Not only is the electricity supply in Tanzania unreliable, it is also unaffordable for much of the nation's poorest households as displayed in figure 6.

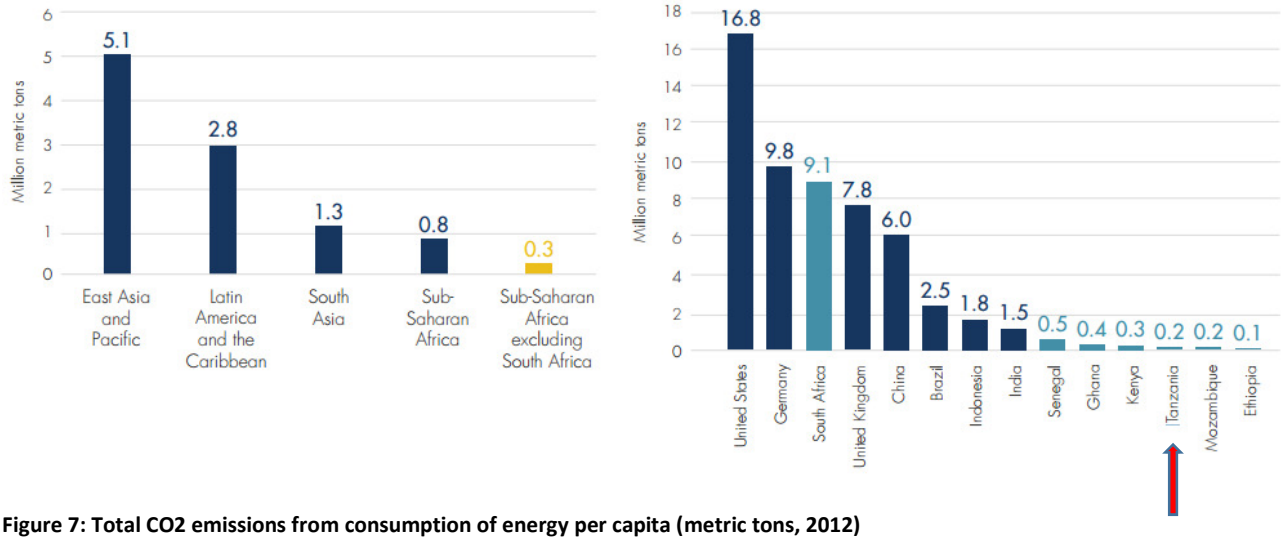

Figure 7: Total CO2 emissions from consumption of energy per capita (metric tons, 2012)

The island of Zanzibar is connected to the National (Tanzania) Power Grid through an underwater cable.[17] The cable can currently withstand a peak demand of 58.3 MW.[18]

[17] http://www.zanzibarinvest.org/infrastructure.htm
[18] http://www.unosd.org/content/documents/836Zanzibar%20v3.pdf

The energy sector governance structure of Zanzibar is as follows:

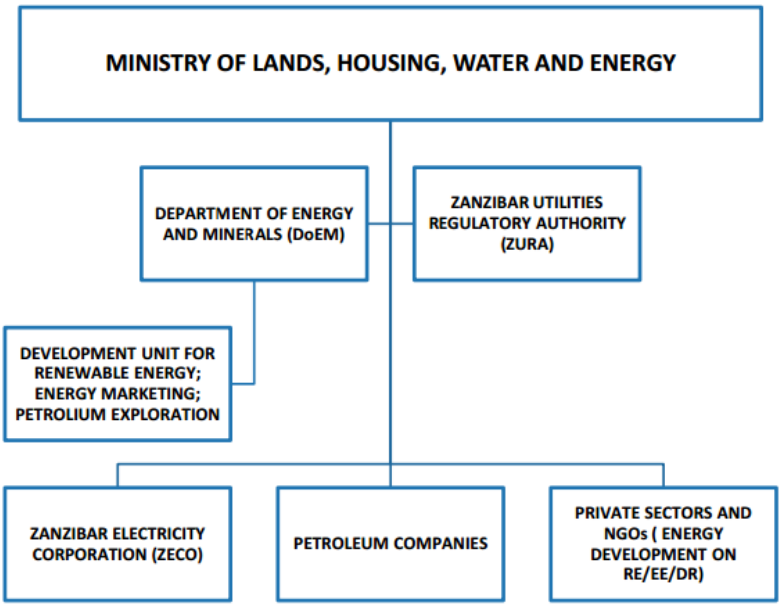

Figure 8: Zanzibar energy sector governance structure

The key energy challenges currently facing Zanzibar are the following:

- Biomass energy accounts for over 90% of final energy consumed which has caused serious impacts on forest ecosystems
- Power demand is imposing pressure on existing installed capacity
- Zanzibar does not generate its own power. It is connected to mainland Tanzania via undersea cables
- There is a growing demand for fossil fuels from the transport sector and tourism industry due to their reliance on diesel generators
- There is no installed renewable energy system (only out-of-
- grid small scale and NGO initiatives)
- ZECO suffers from 100% reliance on mainland, subsidies, power losses and lack of financial and planning architecture towards renewable energy targets[19]

Zanzibar's power supply is unreliable and blackouts occur frequently. Blackouts occur mainly for two reasons; one is the rolling blackout when the electricity company purposely disconnects a certain area from the grid when demand is higher than supply in order to stop the frequency in the grid to drop under a predetermined value. The electric grid is sensitive to changes in the frequency and small differences can harm valuable and expensive components in power plants and in the grid. The other main reason for blackouts is technical failure in the grid. In Zanzibar these kind of failures are especially common during

[19] http://www.unosd.org/content/documents/836Zanzibar%20v3.pdf

the rainy seasons, when equipment gets wet or flooded and infrastructure may be washed away or significantly damaged.[20]

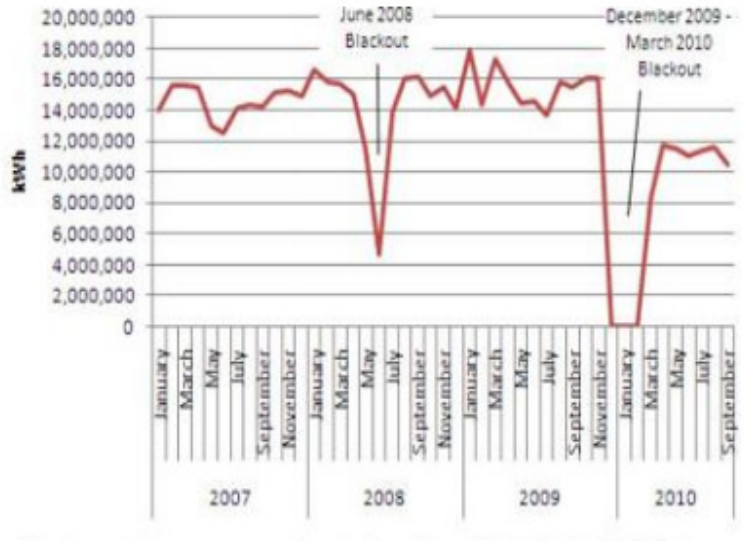

Figure 9: Monthly electricity consumption in Zanzibar, 2007-2010 (ZECO data)[21]

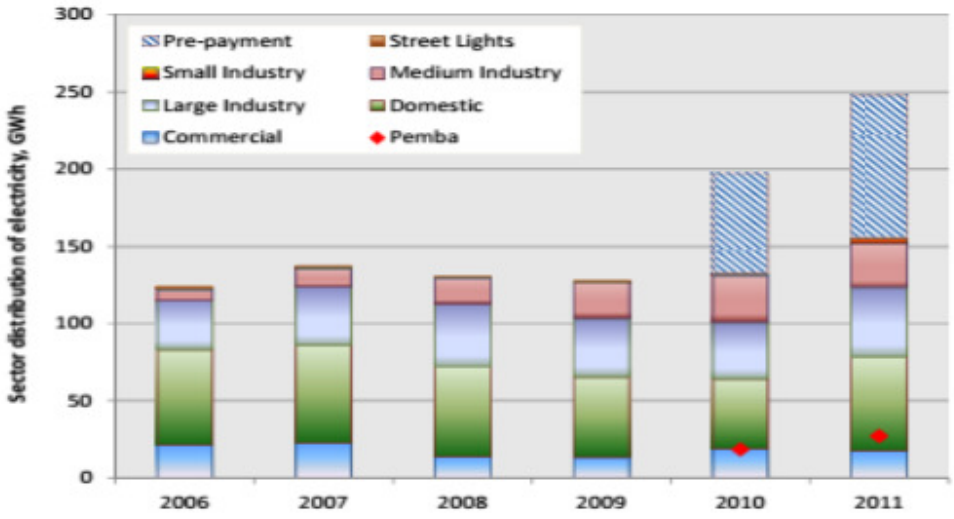

Figure 10: Distribution of electricity sales by sector, 20-06-2011 (ZECO data)

[20] http://www.diva-portal.se/smash/get/diva2:840779/FULLTEXT01.pdf
[21] file:///C:/Users/Catherine/Downloads/Zanzibar_Baseline.pdf

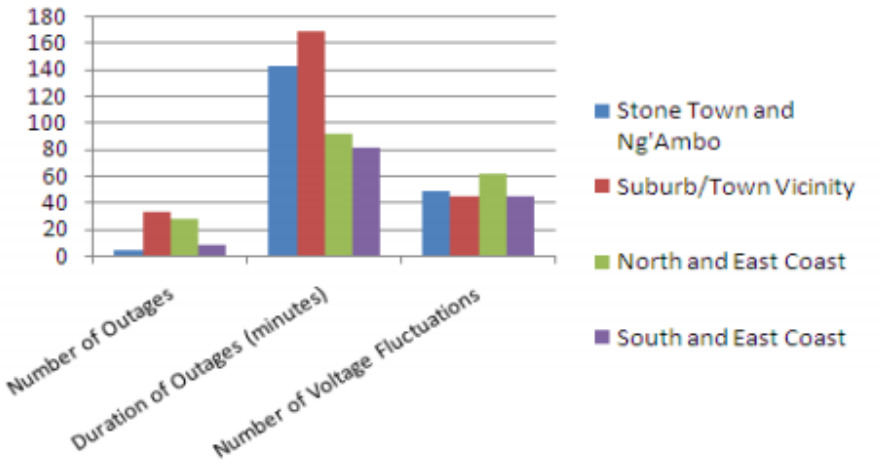

Figure 11: Zanzibar cable activity evaluation baseline hotel survey, June-August 2010[22]

Current baseline scenarios project a looming energy crisis for the tourism industry in Zanzibar.

Zanzibar has the following alternative fuels and options available:

- LPG: provides 0.5% of cooking energy in Zanzibar
- Wind generation: a study has been conducted in the south-east for a potential farm of 25 turbines, each 600kW, therefore producing a total of 15 MW
- Home solar PV systems
- Biogas
- Improved Cooking Stoves (ICS): small scale projects have been conducted by various NGOs
- Briquettes: under trial at a small scale

The Renewable Energy Zanzibar Association (REZA) was launched by researchers to promote alternative renewable energy produced by solar, wind or domestic waste. The launch of REZA has the hope of promoting renewable energy from available sources and therefore making the islands assured of electricity around the clock, even when power supply from Tanzania mainland is suspended. REZA is a non-governmental organization, regarding itself as non-profit that brings together actors/stakeholders in the renewable energy sectors to promote the accessibility and uses of renewable energies in Zanzibar.[23]

5.3.2. Water Supply and Infrastructure

The water and sanitation sector of Tanzania has undergone extensive reforms over the past decade. The recently adopted Sector-Wide Approach (SWAp) aims to improve performance monitoring and institutional development with funding from the Water Sector Development Program (WSDP).

[22] file:///C:/Users/Catherine/Downloads/Zanzibar_Baseline.pdf
[23] http://allafrica.com/stories/201605040079.html

The trend in access to water cannot keep up with the population growth of Tanzania. Funding from WSDP is less than what is required to meet urban water supply targets and only sufficient in rural areas if low cost technology options are deployed.

Key concerns within the water sector include:

- At the national level, improvements in procurement and budget management, monitoring, and reporting are critical to prevent a return to project funding
- At the local level, sustainability and equity challenges threaten to undermine the effectiveness of the new funds in rural areas, as does the lack of a clear strategy for pro-poor urban water supply
- Low budget utilisation suggests that even if investment funding for water supply were increased to the required level, the targets would not be met
- In sanitation, institutional and policy frameworks lag behind those of the water supply sector, though progress is being made in addressing this
- The sanitation sector is also undermined by the lack of accurate data on the current state of latrine coverage.
- The lack of proven effective strategies to persuade and enable rural and urban households to invest in improved sanitation in the Tanzanian context is also holding back the sector. The outcome of ongoing efforts to fill this knowledge gap will be very important.

Groundwater is the primary source of public water supply in Zanzibar as the island receives relatively high rainfall and has large groundwater resources.[24] Untreated municipal and industrial wastes are currently the main threats to the quality of ground water in Zanzibar.

5.3.3. Waste Management and Sanitation Facilities

In Tanzania solid waste management (collection, transportation and disposal) is one of the key duties of all urban authorities in the country and is a legal obligation in accordance with the Local Government Act 1982 section 55 (g) and the Environmental Management Act of 2004. Solid Waste Management in urban areas is regarded as a public service whereby the government has the duty to provide the Solid Waste Management Services, and the public has to pay for that service. However, due to rapid urban growth, coupled with scarcity of funds facing urban authorities, as well as the reluctance of the urban dwellers to pay for the services, represents a major challenge to solid waste management. While cities and towns are generating an ever-increasing volume of waste, the effectiveness of their solid waste collection, transportation and disposal systems are declining, where less than half of the generated solid waste is collected. Due to the weak financial structure and institutional incapacity of the urban local authorities to handle these problems, the Government of Tanzania, through Local Government Authorities is now looking into a different approach whereby a joint cooperation and investment between public/private and/or formal/informal sectors is needed.[25]

[24] http://www.economics-of-cc-in-zanzibar.org/images/Impacts_vulnerability_and_adaptation_vs_3.pdf
[25] http://globalmethane.org/documents/events_land_120910_11.pdf

Zanzibar's waste management and sanitation facilities are not keeping pace with the increase in population on the island. In the capital of Zanzibar, Zanzibar City, only a minority of residents, those living in the historical centre – Stone Town – are connected to the sewerage network, which consists of only 25km of pipes, according to the municipal council (ZMC). All new-built hotels have to have lined pits or a sewage treatment system. This type is lined with concrete on the walls and bottom to prevent the sewage from leaking into the surrounding ground. When the pit gets full the hotel is to notify the Zanzibar municipality who will collect the contents. This collected sewage is disposed of on the main rubbish dump in the outskirts of Zanzibar town. A more recently built hotel in Zanzibar has a septic tank to which enzymes are added regularly. This should decompose all the sewage, and the tank does not have to be emptied.[26] Most hotels discharge sewage into the sea with only minimal treatment. Considerable amounts of sewage, including from septic tanks where only minimal treatment takes place, is discharged directly into the sea as the island has no sewage treatment plant. Between 9 000 and 12 000 cubic metres of liquid waste is discharged into the sea daily.[27]

Solid waste management in Zanzibar is also inadequate. Of about 200 tons of waste generated daily, only 45% is moved to dumping sites, with the remainder left in open spaces. According to estimates, about 0.5kg of solid waste is generated per capita daily – 80% of this being organic. There is limited control at the dumping sites and complaints have been raised over rodent infestation, bad odours and smoke from the site which is about 12km from Zanzibar City.[28] All of the hotels on the islands use a rubbish-pit without waste separation. There is no current system on the islands for handling different fractions of waste and waste is collected by Zanzibar municipality where it is thrown onto the main rubbish dump.[29]

5.4. Key Environmental Issues

Tanzania is prone to flooding on the central plateau of the country during the rainy season and, on the contrary, often suffers from drought during the drier seasons of the year.

Environmental issues experienced by Tanzania as determined by CIA:[30]

- Soil degradation
- Deforestation
- Desertification
- Destruction of coral reefs threatens marine habitats
- Recent droughts affected marginal agriculture
- Wildlife threatened by illegal hunting and trade, especially for ivory
- Coastal flooding, inundation and erosion in Zanzibar due to sea level rise

[26] http://bioenv.gu.se/digitalAssets/1322/1322530_erik-hansson.pdf
[27] http://www.irinnews.org/report/88901/tanzania-zanzibars-sewage-disposal-challenge
[28] http://www.irinnews.org/report/88901/tanzania-zanzibars-sewage-disposal-challenge
[29] http://bioenv.gu.se/digitalAssets/1322/1322530_erik-hansson.pdf
[30] Central Intelligence Agency: https://www.cia.gov/library/publications/the-world-factbook/geos/tz.html

In urban areas, most of the environmental problems are a result of high urban population growth rate with inadequate provision of housing, infrastructure and services.[31] Consequently, due to inadequate urban planning there is an increase in urban pollution by means of sanitation and sewerage problems as well as increased environmental pollution from growing industries, factories, hospitals and the like, into receiving bodies such as water, air and the soil.

The major environmental concerns in rural areas revolves around the depletion of the natural resource base through land degradation, including coastal zone degradation, and environmental pollution, resulting from the application of excessive agrochemicals and the use of mercury in mining activities.

The causes of environmental problems are varied and the lack of adequate land use planning is one the main contributing factors that feed land degradation.

5.5. Green Buildings in Tanzania

The following is a regional update from the World Green Building Council regarding the status of the Tanzania Green Building Council:[32]

> *The Tanzania Green Building Council has been instrumental in advancing green building in the country, with two impressive new projects recently completed.*
>
> *NHC Place is Tanzania's first green building with zero incremental cost. Its green value engineering approach seeks to incorporate all elements of green building wherever possible.*
>
> *As a result, this successful project is packed with green features. Even before construction commenced, the building site was chosen from land already reserved for developed, so undeveloped land could be preserved.*
>
> *In the building itself, systems and equipment used were thoroughly researched to ensure that they consume minimal energy. A refuse chute is provided for recyclable waste, and plants on site are selected to use less water.*
>
> *The second impressive project is Kigamboni, a housing estate with the goal of building a resilient community in Dar Es Salaam – an "abode of peace" for African cities to emulate.*
>
> *Great care was taken to incorporate green elements in the design and construction. The resulting estate has a reduced dependence on energy, with orientation, ventilation, insulation, solar shading and use of daylight all designed to regulate building temperature and reduce the need for artificial heating, cooling and lighting.*

[31] Development of land use planning and land tenure systems in Tanzania: http://www.tzonline.org/pdf/areporttothefoodandagriculturalorganization.pdf

[32] World Green Building Council: http://www.worldgbc.org/activities/news/africa-news/tanzania-gbc-projects-advancing-local-green-building/

The project also aimed to maximise social responsibility, reducing use of toxic materials and incorporating low VOC paint to ensure that the dwellings are healthy. The project was also a community effort, with local residents working on the construction of the estate, and thereby learning new skills.

GreenA Consultants Pte Ltd was the lead ESD consultant and provides advisory and consultation services in areas of sustainability and the achievement of Singapore BCA Green Mark, LEED, Green Globe and Malaysia Green Building Index Certification.

6. Applying Green Star SA to Tanzania – General

This section outlines the application of Green Star SA to Tanzania from a general perspective.

The Green Star SA rating tools, namely Office, Retail Centre, Multi Unit Residential, Public and Education Building, have been assessed for relevance in the Tanzanian context on a credit by credit basis. Each credit's applicability to the Tanzanian context is discussed and recommendations are made where the project team should submit a Credit Interpretation Request (CIR) to the GBCSA where an alternative standard will be better suited.

It considers the typical project delivery, relevant building codes and standards, the eligibility requirements in Green Star SA, the conditional requirements and the environmental weightings of the tool.

It is suggested that the weighting system of the credits should remain the same as that of the original Green Star SA rating tools.

6.1. Building Codes and Standards

The construction sector is primarily under the Ministry of Infrastructure Development, which is charged with developing a sector capable of meeting construction needs, rehabilitation and maintenance of civil works and buildings.

Key institutions under the construction sector include:

- Ministry for Water and Irrigation
- Ministry of Lands, Housing and Human Settlements
- National Housing Corporation (NHC)
- Contractors Registration Board (CRB)
- The National Construction Council
- Engineers Registration Board (ERB)
- Architect and Quantity Surveyors Registration Board (AQRB)
- Tanzania Building Agency (TBA)
- Tanzania Electrical, Mechanical and Electronics Services Agency (TEMESA)
- Public Procurement Regulatory Authority (PPRA)
- Procurement and Supplies Professionals and Technicians Board (PSPTB)

The National Construction Industry Policy was approved by the Tanzanian Government in 2003 with the following objectives:

- To improve the capacity and competitiveness of the local construction enterprises (contractors, consultants and informal sector)
- To develop an efficient and self-sustaining roads network that is capable of meeting the diverse needs for construction, rehabilitation and maintenance of civil works for trunk, regional, districts and feeder roads network
- To improve the capacity and performance of the public sector and private sector clients so as to ensure efficient, transparent and effective implementation and management of construction projects.
- To ensure efficient and cost effective performance of the construction industry that will guarantee value for money on constructed facilities in line with best practices
- To promote application of cost-effective and innovative technologies and practices to support socio-economic development activities such as road works, water supply, sanitation, shelter delivery and income generating activities.
- To ensure application of practices, technologies and products which are not harmful to both the environment and human health
- To mobilize adequate resources from both the public sector and the private sector for construction and maintenance of public infrastructure
- To enhance participation in regional and international co-operation arrangements for the purpose of promoting the capacity and competitiveness of the industry and developing markets for export of its services and products.
- To improve co-ordination, collaboration and performance of the institutions supporting the development and performance of the construction industry[33]

The Tanzanian Bureau of Standards (TBS) has published 51 standards of direct relevance to the construction industry. This number falls short of industry's expectation and the regulations currently in use are outdated and their enforcement is weak. While the Ministry responsible for lands and human settlements formulates building regulations, their enforcement if the responsibility of the local authorities. Lack of appropriate building regulations and standards is one of the contributing factors to poor quality of products and services.

6.2. Eligibility Requirements

No adaptations shall be made to the Spatial Differentiation, Space Use and Timing of Certification eligibility criteria of the Green Star SA rating tools. Conditional Requirements eligibility criterion are included in the credit by credit review.

[33] http://www.natcomreport.com/Tanzania/pdf-new/construction.pdf

6.3. Environmental weightings and applicability to Tanzania

It has been agreed that the category weighting system should remain the same as that of the Green Star SA rating tools. Recommendations for the Conditional Requirements eligibility criterion are included in the credit by credit review below.

7. Applying Green Star SA – Credit by Credit

This section outlines the application of Green Star SA to Tanzania, credit by credit.

- Application of the Green Star SA – Office v1.1 tool as well as Green Star SA v1 rating tools for Retail Centre, Multi-unit Residential & Public and Education Building.
- This has been included as an interim measure and attempts to limit the number of changes to the overall tool. It includes suggestions of where the project team might submit a Credit Interpretation Request (CIR) to the GBCSA where an alternative standard may be appropriate to their project.

Each credit is reviewed in the following way:

- Aim of the credit,
- Discussion, which outlines the views of the Tanzanian professionals contacted as part of this research,
- Requirements for the adoption of the Green Star SA tool,
- Resources, which include changes to the references listed in the technical manual as well as relevant Tanzanian manufacturers, suppliers and consultants.

A full list of the professionals contacted for this research can be found in Section 9 of this report.

The details of all credits have not been provided. This section must be read in conjunction with the technical manuals for Green Star SA – Office v1.1 as well as Green Star SA v1 for Retail Centre, Multi-unit Residential & Public and Education Building (available by order from www.gbcsa.org.za.)

The Green Star SA – Office v1.1 tool as well as Green Star SA v1 rating tools for Retail Centre, Multi-unit Residential & Public and Education Building, have been assessed for relevance on a credit by credit basis. Each credit's applicability to the Tanzanian context is discussed and requirements are listed as to where the project team must submit a Credit Interpretation Request (CIR) to the GBCSA where an alternative standard may be better suited.

Credit by credit review

For each credit reviewed as part of this report, the credits are colour coded in accordance with the changes required for applicability to the local context:

The credit should be kept in its current form and no adjustments need to be made.

The credit requires a CIR or TC or adaptation to ensure relevance to the Tanzanian context.

The credit should be omitted and made 'not applicable' for the Tanzanian application of the tool.

All credits for new building tool credits have been included within the table below. All credits applicable to Green Star SA Office v1.1 tool as well as Green Star SA v1 rating tools for Retail Centre, Multi-unit Residential & Public and Education Building have been included in the local context report.

Tanzanian projects would also be required to use the latest Green Star SA TCs, CIRs and Errata relevant to rating tools, published on the GBCSA's website, which represent the current version of that specific tool.

7.1. Management

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	MAN-1: Green Star SA Accredited Professional To encourage and recognise the engagement of professionals who can assist the project team with the integration of Green Star aims and processes throughout design and construction phases.	It is important that project members understand the eligibility criteria and credit criteria of the Green Star rating tools and their processes. Therefore, until the TZGBC establishes a rating tool and course delivery system, it is recommended that professionals be trained under the GBCSA system. Therefore, the credit in its current form is equally relevant and applicable in Tanzania as is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	MAN-2: Commissioning Clauses To encourage and recognise commissioning and handover initiatives that ensure that all building services can operate to optimal design potential.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	MAN-3: Building Tuning To encourage and recognise commissioning initiatives that ensure optimum occupant comfort and energy efficient services performance throughout the year.	This is not conducted as wide-spread current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania. A few professionals in Tanzania are undertaking commissioning after the installation works have been completed, following a method statement, check list and test report.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	MAN-4: Independent Commissioning Agent To ensure buildings are designed with regard to future maintenance and are correctly commissioned before handover.	The professionals contacted do not know of any local commissioning agents, however, it is mandatory to employ an independent commissioner when the commissioning process is undertaken in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	MAN-5: Building User's Guide To encourage and recognise information management that enables building users to optimise the building's environmental performance.	Informing the users on how the building should function is an important aspect of making sure that a green building performs to its optimum, therefore the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	MAN-6: Environmental Management To encourage and recognise the adoption of a formal environmental management system in line with established guidelines during construction.	Environmental Management in construction should not be a region-specific practice but should be practiced globally in order to minimise the disturbance to the environment. There are no local environmental management standards that need to be adhered to in the building industry in Tanzania, therefore those mentioned in the Green Star SA Technical Manual are to be applied to the Tanzanian context too.	The credit should be kept in its current form and no adjustments need to be made.
	MAN-7: Waste Management To encourage and recognise management practices that minimise the amount of construction waste going to disposal.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania. Waste recycling is an income source for contractors and it is environmentally beneficial. The credit will encourage the development and growth of these facilities in the country.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	MAN-8: Airtightness Testing To encourage and recognise measures to reduce uncontrolled air leakage in buildings, and reward the testing and achievement of good air tightness testing levels.	Infiltration is uncontrolled air leakage through cracks and gaps in the building fabric. It is affected strongly by design decisions and construction quality. Pressure and temperature differences between the inside and the outside of the building lead to infiltration, which will rise and fall uncontrollably; this is largely in response to fluctuations in external wind speed and air temperature. Significant amounts of energy are wasted through leaky construction of buildings. In naturally ventilated buildings this leads to excessive use of heating in winter (as well as user comfort issues associated with draughts). In air conditioned buildings, this leads to excessive use of both heating in winter and cooling in summer. As such, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	MAN-9: Waste Recycling Management Plan – RETAIL CENTRE To encourage and recognise management systems and building infrastructure that facilitate the reduction of the overall operational waste generation and disposal.	It is believed that through the development of management systems that facilitate the reduction of the overall operational waste generation and disposal, this credit will encourage the development and growth of these facilities in retail centres in the country. As such, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	MAN-10: Building Management System – RETAIL CENTRE & PEB To encourage and recognise the incorporation of Building Management Systems to actively control and maximize the effectiveness of building services.	Building Management Systems are computer based control systems installed in buildings to control and monitor the building's mechanical and electrical equipment as well as the water systems. Ideally the BMS, especially on large building projects, is a central integrated system monitoring and controlling the building. However, on smaller projects where a single BMS system is not appropriate there is still benefit in installing smaller separate control systems that are linked to a central location to enable	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		effective monitoring and control by the building facilities management team. Although Building Management Systems are not commonly installed in retail centres, public and education buildings in Tanzania, it is believed that the expertise do exist within the country to incorporate such a system to actively control and maximise the effectiveness of building services. Therefore, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	
	MAN-11: Green Lease - RETAIL CENTRE To encourage and recognise initiatives taken by the building owner to encourage improved environmental behaviour by tenants of the retail centre	Through the establishment if a contractually-binding tenancy lease agreement that requires the tenants of a retail centre to participate in the following initiatives: • Electrical energy monitoring and reporting (minimum quarterly) and have submitted an energy management plan at the beginning of each year; • Water monitoring and reporting (minimum quarterly) and have submitted a water management plan at the beginning of each year; • Waste reduction/recycling monitoring and reporting (minimum quarterly) and have submitted a waste management plan at the beginning of each year; • The preparation of a procurement policy at the beginning of each year regarding the use of environmentally friendly consumables (cleaning products, toiletry products, paper and plastic consumable products) and the building owner being required to report back to the tenants on the buildings' performance relating to energy, water, waste and procurement policies on an annual basis, market transformation within retail centres in Tanzania would occur through this credit.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		This credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	
	MAN-12: Common Property Rules – MULTI UNIT RES To encourage and recognize developers who embed legal and contractual environmental management initiatives within the formal management structures of the development.	Through the establishment of legal and contractual environmental management initiatives embedded within the formal management structures of the development, it is believed that within the rules of the development, the Management Entity committing to environmental initiatives would be beneficial to the common property areas of multi-unit residential developments. This credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	MAN-13: Learning Resources - PEB To encourage and recognise sustainability initiatives implemented in the development as learning resources for building users and visitors.	This credit has been developed to educate building occupants on how the sustainability initiatives implemented in the building work, and the associated environmental benefits of these initiatives. Making sustainable building initiatives and features visible and interactive can provide a valuable education and learning opportunity for building users to develop awareness about the building's impacts on the natural environment and resources. By incorporating important concepts such as energy, water and material efficiency, public and education buildings can become interactive learning tools in public and education buildings. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	MAN-14: Life Cycle Costing - PEB To recognise and encourage the development of a Life Cycle Cost (LCC) analysis to consider	This credit even in South Africa is a stretch and as such the credit is omitted for projects in Tanzania, however projects could choose to target the credit under the Innovation category.	Man-14 credit is omitted.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	environmentally sustainable attributes in assessing improved design, specification and through-life maintenance and operation.		
	MAN-15: Maintainability - PEB To encourage and recognise building design that facilitates on-going maintenance, and minimises the need for on-going building maintenance throughout a building's lifecycle.	Public buildings can be complex structures with a variety of attributes which require a significant amount of maintenance. The design of these types of buildings should reflect the need for such maintenance by providing suitable access to facilities managers. When designed and managed accordingly, public buildings can minimise maintenance and operational costs, while also minimally impacting their occupants. As such, this credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.

7.2. Indoor Environment Quality

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	IEQ-01: Ventilation Rates To encourage and recognise designs that provide ample amounts of outside air to counteract build-up of indoor pollutants.	The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa. ASHRAE Standard 62.1 will be used instead of CIBSE.	If the project team wish to use an alternative standard (ASHRAE) then they should submit a CIR to the GBCSA.
	IEQ-2: Air Change Effectiveness To encourage and recognise systems that effectively deliver optimum air quality to any occupant throughout the occupied area.	IEQ-2: Air Change Effectiveness credit omitted from Office v1.1.	IEQ-2 credit is omitted.
	IEQ-3: Carbon Dioxide Monitoring and Control To encourage and recognise the provision of response monitoring of Carbon Dioxide levels to ensure delivery of optimum quantities of outside air.	The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	A CIR should be submitted to the GBCSA should the project team wish to use ASHRAE Standard 62.1 instead of CIBSE.
	IEQ-4: Daylight To encourage and recognise designs that provide good levels of daylight for building users.	IEQ-4 is not region specific, therefore the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	IEQ-5: Daylight Glare Control To encourage and recognise buildings that are designed to reduce the discomfort of glare from natural light.	Glare can easily be controlled through louvers, blinds or types of glass. This should be considered good practice in Tanzania as it is in South Africa. It is important to note Technical Clarification IEQ5-T-OB1-612 Solid opaque blinds which states that: "The GBCSA confirm that for the purposes of proving compliance with the IEQ-5 Daylight Glare Control credit, solid (not perforated or woven) opaque blinds such as solid metallic or solid timber blinds can be assumed to have a VLT of < 10%. Confirmation from the manufacturer or manufacturers'	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		datasheets detailing the nature of the material component must be provided in the submission however and this assumption clearly stated referencing this Technical Clarification. Similarly, in most instances 'block-out' fabric blinds will also have a VLT < 10%. For 'block-out' fabric blinds, where the VLT of the material is not known, project teams can confirm through Technical Clarification (TC) that the material composition is similar in nature to another fabric with a known VLT < 10%. Confirmation from the manufacturer or manufacturers' datasheets detailing the nature of the material component must be provided within the TC submitted." The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	
	IEQ-6: High Frequency Ballasts To encourage and recognise buildings that increase workplace amenity by avoiding low frequency flicker that may be associated with fluorescent lighting.	Note that in Green Star SA Office v1.1, the IEQ-6 High Frequency Ballasts credit has been omitted, and would be omitted in Tanzania as well. The professionals at the workshop, however, indicated that while it is best practice to specify high frequency ballasts in the projects, although in some instances, these ballasts would be value engineered out of the project. Therefore, should a project in Tanzania be registered under Green Star, if they meet the credit and documentation requirements of IEQ-6 High Frequency Ballasts according to Green Star SA Office v1, they would be awarded 0,5 points in the Innovation category under Innovation 3.	Innovation point opportunity IEQ-6 should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	IEQ-7: Electric Lighting Levels To encourage and recognise base building provided office lighting that is not over designed.	This credit is of particular importance to the Tanzanian context as it has been proven that in developing countries, including Tanzania, up to 86% of the entire electricity load is used for lighting purposes. This credit will address this issue. The professionals contacted for this credit say that the British Standard is used for lighting levels in offices and other building types.	The credit should be kept in its current form and no adjustments need to be made.

Resources for IEQ-7

Item	Details	Website / Contact Details
Bhusal, P. 2009. Energy-efficient electric lighting for buildings in developed and developing countries. Helsinki University of Technology.	A dissertation to review the different aspects of lighting quality and energy efficiency and to test the existing technologies for efficient lighting.	http://lib.tkk.fi/Diss/2009/isbn9789512296385/isbn9789512296385.pdf

	IEQ-8: External Views To encourage and recognise designs that provide occupants with a visual connection to the external environment.	There is increasing evidence that eyestrain and related health problems can be significantly reduced in situations where the eyes can be refocused periodically on a distant object. This is easier to achieve where there is a nearby window with a view out. This is especially important where occupants spend significant periods of time in front of computer monitors or closely studying paperwork as in a typical office. Therefore, this credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	IEQ-9: Thermal Comfort To encourage and recognise buildings that achieve a high level of thermal comfort.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania. As this credit aims to encourage projects to design for comfort, rather than temperature, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	IEQ-10: Individual Comfort Control To encourage and recognise designs that facilitate individual control of thermal comfort.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	IEQ-11: Hazardous Materials To encourage and recognise actions taken to reduce health risks to occupants from the presence of hazardous materials.	According to the Tanzania Environmental Management Act 2004: 135: (1) The Minister shall ensure that, any movement of hazardous waste within and through Tanzania shall be conducted in a manner that prevents or minimizes adverse effects to human health and the environment and shall conform to movement procedures as may be prescribed in the Regulations. (2) Any generator of hazardous waste shall take measures to minimise the generation of such waste (3) Any generator of hazardous waste shall be responsible for its disposal and shall be liable for any damage to human health, living beings and the environment. 136: (1) Subject to the provisions of subsection (2), disposal of any hazardous waste shall be done in an environmentally sound manner. (2) Environmental Impact Assessment shall be carried out before hazardous waste is disposed of into soil, land, air or body of water.	IEQ-11 to be kept in its current form. A CIR should be submitted, to be assessed by the GBCSA, should the project team wish to use an alternative set of Occupational Health and Safety (OH+S) regulations the South African Occupational Health and Safety Act (OH&S) should be used.

<table>
<tr><th></th><th>AIM OF CREDIT</th><th>DISCUSSION</th><th>REQUIREMENT</th></tr>
<tr><td></td><td colspan="3">Resources for IEQ-11
<table>
<tr><th>Item</th><th>Details</th><th>Website / Contact Details</th></tr>
<tr><td>Tanzania – Environmental Management Act, 2004</td><td>An Act to provide for legal and institutional framework for sustainable management of environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide basis for implementation of international instruments on environment; to provide for implementation of the National Environment Policy; to repeal the National Environmental Management Act, 1983 and provide for continued existence of the National Environment Management Council; to provide for establishment of the National Environmental Trust Fund and to provide for other related matters.</td><td>http://www.lead-journal.org/content/07290.pdf</td></tr>
</table></td></tr>
<tr><td></td><td><u>IEQ-12: Internal Noise Levels</u>
To encourage and recognise buildings that are designed to maintain internal noise levels at an appropriate level.</td><td>This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.</td><td>The credit should be kept in its current form and no adjustments need to be made.
A CIR should be submitted, to be assessed by the GBCSA, should the project team wish to use an alternative set of standards.</td></tr>
<tr><td></td><td><u>IEQ-13: Volatile Organic Compounds</u>
To encourage and recognise specification of interior finishes that minimise the contribution and levels of Volatile Organic Compounds (VOCs) in buildings.</td><td>This is not conducted as current practice in Tanzania, although the credit requirements are understood by professionals and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.</td><td>The credit should be kept in its current form and no adjustments need to be made.</td></tr>
</table>

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		Imported VOC products are readily available in Tanzania for purchase, however, there are no local standards stipulating the use of low VOC products.	
	IEQ-14: Formaldehyde Minimisation To encourage and recognise the specification of products with low formaldehyde emission levels.	This is not conducted as current practice in Tanzania, although the credit requirements are understood by the local professionals and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	IEQ-15: Mould Prevention To encourage and recognise the design of services that eliminate the risk of mould growth and its associated detrimental impact on occupant health.	Due to that fact that Tanzania has high levels of relative humidity throughout the year, this credit is of high importance in the Tanzanian context and should therefore be prioritised by all projects. This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	IEQ-16: Tenant Exhaust Riser To encourage and recognise the design of buildings with a general exhaust riser that can be used by tenants to remove indoor pollutants from printing and photocopy areas.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	IEQ-17: Environmental Tobacco Smoke (ETS) Avoidance To encourage and recognise the air quality benefits to occupants	Tanzania became a Party to the WHO Framework Convention on Tobacco Control on July 29, 2007. The Tobacco Products (Regulation) Act, 2003 is the only piece of tobacco control legislation in Tanzania. It regulates public	The credit should be kept in its current form and no adjustments need to be made.

<table>
<tr><th></th><th>AIM OF CREDIT</th><th>DISCUSSION</th><th>REQUIREMENT</th></tr>
<tr><td></td><td>by prohibiting smoking inside the building.</td><td>smoking; tobacco advertising, promotion and sponsorship; and tobacco packaging and labelling.

Tobacco smoke is unhealthy for human beings when inhaled and this credit would align with the requirements of this credit.

As such, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.</td><td></td></tr>
<tr><td></td><td colspan="3">Resources for IQ-17
<table><tr><th>Item</th><th>Details</th><th>Website / Contact Details</th></tr><tr><td>Who Framework Convention on Tobacco Control</td><td>About the WHO Framework Convention on Tobacco Control</td><td>http://www.who.int/fctc/about/en/</td></tr><tr><td>Tobacco Control Laws of Tanzania</td><td>Tobacco Control Laws of Tanzania</td><td>http://www.tobaccocontrollaws.org/legislation/country/tanzania/summary</td></tr></table></td></tr>
<tr><td></td><td><u>IEQ-18: Places of Respite and Connection to Nature – RETAIL CENTRE</u>
To encourage and recognise developments that create approximately designed areas where retail centre staff and visitors can relax in a place of respite which has a connection to nature.</td><td>Places of respite which have a connection to nature provide retail centre staff and visitors with approximately designed areas in which to relax and decrease stress levels commonly induced by excessive time spent confined indoors.

Where the place of respite is outdoors, the area should have low noise exposure (from traffic and building services, shading to at least 35% of its area; and be screened from significant prevailing winds. Where the place of respite is indoors, the area should have a Daylight Factor (DF) of at least 2.5% and meet the credit criteria of IEQ-01. This can be achieved within the Tanzanian context and, with the minor changes for IEQ-01, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.</td><td>The credit should be kept in its current form and no adjustments need to be made.</td></tr>
</table>

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	IEQ-19: Private Outdoor Space - MULTI UNIT RES To encourage and recognize dwelling designs which improve the health and wellbeing of the occupants by providing private outdoor space.	Private outdoor spaces accessible for private use by the dwelling occupants only, directly adjacent to, and accessible from, the associated dwelling and at least 1m2 per occupant or at least 6m2 improve the health and wellbeing of the occupants in multi-unit residential developments as it provides the occupants with private places of respite in nature. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	IEQ-22: Universal Access - MULTI UNIT RES To recognize design that provides universal access, to and within dwellings, to meet the changing needs of occupants.	Facilities for persons with disabilities within multi-unit residential developments are often neglected resulting in difficulties for occupants within the developments who have differing needs. The professionals contacted noted that there are currently no building code standards, regulations or legislations addressing the design of facilities for persons with disabilities. It is therefore recommended that projects comply with the guidelines in SANS 10400-S. As such, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	IEQ-23: Stairs - PEB To encourage and recognise designs that promotes the wellbeing of occupants by encouraging the use of stairs as an alternative to vertical transportation by lift.	Lifts in multi storey buildings is often the main form of vertical transport. This can largely be attributed to the fact that stairs are 'hidden' away and used for emergencies only. By making stairs more prominent their use could be more attractive with added health benefits as a result. Provision of attractive stairs promotes the use of stairs and thereby giving occupants the option to improve their physical well-being. Provided that cognisance is made for the provision for persons with disabilities, designs that promote the use of stairs within public and education buildings can easily be achieved within the Tanzanian context. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa	The credit should be kept in its current form and no adjustments need to be made.

7.3. Energy

<table>
<tr><th></th><th>AIM OF CREDIT</th><th>DISCUSSION</th><th>REQUIREMENT</th></tr>
<tr><td></td><td><u>ENE-0: Conditional Requirement</u>
To encourage and recognise designs that minimise the greenhouse gas emissions associated with operational energy consumption, and maximise potential operational energy efficiency of the base building.</td><td>There are no energy efficiency requirements legislated by the current Tanzanian building code standards. As such, it is recommended that Compliance Route 1 (SANS 204 compliance), Route 2 (ASHRAE) and Route 3 (Energy Modelling) remain options and are made available to projects in Tanzania seeking Green Star SA certification.

Where applicable, changes to the Green Star SA Energy Calculator and Modelling Protocol Guide should be motivated by the registered project through the mandatory CIR.

For the mandatory CIR, should the project team elect to use an alternative standard to SANS 204 for Compliance Route 1, the following aspects would need to be addressed and the equivalent, or more stringent, attributes clearly demonstrated:
<table>
<tr><td>Section 4.1: Model Notional SANS204 Building</td><td>Title</td></tr>
<tr><td>Section 4.1: Model Notional SANS204 Building</td><td>“generally as defined by SANS 204-3:2008 … deemed to comply clauses”</td></tr>
<tr><td>Section 5.1: General modelling parameters</td><td>N/A</td></tr>
<tr><td>Section 5.2: Building Envelope</td><td>“Fabric based on SANS204-3”</td></tr>
<tr><td>Section 5.2: Building Envelope</td><td>“Windows U value 5.6 and SHGF 0.77 (clear single glazing, timber framed). Windows to be distributed on all sides of the building such as to achieve compliance with the SANS204-3 formula. Roof lights at 10% of floor area, with U value 2.5 and SHGF 0.35. Walls insulated to R</td></tr>
</table></td><td>ENE- should be kept in its current form with a mandatory CIR to confirm eligibility.

Reference must be made to the Green Star SA Energy Calculator & Modelling Protocol Guide current at the time of project submission.

Where project teams are uncertain of the validity of the energy modelling programme used, an enquiry can be issued to the GBCSA for confirmation of validity.</td></tr>
</table>

	AIM OF CREDIT	DISCUSSION	REQUIREMENT

	= 2.2. Roof insulated to R = 2.7 to 3.7 depending on climatic zone"
Section 5.3: Internal Design Criteria	"Notional SANS 204 building"
Section 5.3: Internal Design Criteria	"24°C in summer and 20°C in winter"
Section 5.4: HVAC Systems Simulation	"Notional SANS 204 building"
Section 5.4: HVAC Systems Simulation	"Heating is to be provided … as per the actual design"
Section 5.4: HVAC Systems Simulation	"per SANS 204-3:2008" (occurs twice)
Section 5.4: HVAC Systems Simulation	"To satisfy SANS204-3"
Section 6.1: Extract and Miscellaneous Fans	"per SANS 204-3:2008" occurs twice
Section 10: Fuel factors	"An average fuel factor for South African mains electricity is used by the calculator, which is defined as 1.2kgCO2/kWh … it will be necessary to revise the fuel factors in future Green Star SA tool and versions."

The Conditional Requirement will not be met unless:

- The software used for modelling complies with the requirements and verification methods detailed in the Green Star SA Energy Calculator and Modelling Protocol Guide of the rating tool, current at the time of project registration or more recent;
- Energy modelling for the project was undertaken using the methodology, as detailed in the Green Star SA Energy Calculator and Modelling Protocol Guide of the rating tool, current at the time of project registration or more recent; and
- Each variable in the Greenhouse Gas Emissions Modelling Report (e.g. building form, materials or air-conditioning system) is referenced consistently throughout the rest of the submission (i.e. in related credits such as IEQ-1 'Ventilation Rates' or ENE-5 'Peak

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		Energy Demand Reduction') and is clearly justified by the documented design or the as-built evidence (dependent on the stage of assessment). Where professional teams are uncertain of the validity of the energy modelling programme used, an enquiry can be issued to the GBCSA for confirmation of validity.	
	ENE-1: Greenhouse Gas Emissions To encourage and recognise designs that minimise the greenhouse gas emissions associated with operational energy consumption.	See above (ENE-0). Routes 1, 2 and 3 specify the reduction of energy consumption in buildings. These building codes also specify passive design systems that help reduce the energy demand. Further to this, however, it is noted that on-site energy generation has not been commonly adopted in Tanzania owing to the cost of installation. As such, ENE-1 should be kept in its current form with a mandatory CIR to confirm applicability.	Office v1.1 rating tool be applied to all other credits, calculations and protocols except the Energy modelling protocol for the ENE-0 and ENE-1: Greenhouse Gas Emissions credit, where the Office v1 Energy modelling protocol will be applicable to Tanzanian projects. ENE-1 should be kept in its current form with a mandatory CIR to confirm applicability.
	ENE-2: Energy Sub-metering To encourage and recognise the installation of energy sub-metering to facilitate on-going management of energy consumption.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania. The contacted professionals explained that in Tanzania it is common practice that a main electricity meter is provided per building and a separate single meter per tenant is provided by TANESCO.	The credit should be kept in its current form and no adjustments need to be made.
	ENE-3: Lighting Power Density To encourage and recognise designs that provide artificial lighting with minimal energy consumption.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		The contacted professionals explained that most buildings in Tanzania are designed with a lighting power density of 5-8 W/m^2 according to the British Standard.	
	ENE-4: Lighting Zoning To encourage and recognise lighting design practices that offer greater flexibility for light switching, making it easier to light only occupied areas.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania. The contacted professionals were not aware of any buildings in Tanzania that have individually addressable lighting systems.	The credit should be kept in its current form and no adjustments need to be made.
	ENE-5: Peak Energy Demand Reduction / ENE-5 Maximum Electrical Demand Reduction - PEB To encourage and recognise designs that reduce peak demand on energy supply infrastructure.	Running on stand-by generation is commonplace in both Tanzania and its surrounding islands which rely on the Tanzanian grid, including Zanzibar. Based on this, Tanzanians realise the need to reduce peak demand on energy supply infrastructure. As per the technical manual "Stand-by generators do not satisfy the on-site generation requirement unless they are designed and integrated into the development for the purpose of maximum electrical energy demand reduction and can be activated automatically." The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa. The contacted professionals explained that the peak electrical demand period in Tanzania is from 06:00-09:00 and 19:00-21:00 in residential buildings and 10:00-12:00 and 14:00-16:00 in office buildings and this should be considered during credit compliance.	The credit should be kept in its current form and no adjustments need to be made.
	ENE-6: Thermal Energy Sub-Metering – RETAIL CENTRE To encourage and recognise the installation of thermal energy sub metering to facilitate ongoing management of thermal energy consumption.	Sub-metering of thermal energy consumption is not a very common practice in Tanzania. Most retail buildings meter energy consumption per tenant and not all substantive thermal energy uses where flow temperature, return temperature and mass flow rate are measured. This credit should therefore remain to encourage responsible thermal energy monitoring.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	
	ENE-7: Hot Water Energy Use - MULTI UNIT RES To encourage and recognise dwelling designs that reduce greenhouse gas emissions associated with domestic hot water production.	Several designs within multi-unit residential developments can be incorporated to reduce greenhouse gas emissions associated with domestic hot water production. This could include the use of more efficient domestic hot water fixtures and fittings, the installation of solar or other forms of renewable energy hot water geysers or heat recovery plants. The reduction of greenhouse gas emissions associated with domestic hot water production should be a priority irrespective of region, such that the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa. The Green Star SA Multi Unit Residential v1 Hot Water Calculator would however need to be adapted to reflect the relevant fuel factors in Tanzania. This would be project-specific and a mandatory CIR would need to be submitted to confirm applicability.	Ene-7 the Green Star SA Multi Unit Residential v1 Hot Water Calculator would need to be adapted to reflect the relevant fuel factors in Tanzania. This would be project-specific and a mandatory CIR would need to be submitted to confirm applicability.
	ENE-8: Common Property Energy Use - MULTI UNIT RES To encourage and recognise designs that reduce energy use associated with common property lifts, car park ventilation and lighting.	It is important that the energy use associated with common property lifts, car park ventilation and common property lighting in multi-unit residential developments is reduced. Where projects wish to apply other standards than those in the Green Star SA tool (SANS 10400-O), a CIR must be submitted to the GBCSA. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa, therefore ENE-8 should be kept in its current form and no adjustments need to be made.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	ENE-9: Low Emission Energy Generation - MULTI UNIT RES To encourage and recognise designs that incorporate on-site energy generation systems utilising renewable or low emission energy sources.	It is encouraged that designs incorporate on-site energy generation systems utilising renewable or low emission energy sources. The potential exists for co-generation or tri-generation to encourage systems utilising renewable or low emission energy sources. Up to four points can be achieved in the Tanzanian context, such that the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	ENE-10: Energy Efficient Appliances - MULTI UNIT RES To encourage and recognise initiatives which reduce energy consumption associated with major appliances.	It is encouraged that initiatives are implemented which reduce energy consumption associated with major appliances. As such, points are awarded where a minimum of two applicable appliances are provided within the scope of the main contract; and applicable appliance provided is certified with a minimum 'B' rating of the European "Energy Rating" labelling system. Appliances certified with a minimum 'B' rating of the European "Energy Rating" system can be made available in the Tanzania market. This credit should therefore remain to encourage the use of energy efficient appliances. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	ENE-11: Unoccupied Spaces - PEB To encourage and recognise designs that minimise or eliminate energy use for spaces when unoccupied.	Depending on the climate of the location, HVAC systems use between 10% and 30% of the total electricity used in buildings. Therefore, by reducing the amount of energy spent on heating and cooling in a building, users can reduce both greenhouse gas emissions and operational costs significantly. Where projects wish to apply other standards than those in the Green Star SA tool (SANS 10400-O), a CIR must be submitted to the GBCSA. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.

7.4. Transport

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	TRA-1: Provision of Car Parking To encourage and recognise developments that facilitate the use of alternative modes of transportation for commuting to work.	This credit refers to South African local, provincial or national authority planning allowances for the minimum or maximum values of car parking spaces provided for the project. In the context of Tanzania, this credit would refer to the Tanzanian local, provincial or national authority planning allowances for car parking spaces. However, for projects where such guidelines are not available, the technical manual refers to a set of 'alternative requirements'. These alternative requirements state that when the mandatory requirements do not exist or are optional (or recommended), the project has the following two options: • Clearly demonstrate that car parking is not provided in excess of one car parking space per 100 m2 of net lettable area (NLA) to achieve one point or one parking space per 200 m2 to achieve two points; or • Submit a CIR to substantiate an argument for equivalent yet alternative compliance with the Credit Criteria. As such, TRA-1 should remain in its current form with emphasis on the 'alternative requirements' section of the Additional Guidance for projects where the mandatory local parking requirements do not exist or are optional (or recommended).	TRA-1 should be adapted to refer to the Tanzanian local, provincial or national authority planning allowances for the minimum or maximum values of car parking spaces provided for the project. For projects where the mandatory local parking requirements do not exist or are optional (or recommended), the technical manual refers to a set of 'alternative requirements' in the Additional Guidance which would be applicable to the project.
	TRA-2: Fuel-Efficient Transport To encourage and recognise developments that facilitate the use of more fuel efficient vehicles for work commuting.	With the growing awareness of environmental sustainability, more people are considering other options for travelling to work in Tanzania. Incentives to choose fuel-efficient options are a good tool to encourage tenants to be fuel efficient. The credit is equally relevant and applicable in Tanzania as it is in South Africa in its current form.	The credit should be kept in its current form and no adjustments need to be made.
	TRA-3: Cyclist Facilities To encourage and recognise developments that facilitate the	Bicycles are not commonly used in Tanzania as a mode of transport and therefore this credit should be targeted to promote this means of transport.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	use of bicycles by occupants and visitors.	By targeting this credit, it could be a means of future proofing a building for when cyclist facilities are further developed within Tanzanian cities, such as cycle lanes. As such, this credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	
	TRA-4: Commuting Mass Transport To encourage and recognise developments that facilitate the use of mass transport for work commuting.	When a development is poorly located, in relation to the proximity of transport nodes and their frequency of service, then it is unlikely that building occupants will use mass transport to travel to the development. Conversely, developments that are within close proximity of good transport nodes with frequent service can encourage building occupants to use mass transport. The contacted professionals stated that the following are main means of transport across Tanzania: BRT, Bus, Ferry, owned vehicles, taxis and bicycles. It is therefore recommended that TRA-4 should remain as is in order to accommodate both the contract and uncontracted commuting mass transport infrastructure in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	TRA-5: Local Connectivity To encourage and recognise office buildings that are integrated with or built adjacent to community amenities and/or dwellings in order to reduce the overall number of automobile trips taken by building users.	When selecting the potential site for a new building, the project should be encouraged to choose sites that contribute to fuel-efficiency by being located in close proximity to amenities thus allowing building users the option to walk instead of drive. This credit is therefore equally relevant, applicable and achievable in Tanzania as it is in South Africa. The contacted professionals explained that cities within Tanzania have adequate pedestrian facilities.	The credit should be kept in its current form and no adjustments need to be made.
	TRA-6: Trip Reduction – Mixed Use – RETAIL CENTRE To encourage & recognise retail centres that are built in mixed use	Similar to TRA-5, the choice of site often depends on the availability of a suitable site. When faced with multiple options for a site, this credit aims to encourage retail developments that incorporate	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	areas in order to reduce the overall number of car trips taken by patrons.	effective car-based trip reduction measures such as the provision of quality pedestrian, cycling and public transport access. Mixed use development or retail centres within mixed use areas, and within walking distance, encourage shoppers and retail employees living nearby, and to made a modal switch from using cars to walking or cycling. Besides reducing congestion and pollution, walking and cycling can also bring health benefits to the public and should be encouraged. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa, therefore TRA-6 should be kept in its current form and no adjustments need to be made.	
	TRA-7: Vehicle Operating Emissions – RETAIL CENTRE & PEB To encourage & recognise retail centres that reduce vehicular emissions resulting from traffic congestion by upgrading road infrastructure around the centre.	Usually, 'delay' and 'number of stops' are used to determine the existing, existing plus development and post road improvements operational condition of an intersection. The higher the delay and number of stops the higher the CO 2 emissions per vehicle will be. Car emissions are a major source of air pollutants, such as oxides of nitrogen, particles and ozone. Poor air quality has been shown to aggravate asthma, bronchitis and cardiac problems. Carbon dioxide from vehicle emissions is also known as a contributing factor to global climate change. Road infrastructure improvements are necessary to reduce the traffic impact of the development to acceptable levels. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa, therefore TRA-7 should be kept in its current form and no adjustments need to be made.	The credit should be kept in its current form and no adjustments need to be made.

7.5. Water

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	WAT-1: Occupant Amenity Water / WAT-1: Potable Water – PEB To encourage and recognise designs that reduce potable water consumption by building occupants.	Water efficient fittings and fixtures are available in Tanzania. Several rainwater harvesting projects have been established in Tanzania therefore the skills and expertise are readily available. Do to water supply infrastructure issues, some buildings include holding tanks for potable water and black water treatment facilities due to lack of sewage infrastructure. At present there is no national certification system which would allow different fixtures and fittings to be rated. Therefore, this credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa. However, as the Green Star SA Potable Water Calculator takes into account South African rainfall per region, the Green Star SA Potable Water Calculator would need to be adapted to reflect the rainfall values in the different regions in Tanzania. This would be project-specific and a mandatory CIR would need to be submitted to confirm applicability.	As the Green Star SA Potable Water Calculator takes into account South African rainfall per region, the Green Star SA Potable Water Calculator would need to be adapted to reflect the rainfall values in the different regions in Tanzania. WAT-1 should be kept in its current form with a mandatory CIR to confirm applicability. The rainfall data should consist of 12 months of average monthly rainfall data in mm for the specific town/ city/ village.
	Resources for WAT-1 **Item** / **Details** / **Website / Contact Details**		

	AIM OF CREDIT	DISCUSSION		REQUIREMENT
	The climatological regions of Tanzania based on rainfall characteristics	A paper to delineate the rain gauge network of Tanzania into homogenous groups.	https://www.researchgate.net/publication/230352242_The_climatological_regions_of_Tanzania_based_on_rainfall_characteristics	
	WAT-2: Water Meters To encourage and recognise the design of systems that both monitors and manages water consumption.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.		The credit should be kept in its current form and no adjustments need to be made.
	WAT-3: Landscape Irrigation To encourage and recognise the design of systems that aim to reduce the consumption of potable water for landscape irrigation.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania. It is encouraged that projects install systems that aim to reduce the consumption of potable water for landscape irrigation, therefore, this credit in its current form is equally relevant and applicable to Tanzania as it is in South Africa.		The credit should be kept in its current form and no adjustments need to be made.
	WAT-4: Heat Rejection Water To encourage and recognise design that reduces potable water consumption from heat rejection systems.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.		The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	WAT-5: Fire System Water Consumption To encourage and recognise building design which reduces consumption of potable water for the building's fire protection and essential water storage systems.	When routine fire system tests are carried out in Tanzanian buildings they should be done in the most water-efficient manner possible. This credit is therefore equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	WAT-7: Potable Water Efficient Appliances - MULTI UNIT RES To encourage and recognise initiatives which reduce water consumption associated with major appliances.	Various initiatives can be implemented in multi-unit residential developments to reduce the water consumption associated with major appliances. These initiatives could include the provision of clothes washes for a minimum of 90% of dwellings or the provision of communal laundry area(s). These initiatives could also include the provision of dishwashers where all dishwashers provided achieve a minimum water efficiency of 7.2 litres/kg. Potable water efficient appliances can be made available in the Tanzania market. This credit should therefore remain to encourage the use of potable water efficient appliances. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	WAT-8: Swimming Pool / Spa Water Efficiency - MULTI UNIT RES To encourage and recognise designs that reduce potable water consumption associated with swimming pools and spas.	Swimming pools lose water through evaporation and also through filter cleaning and backwashing. Therefore, to achieve this credit, for any pool within the multi-unit residential development, a pool blanket is provided; and the pool filtration system avoids the requirement for backwashing (i.e. is not sorptive media or sand based filtration); and for any spa within the development, a spa cover is provided. Alternatively, no pool(s) and or spa(s) are provided in the development. As such, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.

7.6. Materials

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	MAT-1: Recycling Waste Storage To encourage and recognise the inclusion of storage space that facilitates the recycling of resources used within buildings to reduce waste going to disposal.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania. Despite the lack of recycling companies, it is still recommended that space be provided in sustainable buildings to begin driving the marketplace towards recycling and to future proof the building for when recycling is more common place in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	MAT-2: Building Reuse To encourage and recognise developments that reuse existing buildings to minimise materials consumption.	The Tanzania Environmental Management Act, 2004: Section 7 calls for "the generation of waste be minimised, wherever practicable, waste should be, in order of priority, be re-used, recycled, recovered and disposed of safely in a manner that avoids creating adverse effects or if this is practicable, is least likely to cause adverse effects". The contacted professionals explained that it is not common practice for existing buildings to be reused. They are mostly demolished and rebuilt and therefore this credit is important to target in Tanzania and no adjustments are to be made to the credit criteria.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	Resources for MAT-2		
	Tanzania – Environmental Management Act, 2004	An Act to provide for legal and institutional framework for sustainable management of environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management, environmental quality standards, public participation, compliance and enforcement; to provide basis for implementation of international instruments on environment; to provide for implementation of the National Environment Policy; to repeal the National Environmental Management Act, 1983 and provide for continued existence of the National Environment Management Council; to provide for establishment of the National Environmental Trust Fund and to provide for other related matters.	http://www.lead-journal.org/content/07290.pdf
	MAT-3: Reused Materials To encourage and recognise designs that prolong the useful life of existing products and materials.	Irrespective of region, projects should strive to prolong the useful life of existing products and materials as much as possible. This ensures that the waste generated from the demolition and construction processes of projects is minimal. As such, this credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	MAT-4: Shell and Core or Integrated Fit-out To encourage and recognise base building delivery mechanisms that	The majority of top tier projects in Tanzania are delivered as speculative spaces which are neither shell and core nor integrated fitout. Spaces are typically provided with ceilings, lighting, finishes and air conditioning.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	eliminate the need for immediate tenant refits.	Project teams must therefore be made familiar with the two terms: "integrated fit-out" and "shell and core". This will help them be aware of the wasteful expenditure that is associated with refits as well as the unnecessary consumption of resources, which happens as much in Tanzania as in South Africa. This credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	
	MAT-5: Concrete To encourage and recognise the reduction of embodied energy and resource depletion occurring through use of concrete.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	MAT-6: Steel To encourage and recognise the reduction in embodied energy and resource depletion associated with reduced use of virgin steel.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	MAT-7: PVC Minimisation To encourage and recognise the reduction in use of Poly Vinyl Chloride (PVC) products in buildings.	It is noted, that while the GBCA Best Practice PVC Guidelines may apply in Australia and South Africa, the professionals at the workshop believe that these guidelines are yet to be applied for all PVC products imported and/or manufactured in Tanzania. Having a PVC credit in the tool inappropriately rewards projects for not having PVC when there might be other materials that are equally or more of an issue in that context. As such, PVC minimisation will be removed in the Tanzania context. However, should a project in Tanzania be registered under Green Star, if they meet the credit and documentation	Innovation Point Opportunity MAT-7 should remain in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		requirements of MAT-7 PVC Minimisation according to Green Star SA Office v1, they would be awarded 0.5 points in the Innovation category under Innovation 3.	
	MAT-8: Sustainable Timber To encourage and recognise the specification of reused timber products or timber that has certified environmentally-responsible forest management practices.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania. The contacted professionals stated that very few, if any, projects in Tanzania used sustainable timber and that is it very difficult to get timber certified in Tanzania therefore this credit is particularly pertinent to green building in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	MAT-9: Design for Disassembly To encourage and recognise designs that minimise the embodied energy and resources associated with demolition.	This is not conducted as current practice in Tanzania, although the credit requirements are understood and it is believed that the credit in its current form is achievable. The credit should therefore remain in its current form to promote the green building movement and growth in Tanzania.	The credit should be kept in its current form and no adjustments need to be made.
	MAT-10: Dematerialisation To encourage and recognise designs that produce a net reduction in the total amount of material used.	The aim of this credit is to encourage and recognize designs which product a net reduction in the total amount of material used on a project. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa, therefore MAT-10 should be kept in its current form and no adjustments need to be made.	The credit should be kept in its current form and no adjustments need to be made.
	MAT-11: Local Sourcing To encourage and recognise the environmental advantages gained, in the form of reduced transportation emissions, by using materials and products that are	It is evident that a significant proportion, of Tanzania's building materials, as with neighbouring East African countries, is imported from overseas countries. This is in spite of the intra-regional availability of some of these components, materials and finishes with equivalent performance specifications in the East African Community (EAC).	It is recommended to adapt the credit so that: • One point is awarded where 20% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the member states of the EAC

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	sourced within close proximity to the site.	It is strongly encouraged that local materials manufactured within the EAC and the Southern African Development Community (SADC) should be explored instead, and awareness should be raised of the embodied energy in materials sourced from far away distances to discourage importing from overseas. As such, to stimulate the growth of industry in Tanzania, Southern Africa and East Africa, and to encourage and recognise the environmental advantages gained, in the form of reduced transportation emissions, by using materials and products that are sourced within close proximity to the site - the sourcing of products manufactured intra-regionally is viewed as both an environmental and socio-economic driver of sustainable market transformation. Tanzania has active memberships in two regional trade agreements, namely SADC (according to the SADC Tarde Protocol of 2000) and the EAC (Kenya, Tanzania and Uganda). For the Tanzanian market., therefore, it is recommended to adapt the credit so that: • One point is awarded where 20% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the member states of the EAC and SADC regions as defined by the EAC and SADC respectively. • An additional point is awarded where 10% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the Tanzanian borders. Only materials or products permanently installed in the building are eligible and must have been extracted, harvested, recovered, as well as manufactured within the above mentioned radii of the site in order to qualify for the credit. Mechanical, electrical and plumbing components and specialty items such as elevators and equipment are excluded from this credit.	and SADC regions as defined by the EAC and SADC respectively. • An additional point is awarded where 10% of the total contract value is represented by materials or products (used in construction) that have been sourced from within the Tanzanian borders. This promotes sourcing of materials in the East and Southern African regions which would be beneficial to the Tanzanian local context and regional and national economies. This will also reduce environmental impacts associated with long distance importing of goods and materials, as that is currently common practice in the Tanzanian construction industry.

<table>
<tr><th></th><th>AIM OF CREDIT</th><th>DISCUSSION</th><th>REQUIREMENT</th></tr>
<tr><td></td><td></td><td>By adapting the credit accordingly, it is hoped that project teams will be strongly encouraged to source more of the building components, materials and finishes locally, significantly fostering intraregional economic development for Tanzania, SADC and the EAC.</td><td></td></tr>
<tr><td></td><td colspan="3">Resources for MAT-11

<table><tr><th>Item</th><th>Details</th><th>Website / Contact Details</th></tr><tr><td>Tanzania Trade Performance Review</td><td>Tanzania's trade performance from 1995-2005</td><td>http://www.sadctrade.org/files/TPR%20Tanzania.pdf</td></tr><tr><td>East African Community</td><td>East African Community Website</td><td>http://www.eac.int/</td></tr><tr><td>South African Development Community</td><td>South African Development Community Website</td><td>http://www.sadc.int/</td></tr></table></td></tr>
<tr><td></td><td><u>MAT-12: Efficient Dwelling Size - MULTI UNIT RES</u>
To encourage and recognise multi-unit residential developments with efficiently sized dwelling units and reduced material consumption.</td><td>This credit aims to encourage more efficient use of space in dwelling unit design, and to discourage the over-sizing of residential units. Through designing more efficient spaces, various benefits can be achieved. These include reduction in the use of materials and resources, densification, efficiencies of space use and smarter design.

All the benefits listed above are key in moving the residential market forward towards better design principles and more efficiently sized residential developments.

The credit in its current form, therefore, is equally relevant and applicable in Tanzanian as it is in South Africa, with the availability of building resources and compliance with the credit criteria completed</td><td>The credit should be kept in its current form and no adjustments need to be made.</td></tr>
</table>

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		automatically by the 'Efficient Dwelling Size Calculator" within the rating tool spreadsheet.	
	MAT-13: Masonry - MULTI UNIT RES & PEB To encourage and recognise designs that minimise the embodied energy and resources associated with a reduction of virgin material in masonry units.	Reducing the mass of a masonry unit reduces the embodied energy of the product and reduces transport related greenhouse gas emissions. It also leads to reduced loading on structures, which can lead to reductions in the size of structural members. This would have a significant impact on the masonry used in multi-unit residential, public and education buildings such that the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.

7.7. Land Use and Ecology

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	ECO-: Conditional Requirement To encourage and recognise development on land that has limited ecological value and to discourage development on ecologically valuable sites.	Based on the Tanzanian Environmental Management Act, 2004, section 52: "The following land shall constitute environmentally sensitive areas for the purposes of this Act- (a) Swamps; (b) Any area declared as environmentally sensitive by any local government authority; (c) Area designated by the Council as prone to soil erosion; (d) Land designated by the Council as lands where landslides have occurred or are likely to occur; (e) All areas that have been closed by the Minister to livestock keeping, occupation, cultivation and other specified activities; (f) Area on slops with a gradient exceeding any angle which the Minister shall, after taking account of proper scientific advice, specify; (g) Arid and semi-arid lands; (h) Land specified by the Council as land which should not be developed on account of its fragile nature or of its environmental significance; and (i) Land declared under any other written law to be environmentally sensitive area of hazardous land" Section 55: "Protection and Management of rivers, river bank, lake or lake-shore and shore-lines: (1) Without prejudice to the provisions of any other relevant written law, the Council and local government authorities responsible for environmental matters, shall issue guidelines and prescribe measures for the protection of riverbanks, rivers, lakes or lakeshores and shorelines. (2) Where guidelines and measures have been prescribed pursuant to subsection (1), it shall be an offence to carry out any of the following activity without prior authorization or permit issued by the Minister-	Eco-0 to be kept in its current form with the inclusion of the additional environmentally sensitive areas listed in the Tanzania Environmental Management Act. A mandatory CIR will be required to assess the project's compliance with this Conditional Requirement based on site ecological maps, to ensure approval of this conditional requirement prior to the Round 1 submission.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		(a) use, erect, construct, place, alter, extend, remove or demolish a structure in or under the ocean or natural lake shorelines, riverbank or water reservoir; (b) excavate, drill, tunnel or disturb the shoreline of ocean or natural lake, river bank or water reservoir; (c) introduce or plant any part of a plant, plant specimen whether alien or indigenous, dead or alive in an ocean river, ocean river bank, lake or lakeshore; (d) deposit a substance in a river, river bank, lake or, lakeshore, shoreline or wetland or in or under its bed, which is likely to have adverse environmental effects on river, river bank, lake or lakeshore shoreline or wetland; (e) direct or block a river, river bank, lake or, lakeshore, shoreline or wetland from its natural course; or (f) drain a river or lake. The above requirements pertaining to sensitive areas shall be added to the requirements for Eco-0, however, refurbishments, redevelopments or extensions shall be exempt from the above. The GBCSA would require a mandatory CIR for projects for Eco-0 to ensure approval of this conditional requirement prior to the Round 1 submission.	

Resources for ECO-0

Item	Details	Website / Contact Details
Tanzania – Environmental Management Act, 2004	An Act to provide for legal and institutional framework for sustainable management of environment; to outline principles for management, impact and risk assessments, prevention and control of pollution, waste management,	http://www.lead-journal.org/content/07290.pdf

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	environmental quality standards, public participation, compliance and enforcement; to provide basis for implementation of international instruments on environment; to provide for implementation of the National Environment Policy; to repeal the National Environmental Management Act, 1983 and provide for continued existence of the National Environment Management Council; to provide for establishment of the National Environmental Trust Fund and to provide for other related matters.		
	ECO-1: Topsoil To encourage and recognise construction practices that preserve the ecological integrity of topsoil.	Preserving topsoil is equally important in Tanzania as it is in South Africa because of the slow process of soil formation. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	ECO-2: Reuse of Land To encourage and recognise the reuse of land that has previously been developed and where the site is within an existing municipally approved urban edge.	Urban sprawl is a risk that all cities and countries face whenever more and more greenfield sites are developed upon, with equal prevalence in Tanzania as in South Africa. An incentive for projects to re-develop previously developed land or brownfield sites can contribute towards reducing the threat on sensitive ecosystems and natural resources through the development on greenfield sites. As such, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa. The contacted professionals explained that there are approved urban edges in Tanzania and these must be stipulated on a per-project basis.	The credit should be kept in its current form and no adjustments need to be made. A CIR must be submitted for projects targeting the second point referring to “urban edge.
	ECO-3: Reclaimed Contaminated Land To encourage and recognise developments that reclaim contaminated land that otherwise would not have been developed.	As there is no definition of contaminated land in Tanzania, it is recommended that the definition contained in Additional Guidance of ECO-3 be applied to the Tanzanian context, that is: “The presence in or under any land, site, buildings or structures of a substance or micro-organism above the concentration which is	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		normally present in or under that land which substances directly or indirectly affect or may affect the quality of soil or the environment adversely. Existing building contamination is addressed in credit IEQ-11 Hazardous Materials while this credit deals with reclaimed contaminated land only. It is noted that minor local contamination will occur on most previously used sites and such minor decontamination is not addressed by this credit. For the purpose of this credit, existing contamination must be 'significant'. This means that there must be substantial recommendations for containment and/or removal in the site contamination report. Encapsulation is only an acceptable form of remediation if there are technically no other remediation options. Remediation of the environment refers to the clean-up or making safe of a site or water body that is contaminated by toxic substances, whether they are natural or man-made. Treatment means: any method, technique or process that is designed to change the physical, biological or chemical character or composition of a waste, or to remove, separate, concentrate or recover a hazardous or toxic component of a waste or to destroy or reduce the toxicity of the waste in order to minimise the impact of the waste on the environment. To be deemed no longer contaminated, the site must meet the regulated levels deemed suitable by the relevant competent authority. The environmental auditor or waste management control officer who certifies that the site has been duly decontaminated must meet the requirements of standards set at national level. Please note the contamination resulting from this development (e.g. with asbestos from demolition of the existing buildings) cannot contribute to this credit.	

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		The statement 'prior to construction' as stated in the Credit Criteria refers to construction of actual building structures, not to the beginning of any construction works on the project (e.g. land clearing). Therefore, if remediation occurs during earthworks or any other stages during the construction phase of a project prior to the building of any structure, it is still considered as 'prior to construction'. The submission must clearly demonstrate that: • The site was designated as significantly contaminated at the time of purchase, where 'significant contamination' is defined as any contamination (regardless of extent, concentration, toxicity or otherwise) requiring remediation as determined by the relevant national or local authorities; • The site was correctly and appropriately decontaminated prior to the beginning of the construction phase of the project in accordance with the relevant national legislation and standards, including but not limited to the National Environmental Management: Waste Act (2008); and • As a result of decontamination, the site was certified as uncontaminated and satisfactory for use. As such, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa. For further information on the environmental laws of Tanzania with reference to soil quality parameters, refer to: http://faolex.fao.org/docs/pdf/tan151538.pdf	

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<tr><th></th><th>AIM OF CREDIT</th><th>DISCUSSION</th><th>REQUIREMENT</th></tr>
<tr><td></td><td>Resources for MAT-9
<table><tr><th>Item</th><th>Details</th><th>Website / Contact Details</th></tr><tr><td>The Environmental Management (Soil quality standards) Regulations, 2007</td><td>The Environmental Management (Soil quality standards) Regulations, 2007</td><td>http://faolex.fao.org/docs/pdf/tan151538.pdf</td></tr></table></td><td></td><td></td></tr>
<tr><td></td><td><u>ECO-4: Change of Ecological Value</u>
To encourage and recognise developments that maintain or enhance the ecological value of their sites.</td><td>This credit is applicable to the Tanzanian context.

However, as the Green Star SA Ecological Value Calculator takes the ecological value weighting of the site into account, the Green Star SA Ecological Value Calculator would need to be adapted to reflect the equivalent ecological value of the different bio-regions in Tanzania.

This would be project-specific and a mandatory CIR would need to be submitted to the GBCSA by projects targeting this credit to determine which South African bio-region is most applicable to the project.</td><td>Eco-4 to be kept in its current form.

A mandatory CIR must be submitted to the GBCSA by projects to determine which South African bio-region is most applicable to the project.</td></tr>
<tr><td></td><td><u>ECO-5: Urban Heat Island – RETAIL CENTRE</u>
To recognise and reward initiatives taken to reduce the heat island effect of the buildings which impact on microclimates, human and wildlife habitats.</td><td>The Urban Heat Island negatively impacts not only residents of urban-related environs, but also humans and their associated ecosystems located far away from cities. In fact, UHIs have been indirectly related to climate change due to their contribution to the greenhouse effect, and therefore, to global warming. Therefore, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.</td><td>The credit should be kept in its current form and no adjustments need to be made.</td></tr>
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	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	ECO-6: Outdoor Communal Facilities - MULTI UNIT RES To encourage and recognise designs which enable residents to engage in a broad range of outdoor activities in common areas.	This is relevant for the Tanzanian context as it is for the South African context, as such ECO-06 should be kept in its current form and no adjustments need to be made.	The credit should be kept in its current form and no adjustments need to be made.
	ECO-7: Urban Consolidation - MULTI UNIT RES To encourage and recognise designs which make use of compact development patterns to increase land utilisation efficiency.	Urban consolidation is the process of increasing or maintaining the density of housing in established residential areas, with the aim of urban consolidation to reduce development on the fringe areas of the city. By making use of compact development patterns, land utilisation efficiency is increased as well as local connectivity (refer to TRA-5), trip reductions within mixed use developments (TRA-6) and the sharing of precinct bulk infrastructure, mass commuting transport systems and local amenities. The credit aims to encourage and recognise the efficient use of land by multi-unit residential developments. As such, the credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	ECO-8: Community Facilities - PEB To encourage and recognise integrated planning and shared land use in developments through the provision of on-site outdoor facilities for use by the local community.	This is relevant for the Tanzanian context as it is for the South African context, as such ECO-08 should be kept in its current form and no adjustments need to be made	The credit should be kept in its current form and no adjustments need to be made.

7.8. Emissions

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	EMI-1: Refrigerants/Gaseous Ozone Depleting Potential (ODP) To encourage and recognise the selection of refrigerants and other gases that do not contribute to long-term damage to the Earth's stratospheric ozone layer.	Zero ODP refrigerants are available in Tanzania and therefore this credit is applicable. As such, this credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	EMI-2: Refrigerants/Gaseous Global Warming Potential (GWP) To encourage and recognise the selection of refrigerants that reduce the potential for increased global warming from the emission of refrigerants to the atmosphere.	Low GWP refrigerants are available in Tanzania and therefore this credit is applicable. As such, this credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	EMI-3: Refrigerant Leaks To encourage and recognise building systems design that minimises environmental damage from refrigerant leaks.	The contacted professionals explained that they are aware of systems to monitor for refrigerant leaks and pump down refrigerants and that this can be done in Tanzania. Regardless, air conditioners used in Tanzania are imported and these products are available internationally	The credit should be kept in its current form and no adjustments need to be made.
	EMI-4: Insulant ODP To encourage and recognise the selection of insulants that do not contribute to long-term damage to the Earth's stratospheric ozone layer.	Zero ODP insulants are available in Tanzania and therefore this credit is applicable. As such, this credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	EMI-5: Watercourse Pollution To encourage and recognise developments that minimise stormwater run-off to, and the pollution of the natural watercourses.	The recently revised Green Star SA EMI-5 credit provides detailed information for designing stormwater attenuation and filtration systems according to best practice standards. Therefore, the revised EMI-5 credit should equally apply in Tanzania as it is applied in South Africa. It is noted that where a project's development footprint is located on land within 100 metres of a watercourse of high ecological value, the	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		Watercourse Protection Measures (outlined below) would have to be been completed in order to meet the ECO- Conditional Requirement. Watercourse Protection Measures • A site-specific Watercourse Management Plan has been produced, exhibited and, for an As-Built submission, implemented; and • All points are achieved in EMI-5 Watercourse Pollution and in EMI-7 Light Pollution. The credit in its current form is therefore equally relevant and applicable in Tanzania as it is in South Africa.	
	EMI-6: Discharge to Sewer To encourage and recognise developments that minimise discharge to the municipal sewerage system.	The municipal sewage system is very limited in Tanzania and does not exist in many areas therefore the reduction of discharge to sewer is particularly pertinent in the Tanzanian context. Most sewage in coastal areas is simply discharged into the sea with minimal treatment beforehand.	The credit should be kept in its current form and no adjustments need to be made.
	EMI-7: Light Pollution To encourage and recognise developments that minimise light pollution into the night sky.	The contacted professionals noted that this credit was achievable in the Tanzanian context and that the CIBSE standard referenced was the appropriate one. It is noted that where a project's development footprint is located on land within 100 metres of a watercourse of high ecological value, the Watercourse Protection Measures (outlined below) would to have been completed in order to meet the ECO- Conditional Requirement. Watercourse Protection Measures • A site-specific Watercourse Management Plan has been produced, exhibited and, for an As-Built submission, implemented; and • All points are achieved in EMI-5 Watercourse Pollution and in EMI-7 Light Pollution. The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	EMI-8: Legionella To encourage and recognise building systems design that eliminates the risk of Legionnaires' disease (Legionellosis).	Refer to the discussion on the provision of cooling towers in WAT-4. This credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	EMI-9: Boiler and Generator Emissions To encourage and recognise the use of boilers and generators that minimise harmful emissions.	The credit in its current form is equally relevant and applicable in Tanzania as it is in South Africa.	The credit should be kept in its current form and no adjustments need to be made.
	EMI-10: Kitchen Exhaust Emissions – RETAIL CENTRE To encourage and reward designs that avoid kitchen exhaust fumes being expelled directly into the adjacent spaces that people occupy.	Kitchen exhaust emissions expelled by retail tenants directly into the adjacent spaces have a negative and unhealthy impact on the people occupying these spaces. The credit is equally relevant and applicable in Tanzania as it is in South Africa in its current form.	The credit should be kept in its current form and no adjustments need to be made.

7.9. Innovation

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
	INN-1: Innovative Strategies and Technologies To encourage and recognise pioneering initiatives in sustainable design, process or advocacy.	This credit should be kept in its current form with reference being made instead to the Tanzanian context, as opposed to the South African context. As such, up to two points can be awarded for an innovation initiative where the initiative is a technology or process that is considered a 'first' in Tanzania or in the World; or the project substantially contributes to the broader market transformation towards sustainable development in Tanzania or in the World. Points are awarded as follows: • One point is awarded when either of the above is true for the Tanzania market; or • Two points are awarded when either of the above is true for the Global market. Up to five innovation initiatives can be awarded points under this credit, but no individual initiative can achieve more than two points in this credit. Qualifying initiatives may achieve additional points in other Innovation Credits, however the maximum points available for any one building assessment under INN-1, INN-2 and INN-3 is five (in total).	The credit should be kept in its current form with reference being made instead to the Tanzanian context, as opposed to the South African context.
	INN-2: Exceeding Green Star SA Benchmarks To encourage and recognise projects that achieve environmental benefits in excess of the current Green Star SA benchmarks.	This credit should be kept in its current form with reference being made instead to the Tanzanian context, as opposed to the South African context. As such, up to two points can be awarded for an innovative initiative where there has been a substantial improvement on an existing Green Star SA / Green Star SA-Tanzania credit, as follows: • One point for a solution that results in the elimination of the specific negative environmental impact of the project targeted by an existing credit; and • Two points for a solution that results in a substantial (e.g. 5% or greater above 'neutral') restorative environmental impact targeted by an existing credit.	The credit should be kept in its current form with reference being made instead to awarding points to an innovative initiative where there has been a substantial improvement on an existing Green Star SA / Green Star SA-Tanzania credit

	AIM OF CREDIT	DISCUSSION	REQUIREMENT
		Up to five innovation initiatives can be awarded points under this credit, but no individual initiative can achieve more than two points in this credit. Qualifying initiatives may achieve additional points in other Innovation Credits, however the maximum points available for any one building assessment under INN-1, INN-2 and INN-3 is five (in total).	
	INN-3: Environmental Design Initiatives To encourage and recognise sustainable building initiatives that are currently outside of the scope of this Green Star SA rating tool but which have a substantial or significant environmental benefit.	This credit should be kept in its current form with reference being made instead to the Tanzanian context, as opposed to the South African context. As such, one point can be awarded where an initiative in the project viably addresses a valid environmental concern outside of the current scope of this Green Star SA / Green Star SA-Tanzania tool. Up to five innovation initiatives can be awarded points under this credit, but no individual initiative can achieve more than two points in this credit. Qualifying initiatives may achieve additional points in other Innovation Credits, however the maximum points available for any one building assessment under INN-1, INN-2 and INN-3 is five (in total).	The credit should be kept in its current form with reference being made instead to awarding points where an initiative in the project viably addresses a valid environmental concern outside of the current scope of this Green Star SA / Green Star SA-Tanzania tool.

8. References

Africa Progress Panel. 2015. *Power People Planet: Seizing Africa's Energy and Climate Opportunities: Africa Progress Report 2015.* http://app-cdn.acwupload.co.uk/wp-content/uploads/2015/06/APP_REPORT_2015_FINAL_low1.pdf

All Africa. 4 May 2016. *Tanzania: Zanzibar Eyes Multiple Sources of Renewable Energy.* http://allafrica.com/stories/201605040079.html

Central Intelligence Agency. *The World Factbook: Tanzania.* https://www.cia.gov/library/publications/the-world-factbook/geos/tz.html

Climate-Data.org. *Climate: Tanzania.* http://en.climate-data.org/country/132/

ESI Africa. 31 May 2012. *Facilitating small power projects in Tanzania.* http://www.esi-africa.com/news/facilitating-small-power-projects-in-tanzania/

Global Climate Adaption Partnership & UK Aid. May 2012. *The Economics of Climate Change in Zanzibar: Vulnerability, Impacts and Adaptation.* http://www.economics-of-cc-in-zanzibar.org/images/Impacts_vulnerability_and_adaptation_vs_3.pdf

Green Building Council of South Africa. November 2014. *Technical Manual Green Star SA – Office Design & Office As Built Version1.1.* s.I. GBCSA

Green Building Council of South Africa. April 2010. *Technical Manual Green Star SA – Retail Centre Design & Retail Centre As Built Version 1.* S.I. GBCSA

Green Building Council of South Africa. November 2011. *Technical Manual Green Star SA – Multi Unit Residential Design & As Built Version 1.* S.I. GBCSA

Green Building Council of South Africa. March 2013. *Technical Manual Green Star SA – Public & Education Building Design & As Built Version 1.* S.I. GBCSA.

Hansson, E. November 2010. Goteborgs Universiteit. *Groundwater on Zanzibar: Use and Pollutants.* http://bioenv.gu.se/digitalAssets/1322/1322530_erik-hansson.pdf

Hauser Global Law School Program, New York University School of Law. November 2006. *Guide to Tanzanian Legal System and Legal Research.* http://www.nyulawglobal.org/globalex/Tanzania.html

IRIN. 23 April 2010. *Zanzibar's sewage disposal challenge.* http://www.irinnews.org/report/88901/tanzania-zanzibars-sewage-disposal-challenge

Jumbe, A.S. *Fossil Fuels and Renewable Energy – The Zanzibar Case Study.* http://www.unosd.org/content/documents/836Zanzibar%20v3.pdf

Kerario, E.J.C. June 1995. *Development of land use planning and land tenure systems in Tanzania: The Environment Component.* A report to the Food and Agricultural Organisation (FAO) of the United Nations. http://www.tzonline.org/pdf/areporttothefoodandagriculturalorganization.pdf

KTH Industrial Engineering and Management. 2015. 2015. *A minor field study in the Losses in the Electric Grid on Pemba, Tanzania.* http://www.diva-portal.se/smash/get/diva2:840779/FULLTEXT01.pdf

Majamba, H.I. 2005. An Assessment of the Framework Environmental Law of Zanzibar. *Law Environment and Development Journal.* 1(1), 18.

Mathematica Policy Research, Inc. 18 March 2011. *Tanzania Energy Sector Impact Evaluation: Findings from the Zanzibar Baseline Study.*

Ntakamulenga, R. September 2012. Presentation: *The Status of Solid Waste Management in Tanzania.* National Environmental Management Council, Tanzania. http://globalmethane.org/documents/events_land_120910_11.pdf

The Redd Desk. 1 January 2007. *The National Land Use Planning Commission Act, 2007 (Tanzania).* http://theredddesk.org/countries/laws/national-land-use-planning-commission-act-2007-tanzania

The World Bank. 2016. *Tanzania.* http://data.worldbank.org/country/tanzania

UNESCO National Commission of the United Republic of Tanzania. *Construction: A Vibrant Industry.* http://www.natcomreport.com/Tanzania/pdf-new/construction.pdf

United Republic of Tanzania. 2015. *National Environmental Management Council.* http://www.nemc.or.tz/index.php?option=com_content&view=article&id=96&Itemid=186

United Republic of Tanzania: The Vice-President's Office. 2010. *The Environment Division.* http://www.vpo.go.tz/environment/utawala.php

World Green Building Council. 28 July 2015. *Tanzania GBC Projects Advancing Local Green Building.* http://www.worldgbc.org/activities/news/africa-news/tanzania-gbc-projects-advancing-local-green-building/

World Weather & Climate Information. 2016. *Average weather in Zanzibar City, Tanzania.* https://weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,zanzibar-city,Tanzania

Zanzibar Invest. 2007. *Infrastructure and Utilities.* http://www.zanzibarinvest.org/infrastructure.htm