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Low Emissions Development Program

CASE STUDY

Lessons from Supporting Municipalities in Accessing Grant Funding from the DMRE's Energy Efficiency Demand Side Management Program

BACKGROUND

Launched in 2015, the USAID South Africa Low Emissions Development (SA-LED) program has provided assistance to the government of South Africa to support its transitioning to a green, low carbon economy. The program has worked to strengthen the capacity of the public sector to plan, finance, implement, and report on low emissions development (LED) projects and to accelerate the adoption of low emissions technologies.

One aspect of the SA-LED program was to provide technical assistance to various municipalities on applying for grant funding from the Department of Mineral Resources and Energy (DMRE) – formerly the Department of Energy (DoE) Municipal Energy Efficiency Demand Side Management (EEDSM) program[1]. The EEDSM is a conditional grant[2] from the national fiscus allocated as such by the National Treasury through the Division of Revenue Act (DORA).

The EEDSM program supports municipalities in their efforts to reduce electricity consumption by increasing energy efficiencies in the following energy-consuming areas:

- Energy efficient traffic lighting
- Energy efficient street lighting and new light-emitting diode (LED) lights on high masts
- Energy efficient building lighting, and heating, ventilation and air conditioning (HVAC)
- Energy efficient water infrastructure (e.g. potable water pumps)
- Energy efficient wastewater treatment

All applicants of EEDSM DORA funding are required to follow a prescribed step-by-step process that includes conducting an energy audit to establish both the pre- and post-implementation baselines as well as develop a detailed business plan to define the payback period as well as a measurement and verification (M&V) template for the purposes of independent M&V.

[1] https://www.savingenergy.org.za/municipal-eedsm/

[2] Conditional grants are designated for a specific purpose and may not be used for another project, while unconditional grants may be used for any purpose the recipient local government sees fit. Meaning the EEDSM is only for energy efficiency retrofits in municipal infrastructure.

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The goal of this case study is to share the lessons learned from SA-LED's technical assistance to South African municipalities in conducting baseline energy consumption audits required for EEDSM DORA funding. The recommendations provided in this case study are designed to assist municipalities and the DMRE to streamline this process.

APPROACH: SA-LED'S SUPPORT

The SA-LED Program signed memoranda of understanding (MoUs) with municipalities to provide different forms of technical assistance and capacity building support in helping them to conduct baseline energy consumption audits on identified municipal buildings and facilities, a key part of the EEDSM application process.

This technical assistance was provided to the following local municipalities:

- Polokwane
- Govan Mbeki
- George
- Hessequa
- Dihlabeng
- Nketoana

In one case, SA-LED engaged college students from a local technical vocational education and training college to conduct energy audits of buildings (see "Case Study: Auditing for Energy Efficiency: Students Conduct Energy Audits in Polokwane linked here).

One of four types of posters SA-LED helped the municipality to develop.

BUILDING CAPACITY OF MUNICIPALITIES THROUGH AWARENESS RAISING

Opportunities for energy savings exist within municipalities. Many of these relate to improved energy efficiency behavior and awareness of energy usage and consumption. In general, there appears to be no ownership of how energy is managed. However, municipal personnel that were involved in the audits developed insight into energy savings objectives.

Energy awareness campaigns are required for an EEDSM grant. As a recommendation, formal energy awareness campaigns and training of municipal staff could have a major impact. As part of raising energy efficiency awareness, with SA-LED's support, in 2018/19 Polokwane developed and printed 300 posters, 300 flyers, and five banners. The banners are used at all municipal events as a constant reminder of how to save energy.

LESSONS LEARNED AND RECOMMENDATIONS

Through its support to the municipalities listed above, the SA-LED team gained insight into municipal capacity to apply for EEDSM funding as well as the areas where they most needed support. Through this support, SA-LED has compiled the following lessons learned and subsequent recommendations.

INTERNAL TARIFF OPTIMISATION

In several municipalities there was no evidence of any internal tariff optimisation. Many were on the incorrect tariffs and in most municipalities, it was found that there is a significant amount of financial waste due to utility overspend to Eskom.

This is largely due to the disconnect as to whom is responsible for paying utility bills and secondly that the financial divisions appear more inclined to just settle accounts rather than check to see whether they are correct or applicable. The engineering or operational divisions appear to be isolated from the billing or operational expenses and is largely attributed to dysfunctional interdepartmental communication.

Recommendation: A key step is supply and demand side energy and costs optimisation to identify low hanging fruit. It is such low hanging fruit that should be targeted for any EEDSM retrofit supported by policies which ensure that such savings are re-invested in further energy savings project.

TECHNICAL SUPPORT TO MAINTENANCE PERSONNEL

Technical support to maintenance personnel to help them understand the principles of energy management was well received. The SA-LED audit teams also offered technical support in other areas of energy consumption, not related to the audit, such as references for technical specifications of equipment and suppliers of equipment. In general, this should not be the case.

Recommendation: Municipalities should allow themselves enough time to issue requests for proposals and quotations for suppliers of equipment, as municipal procurement processes can often prove lengthy.

There also appears to be a tendency for municipalities to neglect basic maintenance of electrical equipment when they have a potential project to replace equipment using EEDSM.

Recommendation: The DMRE should modify the EEDSM templates and requirements in order to limit the possibility of replacing equipment that has not been maintained properly.

COLLECTION AND COMPILATION OF TECHNICAL SPECIFICATIONS

Municipalities lacked the capacity to prepare and plan audits. While SA-LED was able to provide support, there was limited time to prepare, plan, and carry out the audits to meet DRME timelines. Further challenges included municipality building lists not being completed and provided to audit teams before the site work, and managers of buildings not being informed of visits in a timely manner. In some cases, the municipal lead for the project decided which buildings needed audits on an ad hoc basis, while a detailed baseline requires that all buildings are identified.

A certain minimum amount of information should therefore be provided before the commencement of site work by auditors, such as:

- Full lists of all buildings and services, including floor plans (where available)
- Tariff structures and energy bills (a minimum of 12 months for baseline development)
- Contact person and details at each location
- Basic listing of equipment at each location

In the absence of historical energy consumption billing energy data, auditors simply estimate energy consumption from the design energy characteristics of the equipment or appliance (information is available on each equipment's nameplate). Using this information and estimating usage patterns of the appliances in a day/month/year allows one to estimate its annual energy consumption and costs. However, it is important to note that the actual operating characteristics may be quite different

depending on the age, condition, and loading of these systems hence preference would be to have metered data for the buildings.

Recommendation: There must be minimum qualifying criteria in the EEDSM program as to what qualifies for any retrofit. For example, equipment to be audited should be fully operational, have well-defined operational hours, occupancy levels, and billing information at a minimum.

In many instances, audits reflect equipment in facilities that are run-down, underutilised, or non-existent and thus should not even be considered for a retrofit. Retrofits should only apply to facilities in which all equipment is fully operational with well-defined operational hours, occupancy levels and billing information. If this is not done, then the pay back periods will be incorrect.

Recommendation: The EEDSM process should request evidence of fully operational facilities to ensure accurate energy efficiency interventions.

The EEDSM program does not provide any funding guidelines as to minimum project size from a financial perspective. It was seen that many smaller and non-qualifying equipment and facilities were included in an application but the DMRE evaluator has no means to determine where or when this is happening.

Recommendation: Funding guidelines should include minimum project sizes. A pricing key for standard replacement items should be developed. These prices can then be used as a reference check when audit teams submit pricing from local suppliers and limit the possibility of inflated prices for goods and services.

Some of the audits provided no reference or correlation to or with the municipal financial and/or asset database. In some instances, equipment audits conducted by several external auditors for different municipal divisions of the same areas could not be linked to one another with each choosing their own auditing style and primary key definitions. External auditors, for example, would conduct audits for difference municipal divisions/units while auditing the same buildings. In other words, municipal facilities would end up being audited more than once by different municipal units or divisions.

Recommendation: Any equipment audit should be linked to the municipal asset and financial and billing database(s). Each piece of equipment should use common primary audit keys which have the municipality, area, erf, location, Geographic Information Systems (GIS) co-ordinates, initial costs, annual write down costs, etc.

Simply verifying the numbers of equipment taken out or replaced is insufficient as there is no guarantee where they are from or being deployed, only that the numbers appear to add up, but which is not the case when a field audit is conducted. Some equipment was found to be in the wrong town with incorrect GIS coordinates. It was also found when conducting audits that certain assets were repeated in the asset register which gives a false appearance of what is installed and available on the ground.

In many instances building and facilities' names were difficult to locate, misspelt, and had no locations or were addressed by local and not proper names. It was noticed that although some equipment had been repaired or replaced, the asset database and the local maintenance records were not updated. Thus, there was no record on how long equipment has been in use or whether this was within or fell outside the expected running hours or lifecycle of the equipment. This is mostly due to third-party contractors conducting maintenance and no formal maintenance documentation plan and asset register update mechanism is in place.

Recommendation: Any audit that involves a retrofit should have a property, floor, and street plan and use assets register data and primary keys so that it may be checked and referenced to and with the municipal asset register, utility bills, and GIS information for accurate location of assets. It

is not that an audit cannot be done without such information, but when companies bid for the audit and M&V, there are certain basic assumptions made failing which increases audits costs and auditing time becomes lengthy.

It was also observed that existing audits appear to be done by one or several different internal and or external entities with none having any consistent audit approach or methodology. This in turn gives rise to inconsistent technical specifications and ultimately large and questionable product quantities and pricing variations.

Recommendation: The EEDSM program should provide guidelines for a standardized methodology.

Municipalities are reluctant to divulge asset and financial information required by the EEDSM templates, as they contain a wider range as well as a large amount of information. Often the information required by the audit and the various EEDSM templates is not understood as an EEDSM requirement.

Recommendation: Primary audit keys that auditors struggle to get from municipalities—key information such as municipal bills for energy data or asset registers for municipal infrastructure, including financial billing databases—are important and should form an integral part of the information required by the EEDSM templates. The template and background categories in the EEDSM spreadsheet could be improved to include more aspects of energy savings.

INTERDEPARTMENTAL DATA SOURCING

Energy auditing should be interdepartmental as not all data lies within one department at municipalities.

Typically, the following municipal departments should participate:

- Assets
- Finance
- GIS / Spatial / Town Planning
- Facilities Management (also for external contractor liaison)
- Metering
- Energy / Electricity Department / Implementing Division
- Supply Chain Management (Procurement) - to issue and get equipment pricing on Request for Quotations (RFQs)

Audits need to be well planned and coordinated and require input from various divisions to ensure access to sites, facilities, rooms and equipment, GIS, billing information, etc. Also, basic equipment such as ladders, extensions, and sample spare lights need to be provided and made available. In most cases, this coordination capacity, skills, and/or experience do not exist in all these divisions or departments in a municipality and a champion driving the audit will be required.

Recommendation: EEDSM applicants must be encouraged to provide all the necessary information to enhance the audit process. The champion coordinating the auditing process must inform the relevant respondents in the municipality who will be gathering the data, what information should be gathered before the audit, and when to be available for meetings. Therefore, the availability of information and people are critical.

SKILLS AND KNOWLEDGE AVAILABILITY

In order to write a comprehensive and competitive Request for Quotation (RFQ), a municipal employee must have a sound knowledge of the technology, its design, market pricing and application, as well as labor requirements as all EEDSM applications need to be well justified and motivated.

Currently, the EEDSM sets no requirements in terms of the capacity, skills or qualifications for those who will bid, manage, and implement any EEDSM projects. Many municipal employees do not know where to start and seek technical assistance from suppliers or external consultants which helps, but does not resolve the problem, as does the high churn of employees in the municipalities.

Many municipalities are being both inconsistent and overcharged with pricing well above the market price by suppliers and/or consultants. In some instances where municipalities engage service providers to do this at risk, they then raise expectations where suppliers make direct approaches and even threaten municipal employees where they are unwilling to share or divulge the detailed audit information.

There are often issues raised about the lack of technical skills and capacity within municipalities, but the reality is that retrofit programs are unpredictable such that in-depth training is ineffective and unsustainable due to the high staff turnover rates.

Recommendation: Municipalities should make energy efficiency improvements part of their everyday operations rather than a once-off intervention. Given proper regular training and buy-in to resource efficiency it becomes second nature to replace an inefficient system with an energy efficient one at the end of its lifetime. Adjustments to the supply chain management processes within municipalities would also help ensure that the municipality invests primarily in energy efficient and equipment with a longer lifespan.

RECOMMENDATIONS TO THE DMRE ON THE EEDSM PROCESS

Finally, through its support to municipalities in conducting energy efficiency audits necessary to apply for EEDSM funding, SA-LED also gained a better perspective on the EEDSM process and whether the process itself and the resources made available to municipalities could be improved. Below, SA-LED presents recommendations on the process as a whole, based on what is currently at municipalities' disposal.

RESOURCES

The EEDSM program makes the following resources available to prospective municipal applicants:

- EEDSM templates for requests for proposals (RFP): i.e. project RFP, narrative report for RFP, and an Excel RFP template

- EEDSM downloads: Extended-Baseline-Template-2016, Detailed-Baseline-Template-2017, Energy-Audit-Narrative-Report-Template-2017, Business-Plan-Template 2017-2018, Master-Contract-DoE-and-Municipalities-template, Quarterly-Reporting-Template, Site-Inspection-form, Close-Out-Report-Template 2016, and a Signing-Letter-of-Delegation-Template

- Other downloads: EEDSM Financial-Analysis-Tool, Solar-PV-Financial-Analysis-Tool, and Energy Efficiency awareness posters

These templates, however, were developed in isolation and with limited consideration of the hierarchy and structural interdependence of participating municipal departments as well as the limited capacity and technical capabilities within municipalities to prepare the application.

The EEDSM program then consists of a structured implementation process that includes 12 steps, summarized in the following table. Some shortcomings, mainly related to the sequence of the steps, have been identified during the provision of technical support to municipalities, which are also summarized in the table below.

Steps	Description	Shortcomings
1	Call for Proposal	Developed at a high level of management but are not informed by Steps 4 and 5.
2	Budget Allocation through the DORA	
3	Procurement of EEDSM Support	
4	Energy Audit Report	Only completed after the application process. Once notification of a partial reward is made, it requires shifting of the goalposts to make the project fit the grant awarded.
5	Business Plan Report	
6	Contract with the DMRE	
7	Monitoring and Verification	
8	Procurement/Tendering	
9	Monthly and Quarterly Reporting to DMRE	
10	Managing Installation Process	
11	Energy Efficiency Awareness Campaign	
12	Project Close-out	

PROPOSED REVISED SEQUENCE OF EEDSM PROCESS STEPS

Based on the auditing support experiences, the following reviewing of the sequence of steps in the EEDSM process is proposed:

Steps	Description	Reasoning for the proposed sequence
1	Energy Audit Report	All relevant information pertaining to equipment and operational hours will be traceable and verifiable assets will be captured.
2	Business Plan Report, including a RFQ procurement process for new equipment pricing and technical specifications[3]	
3	Measurement and Verification	Verify the pre- and post- implementation baseline for inclusion in the proposal submission.
4	Call for Proposal	
5	Budget Allocation through the DORA	
6	Contract with the DMRE	
7	Procurement of EEDSM Support	
8	Procurement/Tendering	
9	Monthly and Quarterly Reporting to DMRE	
10	Managing Installation Process	
11	Energy Efficiency Awareness Campaign	
12	Project Close-out	

In conclusion, there are opportunities to improve the EEDSM process, both at the municipal level and when considering the process itself and resources available.

[3] This will allow the DMRE to more fairly, readily and consistently adjudicate equipment pricing to avoid any possible laundering and/or pricing collusion by equipment vendors and their local suppliers.