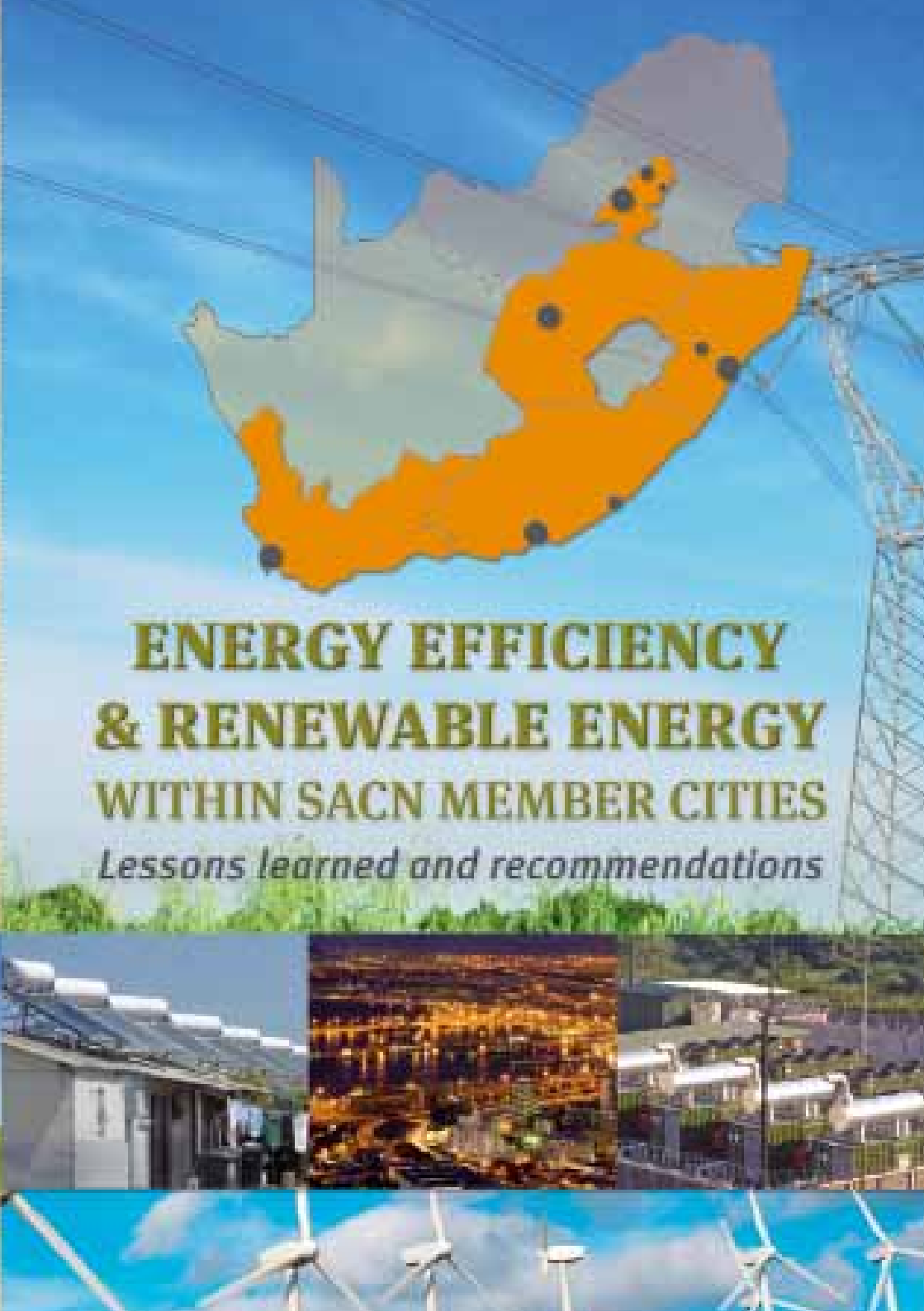

ENERGY EFFICIENCY & RENEWABLE ENERGY WITHIN SACN MEMBER CITIES

Lessons learned and recommendations

Foreword

Cities need reliable, affordable and environmentally friendly energy to function, but high energy consumption patterns, increasing prices of energy supply and environmental degradation associated with fossil fuel energy generation around the world make cities vulnerable and inefficient. In order to improve the current situation, cities have the power to contribute to the sustainable energy-supply mix by increasing their energy efficient (EE) and renewable energy (RE) initiatives. According to their integrated development plans (IDPs), a number of municipalities in South Africa have introduced or are introducing RE and EE initiatives, supported mostly by donor funding. An emerging positive story is that municipalities have started to fund these initiatives through local sources, such as the Eskom rebate programme for solar water heating and energy efficient retrofits.

The contribution of EE and RE initiatives is also recognised internationally by organisations such as the World Bank. With the support of the World Bank, the South African Cities Network (SACN) has conducted pre-feasibility studies and developed business plans on the viability of the RE/EE technologies in municipalities. This work is summarised in a publication, the *South African Municipal Renewable Energy and Energy Efficiency Programme vol 1*.

The purpose of this publication is to (i) profile municipal RE/EE projects and (ii) create a fundraising tool to support further development of the selected projects. The publication's findings and recommendations thus pave a way for full feasibility studies and implementation of the REEE programme.

The SACN has consolidated the lessons learnt on the implementation of RE and EE projects within its member cities. This booklet, summarising the key challenges and recommendations, is produced to complement the main report. Its main objective is to disseminate this critical information to a broader audience.

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Introduction

The mandate of the South African Cities Network (SACN) is to promote good governance and management of its member cities and partnerships among the spheres of government, in the interest of enhancing good city governance.

One of the key priorities of the SACN's strategic plan 2011/2012–2015/16 is to deal decisively with the vulnerabilities facing cities, in particular sustainable energy access and supply. Against this background, the SACN commissioned Aurecon to gather lessons learned about the energy efficiency (EE) and renewable energy (RE) initiatives that municipalities are implementing. To manage the scope of this project, the EE analysis was limited to elements concerned with electricity savings.

In South Africa, legislation and national policies oblige municipalities to implement EE/RE initiatives. As a result, municipalities have introduced a variety of EE and RE projects with varying degrees of success. From these projects, many lessons can be learned.

This booklet highlights some of the key challenges and recommendations from the Aurecon report, and provides an overview of the legislation that is relevant to EE/RE projects.

What is EE/RE?

EE (energy efficiency) is when the unnecessary wastage of electricity is minimised, which leads to energy saving.

The National Energy Act (No. 34 of 2008) defines EE as 'economical and efficient production and utilisation of an energy carrier or resource', while the Integrated Resource Plan describes it as 'the efficient use of energy to produce a given output or service, i.e. a more energy-efficiency technology is one that produces the same service or output with less energy input'.

RE (renewable energy) contributes to an energy mix, which can lead to a more efficient use of the energy resources available.

The White Paper on Renewable Energy (2003) defines RE as 'electricity, gaseous and liquid fuels, heat, or a combination of these deriving from naturally occurring, cyclical and non-depleting sources of energy such as solar, wind, biomass, hydro, tidal, wave, ocean current and geothermal energy'.

The National Energy Act describes RE as 'energy generated from natural non-depleting resources including solar energy, wind energy, biomass energy, biological waste energy, hydro energy, geothermal energy, and ocean and tide energy'.

The Renewable Energy Independent Producer Process (RE IPP) states that RE is 'the harnessing of naturally occurring, non-depletable sources of energy, including solar, wind, biomass, hydro, tidal, wave, ocean current and geothermal, to produce electricity, gaseous and liquid fuels, heat or a combination of these energy types'.

How is EE/RE mandated?

National government: legislation and policy

The **Constitution** (Section 24) stipulates that all South Africans have the right to a healthy and protected environment, which inherently includes the implementation of EE and RE projects.

The **National Energy Act** (Section 2) promotes effective management of energy demand and conservation, diversity of energy supply and sources, and energy planning through the development of an integrated energy plan (IEP).

White papers set forth the government's policy on a particular subject matter and show its intent.

The White Paper on Energy Policy (1998)

contains government's vision for restructuring the energy industry:

- Introduces the concept of integrated energy planning.
- Shifts the focus from solely supply-side to include demand-side energy management.
- Identifies certain barriers to the implementation of EE measures.
- Gives the Department of Minerals and Energy (DME) a mandate to promote EE and to draw up the National Energy Efficiency Strategy.

The National Energy Efficiency Strategy (2012)

contains eight goals relating to social, environmental and economic sustainability.

- Identifies the need for South Africa to reduce wasteful usage of electricity.
- Sets a national target for energy efficiency improvement of 12% by 2015.
- Describes interventions that could be followed.

Integrated Resource Plan (IRP):

- Details how the long-term electricity demand should be met in terms of capacity, type, timing and cost.
- Gives minimum levels of EE for each sector of the economy.
- Includes energy conservation measures to be used during any energy shortage, including penalties for non-compliance with these measures.

The White Paper on Renewal Energy Policy (2003)

contains government's principles, goals and objectives for RE. By 2013, the target was for 10 000 Gigawatt-hour (GWh) of energy to be produced by RE.

The greatest potential for these measures is in the industrial and household sectors. Therefore, local government can play a large role by introducing laws, education programmes and policies.

The White Paper on National Climate Change Response (2011)

gives government's vision for an effective climate change response and the long-term transition to a climate-resilient, lower-carbon economy and society.

Municipalities have a significant role to play in climate-change intervention and should integrate climate change responses into their planning. EE measures in urban settlements to be implemented include:

- *low-cost housing*
- *affordable lower-carbon public transport*
- *thermal efficiency in designs*
- *climate-resilient technologies.*

Local government: legislation

The Constitution (Section 156) stipulates the powers and functions of municipalities. This derived authority means that they can legislate on EE and RE in their jurisdiction.

The Municipal Systems Act (No. 32 of 2000) sets out how a municipality exercises its legislative/executive authority and implements applicable national and provincial legislation. This can be through by-laws or through policies, plans and strategies and programmes.

The Municipal Structures Act (No. 117 of 1998). Section 83 lays out the functions and powers of municipalities, which include electricity and gas reticulation (and surcharges may be levied on fees for service provided). Section 84 gives municipalities the power to carry out integrated development planning and supply bulk electricity.

Legislation and policy empower municipalities to pass by-laws for EE and RE measures and goals, but the preferred approach has been to develop policies, plans and strategies (which do not impose the same legal obligation as by-laws). A municipality sets out a roadmap for its future through its **Integrated Development Plan (IDP)**, which is reviewed annually in consultation with communities and stakeholders, so that it addresses the needs of the municipal community. **An IDP is a useful tool for planning EE/RE interventions and would ideally evolve into a plan, policy or strategy, and eventually a by-law.**

Challenges: legislation and policy

Up to 40% of electricity consumption is estimated to fall within the municipal sphere, which makes it essential for municipalities to understand how they can contribute to achieving national EE/RE targets.

Municipalities do not have a clearly defined mandate and are limited in what they can do, despite the national government's policy and legislative intent with regards to EE/RE.

No determination of new generation capacity for municipalities exists, although the National Energy Regulatory Act (No. 40 of 2004) states (in Section 34) that additional new generation capacity can only be added to the national grid through a ministerial determination, specifying the capacity required, where it is required and the type of generation to be used.

The IEP and IRP do not specify which generation capacity share has been allocated to municipalities in their predictions of South Africa's energy and electricity demand up until 2030. As a result, municipalities have difficulty planning for RE/EE initiatives and committing own finances and resources.

The ability of municipalities to procure EE and RE is limited by certain conditions of the Municipal Finance Management Act (No. 56 of 2002), which aims to ensure that public funds are used in a responsible, transparent and cost-effective manner.

- The procurement of 'green' electricity is problematic, as the price of electricity generated from RE sources would inevitably be higher than Eskom's traditionally low price.
- The establishment of independent power producers (IPPs) is discouraged, as municipalities cannot guarantee long-term procurement of electricity because of additional conditions for contracts of more than three years. (A IPP plant's lifetime would be at least 20 years.)
- The option of a 'Capital Investment Fund' to finance EE/RE projects (through savings from previous projects) is not possible, as the MFMA does not allow 'savings' accounts within the municipality.

In addition, municipalities generally do not enforce EE/RE policies and plans through by-laws (which the Municipal Systems Act empowers them to do). As a result, EE/RE initiatives are currently only undertaken by municipal representatives who are passionate about the cause instead of being driven by legislation and regulation. The exception is the City of Tshwane, which has a Green Buildings by-law that encourages the development of EE buildings.

Recommendations: legislation and policy

- **Lobby for amendments to the ERA**, so that the Act is 'implementable' for EE/RE interventions.
- **Quantify the municipalities' mandate** by including municipal inputs into the IEP and IRP, based on clear targets set by municipalities for implementing EE/RE.
- **Lobby for a section 34 determination** for embedded and non-embedded generation (similar to the Renewable Energy Independent Power Producer Procurement Programme), which would enable municipalities to become involved with RE generation.
- **Develop a feasible business case to overcome procurement barriers for green energy**. This means developing a template that meets the requirements of Section 33 of the MFMA, which municipalities could use to approach National Treasury about approving EE/RE projects, and could assist in enabling long-term procurement contracts (and so reduce risk for developers).
- **Develop by-laws**[1] to enforce the implementation of EE/RE initiatives. For example the City of Tshwane's Green Buildings by-law (see box). Another possible by-law would enforce EE measures on industrial customers.

MUNICIPAL BY-LAWS AND REGULATIONS

In March 2013, the City of Tshwane became the first municipality to implement a by-law specifying minimum EE requirements over and above the national building regulations.

The eThekwini municipality is considering developing 'solar ready buildings' concepts in town planning regulations, as a way to encourage solar-ready homes and commercial buildings.

[1] Before developing any by-laws, municipalities would need to ensure that they have the capacity for the additional monitoring and control activities and that the poor are not burdened by the new laws.

Challenges: supply chain

Municipalities face barriers that hinder and delay EE/RE implementation throughout the supply chain, from energy suppliers to service providers.

At present, Eskom is designated as the single buyer of power from IPPs[2] and so **municipalities cannot purchase from IPPs.** Nor can municipalities own or invest in IPPs, according to Section 86 of the Municipal Systems Act.

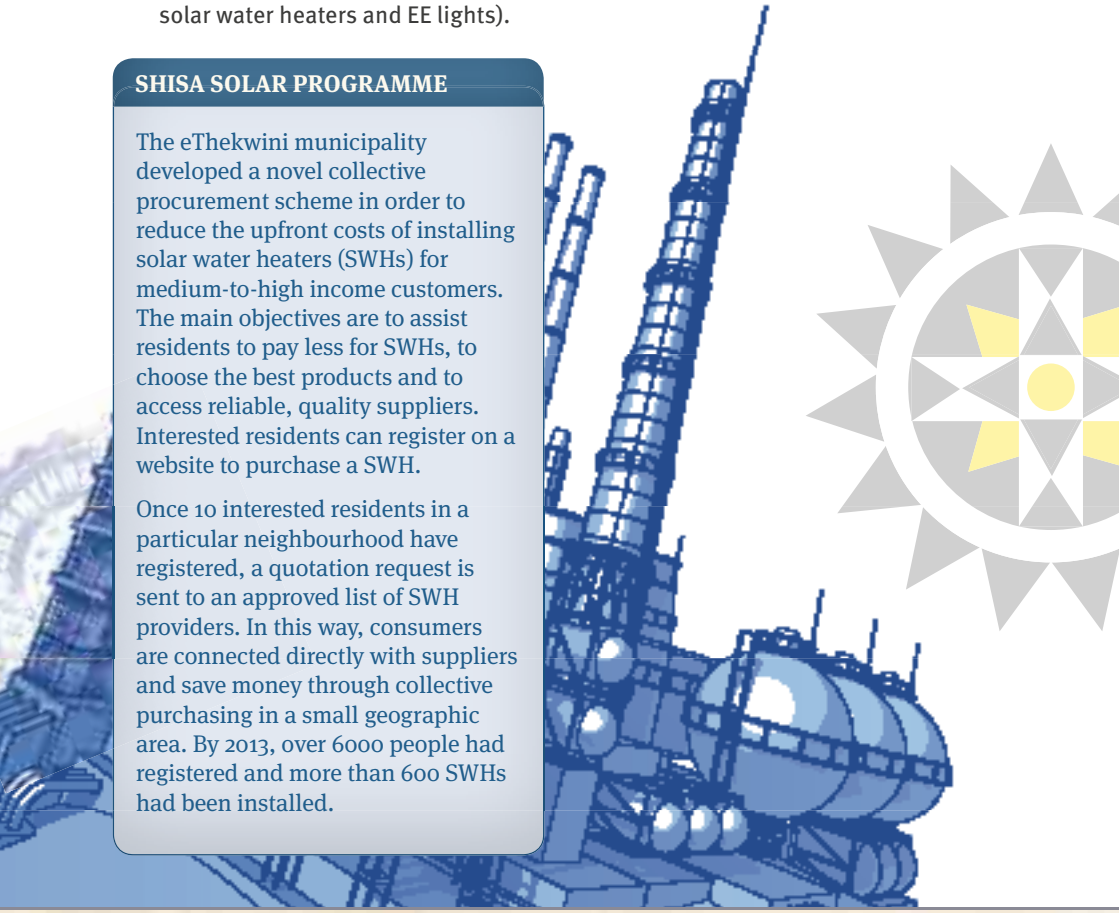
Municipalities are experiencing **problems and risks from the selection and long-term appointment of energy service companies (ESCOs)**. Suppliers engaged under current municipal contracts do not offer the best technology and quality, while some municipalities are tied into long-term contracts with suppliers who do not offer EE alternatives.

Shortcomings in the procurement process and the use of unaccredited suppliers have resulted in excessive technical and installation problems. Municipal procurement requirements also hinder EE/RE implementation as, for example, foreign technology could not be selected even if more efficient.

[2] Cabinet decision taken at a meeting on 5 September 2007.

Recommendations: supply chain

- **Develop a national approach to dealing with ESCOs**, which would alleviate overcommitted municipal resources and speed up the entire process.
- **Negotiate collective purchase agreements with approved suppliers**, which would reduce upfront costs and minimise the 'per unit' cost of EE/RE equipment (e.g. solar water heaters and EE lights).
- **Implement green procurement strategies**, whereby suppliers are evaluated on the EE measures in their processes and the availability of EE products as part of their service offering.
- **Consider only accredited suppliers and products**, using a process similar to the Eskom national process.



SHISA SOLAR PROGRAMME

The eThekwini municipality developed a novel collective procurement scheme in order to reduce the upfront costs of installing solar water heaters (SWHs) for medium-to-high income customers. The main objectives are to assist residents to pay less for SWHs, to choose the best products and to access reliable, quality suppliers. Interested residents can register on a website to purchase a SWH.

Once 10 interested residents in a particular neighbourhood have registered, a quotation request is sent to an approved list of SWH providers. In this way, consumers are connected directly with suppliers and save money through collective purchasing in a small geographic area. By 2013, over 6000 people had registered and more than 600 SWHs had been installed.

Challenges: financial/economic viability

Municipalities are reluctant to invest in green economy because of a belief that the municipal revenue will be negatively affected.

The perception that reducing electricity use would result in significantly less revenue, as the income from the sale of electricity is currently one of the major contributors to municipal revenues and used to cross-subsidise other departments.

Limited internal funds available for EE initiatives, especially as many external donors are available to assist the implementation of EE/RE interventions. Municipalities are making use of funds such as the EEDSM funding.

Bi-directional metering and tariffs are problematic for the implementation of embedded RE.

Financial year-ends are misaligned between the Department of Energy and municipalities, which causes problems with the releasing of funds: the department releases funds in April for municipalities to implement projects in the current financial year, which only gives two to three months for the municipalities to plan, procure and implement projects.

Recommendations: financial/ economic viability

- **Implement EE measures in council-owned infrastructure**, as these are easily implemented and would result in reduced costs that would offset any loss of revenue. A study[3] by eThekwini municipality found that approximately 20% of municipal GDP is spent on energy costs. Thus, significant savings can be achieved through implementation EE measures.
- **Make use of phased roll-outs** to manage financial commitments, to lessen the risk associated with new technology and reduce the upfront costs.
- **Investigate alternative financial models for financing distributed generation and alternative funding sources**, such as funding allocated for spatial development or crime prevention. Also approach National Treasury to discuss the use of 'capital investment funds'.
- **Evaluate different options for using private-public partnerships**, as funding, technology and development partners, for enabling embedded RE and normal IPPs.

ALTERNATIVE FUNDING

Nelson Mandela Bay is looking at potential funding options for new EE interventions, which include installing new technology high-mast lights that would reduce energy consumption of 1000W to 400W. An option being investigated is that of an international donor who provides funds for interventions that reduce crime. The municipality is making a case that the installation of these high-mast lights in unlit rural areas would contribute significantly to the reduction of crime.

- **Develop a standardised tariff methodology** for calculating tariffs for distributed generation, in consultation with Eskom and AMEU (Association of Municipal Electricity Undertakings), through the NRS (National Rationalisation of Specifications) process.
- **Create an alignment** between the Department of Energy and municipalities' financial planning, without changing the respective year-ends.

[3] Presentation: Legal and Financial Barriers to Embedded Generation; eThekwini Energy Office; 3rd Annual Solar Indaba; 2–5 October 2013; Cape Town

Challenges: perceptions and awareness

The implementation of EE/RE initiatives at local level remains limited because of perceptions within municipalities and a lack of awareness among consumers.

EE and RE are not clearly mandated and planned within municipalities and so are seen as an additional rather than essential part of municipal culture and enhancing the economy.

The normal municipal decision-making processes focus on the short term, as mandated by legislation and in response to pressing service delivery needs and quick-fix solutions, whereas EE/RE initiatives make long-term sense and bring long-term benefits.

As a result, EE/RE projects are not currently prioritised, especially in municipalities that do not have dedicated EE/RE offices. EE/RE projects occur on an ad-hoc basis and depend heavily on external factors such as the availability of donor funding.

Generally, customers are not aware of the benefits of EE/RE initiatives. For example, consumers deterred by the high upfront costs but are not aware of the potential rebates and full lifecycle savings that can be achieved through the Energy Efficiency Demand-Side Management Programme (EEDSM).

Recommendations: perception and awareness

- **Develop a municipal EE/RE strategy** that includes timelines and key performance indicators and is aligned with the municipality's goals and strategies.

EEDSM SWH ROLL-OUT

Understanding the local environment is essential for successful interventions. As part of the EEDSM SWH roll-out, the Nelson Mandela Bay Municipality installed SWH in rural, off-grid areas. Users here had a greater need for warm water than for electricity. Thus, SWH without electrical back-up connections were installed, eliminating the need for earth leakage and copper pipes. The result was reduced cost and no likely theft of copper pipes.

- **Identify clear action plans and feasible initiatives for different consumer segments**, for example: green design (SWH, ceiling retrofit) in new RDP houses for low-income households; mandatory EE improvements for medium-to-high income households.
- **Conduct baseline energy and consumption audits**, so that municipalities have an accurate picture of consumption in their area.
- **Prioritise replicating EE/RE projects that have been implemented elsewhere**, as such projects are easily achievable, require less effort (especially upfront) and are proven to yield results. For example, retrofitting low-income housing or municipal buildings.
- **Involve the community and raise awareness among consumers**, and thereby change customer behaviour, which is an effective, low-cost way to achieve energy savings. For example, school programmes, booklets, advertisement and awareness seminars. Industry forums provide a platform for municipalities to share lessons and developments with industrial partners.

Challenges: municipal capacity

The lack of capacity and dedicated staff is hindering the implementation of EE/RE within municipalities.

Implemented EE/RE projects often fail to realise their true potential because departments are working in 'silos', instead of working in an integrated and cross-sectoral manner, which results in greater cost savings and value for money.

A similar lack of integration and coordination exists between external stakeholders, such as donor funders and municipalities. For example, Eskom will provide funds for projects that are not part of a municipality's planning. Unwilling to let this opportunity pass, municipalities obtain and then use these funds on projects that are not aligned to municipal priorities or capabilities, which results in projects that are suboptimal and not well monitored or closed out.

Municipal officials are unsure on how to report on EE/RE projects, and no standard process or requirements for reporting are in place.

Cumbersome municipal internal processes slow down the initiation of EE/RE projects, made worse by the lack of dedicated staff and resources necessary for procurement and project approval.

Recommendations: municipal capacity

- **Establish a central department ('sustainability unit') responsible for coordinating and aligning EE/RE** projects across the municipality, identifying potential funding, assisting with policy-related matters and educating municipal personnel on the benefits of RE/EE. An inter-departmental committee would support this unit and ensure management buy-in for the projects.

LANDFILL GAS TO ELECTRICITY PROJECT

eThekwini was the first municipality in South Africa to successfully develop landfill gas to electricity generation, at its three landfill sites. The project had a dedicated champion, but cross-divisional participation was an important factor in the success of the project: the Cleaning and Solid Waste Department drove the project, while the Electricty Department assisted with on-site installation and linking the generators to the national grid. The mayor was also directly involved.

The project has resulted in monthly savings, increased revenues and environmental benefits, and provides a secure alternative electricity supply.

- **Employ a project champion and dedicated staff** who can drive EE/RE projects, ensure the correct processes are in place, obtain the necessary approvals and agreements, generate political buy-in and make sure that accurate progress reports are submitted on time.
- **Create a knowledge-sharing platform among municipalities** where lessons and new developments can be shared. Less mature municipalities could duplicate strategies that were effectively implemented in other municipalities, using established best practices.
- **Encourage coordination and alignment between municipalities and national bodies**, such as Eskom, the Department of Energy or NERSA, in order to avoid duplication and save costs. Municipalities should become more involved with central government's policy setting and strategy formulation.
- **Use external resources to build and expand municipal capacity**, either through donor funding for training or external consultants/academics/community members to implement, monitor and evaluate projects. Existing networks, such as the SACN, can also provide support.

The way forward

The potential is massive for municipalities to become actively involved in EE/RE initiatives. However, the legislative environment is clearly not conducive to EE/RE at municipal level: the municipal mandate regarding EE/RE must be clarified and the legislation adjusted, as recommended on page 7.

The SACN has an important role to play in supporting the implementation of EE/RE initiatives at municipal level. Specific ways in which SACN can assist include:

1. Liaising with the Department of Energy, NERSA and National Treasury in order to clarify the mandate of municipalities by including municipal EE/RE targets in the IEP and IRP.
2. Developing the RE business rationale and lobbying the Minister of Energy for a section 34 determination for embedded and non-embedded generation.
3. Developing a business template that meets the requirements of Section 33 of the MFMA, which municipalities can use when approaching National Treasury for approval of EE/RE projects.
4. Proposing a standardised, national ESCO process, based on an investigation into the different options currently being used.
5. Investigating alternative financial models for financing distributed generation and proposing the best alternative(s) for South African municipalities.
6. Proposing a tariff methodology to NERSA, after consultation with industry roleplayers.
7. Discussing with National Treasury the use of 'capital investment funds' (i.e. ringfenced finances declared as savings) to finance EE/RE initiatives.
8. Developing a strategy for accessing EE/RE funding, to ensure funding is coordinated and allocated optimally.
9. Investigating different options for using different business models (PPPs), highlighting the advantages and disadvantages of each option.
10. Developing a knowledge management centre where information related to EE/RE initiatives is consolidated and which is accessible to municipalities.

Key messages for municipalities

- A detailed EE/RE strategy
- Integrated EE/RE initiatives across all departments
- A central EE/RE department with sufficient capacity and trained staff
- Mechanisms for engaging with other municipalities and external stakeholders.

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