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Low Emissions Development Program

ANNUAL REPORT

SOUTH AFRICA LOW EMISSIONS DEVELOPMENT PROGRAM (SA-LED)

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CONTENTS

ACRONYMS

CDA	Cacadu Development Agency
CHDM	Chris Hani District Municipality
CHP	Combined Heat and Power
CISL	Cambridge Institute For Sustainability Leadership
CLEER	Clean Energy Emission Reduction
DBE	Department of Basic Education
DEA	Department of Environmental Affairs
DEDEAT	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism
DoE	Department of Energy
EEDSM	Energy Efficiency and Demand Side Management
EMM	eThekwini Metropolitan Municipality
EWS	eThekwini Water and Sanitation Unit
FY	Fiscal Year
GHG	Greenhouse Gas
GIZ	Gesellschaft für Internationale Zusammenarbeit
GMM	Govan Mbeki Municipality
GPC	Global Protocol for Community-Scale Greenhouse Gas Emission Inventories
GoSA	Government of South Africa
ITP	Integrated Transport Plan
LED	Low Emissions Development
LOP	Life of Program
M&E	Monitoring and Evaluation
NSNP	National School Nutrition Programme
PPP	Public Private Partnership
PV	Photo Voltaic
RFP	Request for Proposal
SA-LED	South Africa Low Emissions Development Program
SABIA	Southern African Biogas Industry Association
SAGEN	GIZ-South African-German Energy Programme
SALGA	South African Local Government Association
SANS	South African National Standards
SSEG	Small-Scale Embedded Generation
TVET	Technical Vocational Education and Training
WESSA	Wildlife and Environment Society of South Africa
WWTW	Wastewater Treatment Works

EXECUTIVE SUMMARY

The focus of the South Africa Low Emissions Development Program (SA-LED) in Year 3 was to continue increasing demand for low emissions development (LED) projects through the provision of technical assistance to develop technically and financially feasible projects. Applying implementation experience and lessons learned from Years 1 and 2, SA-LED focused on mainstreaming LED into the municipal planning and budgeting processes to ensure sustained political and administrative support for Program-supported initiatives. SA-LED also sought to increase the understanding of the socio-economic development benefits associated with LED projects and continued training municipal officials on greenhouse gas (GHG) measurement and reporting. Additionally, the Program began increasing its financial advisory and transaction support to municipalities in Fiscal Year (FY)18. In this regard, SA-LED supported municipalities to understand the implications of engaging in electricity trading processes and provided financial advice to take LED projects to financial feasibility. Finally, SA-LED continued to apply its project selection criteria to identify nine new LED initiatives eligible for technical assistance. To support new and ongoing projects, the Program deployed technical assistance in engineering consulting services, financial and legal advisory services, economic modeling, revenue and utility impact analysis, LED multiple benefits analyses, and greenhouse gas emissions analysis, among others forms.

Building on the results of the first two years of the Program, SA-LED continued to achieve outstanding results in FY18. As a result of SA-LED technical assistance across a variety of initiatives in FY18 alone, a projected 418,000 tons of CO2 equivalent emissions will be mitigated (four times the five-year program target). Moreover, the Program was able to leverage more than $3.2 million to support LED initiatives across the various provinces and municipalities that SA-LED serves. Year 3 also saw SA-LED's technical experts embedded in the Polokwane Municipality and Chris Hani District Municipality (CHDM) demonstrate their value to their respective municipalities. For example, the Program's expert embedded in the Polokwane Municipality played a central role in developing the Municipality's "Green Goal Energy Strategy" which aims to address the key challenges of energy security, economic competitiveness, climate change, and poverty, while SA-LED's technical advisor embedded in CHDM supported the Municipality to update and finalize their Climate Change Strategy.

HIGHLIGHTS FOR THE YEAR

Figure 1: FY18 Highlights

1. INTRODUCTION

GOAL

The South Africa Low Emissions Development (SA-LED) Program is a $14.9 million, five-year USAID-funded initiative aimed at supporting the Government of South Africa to achieve its green growth objectives.

OBJECTIVES

SA-LED is working to strengthen the capacity of the public sector to plan, finance, implement, and report on low emissions development projects and to accelerate the adoption of low emissions technologies in both the public and private sectors. A particular focus is to increase the flow of investments into LED projects and to increase the size and quality of the LED project pipeline.

SECTORS

To support the implementation of South Africa's Climate Change Response Policy, SA-LED focuses on near-term priority flagship sectors: Renewable Energy, Energy Efficiency and Energy Demand Management, Waste Management, and Transport.

PARTNERS

The USAID SA-LED Program was co-created in conjunction with the South African Department of Environmental Affairs (DEA) and the Department of Science and Technology (DST).

South Africa's transition to a low-carbon economy illustrates the typical dichotomy facing developing economies: joining the global fight against climate change, while advancing economic growth and social development.

South Africa has embarked on an ambitious effort to use LED as a means to reduce its GHG emissions in a more sustainable and equitable way. To do so will require change at multiple levels and sectors, including mitigating key capacity bottlenecks and coordinating with a diverse set of actors who contribute to LED project development. South Africa's Climate Change Bill is currently in the process of being formally legislated. The Bill was borne out of the 2011 National Climate Change Response White Paper, which outlined cross-sectoral mitigation goals for South Africa. It aims "to build the Republic's effective climate change response and the long-term, just transition to a climate resilient and lower carbon economy and society in the context of an environmentally sustainable development framework; and to provide for matters connected therewith." At the inception of this Program, SA-LED aimed to respond to the provisions of what was articulated in the White Paper. Now, SA-LED aims to align its technical assistance with the principles pending Climate Change Bill.

South African municipalities at present are challenged by lack of adequate skills to move LED projects through the project development pipeline. A more coherent structure for coordinating at the municipal and the national department level needs to be articulated. These institutions need to be better equipped to operationalize and adequately plan for the implications of provisions within the Climate Change Bill in order to translate the Department of Environmental Affairs' (DEA) recommendations into actionable projects. Moreover, South African investors continue to perceive LED investments as risky. Investors pursuing investment in the energy sector need to acquire a more sophisticated understanding of LED technology and the legal and regulatory framework surrounding green investment. SA-LED seeks to play a catalytic role and bridge the gap between public institutions and LED investors as well as showcase the potential for LED to deliver a multifaceted development impact.

The Program works to remedy these challenges by providing technical assistance, capacity building, financial advisory services, and support in sourcing external finance to help the Government of South Africa (GoSA) advance LED projects through the project development cycle in high priority sectors. The sectors identified by the GoSA as "near-term priority flagship programs" include waste management, transport, energy efficiency and energy demand management, renewable energy, and water conservation and demand management. The GoSA has committed to reaching their Nationally Determined Contribution goals to the Paris Agreement on Climate Action. South Africa has also committed to adopt appropriate mitigation action to enable a 34% deviation below the 'Business as Usual' emissions growth trajectory by 2020 and a 42% deviation below the 'Business as Usual' emissions growth trajectory by 2025. This level of effort will enable South Africa's GHG emissions to peak between 2020 and 2025.

THE SA-LED APPROACH

The overall approach of SA-LED focuses primarily on helping South African municipalities move LED projects through the project development life cycle as the vehicle to deliver technical assistance and capacity building. Under this approach, SA-LED, its consortium partners, and short-term consultants, identify municipal projects that are stuck in the project pipeline and provide the training and support needed to move these projects towards implementation. This approach provides ample opportunities for practical learning, using real project blockages as the training materials to build the capacity of municipalities. Since inception, SA-LED has employed a comprehensive suite of training resources that will remain in the public domain long after the Program ends. These activities bring lasting benefits to the country by upskilling those that are working within the sector, and within provinces and municipalities. The Program has brought lasting benefits to a diverse set of LED actors within South Africa that will enable the country to sustain the envisioned incoming flow of LED projects.

Year 3 represented an important pivot in SA-LED's implementation. Building on the successful ramping-up of technical assistance in Year 2, the Program's focus shifted to consolidating and integrating learning across sectors and highlighting programmatic success where methodologies were repeated, refined, and consolidated. In this process, SA-LED focused on replicating successful methodologies and approaches, consolidating critical mass in specific sectors (for example the waste and energy efficiency sectors) and integrating overall technical learning. With its project development process firmly established, SA-LED continued to demonstrate its unique value-addition within the South Africa's LED sector. The demand for the Program's technical expertise has surpassed expectation, with agreements with municipalities reaching a peak in FY18. Additionally, SA-LED's technical work in Year 3 shifted from taking projects to the Request for Proposal (RFP) stage to building on technical feasibility to ensure financial feasibility and links to viable sources of finance.

Communications and outreach continued to serve as a crosscutting function to support the distribution of lessons learned, the development of training manuals, and knowledge management across each of the Program's five intervention areas. Moreover, SA-LED's Monitoring and Evaluation (M&E) Plan allowed for communication and dialogue with USAID, the GoSA, the Program's Advisory Committee, consortium partners, and key stakeholders to adapt technical assistance as required throughout Year 3. The Program also continued to engage with relevant civil society actors and the private sector to ensure SA-LED's technical assistance was aligned with inclusive, gender-equitable development in all facets of the LED project development process.

RESEARCH AND ANALYSIS

During FY18 SA-LED, continued its working relationship with key consortium partners within the LED sector, namely DNA Economics, The Green House, Linkd Environmental Services, and ICF International. The Program's Year 4-5 work planning session conducted in Quarter 4 of provided an invaluable opportunity for consortium partners to influence the Program's strategy and implementation through close-out. As SA-LED ramped-up capacity building and technical support in Y3, SA-LED assigned specific work streams to consortium partners according to their strengths and expertise in supporting municipalities to achieve low-carbon development goals. The consortium partners will further play a crucial strategic role in ensuring the sustainability of SA-LED's technical assistance in the market post May 2020. In view of this legacy work, research and analysis was focused on addressing specific blockages related to ramping-up technical assistance. Where

SA-LED has gained traction in sectors, analysis became the key tool develop audience-specific business case studies, decision-support tools, and training materials.

LED PROJECT DEVELOPMENT

SA-LED continued supporting LED initiatives across each of the four flagship sectors in unblocking and progressing projects that face challenges and to provide technical assistance that will help bring projects to financial close or RFP award. This technical assistance support included conducting feasibility assessments; mobilizing finance; evaluating LED technology options; and providing legal, financial, and engineering technical assistance to LED projects.

CAPACITY DEVELOPMENT

SA-LED continued to upscale experts and conduct formal training with municipal partners in addition to implementing projects together by facilitating 'practical learning' LED project implementation. For example, the Program collaborated with key stakeholders to train 51 municipal officials from the City of Tshwane and City of Johannesburg on the new South African National Standards (SANS) 10400-XA municipal level green building guidelines. Participating officials critiqued the application process and made recommendations for further roll-out in South Africa.

ENABLING ENVIRONMENT

SA-LED works to create an enabling environment that institutionally supports LED efforts across local, provincial, and national government. Based on the results of the research and analysis focus of the Program in FY16, activities in this area increased in FY17 to enhance existing municipal networks, trainings and government initiatives, and industry association efforts. In FY18, these efforts were implemented into actionable projects, operating at the municipal level, through the use of a SA-LED GHG municipal fleet calculator that is able to assess the GHG emissions of municipal buses. Further, SA-LED's interventions include initiatives such as the installation of solar photo voltaic (PV) panels on top of municipal buildings, resulting in the reduction of the amount spent on costly municipal energy bills. Additionally, the Program supported the development of new LED funds through national institutions such as the Development Bank of Southern Africa and tools to streamline LED project development.

MEASURING, REPORTING AND VERIFICATION OF GHG EMISSIONS

SA-LED continued supporting municipalities to perform project-level GHG emissions analysis using USAID's Clean Energy Emission Reduction (CLEER) Tool developed by consortium partner ICF International where applicable, and to articulate the multiple-benefits of LED projects. In FY18, the Program revised the GHG mitigation sections of the DEA's M&E Sectoral Guidelines for the combined Energy and Transportation, and the Industrial Processes and Product Use sectors. In addition, the Program supported select municipalities to align their local GHG inventories with internationally recognized reporting protocols.

KEY ASSUMPTIONS

Assumptions explain the underlying logic behind SA-LED's expectations of the connections between different components of the pathway-of-change. The underlying assumptions of the Program are as follows:

1) Implementation of LED initiatives will ultimately contribute towards reducing relative levels of GHG emissions.

2) Provision of capacity building and technical assistance to targeted municipalities will result in increased investment in LED initiatives.

3) Assistance to mainstreaming LED initiatives into municipal planning, programming and budgeting processes will result in increased uptake of LED projects at the municipal level, for example generation of renewable energy, improved waste management, and efficient public transport systems.

4) Municipalities are key actors in developing and implementing climate change mitigation policies and programs as they are located at the interface of local action, through their service delivery mandates, and national commitments.

5) Implementation of LED initiatives has the potential to support economic development and job creation for women and youth.

SA-LED's Progress for FY18 is detailed in the following sections. The report provides information on progress on projects that will lead to a reduction in GHG emissions, capacity building with respect to LED, and activities to promote an enabling environment for the uptake of LED projects. Given the present position of the Life of Program (LOP), the report will also focus on projects that are scaling down at present.

SUMMARY OF KEY LED INITIATIVE LOCATIONS IN FY18:

Figure 2: Current SA-LED-supported project locations.

2. LED PROJECT DEVELOPMENT

In FY18, SA-LED continued to provide technical assistance to a variety of LED projects. The Program provided support to different types of municipalities (i.e. metro, district, and local) and across the GoSA's climate change flagship sectors of waste management, transport, energy efficiency and energy demand management, renewable energy, and water conservation and demand management. Figure 2 above provides a geographical representation of where technical assistance is currently being provided. The projects outlined below include institutional capacity building initiatives and initiatives that promote an enabling environment to increase uptake of LED projects, including financial advisory support and planning for low emissions development.

ANNUAL HIGHLIGHTS

eTHEKWINI METROPOLITAN MUNICIPALITY: SOLAR PV ON RESERVOIRS

In its efforts to contribute to the city's climate change mitigation objectives, eThekwini's Water and Sanitation Unit (EWS) plans to install solar PV panels on the available space above its water reservoirs. However, successful solar installations need to demonstrate both technical and financial feasibility for them to gain adequate support not only within the municipality but also within the investment community. In FY18, SA-LED performed a high-level technical and financial feasibility assessment of ground mounted solar PV installations on reservoir sites across the eThekwini Metropolitan region as identified by EWS. EWS had provided SA-LED with the coordinates and available areas for its 440 sites.

Photo 1: An example of a solar PV installation at Ekhuruleni Metropolitan Municipality office.

Solar yield and financial assessments were conducted for sites which could accommodate at least 100 kWp of installed capacity since the smaller the sites, the less viable the business case becomes. This reduced the number of assessed sites to 39. The Electricity Department indicated that since most of the reservoirs are located in residential areas, there could be issues extracting power due to the current design and strength of the grid network. Moreover, it would be costly to build new sub-stations in residential areas to facilitate the transmission of generated power.

SA-LED's technical assistance in FY18 aimed to provide an objective, independent and accurate assessment of the probable energy yield of solar PV panels installed on reservoirs. The initial thinking within EWS was to procure the solar PV panels through a Municipal Public Private Partnership (PPP) arrangement. This project is already registered with the National Treasury's PPP Unit as a project that will be procured through the prescribed National Treasury's Municipal PPP Guidelines. In Quarter 1 of FY19, SA-LED will assess a variety of procurement models and develop a financial model that includes investment costs of the projects. SA-LED will present the final technical and financial assessment to EWS and National Treasury's PPP Unit in November 2018, indicating a thorough evaluation of the solar yield potential assessment.

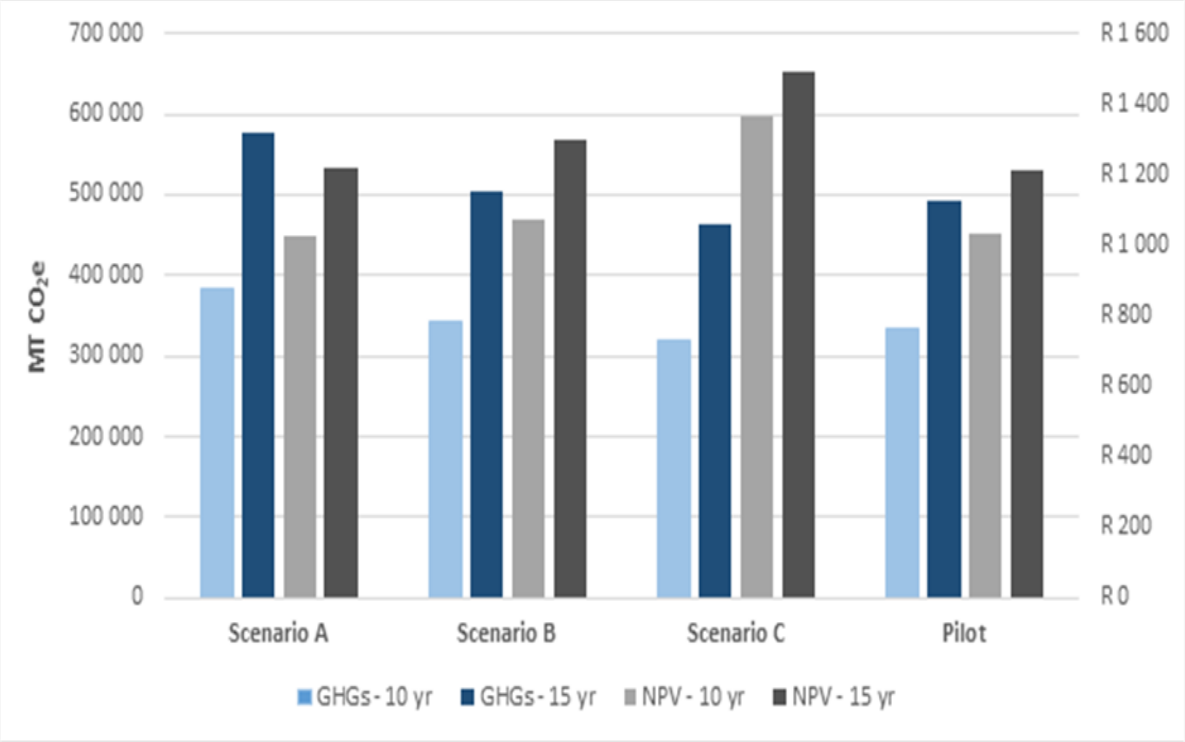


Figure 3: A 15-year analysis results for GHG emissions and net present value.

eTHEKWINI METROPOLITAN MUNICIPALITY: CONDUIT HYDROPOWER

In FY18, SA-LED was appointed the transactional advisor for the inline conduit hydropower projects in the Northern Aqueduct and the Western Aqueduct water pipelines, which are yet to be commissioned. The tanks on the Western Aqueduct – Ashley Drive and Wyebank – have a potential to host small-scale hydropower generation installations (small-scale is defined as less than 10MW for each site). The Northern Aqueduct will host mini-hydro facilities at eight sites of less than 1MW each. In FY18, SA-LED conducted a "pre-feasibility" study on the conduit small hydropower (<10MW) potential at the two break pressure tanks on EWS' Western Aqueduct, namely Ashley Drive and Wyebank. These two break pressure tanks are

expected to be commissioned in April 2019. The pre-feasibility study was useful as it confirmed the potential location of the hydropower generating units and their suggested configuration within the constrained break pressure tanks. Initially the municipality had thought these units might have to be located on a golf course in the case of Ashley Drive and on the hill above the water reservoir in Wyebank.

SA-LED commenced the feasibility study following the National Treasury's prescribed Municipal PPP Regulations to the Municipal Financial Management Act. The feasibility study is based on projected flows and pressures of the water as no water has flown through the Western Aqueduct pipelines which could have made monitoring of water flows possible. In Quarter 2 of FY19, SA-LED plans to complete the feasibility study on the two pipelines. To complete the feasibility study, SA-LED as the Transaction Advisor will take EWS through the needs analysis, the technical options analysis, and the service delivery analysis together with the due diligence, a value assessment for service provision by a delivery method per the National Treasury PPP development guidelines. The feasibility study will need to be duly approved by National Treasury (Treasury Views and Recommendations 1) before the municipality proceeds with any procurement plans. To ensure a successful procurement by the municipality, the Program's support has extended to the bid evaluation stage where a SA-LED hydropower expert will assist the municipality (as an observer, not scoring the bids) in evaluating the bids.

THABO MOFUTSANYANA DISTRICT MUNICIPALITY: ENERGY EFFICIENCY AND DEMAND SIDE MANAGEMENT

Thabo Mofutsanyana District Municipality encompasses the Dihlabeng, Nketoana, Setsoto, Maluti-a-Phofung, Phumelela, and Mantsopa municipalities. It also houses the Department of Energy's (DoE) EEDSM Program. These local municipalities requested for the District Municipality to coordinate the submission of applications for EEDSM funding in order to ensure they were used for optimal value. In one of SA-LED's best examples of vertical LED development, the District Municipality coordinated and managed the local municipalities' EEDSM activities. The District Municipality managed the disbursement of funds received from the DoE to ensure effective implementation of energy efficiency interventions as intended by the EEDSM grant funding.

In FY18, SA-LED provided building lighting energy audit support to Dihlabeng and Nketoana Municipalities to help them with their EEDSM application processes. The audit findings for each local municipality were as follows:

- **Nketoana Municipality:** The energy audit revealed that the current energy consumption of lighting is 77,855 kWh per year. However, if the Municipality were to roll-out its energy efficiency lighting retrofit program as per the audit recommendations, it could realize 45% energy savings equivalent to R35,000/$2,500 annually.
- **Dihlabeng Municipality:** Technical support to the Municipality's maintenance personnel was well received and improved the understanding of energy management with an estimated 58% energy consumption savings (approximately 179,000 kWh) which will result in a total of R254,300/$17,500 in annual energy savings.

GOVAN MBEKI DISTRICT MUNICIPALITY: HIGH MAST LIGHTING

In Quarter 1 of FY18, SA-LED entered into an agreement with the DoE to provide technical assistance to municipalities that were shortlisted to receive grant funding from their Energy Efficiency and Demand Side Management (EEDSM) Program. The grant funds are meant to be utilized to improve the energy efficiency of municipal infrastructure in areas such as public lighting, water and wastewater treatment plants, and municipal buildings.

Govan Mbeki Municipality (GMM) had applied for EEDSM funding for the 2018/19 financial year to cover the cost of high mast lighting energy efficiency retrofits. This project entails replacing energy inefficient high-pressure sodium light bulbs on high mast lighting fixtures with energy efficient light-emitting diode luminaires. The DoE notified the Municipality that they had funding that could be transferred within the current financial year (2017/18). This transfer was on the condition that the Municipality would submit a sound business plan in addition to the Municipality being prepared to take on this work. SA-LED assisted the Municipality by conducting high mast energy audits and developing a high mast lighting baseline. The audit was to verify the information submitted in GMM proposal to DoE and to collate all data resulting in the business plan. SA-LED further assisted the Municipality by organizing their asset register and creating an inventory of the high mast lighting infrastructure. The Program collected data on the location of each high mast light and mapped it on the publicly accessible Tableau Platform. These steps were essential because the Municipality did not have an understanding of the total number and locations of their high mast installations. This new system will make it easier to manage and maintain lighting infrastructure and remove duplicate information on the lighting infrastructure, further saving the Municipality money from conducting extensive lighting audits

CACADU DEVELOPMENT AGENCY (CDA): GREENING OF THE MOHAIR VALUE CHAIN

South Africa is one of the biggest exporters of Mohair in the world. Commercial farmers generally procure very good prices on the global market for this luxury fiber, as the standard of produced mohair quality is very good. In line with GoSA's policies regarding the redistribution of land to previously disadvantaged individuals, several emerging farmers are now entering the mohair value production chain.

In FY18, SA-LED continued the work on developing the "Green Mohair Standard" and an information platform to assist farmers with complying with the standard. The "Greening the Mohair Value Chain" project has focused on two main areas of work: i) developing and populating a mohair GHG calculator with data from field studies; and ii) developing a comprehensive understanding of the mohair value chain and its potential for GHG emissions. SA-LED updated the current standard outline of an information platform that already exists in the market. The platform is an online tool that the farmers will access via tablets to gain daily essential farming information. The information includes wool pricing, greening principles, and practical on-site aspects specific to helping emerging and commercial farmers. SA-LED and CDA stakeholders assessed the platform and provided inputs on how to update information in an effort to reflect the relevant greening information for emerging farmers.

Also, in FY18, SA-LED developed a questionnaire to assist farmers with a framework that can guide their progress towards an efficient, effective and sustainable "green" mohair value chain.

The questionnaire serves as a basic checklist that supports the farmer to identify specific greening practices quickly and simply. Together with the comprehensive information platform, the farmers, via the questionnaire co-produce information available via the platform. SA-LED's mohair work in FY18 was accepted by the CDA, which is the implementing agency for the district, the emerging farmers, as well as the working group that steers this work in general.

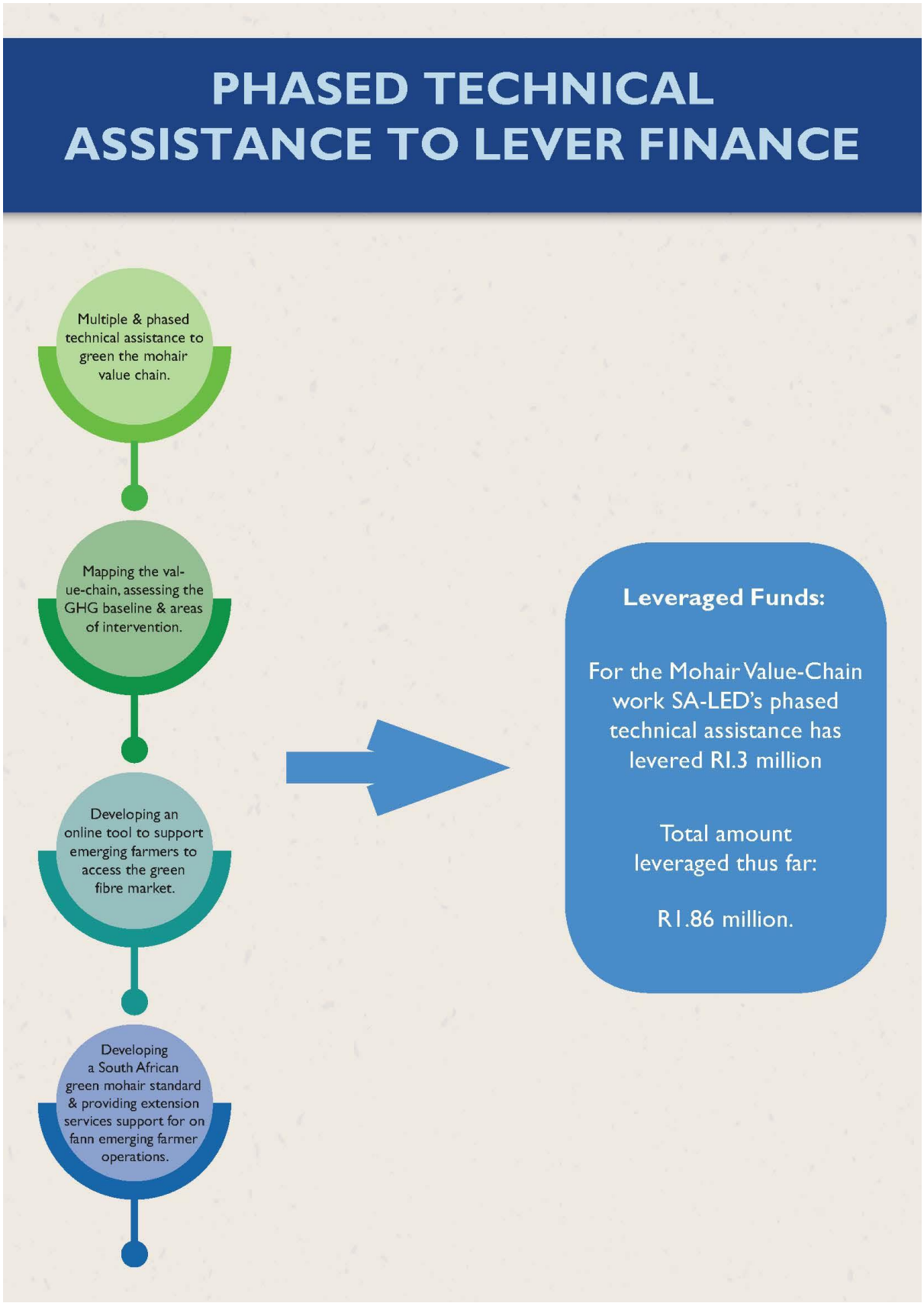


Figure 4: A graphic illustration of the technical assistance SA-LED has provided to the Green Mohair Value Chain.

EDEN DISTRICT MUNICIPALITY: EDEN DISTRICT WASTE MANAGEMENT

SA-LED's support to the Eden District Municipality in Quarters 1 and 2 of FY18 focused on defining the Municipality's specific organic waste sources and identifying the volumes and sources of six organic waste streams. This waste stream resource "map" data set was enhanced in Quarter 3 through the addition of an LED technology framework (waste management technologies and processes) that can be applied in managing these waste streams. SA-LED provided the Municipality with phased-in technical support that will allow the Municipality to make waste management decisions in line with green economy goals and integrate the decision-making into its Integrated Development Plan processes.

SA-LED's on the ground work with the Municipality has proven to be valuable. In FY18, the Municipal Council approved the Waste Strategy which SA-LED helped draft. This is significant because the Municipality is home to South Africa's most important tourism route, "The Garden Route". The Municipality has experienced challenges trying to adequately address its waste management systems. The strategy SA-LED helped draft will allow the Municipality to adequately discharge its waste. At present, the collection of the technical data is complete and the Program will now begin the modelling of waste work in order to develop a decision-support platform for the Municipality moving forward.

BLUE KAROO TRUST FISH FARM: AQUACULTURE PROJECT

Similar to many countries around the world, South Africa is faced with the challenge of reducing GHG emissions while demand for protein-rich food increases. Fisheries have historically offered South Africa a high source of protein and further, the industry produces much lower levels of GHG emissions than the livestock industry. However, given the approximate 80% decline in sardine stocks off the east coast of South Africa of the last decade, the country's ability to produce and supply fish as a core source of protein has been impacted. In response, the aquaculture industry in South Africa is expanding. While the industry is less carbon intensive than the livestock industry, there are significant environmental impacts (mainly from waste water released into local environments/water systems) that need to be mitigated as the industry grows.

Photo 2: Grow out tunnels at Blue Karoo Trust Fish Farm.

In November 2017, SA-LED partnered with the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) to support the Blue Karoo Trust Fish Farm (an existing catfish farming business located in the town of Graaf-Reinet) to reduce their environmental impact as they scale production. The Program's technical assistance informed the design, installation, and monitoring of the fish farm's integrated waste water repair and anaerobic digester pilot system. The system was required because the fish farm was producing 600m3 of waste water from regular cleaning of fish tank and grow out

tunnel water filters and maintenance of the overall farming system. The waste water (which contained high levels of nutrients from fish excrement and fish food used) was then released into a nearby field. To stop the release of the waste water into the local environment, the system uses algal ponds and pre- and post-settlers that filter out fish waste solids and convert the waste into thermal energy. Both the filtered water and thermal energy are then used to operate the farming system. Overall, the system helps the fish farm meet environmental compliance standards and reduces operating costs (i.e. water and energy costs).

Photo 3: A catch of the catfish produced in the grow out tunnels.

The monitoring data collected by SA-LED in FY18 will also inform a final feasibility study that the Program plans to complete in FY19. Due to a lack of data on the technical aspects of catfish farming, the study is required to provide baseline information to help aquaculture businesses such as the Blue Karoo Trust Fish Farm scale their business. Moreover, the study will also help demonstrate how sustainable fish farming can unlock a variety of social and environmental benefits. For example, the Blue Karoo Trust Fish Farm currently employs 210 people, 80% of which are women under the age of 35. Through training, several women employees have advanced to managerial and operational levels of the business. Integrating women's empowerment into the core business model of their farming operations has allowed these women to increase their knowledge, skills, and subsequently, improve their families' quality of life. The fish farm is also currently producing more than 1,400 tons of catfish annually.

Additionally, in order to utilize the aquaculture project as an LED best practice business case study and to demonstrate the viability of a gender-inclusive business that is providing an alternative source of protein, SA-LED began producing three videos in FY18 that highlight the multiple benefits and the Program's technical assistance. These videos will be finalized in FY19.

3. CAPACITY DEVELOPMENT

Enhancing capacity development continues to be a central component of SA-LED's work. In FY18, the Program trained 53 individuals on the USAID CLEER Tool and 358 more individuals were trained on other LED topics discussed below - 280 more than SA-LED's LOP target. Training will continue in Years 4 and 5 and will be driven by specific municipal requests and project needs.

POLOKWANE MUNICIPALITY: EEDSM TECHNICAL SUPPORT

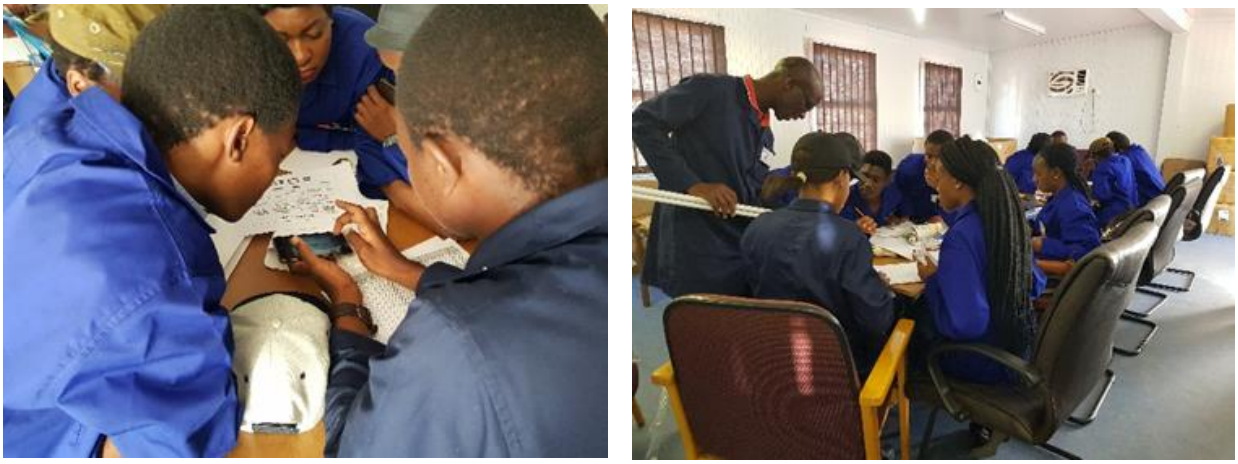
SA-LED's embedded EEDSM Coordinator supported the Polokwane Municipality on several initiatives during FY18. The Coordinator played a critical role in the organization and development of the Municipality's "Green Goal Energy Strategy" which will be submitted for approval in FY19. The Strategy was developed to address the key challenges of energy security, economic competitiveness, climate change, and poverty within the City of Polokwane.

In FY18, SA-LED's embedded Coordinator also supported the Municipality to manage a R6 million/$414,000 grant from the DoE intended to support energy savings initiatives within the City of Polokwane. The funds were utilized to retrofit nearly 1,000 streetlights with LED fixtures. The Program also assisted the Municipality in developing posters designed for a Provincial energy awareness campaign. The posters were designed to help members of the public understand different energy savings initiatives that the City of Polokwane is embarking on including the installation of retrofitted street lights and changing streetlights to utilize LED technology. A total of 300 posters, 300 flyers, and five banners amounting to R60,000/$4,100 of grant funding was allocated to this initiative.

Photo 4: Technical Vocational Education and Training (TVET) Students conducting an Energy Audit in Polokwane.

Furthermore, the EEDSM Coordinator worked on the application for the next DoE grant RFP for the 2018/19 financial year. The 2018/19 grant is a follow-on grant from the previous 2017/18 successful grant implementation that the Municipality received from DoE. The Municipality was granted R8 million/$552,000 to continue retrofitting 250W High Pressure Sodium to LED. The Municipality aims to retrofit 1,384 streetlights (though this number could increase depending on the cost of the LED strategies at the time of implementation). As part of the grant application, the Municipality was required to conduct energy audits for their buildings and requested SA-LED's support. In response, the Program collaborated with Capricorn Technical Vocational Education and Training (TVET) in Polokwane to conduct the audits. The energy audits began with a one-day in-service training in basic energy auditing for TVET students, lecturers, and select municipal officials. A total of 30 participants were trained including 20 youth (9 male, 11 female).

The training provided a practical learning opportunity for students and provided instructors material to develop a more comprehensive energy audit course. The 20 trained students then applied the skills and knowledge by conducting energy audits on 25 municipal buildings. The energy audits will allow the Municipality to replace more than 130 400-watt High Pressure Sodium (HPS) floodlights at the Peter Mokaba Stadium and Polokwane Cricket Club with 120-watt LED floodlights in 2018/19. This will result in energy savings of 28,728 kWh/a, which will translate to a financial savings of approximately R25 million/$1.7 million per year.



Photos 5 & 6 : TVET students receive training on how to conduct an energy audit.

MUNICIPAL FLEET COSTS AND ENVIRONMENTAL IMPACTS CALCULATOR

Municipal fleet managers are often faced with the challenge of deciding which vehicle fuel alternatives would offer the best benefits for their locality. Given the recent focus on transitioning to green transport systems, municipalities are faced with the challenge of deciding which alternative vehicle fleet systems are best to invest in. To respond to this challenge, SA-LED and its partners, The Green House and ICF International developed a decision-making tool for municipal bus fleets in FY2018. The Microsoft Excel-based calculator estimates the costs and the GHG and air pollution emissions of fossil fuel, electric, and biodiesel and biogas municipal bus fleets. The calculator permits the user to customize fuel sources, prices, electricity mixes, discount rates, and other aspects to better understand how these variables can influence overall fleet costs and impacts. The spreadsheet allows the user to customize formulas, constants, or assumptions used throughout the calculations for a deeper level of

customization. The alternative vehicle calculator tool has been shared with all South African cities, C40, the Southern African National Energy Development Institute, GIZ and the South African Cities Network. In FY19, SA-LED will consider rolling-out capacity building workshops to train municipal vehicle fleet managers on using the tool.

Photo 7: Municipal Transport Managers are taught how to calculate emissions from Municipal bus fleets, such as the 'ReaVaya' public buses in Johannesburg.

ECO-DISTRICTS FORUM 2018: JOHANNESBURG & CAPE TOWN

EcoDistricts is a US based organization that promotes a collaborative, ecological urban design process that supports climate friendly design of neighborhoods, districts, and settlements from its ecological basin through to all integrated aspects of sustainable city planning. SA-LED has been cultivating a long-standing relationship with EcoDistricts and relevant local stakeholders since April 2017. This collaboration has resulted in multiple learning opportunities for two South African Cities, Johannesburg and Cape Town, as well as their integrated city planning teams.

SA-LED continued to cultivate this valuable knowledge-sharing in September 2018 by hosting an in-depth follow-up incubator to the City of Cape Town incubator held in November 2017. The Program also facilitated continued learning for the City of Johannesburg in 2018. Specifically, SA-LED collaborated with EcoDistricts to hold forums in Johannesburg and Cape Town to train municipal, civic organization, and private sector stakeholders in the EcoDistricts green community design methodology. The in-country forums ensure continuity of SA-LED's technical assistance in support of contextually relevant urban development initiatives that align with South Africa's overarching low-carbon transition goals. Moreover, in-country training provides the opportunity for multiple stakeholders to participate in and co-create climate change responses to spatial planning and development challenges, particularly related to climate change mitigation, collaboration, and resiliency constraints in spatial planning. For example, stakeholders from both cities cited severe planning challenges around social housing and water management. The final report for the forums will be submitted by EcoDistricts in Quarter 1 of FY19, and EcoDistricts will continue to provide technical assistance on green community development Quarter 2 of FY19.

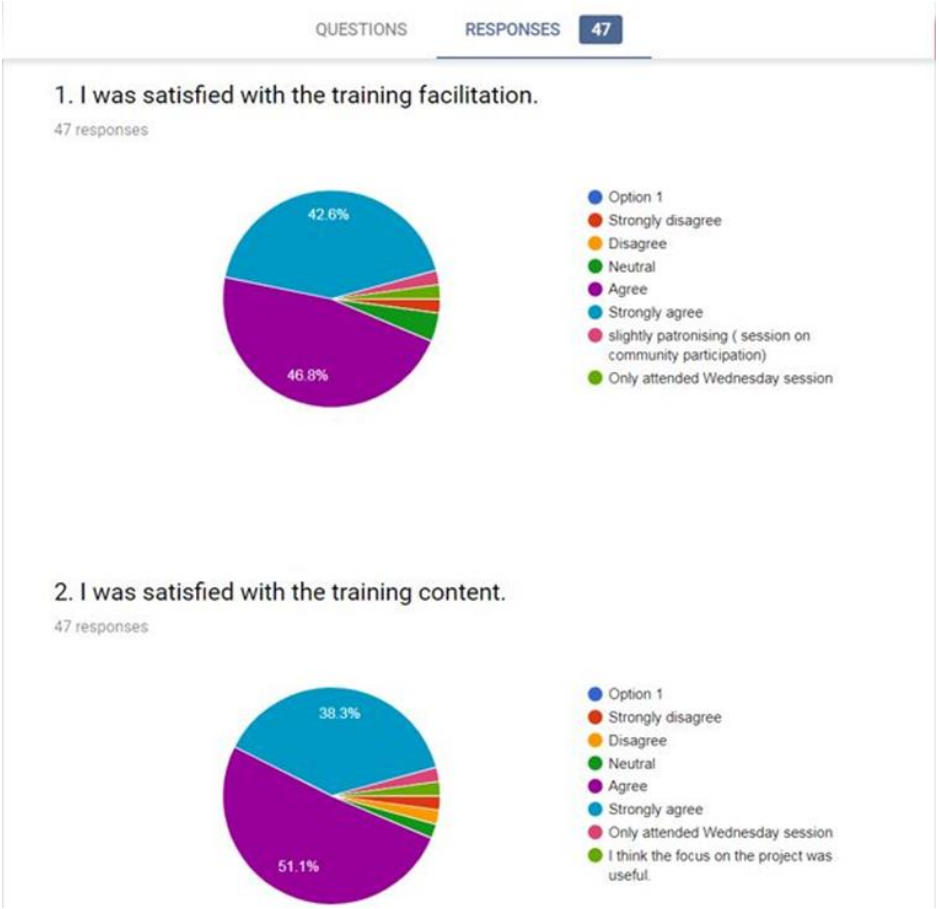


Figure 5. Sample results from the EcoDistricts participant survey.

SANS 10400 XA: ENERGY EFFICIENCY IN NEW BUILDINGS

The National Building Regulation for energy efficiency in buildings was disseminated in 2011. Even with the publication of the regulations, low levels of compliance to the regulation and support for the SANS 10400-XA still persist. SA-LED's interest in these regulations was ignited by the fact that one of the proposed methods to decrease emissions is to increase compliance with energy efficiency regulations and standards for buildings. This speaks directly to the Program's mandate of LED, thus making the SANS 10400-XA a valuable opportunity for the SA-LED Program to employ technical expertise by conducting a training workshop on the regulations for municipal officials. The pilot test training took into account version 1 of the regulation, drafted in August 2011; and version 2 of the regulation, which will be published in late 2018.

Photo 8: Municipal building officers attend the SANS 10400-XA Training.

SA-LED, in partnership with South African Local Government Association (SALGA), City of Tshwane, and the Green Buildings Group, implemented a two-day training workshop to pilot test the revised SANS 10400-XA in March 2018. The workshop was designed to provide a practical methodology for staff within the building control offices and municipalities to understand, adopt, and comply with the performance requirements of the revised SANS 10400-XA – 'Energy Efficiency in New Buildings' regulations. The regulations were tabled to a total of 51 municipal officials and industry partners in the pilot training study. Building control officials from five different municipalities (Ekurhuleni Metro, Emfuleni Municipality, City of Johannesburg, City of Tshwane, and Mogale City) and five industry observer representatives attended the training. The workshop exposed the officials to the regulations and processes. Preparations are currently underway to finalize the revision of the training materials for use in municipalities nationally in FY19.

> "The SANS10400-XA Compliance Workshop is the most practical training that I have ever attended of the SANS 10400 series."
>
> - [redacted] *Ekurhuleni Building Development*

CAMBRIDGE INSTITUTE FOR SUSTAINABILITY LEADERSHIP (CISL)

As part of the Program's goal to increase competencies of municipal officials to implement LED projects, SA-LED funded municipal officials to attend the CISL's Prince of Wales' Business and Sustainability Program. The Institute's capacity development program teaches organizational leaders to manage an increasingly complex range of stakeholders and non-financial business challenges, especially in the sustainability space. There are two levels of training offered which include (1) the senior executive leadership course, and (2) the practitioner course. The objective of the senior executive course is to equip senior executives from the public and private sectors with knowledge and techniques to address key sustainability challenges in a practical manner. The practitioner course enables managers to influence and guide their organizations to take an integrated approach to sustainability across all functions.

SA-LED funded the participation of 10 municipal officials (five senior executives and five middle managers) from three municipalities (!Kheis, Kwadukuza, and Makana) in the two CISL courses, respectively. The senior executive course was held in May 2018 in Cape Town and the practitioner course was in August 2018 in Pretoria. Municipal officials' participation in the training was dictated by their respective municipality's interest to either initiate or continue with LED activities.

> "Thank you very much for the opportunity to attend this extraordinary program which has completely changed how one thinks about sustainable living."
>
> - [redacted] *Kwadukuza Municipality*

THIRD NATIONAL BIOGAS CONFERENCE

SA-LED supported the Third National Biogas Conference in November 2017 where the Program collaborated with the DoE, GIZ-South African-German Energy Programme (SAGEN), and the Southern African Biogas Industry Association (SABIA) in hosting and facilitating the participation of municipal officials at the conference resulting in knowledge sharing among biogas stakeholders on experiences, challenges, and opportunities for the development of a local biogas industry. A total of 150 national and international delegates were invited to attend to the conference.

Photo 9: Delegates at the SABIA Biogas Conference

This conference produced valuable outcomes for SA-LED, including an interest in collaboration and lesson sharing with the U.S. Coalition for Renewable Natural Gas. [redacted] a wastewater expert at City College of New York, has subsequently offered to provide advisory support to municipalities intending to implement combined heat and power (CHP) projects in wastewater treatment plants. Thus far he has provided inputs on the scope of work for the Zeekoegat Wastewater Treatment Works (WWTW) in the City of Tshwane which SA-LED will support in FY19. [redacted] is also currently providing pro-bono review support to eThekwini Water and Sanitation Unit (EWS) on their request for proposal (RFP).

SCHOOLS BIOGAS PROJECT

Photo 10: An inserted biogas system at Takheleni Primary School in Mpumalanga.

South Africa's Department of Education provides a national feeding scheme, known as the National School Nutrition Programme (NSNP). The Programme's overall objective is for schools to provide students from poorer economic backgrounds with meals throughout the school day. The scheme provides nutritious meals to more than nine million learners per day at schools throughout the country. Additionally, the NSNP promotes nutritional knowledge/healthy food choices and establishes food gardens to improve food production knowledge/skills and contribute directly to the feeding scheme.

As part of SA-LED's work to foster LED and introduce alternative energy sources in municipalities, the Program piloted micro-biogas digester systems in three schools (Lamlile Primary School, Mkhulu Combined School, and Takheleni Primary School) in Mpumalanga Province in FY18. The Program's technical assistance aimed to augment the NSNP and included overall project management, the development of system operation and maintenance training materials, and capacity building of school and community representatives to operate and maintain the systems.

The pilots revealed a variety of interconnected, multiple benefits associated with installing and using biogas digester systems. First, the systems provide a renewable source of energy that is produced on school grounds using organic waste from school gardens and the feeding scheme. This saves schools money on energy costs (i.e. electricity or LPG), giving schools a cost-effective means of cooking food for the NSNP. Second, renewable biogas offers the schools a low carbon method of cooking food and related, contributes to reducing emissions by diverting organic waste from landfills. Third, utilizing the organic waste to produce biogas reduces the amount of waste produced thereby reducing the prevalence of vermin on school grounds and associated health problems. Fourth, the biogas slurry (liquid biproduct of the biogas) can be utilized to fertilize school vegetable gardens (another cost-savings). Finally, the systems (inclusive of the vegetable garden, rainwater harvesting system, and the micro-biogas digester itself) offer students and teachers practical knowledge and skills that complements what they learn and teach in the classroom.

Beyond SA-LED's technical assistance to the pilot projects, the Program also conducted a study on the multiple benefits (or co-benefits) of installing biogas digesters in schools. The primary results of this study aligned with the above findings and are presented in Figure 6 below. SA-LED also met with [redacted] from the Department of Basic Education (DBE) in April 2018 to discuss the rationale for integrating biogas systems into schools and to identify possible opportunities for collaboration. [redacted] suggested that SA-LED implement a pilot study that could provide baseline data to demonstrate operational savings over a longer period of time by demonstrating how schools operate and maintain the biogas digesters. With SA-LED's planned technical assistance to the Eastern Cape Province's schools biogas program (in 33 schools), the Program plans to complete the pilot study and share the results with the DBE in FY19.

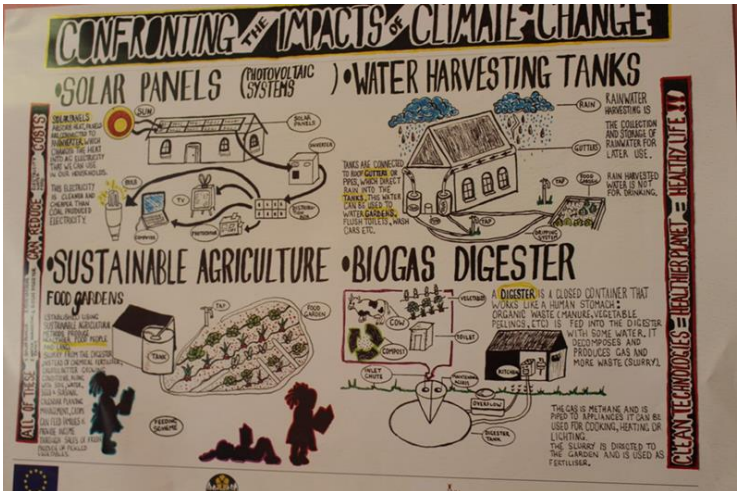


Photo 11: A poster used as a learning tool at Khangezile Primary School, where we have implemented a biogas digester.

Figure 6: Biogas in Schools Co-Benefits

4. ENABLING ENVIRONMENT

SA-LED recognizes that in order to play a catalytic role in scaling the uptake of LED projects in South Africa, considerable work must be conducted across legal, financial, policy, and regulatory boundaries. Numerous government departments, existing networks, donor agencies, development finance institutions, and private industry have done excellent work for many years to attain the same goals. SA-LED works to leverage these existing efforts as frequently as possible. During FY18, several meetings and collaborative efforts were undertaken to continue enhancing the Program's working relationships and supporting the Program's key stakeholders. Highlights include the following:

GOVAN MBEKI MUNICIPALITY (GMM) CLIMATE CHANGE RESPONSE IMPLEMENTATION PLAN

SA-LED provided technical assistance to GMM in the development of a climate change response implementation plan. The implementation plan captures goals and high priority actions identified with regards to climate change mitigation in various municipal consultation workshops facilitated by the Program. The climate change response implementation plan was informed by the Municipality's GHG inventory which identifies the climate change drivers in the municipality. Prior to the development of the climate change response implementation plan, SA-LED worked with the Municipality to develop its municipal-scale GHG inventory aligned to the global reporting standard - the Global Protocol for Community-Scale GHG Emission Inventories (GPC). This makes GMM one of the few South African municipalities with a GPC compliant inventory. The climate change response implementation plan was sent to GMM's Council for approval and adoption. Once endorsed by the Council, the strategy document will be mainstreamed into all municipal planning, processes, and procurements. Additionally, all municipal sector departments would be expected to integrate it into their own plans. Thus, the climate change implementation plan clearly identifies areas for intervention to drive emissions reductions and mitigation measures that are under the control of the municipality and can be easily influenced by municipal actions, policies, and planning.

LEARNING AND KNOWLEDGE SHARING FORUM

SA-LED convened a knowledge sharing and networking forum in July 2018 in Pretoria. The aim of the forum was two-fold: 1) to promote networking and learning among the municipalities that the Program has supported; and 2) learn how useful the work that SA-LED has completed thus far is to the municipalities and how this type of work can be sustained when the Program closes. The forum was well attended with 56 participants from municipalities, national and provincial government, donors, and SA-LED consortium partners and consultants. Participants enjoyed seeing the breadth and extent of the support given by SA-LED to municipalities and appreciated the opportunity to exchange ideas and contact details. The networking was important, and SA-LED was requested to continue to promote these kinds of events to help build an "LED community of practice."

Photos 12 &13 : Municipality officials attend SA-LED's learning and knowledge sharing forum, helping to build a LED community of practice.

THE RURAL SUSTAINABILITY VILLAGES INITIATIVE

The Rural Sustainability Villages Initiative is a DEDEAT program, with the Wildlife and Environment Society of South Africa (WESSA), appointed as the implementing agent. SA-LED engages with this initiative on a project basis, namely on the Program project that supports the roll-out of biogas digesters in schools across the Eastern Cape Province. At this project level, SA-LED's municipal LED expert located in the CHDM has represented SA-LED and the DEDEAT biogas digester program at the regular Initiative status meetings, of which the last one took place in July 2018.

DEDEAT works closely with WESSA in promoting sustainability in rural areas, mainly on alternative forms of energy generation in schools. The main focus of WESSA's work in the Eastern Cape Province is to promote Eco-Schools, which align well with SA-LED's biogas in schools work. The WESSA Rural Villages Eco-Schools Program is a "holistic, participatory approach and a combination of learning and action which makes it an ideal way for schools to embark on a meaningful path for improving the environment in both the school and local community, and to influence the lives of young people, school staff, families, local authorities, and non-governmental organizations. This also benefits the school in terms of whole-school development and improvement[1]."

In attendance at the July 2018 meeting were DEDEAT, WESSA, the CHDM, and GIZ. During this meeting and site visit, the status of the initiative was discussed in detail to align with all parties' goals in the province. WESSA and the CHDM provided feedback on the status of the initiative, the selection of schools, their readiness for implementation of the biogas schools work, as well as identifying the bottlenecks to implementation. The meeting resulted in the submission of a status report to the National Treasury to push for the roll-over of DEDEAT funds from the previous to the current financial year. To compile the report, the working group selected sites for five schools and provided indicative pricing for installation of the digesters. The National Treasury responded positively to the request and it is expected that they will roll-over the money to the current financial year.

SALGA MUNICIPAL MANAGERS FORUM

In February 2018, SALGA hosted a Municipal Managers Forum. SA-LED was invited to exhibit and showcase its work within the LED space across municipalities within the country. The

[1] WESSA and WWF Eco Schools South Africa Handbook http://www.wessa.org.za/uploads/documents/2013_WESSA_Eco-Schools_handbook_CAPS_aligned_v2.pdf on 16 August 2018.

Municipal Managers Forum brings together municipal managers from across the country and has grown into an important platform for local government. The Forum has also become an opportunity for SALGA to obtain feedback from its members and therefore become more effective in their advocacy work. Moreover, this platform is used as an opportunity to learn from the experiences of different municipalities and share their local expertise to ensure that municipal councils are better run institutions set to improve the quality of life in villages, towns, and cities across the country.

COMMUNICATIONS ACTIVITIES

SA-LED's overall communications goal is to promote public and private sector LED technical capacity. More specifically, the Program's communications objectives are as follows:

1) To improve LED awareness
2) To demonstrate SA-LED's expertise
3) To facilitate effective communications between SA-LED and partners
4) To showcase SA-LED's success stories.

In FY18, SA-LED worked to create tangible communications products that describe the quality of technical expertise provided by the Program. Specifically, SA-LED produced technical articles, short videos, posters, and infographics including but not limited to the following:

1) *Blue Karoo Fish Farm Article* which details the methodology of the aquaculture farm.
2) *SANS 10400-XA Training Article* that describes the benefits of the regulations for environmentally friendly buildings.
3) *Benefits of Biogas Systems for Schools Article* that details how the system benefits the Khangezile Primary School located in Gauteng Province.
4) *Buffalo City Industrial Development Zone Carbon Footprint Article and Infographic* that illustrates the City's LED roadmap.
5) *Khangezile Primary School Biogas Video* that depicts the entire value chain of a school that currently utilizes a small-scale biogas digester. The video also highlights how the school has benefitted from utilizing biogas and how the working of the system is a collective effort.
6) *EcoDistricts Methodology Video* targets municipal managers who focus on urban planning and green buildings.
7) *SABIA Biogas Conference Video* captures key highlights and demonstrates the importance of the conference that aims to showcase the work being done in South Africa within the biogas industry.
8) *Polokwane Municipality "Go Green" Energy Efficiency Poster* (see figure 9) provides municipal officials and the public tips on how to save energy.

Figure 7: Polokwane Municipality's "Go Green" Energy Efficiency poster.

An additional three videos on the Blue Karoo Aquaculture project were created in FY18 and will be finalized in FY19.

The focus of the Program's communications activities moving forward will be on developing and standardizing technical products and tools, disseminating the products and tools, and on community of practice events. SA-LED will continue to use multiple approaches to ensure municipalities are aware of the Program and its available services.

5. MULTIPLE BENEFITS FRAMEWORK

In FY18, SA-LED continued using support to LED projects to further develop a "multiple benefits framework." One of the challenges facing LED projects is that they are often criticized for not having the same level of positive social economic impacts as traditional economic development projects. Thus, to understand and quantify the potential benefits of a given LED project for a municipality, local community, and the environment (beyond GHG emission reduction benefits), SA-LED prioritized assessing the multiple benefits of projects receiving technical assistance. Ultimately, the Program envisions that a multiple benefits framework will translate into a decision-support tool that municipalities can apply to maximize the development impact of their LED projects and processes.

Building upon the framework that was finalized in FY16 and the work with ICF International to further contextualize the framework to suit the South African context in FY17, the Program continued to refine the framework in FY18 by completing three case studies (detailed below). As with previous years, the Program prioritized the following multiple benefits for analysis:

1) **Social Impacts**
   - Employment for women and youth
   - Training and empowerment of staff
   - Livelihood enhancement
   - Associated businesses and jobs
2) **Environmental Aspects**
   - Water use
   - GHG and other emissions
   - Waste management
   - Land use change
3) **Social Redress and Community Resilience**
   - Redressing past social and economic injustices
   - Fit within the local municipal development plan

The first multiple benefits case study SA-LED completed was on the City of Ekurhuleni's Rooftop Solar PV project. The Program provided technical support to the Ekurhuleni Metropolitan Municipality (EMM) in Year 2 to develop a Tender for the installation and three-year maintenance of a 1 MW solar PV installation on two selected municipal buildings. This multiple benefits case study was done for a 1 MW solar PV installation completed by the EMM on their Alberton and Springs Civic Centers. An important outcome of this study was its relevance to social redress using a recognized black-owned small, medium, and micro-enterprise company to implement the technical installation of the PV panels. The workers and owners of the private company contracted by the EMM are previously disadvantaged individuals. The company is Level 1 Black Economic Empowerment-certified and more than 60% black worker-owned. This contract conforms with the EMM's policy to give contracted to black-owned companies as a form of economic redress of past apartheid policies.

The second multiple benefits case study the Program completed was on Garden Route District Municipality's Waste Characterization Household Composting project. This case study was completed for one of SA-LED's main waste characterization studies to divert

organic waste from landfill. The Municipality is planning a composting facility inland from Mosselbay (a main harbor and tourist town) that includes a provision for a materials recovery facility, a composting area, and an area for processing construction and demolition waste. SA-LED's technical assistance supported the development of a supportive technology framework to assess suitable LED technologies for the specific waste streams. Alternative technologies for composting include green waste composting, hydrocarbon recycling, and wet organic waste recycling at the regional facility site. An important finding of this study was that from the approximate 6,000 tons of green garden waste per month diverted to the composting facility could double the lifespan of the Municipality's new landfill. It would also reduce GHG emissions by 5.7 million per year and potentially save the Municipality up to R25 million/$1.75 million per year by diverting green waste to the composting facility.

The third multiple benefits case study SA-LED completed was on the Greening the Mohair Value Chain project (see figure 8 below). The case study revealed that the multiple benefits associated with farming of Angora goats for mohair are dispersed and not immediately significant with the small sample of three emerging farmers. However, further benefits are expected throughout the greening of the mohair production value chain once the fiber is sold to the mills and processed into garments. Processing the fiber locally (where the farming is taking place) will increase local social multiple benefits. Even with mohair farming creating few jobs and smaller economic spinoff for small, emerging farmers, it should be noted that once these farmers enter the green value chain the numbers will increase significantly. The jobs created are also in an area characterized by extreme poverty and this case study assessed the multiple benefits in this context. The expected jobs associated with mohair clothing and design in the rest of the value chain are completely dependent on the farmers producing the raw material, thus SA-LED's technical assistance to support the emerging farmers to enter the green mohair value chain. From an emerging farming perspective, the extensive amount of land needed for grazing creates an opportunity to unlock additional multiple benefits for the environment. Improved grazing methods could restore soil health, which in turn increases biodiversity and water production that is collective biological benefit for the region. Important outcomes of this assessment pertain to biodiversity impacts, as well as social redress and municipal integration. The emerging farmers specifically are part of a large-scale attempt to change the demographics of farmers in South Africa from being predominately white men to black men and women farmers. This national program has been beset with problems but these three farmers that formed the basis for this case study are part of the successes and represent some redressing of the past dispossession of farmland using segregation optimized land policy and laws. The farming activity is well placed within the municipal zonation and priorities and they are therefore integrated into the region's development plans.

The DEA has recognized SA-LED's multiple benefits work for its effectiveness in linking development impact to LED interventions, a key goal of the Department. The Program has also enhanced the sustainability of this work by collaborating with the World Resources Institute to assess the comparative trends between the different cases studies. To continue refining the framework, SA-LED plans to complete four additional multiple benefits case studies in FY19, namely on eThekwini's Metropolitan Municipality's inline conduit hydropower project; Cape Nature Trust's integrated cleaner production assessment at Wolwekloof; Enoch Ngijima's waste water treatment system; and one to be determined project.

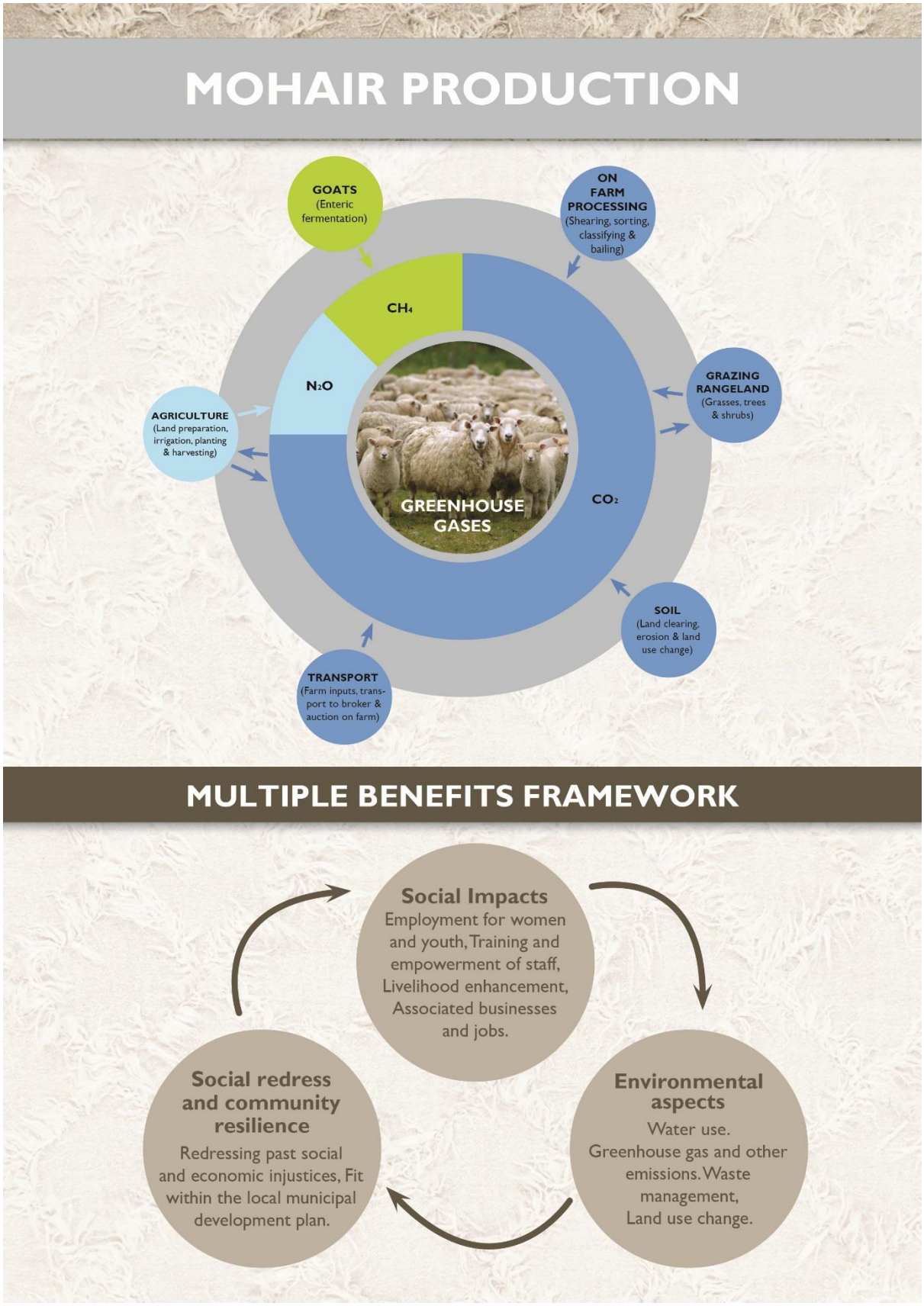


Figure 8 : An illustration of the multiple benefits framework for SA-LED's work on the Green Mohair value chain.

6. IDENTIFICATION OF POTENTIAL LED INITIATIVES FOR TECHNICAL ASSISTANCE

In FY18, SA-LED continued to identify potential LED initiatives according to the Program's Selection Criteria (see Table 1 below) that was developed in FY16. Twelve screening meetings were held during the year where the Program's technical team gathered and based on the Selection Criteria, rated initiatives with a score from 1 to 5 (where 1 is the lowest score and 5 is the highest score). The rating given by the technical team member proposing the initiative is required to justify why it deserves a low or high score and after discussions probing the details of each initiative, consensus is reached regarding whether the initiative is selected for technical assistance. The decision for each initiative is captured in minutes for every screening meeting. In FY18, a total of 27 initiatives were screened and nine were selected for support. Five of these initiatives received support as outlined below and four are still in the initial stages of receiving the Program's technical assistance.

Criteria Description	
Municipal Considerations	
1	Rate the ability of this project to build capacity within our partner municipality
2	Rate the possibility that the project will be implemented in three years
3	Rate the level of in-house political support for the project: Mayor, Municipal Manager (MM), the Member of Mayoral Committee (MMC), the CFO, and/or the Executive Director of the Department (ED)
4	Rate the sustainability of the project supported
5	Rate the ability of the municipality to absorb SA-LED's technical assistance
6	Rate the support needed by the champion to drive the project
7	Rate the track record of the municipality/ department in implementing similar LED projects
8	Rate the priority of the project in the context of the municipality
9	Rate the likelihood that SA-LED assistance will bring a project to financial close, RFP award and/or continuation in operations and maintenance budget line
Finance	
10	Rate the ability of the municipality to finance the entire project
11	If an alternative approach to financing the project is being considered (PPP, PPA, EPC) rate the likelihood the CFO and MM would support that approach
12	Rate the likelihood of securing a grant (NT, EEDSM, provincial, donor) for the project, that the project will attract other DFI finance, or lever private sector finance
13	Rate the likelihood that the project will accelerate private sector investment in the technology or sector and therefore stimulate green jobs
14	If the project is dependent upon private sector financing, rate the likelihood that a commercial bank would provide a loan to a developer of this technology
Environmental, Economic Development, Youth & Gender Multiple Benefits	
15	Rate the size of the project in MW's
16	Rate the size of the project in GHG emission reductions

17	Rate the project in terms of job creation opportunities (temporary and permanent)
18	Rate the opportunity to meet gender and youth objectives
19	Rate the environmental benefits associated with implementation of the project
SA-LED internal decisions	
20	Rate the size of the budget associated with supporting this project
Leveraging partners	
21	Are other parties bringing resources to support this project
Technology Development	
22	Will the project pilot anything important to further up-scaling of the technology in the market
23	Will the project provide data critical to decision-makers to inform pro LED policy development

Table 1: SA-LED's new initiative selection criteria.

These initiatives were then further fleshed out during follow-up meetings with the institutions to be supported. The aim of these meetings was to: (i) gain insight into the development context of the institution; (ii) unpack development issues in terms of service delivery; (iii) analyze to what extent an LED solution would address the development issues; and (iv) prioritize and phase-out the different initiatives offered by the institution. SA-LED is also actively pursuing further LED initiatives to develop a robust pipeline of initiatives to support. SA-LED provided project development support, and in some cases the first phases of planned technical assistance to the five initiatives described below. Results from the Program's support to these initiatives will be reported in Years 4 and 5.

GOVAN MBEKI MUNICIPALITY INTEGRATED TRANSPORT PLANNING

Following the support given to the GMM in developing their Climate Change Strategy and Action Plan, the Municipality's Spatial Planning team approached SA-LED for assistance in the development of their Integrated Transport Plan (ITP). The Program's support to the Municipality in the development of the ITP will take two primary forms in FY19. The first form will be through providing technical assistance to strengthen stakeholder relations and to develop the Municipality's Transport Forum. The second form is through the facilitation of a learning exchange for GMM officials to learn from the George Municipality's (and the Western Cape Government's) experience developing the "Go George" public transport project and apply lessons learned to the development of their own ITP. The learning exchange will provide GMM officials the opportunity to learn how ITP systems compare to standalone projects and review modes with low carbon intensity that can be used in corridors requiring mass transport.

GEORGE MUNICIPALITY SOLAR YIELD ANALYSIS AND WWTW ENERGY EFFICIENCY AUDIT

Following the Green Energy Summit of April 2018, the George Local Municipality intensified their commitment toward zero carbon emissions and approached SA-LED for support in realizing their goals. In FY19, the Program will continue to provide support to the Municipality on supporting the energy audit on the WWTW buildings; the development of a Business Plan for EEDSM funding; and the solar PV optimization on municipal buildings project.

HESSEQUA LOCAL MUNICIPALITY SOLID WASTE MANAGEMENT

The Green Energy Summit held at the Garden Route District Municipality in April acted as a catalyst for renewable energy and energy efficiency projects in the District. After attending the Summit, the Hessequa Local Municipality requested SA-LED's support in June 2018 based on the strength of the Program's work with the District Municipality. The type of technical assistance SA-LED will provide in FY19 includes a feasibility study of solar PV on municipal buildings; supporting the municipality on the solar PV optimization and energy on WWTW; and the contextualization of existing organic waste management.

OR TAMBO DISTRICT MUNICIPALITY SOLID WASTE MANAGEMENT

The OR Tambo District Municipality was introduced to SA-LED by DEDEAT and engaged the Program on support for the development of their integrated waste management plan and energy efficiency. SA-LED will provide technical assistance to the Municipality's Project Steering Committee related to the development of an Integrated Waste Management Plan and the training of municipal officials on the USAID's CLEER Tool (focusing on calculations and examples of how to manage and measure energy usage in the municipality).

ETHEKWINI PHOENIX WWTW ENERGY AUDITS AND OTTAWA ROAD DEPOT SOLAR YIELD ASSESSMENTS

With water and wastewater infrastructure among the highest consumers of energy within municipal operations and service delivery (for example, wastewater treatment uses more energy than all other components in the water management process combined) the EWS intends to install solar PV panels on its Ottawa Road Depot and have the power transferred to run the department's Phoenix WWTW. EWS also intends to implement aggressive energy efficiency interventions at the WWTW to ensure low power demand at the plant. To move these projects forward, EWS requested SA-LED's technical assistance in completing a feasibility assessment for the installation of rooftop solar PV panels on the plant and depot and conducting an energy audit of the WWTW to inform the retrofits. In Quarter 1 of FY19, the Program will contract a structural engineering company to conduct building roof strength integrity assessments at the plant and depot and complete the solar feasibility report. The energy audit will also be completed in Quarter 1 of FY19.

7. CHALLENGES, CONSTRAINTS, AND LESSONS LEARNED

While SA-LED achieved significant results in FY18, the Program was presented with a variety of challenges and constraints in providing technical assistance to municipalities. The following represent key challenges and constraints experienced by SA-LED as well as lessons learned that the Program used to adapt programming in FY18 or will apply moving forward.

South Africa's political landscape across various municipalities (more specifically service delivery protests) coupled with municipal budget constraints impacted LED projects and outputs. These impacts resulted in visible LED project timeframe delays and reprioritization or cancellation of planned activities by municipalities. Moving forward, SA-LED will consider and plan for the unpredictable environment of local government as realistically as possible when prioritizing technical assistance. For example, in the event of timeframe delays or reprioritization, the Program will provide the municipality with a roadmap of how to move a specific LED initiative forward.

SA-LED's technical assistance was also impacted by increased risk factors in the finance sector and the lack of risk appetite from potential investors within the green energy space. More specifically by market challenges including but not limited to: (i) poor financial states (balance sheets) of municipalities; (ii) uncertainty of off-takers' creditworthiness; (iii) lack of technical assistance to assess procurement, transaction, and other legal expertise related to LED deals (e.g. securing off-take agreements); (iv) uncertain regulatory environment; (v) and long lead times to reach financial close both on the project preparation side, as well as in closing deals. Thus, to increase investment in LED, SA-LED developed its draft finance strategy in FY18 to focus on supporting municipalities to prepare financially feasible projects and to match these projects with potential LED finance. The Program aims to finalize the finance strategy in Quarter 1 of FY19.

In relation to SA-LED's capacity development work, the Program experienced challenges in measuring the impact of trainings. This challenge was illustrated following the EcoDistricts Forum where a limited number of training questionnaires were returned. Moving forward, SA-LED will integrate M&E into all training agendas to ensure participants recognize the importance of evaluating the trainings and have ample time to complete questionnaires. In FY19, the Program will also be evaluating means of measuring the impact of trainings on the departments/institutions training participants represent.

Finally, to help ensure the sustainability of SA-LED's technical assistance, the Program learned that the development of practical tools, communication products, case studies, and training for municipal partners is critical. In FY18, SA-LED began compiling a comprehensive list of these products that will be developed in FY19 and handed-over to relevant partners by May 2020.

ANNEX A. DEFINITIONS

DISTRICT MUNICIPALITY: There are 47 Category C or District Municipalities which are made up of several local municipalities that fall under one district (between three to six local municipalities form a district council). The District Municipality coordinates development and service delivery in the entire district.

LOCAL MUNICIPALITY: There are 231 Category B or Local Municipalities which share responsibility for service delivery with District Municipalities.

METROPOLITAN MUNICIPALITY: There are 8 Category A or Metropolitan Municipalities representing the largest cities. These municipalities have a population of 500,000 and above.

MRV: The implementation of climate change mitigation actions in a "measurable, reportable and verifiable" manner.

SALGA: South African Local Government Association is an autonomous association of 278 municipalities with its mandate derived from the Constitution of the Republic of South Africa. This mandate defines SALGA as the voice and sole representative of local government. SALGA interfaces with parliament, the National Council of Provinces, cabinet, as well as provincial legislatures.

ANNEX B. INDICATORS AND MILESTONES

The table below provides a summary of progress towards the achievement of SA-LED's targets for FY 2018 and over the life of the Program. Progress on activities as laid out in the SA-LED's FY 2018 work plan is also described in the table. The table is structured to illustrate how work plan activities contribute towards the achievement of the SA-LED's indicators.

Level of Results	Result Statements	Indicators	LOP Targets	FY16 Results	FY17 Results	FY18 Targets	Progress FY18 Q4	Annual Performance Achieved to Date (in %)	Comments
Ultimate Outcome	**Reduced greenhouse gas emissions through implementation of SA-LED initiatives**								
Intermediate Outcome 1: Increased investment in LED									
KRA: Innovative LED projects identified, supported, and facilitated		Number of LED projects provided with technical assistance	20	6	5	**4**	2	275%	SA-LED provided technical assistance to a total of 4 projects in this quarter: **2 new projects:** i) George WWTW, and ii) George Solar PV. **2 existing projects:** i) !Kheis Micro-hydro, ii) eThekwini Solar PV.
KRA: Reduced emissions potential in strategic sectors demonstrated		Projected quantity of GHG emissions in metric tons of CO2e, reduced or avoided by 2030	100,000 tons	0	70,942 tons	**10,000 tons**	418,229	4382%	SA-LED has surpassed its annual and LOP targets. In FY 2018, the Program strategically identified projects that offered high GHG impact. Reported emissions come from: i) Biogas to Renewable Natural Gas in eThekwini Metro Municipality, ii) !Kheis Mini-hydropower; and iii) Mbombela Rooftop Solar.
		MW of clean energy generation capacity supported by SA-LED assistance[2]	10MW	0	2.96 MW	**4MW**	0.59 *(Hydro 0.04, Solar 0.55)*	0.15%	MW reported were generated by the following projects: !Kheis Micro-hydro and Mbombela Rooftop Solar
Immediate Outcome 1.1: Improved project preparation									
Activity	Results Statement	Comment of Progress							

[2] This is a LED project, with energy being one of the aspects in which we work. As such, SA-LED will contribute to Power Africa goals and share monitoring and reporting data from our energy projects with Power Africa. The annual targets for this indicator are not true "targets" we hope to meet necessarily but this is rather a "monitoring indicator" to make sure we can report on any clean energy generation projects SA-LED ends up supporting.

Level of Results	Result Statements	Indicators	LOP Targets	FY16 Results	FY17 Results	FY18 Targets	Progress FY18 Q4	Annual Performance Achieved to Date (in %)	Comments
Ultimate Outcome	**Reduced greenhouse gas emissions through implementation of SA-LED initiatives**								
Activity 1.1.1	Provide technical assistance to projects to strengthen LED development	In Quarter 4, SA-LED provided technical assistance to the following four projects: i) eThekwini solar PV on reservoirs; ii) !Kheis Municipality Micro hydro and water engineering support; iii) George Solar PV and WWTW.							
Activity 1.1.2	Evaluate potential projects via screening criteria	No projects were screened during this quarter.							
Activity 1.1.3	Development of a robust pipeline of LED projects	SA-LED is focusing on providing technical assistance to a consolidated pipeline of projects which will have the most impact and which technical assistance can be completed by Quarter 1 of FY 2019.							
Activity 1.1.4	Analyze the current selection criteria and develop additional criteria to pursue strategic technologies	Activity is completed in Quarter 2.							
Activity 1.1. 5	Develop business case studies of specific LED technologies	ICF International completed a business case study on the Durban Solid Waste landfill biogas for vehicular use project but its review is not yet finalized due to outstanding vehicle fleet specifications.							
KRA: Resources from Development Finance Institutions (DFIs), Public Sector Finance funds (such as the SA Green Fund), and Private Sector Finance mobilized or Leveraged		Value of funds in USD mobilized or leveraged to support LED projects	US$206M	US$200M	US$ 201,356,145	**US$ 2M**	3,244.897	164%	The amount reported is a combination of the following: i) Energy audit work that SA-LED completed for Polokwane, Dihlabeng, and Nketoana municipalities for 2018/19 EEDSM grant applications; ii) 2017/18 EEDSM project management support provided by SA-LED's embedded EEDSM Coordinator in Polokwane; iii) European Union – National Treasury waste to biogas projects support in the Eastern Cape Province.
Immediate Outcome 1.2: Increased financial support to LED projects									
Activity	Result Statements	Comments of Progress							

Level of Results	Result Statements	Indicators	LOP Targets	FY16 Results	FY17 Results	FY18 Targets	Progress FY18 Q4	Annual Performance Achieved to Date (in %)	Comments
Ultimate Outcome	**Reduced greenhouse gas emissions through implementation of SA-LED initiatives**								
Activity 1.2.1	Support co-benefit analyses in support of municipal decision making in the allocation of budget to LED technologies	In Quarter 4, SA-LED completed the following three multiple-benefits case studies: i) Mohair Supply Chain Greening; ii) Ekurhuleni Solar PV; iii) Eden District Municipality Waste. Analysis of Eden District Municipality Waste was broken down into Composting and the Abattoir Waste and the latter will be finalized in Quarter 1 of FY 2019.							
Activity 1.2.2	Share information on the revenue implications of small scale embedded generation models	In Quarter 4, SA-LED co-hosted a small-scale embedded generation (SSEG) training for municipal electricity officials in collaboration with GIZ-SAGEN Program, SALGA, and Sustainable Energy Africa (SEA). A total of 54 municipal officials from Western Cape were trained.							
Activity 1.2.3	Continue to work with the GBCSA finance working group to accelerate private sector investment in green buildings	Decision has been made to include this work in SA-LED's general finance strategy.							
Activity 1.2.4	Provide financial advisory support to projects to increase uptake of the guarantee facility	In FY 2018, SA-LED decided to formalize its financial work into a finance strategy that was developed in Quarter 2. The finance strategy will be finalized and operationalized in Quarter 1 of FY 2019.							
Activity 1.2.5	Collaborate with DFIs, grant agencies, and government finance streams to access funding	This activity was achieved through the workshop that was conducted for key financial stakeholders in Pretoria Quarter 2.							
KRA: Capacities of the Public and Private Sectors to Identify, Develop, and Fund LED Projects in Strategic Sectors Strengthened		Number of institutions with improved capacity to address LED issues	20	0	2	**7**	1	28%	City of Ekurhuleni's capacity was improved as a result of gaining access to CSIR Low Cost of Electricity Model obtained through SA-LED training in FY17. The City used the model to evaluate their RFP for design, supply and installation of a 2MW Rooftop Solar PV plant on the City's buildings.

Level of Results	Result Statements	Indicators	LOP Targets	FY16 Results	FY17 Results	FY18 Targets	Progress FY18 Q4	Annual Performance Achieved to Date (in %)	Comments
Ultimate Outcome	**Reduced greenhouse gas emissions through implementation of SA-LED initiatives**								
KRA: Public planning for LED improved		Number of laws, policies, regulations, or standards addressing LED formally proposed, adopted or implemented as supported by SA-LED assistance	10	0	1	**4**	0	125%	No strategy was approved in Quarter 4. However, the GMM Climate Change Response Implementation Plan was submitted to Council for approval and the Polokwane Green Goal Energy Strategy will be submitted to Council for approval in Quarter 1 of FY 2019.
Immediate Outcome 2.1: Mainstream LED into programming, planning and budgeting of municipal services									
Activity	Result Statements	Comments of Progress							
Activity 2.1.1	Provide technical assistance to municipalities to mainstream LED into programming, planning and budgeting	In Quarter 4, SA-LED provided technical assistance to the following three municipalities: i) eThekwini Metro Municipality (continuing support with solar PV on reservoirs); ii) !Kheis Local Municipality (support for its Micro hydro project); iii) George Local Municipality (on its WWTW and solar PV).							
Activity 2.1.2	Implement SA-LED overarching capacity building plan	SA-LED continued to collaborate with other existing initiatives including: i) CISL which resulted in five municipal officials being trained in the Practitioner course; ii) Urban Energy Network with three SA-LED staff attending the workshop; iii) GIZ-SAGEN Program, SALGA, and SEA resulting in 54 municipal officials from Western Cape attending the training; and iv) EcoDistricts training for City of Johannesburg resulting in the training of 58 individuals.							
Activity 2.1.3	Conduct institutional capacity assessments of municipalities working with SA-LED and develop institutional strengthening plans	No institutional capacity assessments were conducted in Quarter 4. The scheduled re-assessments for Polokwane, Govan Mbeki, and Chris Hani municipalities have been rescheduled for FY 2019 to give municipalities more time to implement interventions from the baseline assessments. SA-LED will finalize a list of new institutions to target for baseline assessments per the Program's Year 4-5 work plan objectives. The Program is also looking into the possibility of conducting institutional assessments for Eastern Cape schools to take part in the biogas project.							

Level of Results	Result Statements	Indicators	LOP Targets	FY16 Results	FY17 Results	FY18 Targets	Progress FY18 Q4	Annual Performance Achieved to Date (in %)	Comments
Ultimate Outcome	**Reduced greenhouse gas emissions through implementation of SA-LED initiatives**								
Activity 2.1.4	Implement institutional strengthening plans for above mentioned assessed municipalities	SA-LED continued to support assessed municipalities (Polokwane, Govan Mbeki, and Chris Hani) to implement their capacity strengthening plans.							
KRA: Technical skills and strategic knowledge within relevant national, provincial or municipal government entities developed		Number of people trained in LED	130	33	117	**31**	194 *(106 Male, 88 Female)*	1325%	SA-LED conducted 3 trainings in Quarter 4: i) EcoDistricts in City of Johannesburg; ii) CISL; and iii) SSEG. Also, reported in this quarter is the City of Cape Town EcoDistricts training that took place in Quarter 1.
		Number of individuals receiving USAID SA-LED training who apply the new knowledge and skills	92	0	3	**37**	38 (*16 Male*, 22 *Female*)	178%	Reported individuals are those who applied the skills and knowledge acquired from the Cities of Cape Town and Johannesburg EcoDistricts trainings.
Immediate Outcome 2.2: Increased municipal capacity for project assessment, design and development									
Activity 2.2.1	Provide capacity building support to individuals to strengthen LED capacity	In Quarter 4, SA-LED facilitated three trainings: i) Ecodistricts in Johannesburg and facilitated application of skills for Cape Town participants who got trained in Quarter 1; ii) CISL Practitioner course; and iii) Co-hosted SSEG for municipal electricity officials with GIZ-SAGEN Program, SALGA, and SEA.							
Activity 2.2.2	Support training opportunities for implementation of LED technologies	SA-LED supported the training of municipal electricity officials on SSEG by collaborating with GIZ-SAGEN Program, SALGA, and SEA.							
Activity 2.2.3	Conduct study tours	No study tour took place during this quarter. The Australian study tour which was planned for Quarter 4 was cancelled as SA-LED will conduct a domestic learning exchange between George and Govan Mbeki municipalities in FY 2019.							
KRA: Key stakeholder knowledge and awareness of LED technologies		Number of communication	50	2	10	**20**	0	35%	SA-LED developed three products on Blue Karoo Aquaculture project: i) Karoo Catch Marketing Video

Level of Results	Result Statements	Indicators	LOP Targets	FY16 Results	FY17 Results	FY18 Targets	Progress FY18 Q4	Annual Performance Achieved to Date (in %)	Comments
Ultimate Outcome	**Reduced greenhouse gas emissions through implementation of SA-LED initiatives**								
and implementation strategies improved		products produced by SA-LED							for promotional and marketing purposes; ii) SA-LED Marketing Video; and iii) How to create an aquaculture farm Video. The Program is in the process of finalizing the videos for release in FY 2019.
KRA: Technical products to facilitate GoSA development and management of LED developed		Number of technical products developed to facilitate GoSA development and management of LED	8	1	2	**2**	1	50%	Municipal Fleet Costs and Environmental Impacts Calculator for municipal use. The Calculator is accompanied by the User Guide to describe how it works. A communication product will be developed from the User Guide.
Immediate Outcome 2.3: Strengthened municipal LED knowledge base									
Activity 2.3.1	Develop and disseminate information on LED technologies and implementation strategies	ICF International has completed developing the Municipal Fleet Costs and Environmental Impacts Calculator, which related to the Life Cycle Assessment -Life Cycle Cost study completed for Durban Solid Waste. The calculator provides municipalities with a tool for estimating and comparing the costs and environmental impacts of fossil fuel and alternative fuel bus fleets.							
Activity 2.3.2	Document best practices on different LED implementation approaches	Best practices focusing on what works or has worked in the past as well as the potential obstacles and barriers to watch out for in the implementation of LED projects will be completed in FY 2019 and FY 2020.							
KRA: Knowledge and awareness of the relationship between economic, gender, and youth implications of low emissions development increased		Number of projects supported by SA-LED that have co-benefits	10	0	2	**4**	3	75%	SA-LED finalized the following three multiple-benefits analyses: i) Mohair Supply Chain Greening; ii) Ekurhuleni Solar PV; and iii) Eden District Municipality Waste. Analyses reports will be submitted to USAID for further approval in Quarter 1 of FY 2019.
Immediate Outcome 2.4: Increased LED credibility as a pathway to local economic development, including gender and youth									
Activity 2.4.1	Integrate youth and women into SA-LED projects and activities	SA-LED contracted an intern for six months to stand in for Polokwane EEDSM Coordinator while she was on maternity leave. He is one of the 20 TVET College students who completed a basic energy audit course and supported the completion of energy audits for select Polokwane Municipality buildings.							

Level of Results	Result Statements	Indicators	LOP Targets	FY16 Results	FY17 Results	FY18 Targets	Progress FY18 Q4	Annual Performance Achieved to Date (in %)	Comments
Ultimate Outcome	**Reduced greenhouse gas emissions through implementation of SA-LED initiatives**								
Activity 2.4.2	Capture learnings on co-benefits from projects supported	SA-LED completed the following three co-benefits analyses: i) Mohair Supply Chain Greening; ii) Ekurhuleni Solar PV; and iii) Eden District Municipality Waste. These three analyses along with the Biogas Schools and Fish Farm Aquaculture analyses completed previously will undergo a comparative analysis to capture trends and lessons learned.							
Activity 2.4.3	Roll out learnings from co-benefits to various SA-LED stakeholders	The co-benefits work to be carried out in activity 2.4.2 above will be rolled out as lessons learnt in the remaining program years. The lessons learnt will be integrated into United Nations International Climate Action Transparency (ICAT) processes and will further be developed into case studies.							
KRA: GoSA skills to monitor, report, and communicate on GHG emissions improved		Number of people capacitated in GHG MRV	130[3]	0	38	**31**	0	170%	No training took place in this quarter.
Immediate Outcome 3.1: Improved skills to monitor, report and communicate GHG emissions at sub national and project level									
Activity 3.1.1	Provide training on different GHG accounting practices	The three DEA officials are continuing with an online Diploma course by GHG Management Institute. SA-LED will continue with the follow ups in FY 2019 to help learners complete the courses they registered for.							
Activity 3.1.2	Support the development of DEA's M&E sectoral guidelines	ICF International finalized the guidelines and they were submitted to DEA in Quarter 4. DEA is currently working on Terms of Reference for printing the guidelines.							

[3] This is a general training target to which training in GHG MRV contributes.

ANNEX C. INITIATIVES SUPPORTED

Project Name	Project Partner(s)	Project Description	Progress
Eden District Waste Mapping	Western Cape	Waste characterization study for six organic waste streams in the Eden Municipal District were conducted. This work was done in response to a request from the Municipality for assistance understanding waste flows to make informed decisions. The Municipality (with rich organic waste streams) is inundated with proposals to help manage their waste, but they did possess up-to-date information on the waste. The work conducted includes a technology framework that will be included in the modelling of a decision-making support network.	Supported
Blue Karoo Trust Wastewater Repair System Design	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism, Aquaculture Innovations	Technical assistance requested to assess the feasibility of fish waste as potential biogas. The feasibility study assessed the fish waste for potential use as a feedstock for biogas, and recommendations were made for application and scale-up. The work will further support the project to comply with waste regulations and alleviate the need to use grid power to heat the water. The pilot Waste Water Repair System and Anaerobic Digester Systems were installed and commissioned. Data is being collected to inform the design of a repair system for a full-scale commercial fish farm. SA-LED created a marketing video to showcase the success of Blue Karoo fish farm business model which other companies around the country could replicate. The video promotes SA-LED's goals in job creation and incorporation of women and youth into business models by promoting the farm's successful model.	Continued support from FY17
Hessequa Local Municipality	Energy Efficiency and Solar PV	On June 14, 2018, SA-LED had a meeting with Hessequa Local Municipality officials. The municipality presented a list of projects with which they wanted support. At a technical team meeting held on June 25, 2018, it was agreed that SA-LED would support optimization of their existing PV plant, solar yield analysis, and energy audits of municipal buildings, and energy audits of WWTW.	Supported

Witzenberg Local Municipality	Waste Management	Through SA-LED's work with Eden District Municipality, officials from Witzenberg Local Municipality approached SA-LED for assistance with its waste management in the municipality. The current municipal landfill services five towns (Tulbagh, Prince Alfred, Hamlet, Op die Berg, Woolseley, and Ceres). The municipality has budgeted for an additional landfill but they would first like to mitigate the problems with the first landfill. SA-LED will conduct a waste characterization study for the municipality in order to identify the waste streams and how to divert waste from the landfill.	Supported
Energy Audits at Chris Hani District Municipality Waste Water Treatment Works	Chris Hani District Municipality	The waste water treatment works in the Chris Hani District municipality are not currently functioning efficiently and the municipality has approached SA-LED for assistance with identifying the operational challenges and solutions to overcome them. SA-LED plans to conduct an energy audit of the WWTW.	Supported
Ekurhuleni Metropolitan Municipality 2 MW Rooftop PV RFP	Ekurhuleni Metropolitan Municipality	Provided support to the municipality to develop and adjudicate an RFP for a rooftop PV project.	Continued support from FY17
eThekwini Solar PV on Reservoirs	eThekwini Metropolitan Municipality	SA-LED conducted solar yield assessments on 440 sites identified by eThekwini Water & Sanitation Department for solar PV installations. eThekwini has selected their eight preferred sites for further economic and financial assessments.	Supported
eThekwini Conduit Hydropower Project	eThekwini Metropolitan Municipality	SA-LED commenced the provision of transaction advisory support to eThekwini Water & Sanitation's proposed PPP inline conduit hydropower projects on the yet to be commissioned Western Aqueduct and the Northern Aqueduct. A pre-feasibility study was developed based on drawings for the hydropower sites to inform the TOR for the Technical Options Analysis as per the National Treasury's PPP for the Western Aqueduct.	Supported
Thabo Mofutsanyana District Municipality	Municipality Facilities EEDSM Audits	Energy audits for the local municipalities has been conducted in efforts to enable them to submit applications for funding under DoE's EEDSM for the 2018/19 financial year.	Supported
Govan Mbeki Municipality High Mast Lighting EEDSM Energy Audits	Govan Mbeki Local Municipality	SA-LED conducted energy audits on high mast lighting within the Municipality in efforts to enable the Municipality to complete the DoE EEDSM application templates for financial support.	Supported

Cacadu Development Agency Mohair Supply Chain Greening	Cacadu Development Agency	The CDA requested SA-LED's technical assistance for their work in Blue Crane Route and Makana Municipalities. SA-LED will support the CDA to facilitate certification of greening the mohair value chain for South Africa. Research was conducted on the green mohair value chain as a comparison to other standards in south Africa (wool and cotton) and developed a green mohair standard. SA-LED further contributed to the development of an online information platform, to assist farmers with essential farming information and help them adopt the green standard.	Supported

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