URBAN LEDS

URBAN LOW EMISSION DEVELOPMENT STRATEGIES

SHOWCASING SUSTAINABLE SOLUTIONS IN AFRICA

A follow up on Urban-LEDs community initiatives in South Africa

ICLEI Local Governments for Sustainability

UN HABITAT FOR A BETTER URBAN FUTURE

Contents

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Showcasing Sustainable Solutions in Africa: A follow up on six community initiatives in South Africa. Cape Town, South Africa.

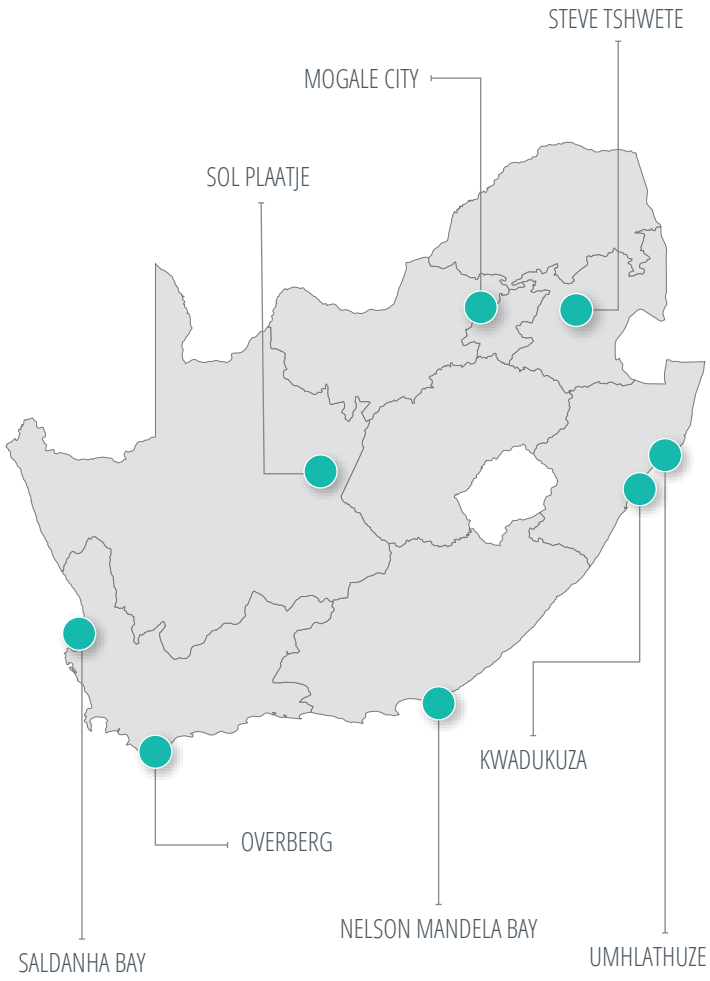
Introduction

Enabling increased energy access and resilient infrastructure is essential to realise the potential of African cities. Through the Urban Low Emissions Development Strategies (Urban-LEDS ll) project, ICLEI Africa supports local governments to develop innovative resource management and service delivery solutions that meet the needs of African cities.

Urban-LEDs ll aims to contribute to the reduction of greenhouse gas emissions – as energy access expands and urban areas develop further – with an enhanced focus on **adaptation** co-benefits and **climate resilience** to ensure an integrated approach to advance the ambition of Nationally Determined Contributions, the 2030 Agenda for Sustainable Development, and Agenda 2063: The Africa we want on the continent.

The Urban-LEDS II project implements the Green Climate Cities (GCC) methodology that provides a comprehensive process and framework to guide and support local governments in defining, adopting and embedding a low emission climate resilient development pathway.

The booklet in front of you provides feedback on the Urban-LEDS l demonstration projects implemented in South Africa in 2015/16. After three years in operation, the low emissions interventions, such as photovoltaic (PV) panels, solar water heaters, and solar streetlights, to name a few, offer important lessons about the maintenance and management of these systems. The reflections and feedback, collected through interviews, provide guidance to municipalities about the necessary operational considerations to be included early in the project process to ensure long-term and sustainable benefits to communities in our cities.



Urban-LEDs ll project municipalities

Overview

This booklet provides an overview of the community showcase projects that were implemented:

- **Doornkop Community Centre** in Steve Tshwete Local Municipality (Mpumalanga)
- **Groutville Care Homes** in KwaDukuza Local Municipality (KwaZulu-Natal)
- **Mphe-Thuto Primary School** in Mogale City Municipality (Gauteng)
- **Grootkloof Environmental Education Centre** in Nelson Mandela Bay Municipality (Eastern Cape)
- **Empangeni Library** in uMhlathuze Municipality (KwaZulu Natal)

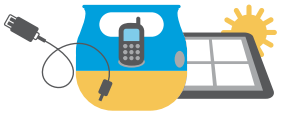
Local Solutions

The overall objective of the community showcase project was to demonstrate the community benefits of sustainability action, focusing on sustainable use of energy and water. Local involvement determined the nature of each project and its different approaches, partnerships and sites of implementation. This contextualisation was a key ingredient for success.

A variety of the following practical solutions were implemented in the municipalities:

SOLAR PV PANELS
with an inverter and battery bank allows the building to reduce electricity cost while still being able to function during power outages. Solar arrays of between 5 and 18 kW were installed. One was totally off-grid, while most were grid-tied and can potentially feed into the grid.

SOLAR WATER HEATERS
are a practical way to heat water without using electricity. Both high- and low-pressure systems were implemented depending on the local requirements.



MOBILE LED SOLAR LIGHT
(Mobiya light by Schneider)
is a cost-effective solution that provides light and cellphone charging ability.

A SOLAR STREETLIGHT
brings light into a community even if they don't have access to electricity. It provides bright LED lights, which are charged by the sun.

LEDS
replace inefficient lights to help reduce the overall energy costs, and provides better luminosity and longer lifespan.

SKYLIGHTS
bring natural light into the building so you don't need lights even when it's overcast.

CEILING INSTALLATION
provides insulation that helps keep the building warmer in winter and cooler in summer.

URBAN FOOD GARDENS
are an important way to help trickle-feed much needed fresh produce into community kitchens. It connects community members to the soil and teaches them about resilience.

RAINWATER HARVESTING

is becoming more important due to the increased concerns about access to water. Taking this a step further than just using it in the garden requires the installation of a **filtration system** that provides clean potable water. The installation of a **solar-based pump** helps to top up a water tank from a borehole, reducing both water and electricity costs.

WONDERBAGS

are insulation cookers that work in a safe and no-fuss way. They reduce energy costs and the amount of water needed for cooking, while reducing household emissions.

COUNTER COMPOST

containers are used in the kitchen for collecting organic food waste. From fruit peels and pips, to vegetable peels, tea bags and eggshells. It all goes back into the gardens to provide nitrogen-rich compost.

SOLAR DRIVEN BOREHOLE WATER PUMPS
use the power of the sun to draw water up from the borehole to be used in the garden, kitchen, and bathrooms. This saves money and reduces carbon emissions associated with electricity.

Project Details

SOLAR PV SYSTEM

72 solar panels of **250 W** each, which provide a potential capacity of 18 kW. The PV system is connected to **32** batteries with a total storage capacity of **48 V**. The solar panels and batteries provide electricity for use at the centre – fridge, lights, community meetings, and to charge phones.

SOLAR WATER HEATER

2 solar heaters provide hot water to the centre. It helps to save on electricity and also reduces CO_2 emissions by **2.8 tonnes** per year.

SOLAR STREET LIGHT

A solar street light has a PV panel, a battery and LED lights that use the **energy of the sun** to provide light at night.

CEILINGS

Ceilings installed in the crèche and the old age centre for insulation, so that it is warmer in winter and cooler in summer.

MOBILE LED SOLAR LIGHTS

The mobile LED solar light is an eco-friendly, energy-efficient, robust light that demonstrates the concept of solar PV. After charging it for one day they can use it for up to 48 hours. They can even use it to charge their cellphones.

COMPOST CONTAINERS

The counter-top compost containers is used in the kitchen for collecting organic waste. From fruit peels and pips, to vegetable peels, tea bags and egg shells. It all goes back into their gardens to provide **nitrogen-rich compost**.

WONDERBAGS

Wonderbags, made in Africa, help with cooking in a safe and no-fuss way. It reduces energy cost and the amount of water needed for cooking. It also reduces household emissions.

Doornkop Community Centre

STEVE TSHWETE

The Doornkop community is situated 15km north of Middleburg, Mpumalanga, on communal property with a population of around 9 000 people. They have a Communal Property Association (CPA), which manages the land on behalf of the beneficiaries. The project focussed on the community centre, crèche and old age centre used by the local community. The showcase project included the installation of Solar PV (18 kW), two solar water heaters, solar street light, security lights, ceilings (for insulation), Wonderbag and mobilesolar lights.

Questions Asked

Questions asked during the project follow up 2018:

- **Is it still in use/ operational?**
- **Have there been any maintenance or operational issues?**
- **How have you overcome these challenges?**
- **Who benefits from the intervention?**

COMMUNITY OWNERSHIP OF THE SOLAR PANELS AND OTHER INTERVENTIONS IS VITAL TO THEIR LONG TERM SUCCESS

Mr Caswell Pokhwane, Doornkop Community Leader

Project Follow Up

SOLAR PV SYSTEM

The Solar PV installed is still operational. The community centre is now connected to the municipal electricity grid, but this is not used because the amount of electricity generated from the solar energy system is sufficient. There have not yet been any maintenance issues yet, other than the need for cleaning the panels. However, the municipality is being proactive about maintaining the system. It is anticipated that the batteries will need to be replaced within a few years, as they come to the end of their life. The community is therefore aiming to set up a communal maintenance fund that all residents contribute to on a monthly basis.

Managing the use of the batteries is important to ensure they reach their full life cycle. This means that the centre intentionally makes use of electricity directly form the panels during the day and only draws from the batteries at night.

To support broader ownership of this solar system, the community members have been educated so they understand the value of the solar systems. This also supports increased security of the solar system.

Ultimately, the community would like to build on the lessons learnt from this intervention and install up to 150MW of electricity using renewable energy sources in the community.

SOLAR WATER HEATERS

The 2 solar water heaters are still operational and working. This means that **8.4 tonnes** of CO_2 has been saved in the three years since installation. There have not been any maintenance issues. The community would like to see this system expanded to households.

SOLAR STREET LIGHT

All five solar streetlights that were installed are still working, but sometimes there are problems with the lights not switching on. Each solar streetlight is a different model to test the system to see which one the community should upscale. With an understanding of capital versus operational costs, the community has acknowledged the benefit of solar lights to provide lighting.

CEILINGS

The ceilings are still in good condition and it was noted that the rooms are warmer in winter than before the ceilings were installed.

WONDERBAGS

The Wonderbags are appreciated so much that those who cook food and use them for the aftercare facility take them home. There is some interested noted from the community to investigate the opportunity to make Wonderbags in Doornkop.

Lessons Learnt

Which intervention has been the most valuable to the community and why?

The **solar PV system** has been the most beneficial intervention, as operational costs have been reduced and the community has benefited from access to more services at the community centre, for example the doctor and aftercare programme. The community maintenance rate will ensure the ongoing benefit of this system.

The second most valuable intervention is the **solar streetlights**. They have increased safety and security by lighting the area in front of the community centre.

Overall, the project was a success, as there was community ownership and leadership. This project's success is in the context of a broader commitment to be a green community.

The municipality has also acknowledged the benefits this project has provided to the community and would like to replicate this at other community facilities.

How can this be used in your city?

Groutville Care Homes

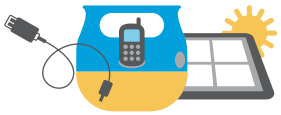
KWADUKUZA

The twenty Groutville Care Homes are situated in the KwaDukuza Municipal area and each houses between six and eight orphans under the care of the Child Welfare Association. These foster families need to take responsibility for their own homes, so they were very pleased to find ways to save money. The showcase project included the establishment of food gardens, mobile solar lights, Wonderbags and solar water heaters.

Project Details

SOLAR WATER HEATERS

By using energy from the sun, the solar water heater provides hot water to the homes. This saves electricity and reduces carbon emissions by **2.8 tons** per year for each house. Jointly, this is a saving of **57 tons of CO_2** equivalent per year for the **20 care homes**.



MOBILE LED SOLAR LIGHTS

Mobile LED solar light is an eco-friendly, energy-efficient, robust light that demonstrates the concept of solar PV. After charging it for one day it can be used for up to **48 hours**.

LED SECURITY LIGHTS

Safety is important and the LED flood lights require only **10W** of electricity. This is a **90%** saving on energy consumption, compared to a conventional halogen flood light, while it also lasts **15 times longer**.

RAINWATER HARVESTING

Rainwater is caught on the roof, which is connected to a water tank so the water can be used for watering the food garden or washing clothes when needed.

FOOD GARDENS

Urban food gardens generate important supplementary **fresh produce** for the kitchens.

WONDERBAGS

The Wonderbag is made in Africa. It helps with cooking in a safe and no-fuss way. It reduces energy costs and the amount of water needed for cooking. It also reduces household emissions.

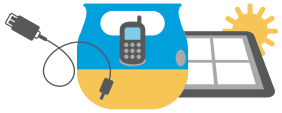
COMPOST CONTAINER

The counter-top compost containers are used in the kitchen for collecting organic waste. From fruit peels and pips, to vegetable peels, tea bags and egg shells. All of this goes back into their gardens to provide **nitrogen-rich compost**.

Project Follow Up

SOLAR WATER HEATERS

The solar water heaters have mixed results, with some households' heaters only working sometimes and others no longer being operational. This is a result of the heaters leaking when they were on. Additionally, ongoing maintenance and the limited connection to municipal water supply is a concern. The solar water heaters required pumps to be installed due to low pressure. These pumps were then removed by the contractor a few months after installation. This is attributed as the cause of the leaks and limited functionality.



MOBILE LED SOLAR LIGHTS

The mobile solar lights are still operational and were busy charging during our visit to the homes. The lamps require daily charging and this is more effective when it is hot. The mobile solar light and battery are used to charge cellphones, provide light for the children at night, and as a torch to go to the bathroom outside. It is felt that this lighting system is far safer than other types of lighting (candles, paraffin, electricity), especially with young children around.

LED SECURITY LIGHTS

The external LED security lights no longer function. There was an expectation that a service would be provided for maintenance, as the housemothers are responsible for maintaining the inside of the homes.

RAINWATER HARVESTING

The rainwater harvesting system and tanks are still operational and provide a valuable service to the care homes, especially for the housemothers who, as a result, no longer need to fetch water from communal standpipes. Having the rainwater tanks is more convenient and it was believed that everyone should have one. This water is used for clothes washing, watering the food garden, and cleaning the house.

FOOD GARDENS

The food gardens are still being used and maintained. There are trenches in some gardens to direct any rainwater not harvested to the food gardens. It is cheaper to buy seedlings that are then germinated regularly than buying vegetables at the market.

WONDERBAGS

The Wonderbags are still being used and are valuable for saving energy (gas and electricity) and money while cooking, especially during times of electrical loadshedding. It is especially useful when cooking samp and beans. It also provides an additional service by acting as a warmer for infants' bottles.

COMPOST CONTAINER

The composting containers are no longer used. They have either been misplaced or broken by children in the homes. However, even without the containers, composting is still being practised, with alternative composting containers being used or vegetable peelings being placed directly on the food garden.

Questions Asked

Questions asked during the project follow up 2018:

- **Is it still in use/ operational?**
- **Have there been any maintenance or operational issues?**
- **How have you overcome these challenges?**
- **Who benefits from the intervention?**

> CONSIDERING ALL THE COSTS AND RESPONSIBILITIES INVOLVED IN MAINTENANCE IS CRITICAL TO CONTINUE TO RECEIVE THE BENEFITS OF THESE SYSTEMS
>
> Mr Bongani Ndlovu, Child Welfare

How can this be used in your city?

Lessons Learnt

Which intervention has been the most valuable to the community and why?

The mobile solar lights are noted as the favoured intervention as they save the housemothers money and it is a safer form of lighting for the children.

Project Details

SOLAR PV SYSTEM

The school has solar PV panels on the roof that use light from the sun to create energy. A solar inverter changes the energy from direct current to alternating current so that it can be used at the school.

SOLAR WATER HEATER

Using the energy from the sun, the solar water heater provides hot water to the school. While it helps the school to save on electricity, it also reduces **CO_2** emissions by **2.8 tonnes** per year.

LED LIGHTS

All the lights in the school have been replaced with more energy-efficient options, which will save over **6 000 kWh** of electricity each year and **5.2 tonnes of CO_2** equivalent.

SKY LIGHTS

The sky light brings natural day light into the classrooms. This means that they don't need to switch on the lights. It reduces energy consumption and saves money. This could save **340 kg of CO_2 equivalent per** classroom each year.

FOOD GARDENS

Urban food gardens are an important way to help trickle feed much-needed fresh produce into their kitchens. It links them to the soil and teaches them about resilience.

RAINWATER HARVESTING

The school catches the rainwater on the roof and have connected it to a water tank so they can use it for watering their food garden or washing clothes when needed.

WONDERBAGS

The Wonderbag is made in Africa. It helps with cooking in a safe and no-fuss way. It reduces energy costs and the amount of water needed for cooking. It also reduces household emissions.

BIODIGESTER

The school uses food scraps from the kitchen and other organic waste to feed their biodigester. This creates fertiliser and methane gas, which can be used for cooking. It helps **reduce CO_2** emissions and sends less waste to landfill.

SOLAR DRIVEN BOREHOLE WATER PUMP

The solar driven borehole pump provides access to water for the school, soup kitchen and food garden so they no longer carry buckets of water for long distances.

Mphe-Thuto Primary School

MOGALE

Magaliesburg is a small town situated west of Gauteng in Mogale Municipality. It has a long and rich history linked to the Sterkfontein Caves where the remains of primitive man were discovered. The Mphe-Thuto Primary School hosts around 900 learners, servicing the local area and specifically the adjoining township. The showcase project included the replacement of all the lights in the school, a solar water heater, skylights and a solar driven borehole water pump. Working in partnership with Earth Life Africa and Oxfam, an 18 kW solar PV panel was installed with a grid-tie inverter and battery bank, as well as a bio-digester and rainwater harvesting.

Questions Asked

Questions asked during the project follow up 2018:

- **Is it still in use/ operational?**
- **Have there been any maintenance or operational issues?**
- **How have you overcome these challenges?**
- **Who benefits from the intervention?**

> IF YOU BENEFIT, YOU WILL MAINTAIN IT
>
> Mr Phiti, Principal of Mphe Thuto Primary School

Project Follow Up

SOLAR PV SYSTEM

The solar energy system is still operational and significantly benefits the school and broader community. During electricity blackouts the school is able to support other schools in the area with administrative tasks. The solar system has helped the school save money, with a **50% reduction** in electricity being purchased from the grid. There has been a concern about the security of the solar system, especially during school holidays. As a result, the school has installed barbed wire around the eaves of the roof. Furthermore, the solar system has an automatic communication system that sends any problems directly to the school principle's cell phone.

SOLAR WATER HEATER

The solar water heater is still working and supplies water to the bathroom block and the kitchen. There have not been any maintenance issues with the system. This means that the schools have reduced their greenhouse gas emissions by **8.4 tonnes** over the past 3 years.

LED LIGHTS

Al the lights are still in place and operational. The school has not needed to replace any lights yet. This means that since 2015, the school has contributed to a reduction of **15.6 tonnes of CO_2** equivalent.

SKY LIGHTS

The skylights provided in each classroom are still providing value to learners and teachers by allowing daylight into classroom, so lights do not need to be used. The school has saved just over **1 tonne of CO_2** equivalent, thanks to this initiative.

RAINWATER HARVESTING

The rainwater harvesting tanks provide water to the food garden with water that is captured from the roofs of classrooms. Three 5 000 litre tanks are sufficiently meeting the needs of the school. Borehole water is not currently being stored in these tanks, as the pressure from the borehole is too low. There have been no maintenance issues, other than needing to build a fence around the tanks to stop school children from playing on the rainwater tanks and pipes and damaging the system.

FOOD GARDENS

The food garden is a core component of the school and community. The seasonal vegetables grown are used in the school kitchen to supplement school lunches. It is run by full-time staff and supported by parents who volunteer their time. In return, parents learn valuable skills for subsistence farming and receive some vegetables. The food garden also forms part of the learners' life skills programme at school where they learn how to plant vegetables and monitor their growth and care. The only current challenge is that, due to the low pressure from the boreholes, they need to rely on municipal water to irrigate the food garden in winter.

Project Follow Up

WONDERBAGS

The Wonderbag is still at the school. While it as not being used to prepare lunch at the time of our visit, it is used for larger school functions.

BIODIGESTER

The biodigester is still operational and forms a key component of the school's energy and waste system. The biodigester is fed with food waste from the kitchen and local hotels, agricultural waste from the food garden, and supplemented with cow dung from a local farm. This provides a steady stream of feedstock to the biodigester, which produces gas that is used in cooking and organic fertiliser used in the food garden. There is regular maintenance of the pipes that supply the biodigester with feedstock from the mastecator in the kitchen and the gas pipes, as there are occasional blockages. These are however easy to fix, making maintenance low cost.
At times, the feedstock in the biodigestor is not digested quickly enough, so there is back-up gas provided in case there isn't gas being produced.

SOLAR DRIVEN BOREHOLE WATER PUMP

The solar driven borehole pump is still operational at the school, but the pressure is very low, thereby limiting its effectiveness.
The school therefore doesn't make use of this intervention at the moment and would need more pumps to increase the pressure.
The low pressure is attributed to a lower water table from which the borehole draws.

Lessons Learnt

Which intervention has been the most valuable to the community and why?

The combination of initiatives at the Mphe Thuto Primary School has allowed for increased self-sufficiency and reduced operational costs, along with providing learning opportunities for learners and the broader community. Many of the initiatives implemented support the food-energy-water nexus and showcase the benefits of circular development for sustainable resource consumption. These direct benefits are in addition to the global and national impact of this project as it continues to mitigate against climate change.

The food garden is identified as a highly valuable intervention for the school, as it has not only increased its ability to provide healthy meals to learners, but also increased the food security in the community. This is due to parents and community members who have volunteered starting their own food gardens at homes, with the skills they gained.

The success of this project relies on the ownership of the interventions by the principal, school governing body, and grounds staff. Each person involved knows how the system works and takes pride in its ongoing operations and maintenance. The key to this maintenance is to be proactive by having monthly routine checks and the ground staff having the right skills. As stated by Principal Mr Phiti, "if you benefit from it, you will maintain it".

Empangeni Library

UMLHATHUZE

The Empangeni Library is situated in the uMhlathuze Municipality, KwaZulu-Natal and is used by the surrounding community on a daily basis. The showcase project included the retrofit of 337 tube lights to LEDs and the installation of Solar PV that can provide an estimated 7.1kWp.

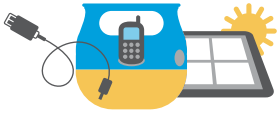
Project Details

SOLAR PV SYSTEM

The library has **23** solar panels of **260 W** each, which provide a potential capacity of **6 kW**. The PV system is connected to an inverter and **8 batteries**. The solar panels and batteries provide electricity for the library and can run the lights and two computers for **2.5 hours** during loadshedding.

LIGHT

337 fluorescent lights have been changed to energy-efficient LED lights. The energy consumption for the lights has decreased by 60% due to the lighting retrofit, enabling an energy saving of **8788 W**.



MOBILE LED SOLAR LIGHTS

The mobile LED solar light is an eco-friendly, energy-efficient, robust light that demonstrates the concept of solar PV. After charging it for one day, it can be used for up to 48 hours. The community can even use it to charge their cellphones.

WONDERBAGS

The Wonderbag is made in Africa. It helps with cooking in a safe and no-fuss way. It reduces energy costs and the amount of water needed for cooking. It also saves household emissions.

COMPOST CONTAINER

Counter-top compost containers are used in the kitchen for collecting organic waste. From fruit peels and pips, to vegetable peels, tea bags and egg shells. It all goes back into their gardens to provide **nitrogen-rich compost**.

Project Follow Up

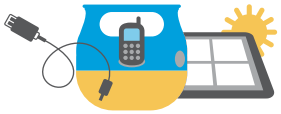
SOLAR PV SYSTEM

The Solar PV system is still operational and has been a valuable intervention for the building. Since installation, the library no longer experiences loadshedding, as the energy generated by the system is sufficient to keep the lights and the 2 computers connected to the system on. The system only required major maintenance when it was hit by a storm.

Once a month, Easy Solar, an organisation responsible for the installation and maintenance of the system, visits the library to determine if it is still in good use. This limits the occurrence of any maintenance issues.

LIGHT

The LED lights continue to benefit the building. Of the 337 LED lights installed during the retrofit, only very few lights have needed to be replaced. This means that since the installation in 2015, energy consumption continued to decrease by 60%.



MOBILE LED SOLAR LIGHTS

The mobile LED Solar light continues to be used for showcasing in the library. It is used to educate and raise awareness to the municipality's citizens and staff who visit the library.

WONDERBAGS

The Wonderbag is still used to educate the community and municipal staff visiting the library about energy efficiency. The community is interested in buying the Wonderbags for themselves, but there is a lack of local suppliers.

COMPOST CONTAINER

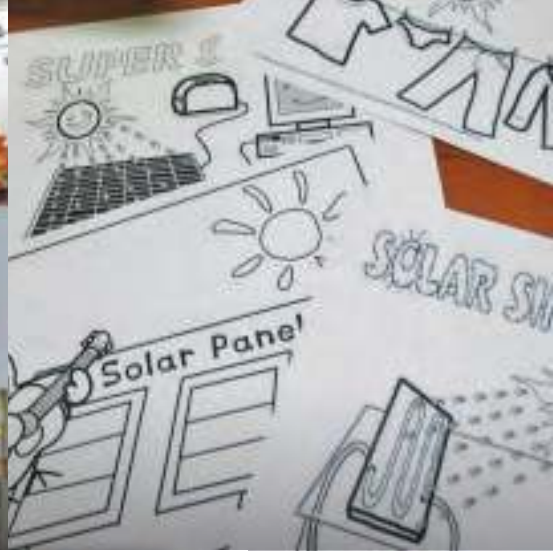
Compost containers are still in use and the library staff is still determined to use them. This has also developed an interest in the staff to collect plastic bottles. The municipality's waste management has initiated a waste recycling initiative.

Questions Asked

Questions asked during the project follow up 2018:

- **Is it still in use/ operational?**
- **Have there been any maintenance or operational issues?**
- **How have you overcome these challenges?**
- **Who benefits from the intervention?**

How can this be used in your city?



Lessons Learnt

Which intervention has been the most valuable to the community and why?

The most beneficial intervention is the solar PV panel and the LED lights, because the building has experienced a reduction in energy consumption, therefore saving the building up to 61% energy consumption each month.

The project has been a success for the community of uMhlathuze. Community members and city staff aware of the interventions have questioned the upscaling of such interventions in other buildings, which has resulted in nearby buildings being retrofitted to include LED lights. This has ensured that the municipality is reducing greenhouse gas emissions and energy consumption in its municipal buildings.

Project Details

SOLAR PV SYSTEM

The Centre has **20** solar panels of **200 W** each, which provide a potential capacity of **4 kW**. The PV system grid feeds excess energy into the grid. The battery backup operates the lights, offices, and classroom during loadshedding. This can save up to **6 tonnes of CO_2** equivalent per year.

SOLAR WATER HEATER

By using the energy from the sun, the solar water heater provides hot water to the centre. While it helps save on electricity, it also reduces CO_2 emissions by **2.8 tonnes** per year.

LIGHTS

161 lights have been replaced with energy-efficient LEDs. All the lights operate on motion sensors and/or photo cells. The energy consumption for the lights has decreased by **59%** due to the lighting retrofit.

RAINWATER HARVEST AND FILTRATION

The Centre has a rainwater harvesting system that can hold up to **22 500 litres** of water. The **3-stage** filter system (particles, ultra and UV filter) ensures that the water has potable quality. This is the main water supply for the whole Centre.

MOBILE LED SOLAR LIGHTS

The mobile LED solar light is an eco-friendly, energy-efficient, robust light that demonstrates the concept of solar PV. After charging it for one day it can be used it for up to **48 hours**. It can even be used it to charge cellphones.

WONDERBAGS

The Wonderbag is made in Africa. It helps with cooking in a safe and no-fuss way. It reduces energy costs and the amount of water needed for cooking. It also reduces household emissions.

COMPOST CONTAINERS

The counter-top compost containers are used in the kitchen for collecting organic waste. From fruit peels and pips, to vegetable peels, tea bags and egg shells. It all goes back into their gardens to provide **nitrogen-rich compost**.

Grootkloof Environmental Education Centre

NELSON MANDELA BAY

The Grootkloof Environmental Education Centre is situated in the Van der Kemp's Kloof Nature Reserve in Port Elizabeth, Eastern Cape. It was built to promote environmental education among the local residents and includes classrooms, offices, kitchen and toilet facilities, as well as caretaker's accommodation. The showcase project included the full retrofit of the lights, solar PV (4.5kW), solar water heater, rainwater harvesting and filtration system. The solar PV feeds into the grid, but also has a battery bank to allow operation during loadshedding, while the water filtration system allows the centre to use municipal water only as a back-up.

Questions Asked

The following questions were asked during the project follow up 2018:

- **Is it still in use/ operational?**
- **Have there been any maintenance or operational issues?**
- **How have you overcome these challenges?**
- **Who benefits from the intervention?**

Project Follow Up

SOLAR PV SYSTEM

The Solar PV system is still operational and a significant benefit to the building. The electricity generated by the system is sufficient for the building's everyday energy use. During power outages, the solar system has been useful by keeping the building's lights on and ensuring the building operates to its functional capacity. Since the installation, no challenges have been encountered. Meters have since been installed in order to determine how much electricity is used from the solar PV system and identify further potential savings. The maintenance of the system has been undertaken by GIZ, a partner in the project's implementation. There is now the opportunity to upskill the building manager and ground staff on the maintenance of the system. Since the solar system was installed, it has saved 18 tons of CO_2.

SOLAR WATER HEATER

Only 1 of the 2 solar water heaters installed in the building is still in use. The other was disconnected because it didn't cater for the building's needs. The one solar water heater still in use supplies hot water to showers, hand basins and kitchen sinks for the visitors and employees situated in the building. This saves the Centre from using electricity to heat water for its employees and also reducing CO_2 emissions by an overall 4.2 tons since installation in 2015. Most of the workers use the showers after a long day of work in the garden and it was found that the one solar water geyser was not sufficient for this high use and the distance from the geyser to the showers in the workers' restrooms results in too much heat being lost. A second electrical geyser has since been installed to meet this higher demand for hot water at the Centre.

LIGHTS

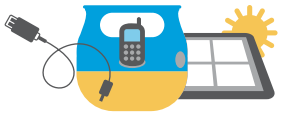
The lights are still operational, however, there has been internal issues of replacing and maintenance. LED lights used in the building aren't stock items in the municipality, therefore, it takes long for the Centre to receive the lights. The outside lights have been problematic; they wouldn't work when needed, as a result, all outside lights have been replaced with a different type of LED light, and no issues were reported after the retrofit.

RAINWATER HARVEST AND FILTRATION

The rainwater harvesting and filtration system is still in use and a major benefit to the community. Water from the system is cleaned to potable quality and provides water to the food garden, kitchen, toilet flushing and showering. As a result the amount of water used from municipal water sources has been reduced. This use of rainwater has helped make the Centre more resilient in the face of the extensive drought experienced by Nelson Mandela Bay Municipality.

WONDERBAGS

The Wonderbags are still used for community school outreach programs only. However, there is potential for greater use in addition to the current use of the bags. The building is used for events and the Wonderbags may potentially be used to support local caterers.



MOBILE LED SOLAR LIGHTS

Mobile LED Solar lights are not used in the centre. They were only given to the community members.

COMPOST CONTAINERS

Compost containers are still used in the Centre. The containers are used by community members and schools. However, the compost is not enough for everyone to use.

Lessons Learnt

Which intervention has been the most valuable to the community and why?

The entire building has been valuable to the community. It has brought the community together, created jobs through the number of events occurring in the Centre and provided fresh vegetables for all who need it. The community is a lot safer now. The Centre is also now known for being a Green Building and this helps to make it a centre for eco-tourism in the municipality.

The overall project was a success. The community has shown ownership in the project and has connected the community surrounding the building to the greater Nelson Mandela Bay Metropolitan Area. As a result, the community has seen a spike in visitors feeling a lot safer in the neighbourhood. The building is used more for events by the community, therefore reducing travel for individuals and reduces greenhouse gases from vehicles and the entire building itself.

THE BUILDING "ENCOMPASSES A ONE STOP SHOP FOR THE COMMUNITY"

Clyde Scott,
The building facilities manager and a local eco-tourism champion

How can this be used in your city?

URBAN-LEDS II PROJECT AT A GLANCE

Project name: Urban-LEDS II

Full title: Accelerating climate action through the promotion of Urban Low Emission Development Strategies

Funded by: The European Union

Project duration:
Four years – April 2017 to March 2021

Project countries in Africa:
South Africa (from phase I) & Rwanda (new in phase II)

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UN HABITAT FOR A BETTER URBAN FUTURE