Chief Executive
SALGA

South African Local Government Association (SALGA) is honoured to be part of this publication that showcases local government leading in the green building movement. In 2015, SALGA entered into a Memorandum of Understanding with the Green Building Council of South Africa (GBCSA) committing to working together to promote the greening of the public built environment; developing the capacity of municipal leaders and officials; and supporting local authorities to green their stocks of public buildings. Sector collaboration and cooperation is a major ethos of SALGA, and this collaboration with the GBCSA presents an opportunity to strengthen partnership with organisations such as ICLEI, to further enhance the support offerings to member municipalities. We therefore look forward to more of these collaborations to strengthen the sector in green building and build on work as presently evidenced by the cities of Tshwane, Cape Town and Johannesburg.

Chief Executive Officer
GBCSA

The Green Building Council South Africa is immensely proud to be part of this publication, which showcases outstanding examples of government taking leadership in the green building movement.

The GBCSA views the public sector as a key player in enhancing sustainability within the built environment and therefore treasures collaborative relationships with various public sector institutions, department etc., in order to maximize adoption of green building practices, developing green buildings at scale and building sustainable communities. So we are delighted that our partnership with SALGA has resulted in all 257 municipalities in South Africa becoming GBCSA members, thus empowering local government and their officials to lead, legislate and facilitate green building principles and practices at municipal level; and our collaboration with ICLEI Africa, which will see our organisations working closely to promote an enabling environment for green building throughout the African Region. Together; inspiring a built environment through which people and planet thrive.
Regional Director
ICLEI Africa

Buildings consume nearly one third of the international energy demand and have a lasting impact. Good choices in building design, construction and operation can help avoid high costs, elevated carbon emissions and provide better urban services. ICLEI Africa works with municipalities throughout sub-Saharan Africa to build urban sustainability and recognizes the importance of green infrastructure to ensure resilience and improve people’s lives. Our partnership with SALGA and GBCSA, and involvement in this publication, enables us to assist municipalities to improve efficiency, overcome barriers and avoid inefficient and costly building stock. Through capacity building and support, municipalities are empowered to make better decisions with long-term solutions. We are pleased to see how many cities are already embracing greening building measures and encourage all cities to report on their interventions and share their experiences, demonstrating that local actions can have global impacts.
Setting the scene:

Almost half of all energy generated in the world is used by buildings. More than half of all resources are used in construction.
Green buildings are energy efficient, resource efficient and environmentally responsible. Their design, construction and operational practices that consider sustainability will minimize their negative impact on the environment and people, while taking into consideration the financial impacts.

A building is however not an island and the surrounding built environment should be taken into consideration during the planning. As an example, a building that is only accessible via private vehicles will create more emissions than the same building located where it can be accessed by public transport.
Local Government
Leadership in Green Building

It is important to address the broader built environment through enabling low emission mobility, integrated waste management, the use of ecological systems as infrastructure provision, and a more inclusive economy based on local assets, skills improvement and capacity building.

Green buildings are the fabric of sustainable communities and cities (SDG11) including circular economy principles (SDG12) where resources aren’t wasted. Green buildings can improve people’s health and wellbeing (SDG3), use renewable energy (SDG7) and spur innovation and while contributing to climate resilient infrastructure (SDG9). Furthermore, they produce fewer emissions (SDG13), save water resources and help to protect forests (SDG15). Through providing green infrastructure it helps to create jobs and boost the economy (SDG8) and create strong global partnerships (SDG17).
Local Government Leadership in Green Building.
Municipalities play a key role in promoting greener buildings through creating an enabling environment, providing suitable policies and leading by example through their own building stock. This publication aims to showcase some of the great examples from the South African government with particular highlights focusing on municipalities.

INFO BOX: Benefits of Green Building:

- Lower operating costs (particularly energy and water)
- Higher rentals and overall returns on assets
- Better marketability (‘smart buildings’, differentiated in the market)
- Lower risk, future proofed buildings
- Increased ability to attract and retain talent (staff) and major desirable tenants
- Increased productivity, better retail sales, higher student pass rates, quicker hospital recuperation
- Responsible investing
- MSCI Index 2016 shows 11% higher Return on Investment (ROI)
Local Government
Leadership in Green Building

The cost premium of building green averages 5% and is decreasing rapidly.

<table>
<thead>
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<th>Certification Level</th>
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<th>AVE</th>
<th>MAX</th>
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COST PREMIUM OF TOTAL PROJECT COST - CERTIFICATION LEVEL

FIGURE 7 GREEN COST PREMIUM - CONSTRUCTION AREA

<table>
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<tr>
<th>Construction area</th>
<th>Minimum</th>
<th>Average</th>
<th>Maximum</th>
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<tr>
<td>&lt; 5,000 m²</td>
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<td></td>
</tr>
<tr>
<td>&gt; 50,000 m²</td>
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</table>
Tools and Policies

Green Building Tools generally include a range of systems and methods, and may also be referred to as Green Building Rating Systems, Green Building Indicators, and Green Building Environmental Assessment Methods. Common to all these tools, is that they enhance the environmental awareness of building practices; provide fundamental direction for the building industry to move toward environmental protection and the achievement of sustainability; and provide a means of demonstrating that a building has been successful in meeting an expected level of performance in various declared criteria (Sebake, 2009).

There has been a shift from an emphasis purely on environmental assessments towards the more holistic inclusion of social and economic factors, particularly in developing countries. South Africa has been playing a leading role in this regard with the Sustainable Building Assessment Tool (SBAT) and development of the Socio-Economic Category for Green Star:

The EDGE tool encourages resource-efficient building growth by providing the business case for building green. It can be used to calculate operational savings and reduced carbon emissions.
Two other documents with a focus on financing sustainable solutions include the ‘Green Lease Toolkit’ and ‘Rands and Sense of Green Buildings’ published by GBCSA. The green lease is basically a vehicle for both tenants and building owners to unpack the shared benefits of “going green” and lay out certain contractual lease obligations between a landlord and a tenant of a building that require or encourage the adoption of environmentally friendly practices.

Rands and Sense of Green Buildings is a pivotal report, as it sets out the economic case for green building in a clear, incontestable manner based on international experience, local evidence and case studies. It dispels the myth that green building is more expensive, lists the benefits of green building and provides the local proof of these.

Municipalities are encouraging green building practices through the establishment of Green Building Guidelines or By-laws, as well as the implementation of national legislation such as SANS 10400-X and 10400-XA focusing on Environmental Sustainability and Energy Efficiency in Buildings. Part X deals with environmental sustainability, and Part XA deals with energy usage in buildings. Adjustments to the housing subsidies, as well as enhancements to the Norms and Standards for low-income residential dwellings, has helped to create more efficient homes.

**INFO BOX: A sample of Municipal policies, guidelines and by-laws that enable Green Building**

- Cape Town: Smart Building Handbook, 2012
- Drakenstein: Green Building Manual, 2010
- KwaDakuza: Green Building Guidelines, 2015
- Msunduzi: Green Building Guidelines, 2015
- Steve Tshwete: Green Building Guidelines, 2015
- Tshwane: Green Building Policy and By-law, 2009
**Tshwane House: Gauteng**

Being a public building, it is important to create an atmosphere that invites citizens to engage and doesn’t feel institutional or intimidating. The building has been designed to provide a high level of thermal comfort for 95% of the usable area - meaning use of energy intensive air-conditioners is minimized and the comfort of the occupants is maximized. *The variable air volume (VAV) air-cooled system is connected to Carbon monoxide (CO) monitors with fresh air provided at a rate of 12l/s/p.*

Most of the building has direct line of sight to the outdoors thus providing natural lighting, as well as energy efficient lights with occupancy sensors that switch on and off as people move through the building. There are various sub-meters that are controlled via a building management system (BMS) to allow maximum energy efficiency.

Rainwater harvesting and filtration was installed and are used to flush toilets and urinals with efficient water fittings (taps, showerheads, toilets). Greywater harvesting from showers allow for irrigation. Paints, adhesives, sealants and carpets with low or no volatile organic compounds (VOCs) were also used.

City of Johannesburg Council Chambers: Gauteng

The building design included principals and inspirations such as circular, traditional, Afrocentric structuring of meetings (Lekgotla/Kraal) which gives rise to a circular, inclusive and flowing structured chamber rather than a linear/opposing arrangement and transparency of the Chamber to represent openness and accountability through the use of see-through facades.

This project focused on creating job opportunities for priority groups such as the youth and women, ensuring that a training and development structure was in place to increase the technical skills of employees. The project supported local businesses specifically black and/or women owned businesses and small, micro and medium enterprises.

The glass façade allows for natural light and views of the outdoors. Efficient lighting together with occupancy sensors reduce the energy required for illuminating the building. All energy and water systems are metered.

Interior finishes have low volatile organic compounds (VOCs) and are formaldehyde free. A large proportion of products were locally manufactured. Under floor displacement systems delivers 100% fresh air to occupants. The quality of the air is measured by carbon emission (CO₂) sensors which automatically increase fresh air levels should CO₂ levels rise above 600PPM.

City of Cape Town Electricity Service Head Office: Western Cape

The building was designed to promote the use of natural light and maximise views to the outside with curved facades. Sun louvers protect the curtain wall glazing from heat gain, and blinds ensure suitable lighting levels can be maintained. These measures are especially significant when bearing in mind the department housed in this building. To quote Councillor Sonnenberg, when showing around a delegation visiting the offices, “…‘In the modern context, one cannot think about the provision of utility services without discussing how to use resources in an efficient way…”

Smart lighting controls, motion sensors and timers linked to the Building Management System (BMS) have been installed to switch off when no motion is detected or adjust the lighting according to the amount of daylight coming into the building.

400 solar PV (photovoltaic) panels have been installed on the roof, providing around 156MWh per annum of the building's electricity needs. A rooftop garden has been established using indigenous, water-wise plants that grow naturally in the area.

A grey water recycling system has also been incorporated into the building design to reduce potable water use for flushing of toilets and urinals. The filtration process is fully automated and uses a chemical-free treatment method.

In terms of the materials used, the furniture, fittings, finishes and building fabric (paints, carpets, adhesives, composite wood products, sealants, etc.) were carefully selected to minimise emissions. All timber products were sourced from reused and/or Forest Stewardship Council (FSC) certified timber.

Manenberg Contact Centre: Western Cape

The building was designed with the community to be in sync with the social, economic and cultural context. The local community were involved in the mosaic work throughout the building. Members of the community worked with a lead artist to produce the images, while the hanging artwork adorning the public hall space was sourced from a local artist. Building Designer, Ashley Hemraj says, "...it’s important that public buildings stand out from the surrounding buildings and become landmarks, beacons within the communities. Buildings should have a civic presence to them, a stature that speaks of the community and reflects their past, present and individuality..."

A labour intensive construction method was selected to create jobs and training for the local community. The site was landscaped with local and indigenous vegetation to minimize drinking water being used for irrigation. The lighting runs on photovoltaic (PV) panels and wind power, while the building has a variable refrigerant volume (VRV) heating and cooling system.

Khayelitsha shared services office building: Western Cape

This building includes a rain water harvesting system and waterless urinals, with water and energy consumption metering and monitoring systems. They have bar-coded glazing design that balances natural daylight distribution. Daylighting is an important consideration as the benefits are two fold. Firstly, the psychological benefits such as increased occupant productivity and a reduction in absenteeism and secondly, the saving in energy costs due to the reduction in electric lighting loads.

The structural cooling system is thermally activated based on the daily requirements.

Local Government
Leadership in Green Building

Sisonke District Offices: Ixopo in KZN

A unique feature of this office block is the extensive roof garden that is home to nearly 100 species of indigenous plants. The remainder of the site has been returned to its endemic Natal Mistbelt Grassland habitat.

Most of the building has adequate daylight availability so additional lighting is not needed, whilst motion sensors will automatically switch lights off when no-one is in the room. The offices are naturally ventilated, while a heat-pump circulates warm water under the floors to heat the building during the winter.

Potable water consumption is reduced through the use of efficient tap and toilet fixtures while rainwater is collected for irrigation.

People are encouraged to cycle to the venue and bicycle storage facilities are provided onsite, whilst preferential parking is reserved for fuel-efficient cars and motorcycles.

National English Literary Museum: Grahamstown in Eastern Cape

The development enhances the surrounding area by introducing a mini-theatre, outside amphitheatre, exhibition area, archives, library, and museum offices. The museum is not fenced and therefore provides park-like, landscaped areas as active play areas for the surrounding community to enjoy. The outside amphitheatre and mini theatre facilities are provided for use by the local community. The location is ideal as the development is within close proximity to a variety of learning institutions and public amenities which can make use of the facilities.

A photovoltaic (PV) installation is included on the roof of the north wing, and provides around 8% of total energy demand for the building. Hot water is provided through the installation of a heat pump.

There is only one lift in the building, located in the east wing and serving the four-story building.

The building has a variable refrigerant volume (VRV) air ventilation system and multiple volume chimney stack to facilitate natural ventilation, with free cooling in circulation and open areas on the courtyard edge of the building. Rain water is harvested from the roof area and used for toilet and urinal flushing.

Department of public works: Batho Pele House Building: Tshwane

The Batho Pele House Building is a refurbishment of a heritage building located close to the Union buildings in Tshwane. The building consists of 10 floors, tenanted by the Department of Public Service and Administration.

It is well integrated into the surroundings with easy access for pedestrians, cyclists and public transport users. The building contains a heritage component, which introduced interesting approaches to sustainability while respecting the history of the existing building. The heritage building façade has not been affected by the addition of the larger office building on the site.

The project focus was on water efficiency with the installation of efficient water fixtures and a grey water treatment system. Water meters and an air-cooled chiller system were installed, while their heating, ventilation and air-conditioning (HVAC) system has an economic cycle and an ice storage system. The chillers are used during unoccupied hours to produce ice, which is then used during the day to cool occupied areas.

The offices have a lot of natural light, access to external views, while daylight glare is reduced by internal manual blinds, and external shad-
ing. A Digital Addressable Lighting Interface (DALI) lighting system was installed to control the lighting in the building, with energy efficient lights. Energy modelling demonstrates that the building has the potential to perform at 40% more efficient than a SANS minimum regulation building. Energy meters, motion sensors and carbon dioxide (CO₂) monitors were installed to help manage the building more efficiently.

The specifications during construction required that 60% of all the reinforcing steel should have a minimum post-consumer recycled content of 90%. The use of low volatile organic compounds (VOC) paints, carpets and sealants provides a pleasant working environment for staff.

The occupancy of the building included training of the building management staff and issuing a Building Users’ Guide for the building owner:

Department of Environmental Affairs: Tshwane

This was the first government building in South Africa to achieve a 6 Star Green Star SA rating from GBCSA.

Sustainable building features include optimal building orientation to make use of thermal heating and cooling. Intense modelling and efficiencies were undertaken to meet the lofty energy consumption goal to not exceed 115kWh/m²/annum.

The roof is almost entirely covered with solar photovoltaic (PV) panels to supply almost 20% of the building’s energy needs. The parking area features a concentrated photovoltaic (CPV) panel which tracks the sun, and supplies power to the electric vehicle (EV) charging station.

Water efficiency measures are expected to consume 30% less water and include rainwater harvesting system, water-wise indigenous plants and efficient irrigation systems. The Facilities Management (FM) team was involved from the start and trained as GBCSA Accredited Professionals to equip them to operate and keep the building performing optimally over the long-term.

Capacity building enhancement

We can add the following from ICLEI’s side (to be re-written to suite the rest)

- Support Municipalities with the development of Green Building Guidelines and Action plan linked to IDP
- Building Efficiency Accelerator (BEA) programme