



LOCAL
GOVERNMENT
ENERGY
EFFICIENCY AND
RENEWABLE
ENERGY
STRATEGY

FULL STRATEGY
DOCUMENT

Prepared by Sustainable Energy Africa (SEA) - Section 21 (not for profit) company on behalf of the South African Local Government Association (SALGA)



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LIST OF ACRONYMS AND ABBREVIATIONS

ADAM	Approach to Distribution Asset Management
AMEU	Association of Municipal Electricity Utilities
ANC	African National Congress
BRT	Bus Rapid Transit
CFL	Compact Fluorescent Lamp/Light
COGTA	National Department of Cooperative Governance and Traditional Affairs
DEA	National Department of Environmental Affairs
DHS	National Department of Human Settlements
DoE	National Department of Energy (formerly known as Department of Minerals and Energy – DME)
DoT	National Department of Transport
DORA	Division of Revenue Act
DTI	Department of Trade and Industry
DWA	National Department of Water Affairs
EE	Energy Efficiency
EEDSM	Energy Efficiency and Demand Side Management Programme
EPWP	Expanded Public Works Programme
ERA	Electricity Regulation Act (2006)
ESCO	Energy Savings Company
FBAE	Free Basic Alternative Energy
FBE	Free Basic Electricity
FET	Further Education and Training
GBCSA	Green Building Council of South Africa
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German International Corporation)
GJ	Gigajoule
GVA	Gross Value Added
HFO	Heavy Furnace Oil
HPS	High Pressure Sodium
HVAC	Heating, Ventilation and Cooling
IBT	Inclining Block Tariff
ICLEI	International Local Government for Sustainability
IDM	Integrated Demand Management
IDP	Integrated Development Plan
IMESA	Institute of Municipal Engineering of Southern Africa
INEP	Integrated National Electrification Programme
IRP	Integrated Resource Plan
IRPTN	Integrated Rapid Public Transport Network
KPI	Key Performance Indicator
KPA	Key Performance Area
KSD	King Sabata Dalindyebo Municipality
LED	Light Emitting Diode
LED	Local Economic Development
LG	Local Government
LPG	Liquefied Petroleum Gas
M&V	Measurement and Verification
MCEP	Manufacturing Competitiveness Enhancement Programme
MFMA	Municipal Finance Management Act
MIG	Municipal Infrastructure Grant
MISA	Municipal Infrastructure Support Agency
NEEAP	National Energy Efficiency Action Plan

NBI	National Business Initiative
NCPP	National Cleaner Production Programme
NGO	Non-governmental Organisation
NERSA	National Energy Regulator of South Africa
NLTA	National Land Transport Act
NMBMM	Nelson Mandela Bay Metropolitan Municipality
NMT	Non-Motorised Transit
NRS	National Regulatory Standard
NT	National Treasury
NT TAU	National Treasury Technical Assistance Unit
PFMA	Public Finance Management Act
PPP	Public Private Partnership
PSEE	Private Sector Energy Efficiency
PTIG	Public Transport Infrastructure Grant
PTNOG	Public Transport Network Operations Grant
PTOG	Public Transport Operations Grant
PTSAP	Public Transport Strategy and Action Plan
PV	Photovoltaic
RE	Renewable Energy
REBID	Renewable Energy Bids
REIPPP	Renewable Energy Independent Power Procurement Programme
RSA	Republic of South Africa
RTSSA	Rural Transport Strategy for South Africa
SABS	South African Bureau of Standards
SACN	South African Cities Network
SAGEN	South African – German Energy Programme
SALGA	South African Local Government Association
SANEDI	South African National Energy Development Institute
SANS	South African National Standards
SAPIA	South African Petroleum Industry Association
SARPPGC	South African Renewable Power Plants Grid Code
SDC	Swiss Agency for Development and Cooperation
SDF	Spatial Development Framework
SEA	Sustainable Energy Africa
SEED	Sustainable Energy for Environment and Development
SETA	Services Sector Education and Training Authority
SIPS	Strategic Integrated Projects
SSEG	Small Scale Embedded Generation
StatsSA	Statistics South Africa
SWH	Solar Water Heater
TSA	Taxi Scrapping Allowance
V-NAMA	Vertically Integrated Nationally Appropriate Mitigation Action

Introduction and background

The Swiss Agency for Development and Cooperation (SDC) has been supporting the implementation of energy efficiency interventions in South Africa through the 'Energy Efficient Building Programme 2010 – 2013'. The programme is committed to supporting South Africa to contribute to the reduction of greenhouse gas (GHG) emissions in South Africa through energy efficiency interventions at policy, monitoring, research, training and implementation. The South African Local Government Association (SALGA) has, through agreement, partnered with the SDC to facilitate implementation of the local government part of the Programme.

The local government component of this programme has involved the development of energy efficiency strategies and implementation plans in 5 pilot municipalities; institutional capacity assessments in relation to the pilot municipalities' role with respect to energy efficiency; knowledge sharing and the development of communication structures related to energy efficiency between the national and local level. This work has specifically related to five pilot municipalities, but the intention of this final output, a SALGA Municipal Energy Efficiency and Renewable Energy Strategy, is to draw together national learnings and experience towards supporting all municipalities across the country in taking this work forward.

Substantial local level energy work is underway across the country, however this has been predominantly focussed within the larger cities and towns, and is also currently addressed on a voluntary and ad hoc basis. There is an expressed need from municipalities for clarification and guidance as to what is required in the area of energy efficiency and renewable energy development from the local level. This strategy aims to address this need.

The Draft National Energy Efficiency Action Plan of the Department of Energy (DoE, 2013), notes that efficiency must be undertaken primarily by end users (residents, businesses) and encourages sectors and other spheres of governance to develop their own plans towards national efficiency targets¹. The National Climate Change Response Policy (DEA, 2011), Section 10.2.6 recognises the important role of municipal government in meeting the challenges of climate change, including areas relating to energy service delivery. This strategy development aims to support these national goals.

Given the call from national government for local government to contribute to climate mitigation and efficiency targets, it also seems useful and necessary to begin to draw up a clear picture of the potential contribution that can be made at the local level and assess the support required to realise this potential. Importantly, this strategy will also ensure that the specific experience of local government, their particular challenges and opportunities, are brought to the fore, so that support programme can be strategically directed.

A diagnostic report by the National Treasury Technical Assistance Unit (NT TAU, 2013) on barriers and challenges to implementing climate change projects at the regional and local level concludes:

¹ Development of a first Draft of a National Energy Efficiency Action Plan (NEEAP) for the RSA, Draft 5, DoE, 2013, p 9 and 56: this recognises the role of sub-national government and includes for action the development of an action plan to support municipal action.

“The need for change has been acknowledged. Interviewees overwhelmingly agreed that the emergence of a new geopolitical order and production-consumption system, at the global level has started to expose the structural rigidities of resource intensive economies. The old resource intensive economic system is breaking down and a different economic system is emerging; one that values resource efficiency and low carbon alternatives of production-consumption. It is likely that, in the interim, the socio-economic system will become increasingly volatile and therefore, *it is imperative that local government is empowered to deliver its service delivery objectives under the changing conditions.*”

Section 154(1) of the Constitution of South Africa (1996) tasks both national and provincial government with supporting and strengthening the capacity of municipalities to manage their own affairs, exercise their powers and perform their functions. This strategy aims to provide a clear programme of action for local government, to promote energy efficiency and renewable energy development in line with national policy direction and within local governance mandates. It is also designed to provide a clear programme of action, to be led by SALGA, to those tasked with strengthening the capacity of municipalities to undertake this work.

A cornerstone of the strategy development process has been engagement and consultation with the country’s municipalities via the SALGA Provincial offices. Despite challenges facing local government, the commitment, passion and calibre amongst local government officials and leaders working in this newly unfolding arena must be acknowledged. Valuable, pioneering energy efficiency and renewable energy work is already underway within South African municipalities. The Strategy development process has drawn extensively on this work and experience.

Local level consultation also made it clear that energy efficiency and renewable energy, at the local governance level, cannot simply be seen as a technical issue, but must be addressed in the context of service provision, in which ensuring sustainability of municipal revenue and electricity service delivery, addressing poverty and access to energy services, and stimulating local economic development is paramount. The strategy developed here aims to reflect these municipal priorities.

This Strategic framework document includes:

Part I) a Status Quo Report and,

Part II) a Municipal Energy Efficiency and Renewable Energy Strategic Framework/Programme of action document.

This latter document provides an indication/ outline of key energy efficiency and renewable energy areas for local government to address as well as an outline of key areas of support work to be taken forward by SALGA (in partnership with relevant national departments and key stakeholders) in order to enable, and facilitate, local government ability to address energy efficiency and renewable energy.

Part I: Municipal Energy Status Quo Report

1. An overview of local level energy work in South African cities and towns

Since democracy, there has been a substantial shift in energy policy in South Africa, influenced also by new global forces, that has brought local government into the energy domain. It is useful to trace these shifts in order to understand the need arising for greater strategic direction and support for local government to continue to meet its service delivery objectives within these new parameters. It is also important to recognise and build on pioneering municipal energy work underway, where much has been learnt through a 'learning by doing and sharing' approach.

A period of transition

Historically the energy sector in South Africa focussed almost entirely on the supply side of energy and on issues of energy security, with little attention being given to demand side and sustainability issues – where was energy being used, by whom, for what and how could these needs be met in a manner that would promote social, economic and environmental sustainability.

New thinking across the globe – coming together at the Rio World Summit on Sustainable Development – began to highlight the enormity of the environmental resource challenges facing the world, along with the persistence of poverty and inequality in resource allocation. It also noted the primary role of local (and in particular urban) government, given that world population growth is massively concentrated in the urban areas of developing countries.

This period coincided with the democratic transition in South Africa and the developmental mandate given to the new, unified, system of local government (as articulated in the Municipal Systems Act of 2000). This identified local government as a key platform for redistribution, predominantly through equitable service delivery.

Sustainability issues began to be brought onto the energy agenda by university research teams, NGOs and community representatives². This saw its way into the energy policy of the ANC, and then the new government, post 1994, in the Energy White Paper (1998) and Energy Act (2008). These policies required that energy direction in the country address energy poverty, energy security, development and environmental issues. The major drive of national government in addressing the environment and poverty-related energy issues has been the globally award-winning Integrated National Electrification Programme (INEP), the Free Basic Electricity/Alternative energy policies and the development of Energy Efficiency and Renewable Energy Strategies and related Programme.

Many of these programmes relate to energy demand (on-ground consumption). These new approaches have brought the issue of energy planning strongly into the domain of local government. This is well illustrated by unpacking the role of local government within the 8 Key Objectives of the draft National Integrated Energy Plan, 2013, as illustrated below.

² Ward, S, The New Energy Book, 2008.

Table 1: Local Government powers and functions relevant to achieving national energy objectives

8 Key National Integrated Energy Objectives (Draft National Integrated Energy Plan, 2012)	Related municipal mandates, or functions (schedules 4 and 5, Constitution of RSA 1996; Municipal Systems Act, Municipal Services Act)
1. Ensure the security of supply	Electricity reticulation; Free Basic Alternative Energy
2. Minimise the cost of energy	Electricity reticulation (tariff setting, cross subsidisation); Human settlements (housing delivery); Public transport (limited); Non-motorised transport;
3. Increase access to energy	Electrification; Free Basic Alternative Energy; Human Settlements (thermal efficiency); Public transport; Spatial planning
4. Diversify supply sources and primary sources of energy	Electricity reticulation; Waste management
5. Minimise emissions from the energy sector	Electricity reticulation; Building codes and planning approval
6. Promote energy efficiency in the economy	Manage public facilities; Building codes and development approval; Air quality management; Electricity distribution
7. Promote localisation and technology transfer and the creation of jobs	Local economic development
8. Promote the conservation of water	Water service delivery

It is increasingly apparent that national government requires strong support from local government to meet national objectives in energy and related environment and economic development targets and this has been recognised in recent policy and plans, such as the Department of Environment’s National Climate Response White Paper (2011), and the Department of Energy’s National Energy Efficiency Action Plan (2013) and IRP 2010 Update Report (2013).

Another development that brings energy into the local government domain is market forces that are rendering rooftop PV to be a financial proposition. This means that households or businesses can produce electricity to meet a substantial amount of their consumption needs. Although this development is likely to be slow in reaching sizeable proportions, it requires a radical re-think as to how electricity distribution businesses, and municipal revenue models, are configured. And while mass take up is likely to be slow, installations are *already underway*, with municipalities receiving applications for grid-feed in on a regular basis. Thus, municipalities have to establish procedures and systems *now*, or run the risk of dangerous and illegal connections becoming widespread; and these procedures need to ensure service delivery sustainability into the future.

Capacity development for local sustainable energy development

A number of organisations and programmes have contributed to the development of local level engagement with energy efficiency and renewable energy. In 1998 Sustainable Energy Africa (SEA) set up the SEED (Sustainable Energy for Environment and Development) Programme, which ultimately became the City Energy Support Unit Programme of SEA. This work pioneered the development of energy data reports for cities (State of Energy reporting) and Energy and Climate Change Strategy development. It has supported a learning network amongst municipalities working in this area, for over fifteen years, building capacity through ‘learning by doing’ and sharing of experience amongst officials, regional and national departments and stakeholders.

In the early years of 2000, ICLEI ran a three year Cities for Climate Protection Programme, which looked at internal municipal energy consumption and supported pilot projects with efficient or renewable energy alternatives. ICLEI Africa is now running the Urban-LEDS Programme, supporting the development of low carbon strategies amongst 'secondary' city partners.

The SA Cities Network has always included a sustainability component within its member cities. Energy indicators form part of the SACN State of Cities reporting and the organisation is also involved in on-ground studies relating to renewable energy development and energy efficiency and led the 2009 City Renewable Energy Summit. Recently the SACN have published a Consolidation of Lessons Learnt for EE and RE Initiatives within Cities: Development of a Roadmap for Future Uptake³.

The South African Local Government (SALGA) has long been a key partner within the INEP Programme, and has recently included an Energy Efficiency component to its infrastructure/services work. Provincial SALGA capacity is also developing around this aspect of energy development. With SDC support SALGA has been actively supporting the development of EE/RE strategies amongst five pilot 'secondary' cities.

The Association for Municipal Electricity Utilities (AMEU, established in 1915), is an association of municipal electricity distributors as well as other organisations (academic, state-owned enterprises, commercial) that have a direct interest in developing quality electricity supply services in Southern Africa.

The Department of Energy (DoE) has worked on the global award-winning Integrated National Electrification Programme (INEP) with municipal distributors, since the INEP Programme inception, and has also run local rollout of the 'Basa Njenga Magogo' smokeless stove Programme. In 2009 the DoE began its first efficiency programme with local government with the inception of the DORA-funded Municipal Energy Efficiency and Demand Side Programme. This provides funding to municipalities to engage with public lighting, water pumps and water heating efficiency. It has also funded the rollout of local solar water heating projects.

The Department of Cooperative Governance and Traditional Affairs established the Municipal Infrastructure Support Programme via the Municipal Infrastructure Support Agency (MISA), in 2011, to provide technical capacity support to facilitate infrastructure development via the Municipal Infrastructure Grant, towards improved service delivery in municipalities.

³ SA Cities Network, Consolidation of Lessons Learnt for EE and RE Initiatives within Cities, prepared by Aurecon, 2013.

2. Legal framework and alignment with national policy

City governments have a central role to play in managing energy consumption and GHG emissions. They can incentivize energy efficiency; promote renewable energy use and public transport. Indirectly they can influence city energy use through urban planning and economic development. Cities are substantial energy users across civic amenities and services and can provide leadership through reducing their own GHG emissions. However, the powers and functions of local government set out in the Constitution are not explicit about the energy dimension of these roles and responsibilities and mandates to act in this regard have often been reliant on interpretation and political endorsement by a proactive leadership.

Pioneering cities in South Africa believe the mandate to act with regard to energy and climate is implicit in the objectives of local government and the powers and functions accorded to local government in the Constitution (1996), the White Paper on Local Government (1998) and Municipal Systems Act (2000). The most recent legal opinion developed on this is that of Cliffe Dekker Hofmeyr, for the South African Cities Network⁴. De Visser, Associate Professor of Community Law, University of Western Cape, has also developed valuable opinions that draw on the developmental role allocated to local government in the Constitution⁵.

South Africa's supreme law, the Constitution of the Republic of South Africa, 1996, under Section 24, states that all South Africans have the right to a healthy environment and the right to have the environment protected. Cliffe Dekker Hofmeyr contend that this can be inferred to include the implementation of clean renewable energy and energy efficiency projects. This is reinforced in the Constitutional objectives accorded to local government, namely: the provision of services to communities in a sustainable manner, promotion of social and economic development and a safe and healthy environment (section 152 (1)).

The Constitution sets out the powers and functions of municipalities (Section 56 (1) and Schedules 4B and 5B), which include aspects relating to air pollution, building regulation, electricity and gas reticulation, municipal planning and street lighting. Therefore, given that municipalities derive authority to intervene in these matters, from the Constitution, they are empowered to legislate on energy efficiency and renewable energy dimensions relating to these powers and functions within their jurisdiction.

The National Energy Act, 1998 specifically mandates renewable energy development and energy efficiency in that it addresses environmental management considerations and increased generation and consumption of renewable energy. It also has as objectives the need to diversify our energy supply, effective management of energy demand and energy conservation.

The Integrated Resource Plan (IRP) of 2010 informs the renewable and energy efficiency interventions on a national level, which are seen to have a bearing on municipalities. However, although the IRP 2010 Update Report begins to introduce elements directly within local government jurisdiction, the IRP 2010 still lacks specific local government energy efficiency or renewable targets. Should the IRP 2010 Report Update become policy, this would signal a step-change in that it lays the foundation for the development of a local

⁴ SA Cities Network: Consolidation of Lessons Learnt for EE and RE Initiatives within Cities, 2013. Prepared by Aurecon.

⁵ Jaap de Visser, UWC Local Government Project, Community Law Centre: LEGAL OPINION: in RE CITY OF CAPE TOWN'S PROPOSED Solar water heating by-law, 2007; available from Sustainable Energy Africa.

government component within national electricity planning. This would substantially address current difficulties in planning and committing resources for renewable energy and energy efficiency initiatives within municipalities.

The White Paper on Renewable Energy Policy (2003) seeks to ensure that renewable energy is a significant part of the country's energy mix. Energy efficiency is also identified as an important facet of integrated energy planning and the policy states that the greatest potential for efficiency measures is in the industrial and household sectors. It further points out that local government can play a large role in improving energy efficiency by ensuring the existence of applicable laws, education Programme and policies.

The White Paper on National Climate Change Response (2011) presents the country's vision for an effective climate change response and the long-term transition to a climate-resilient low carbon economy and society. Cliffe Dekker Hofmeyr feel that this policy document does not clearly argue for the benefits of renewable energy and energy efficiency. However, among the identified interventions to mitigate emissions, the main opportunities consist of energy efficiency measures, demand-side management and moving to a less emissions-intensive generation mix. It is however unclear how municipalities are empowered to go about implementing and achieving these goals, although they are identified as key partners, with SALGA as a key support (Section 10.2.6).

While regulations and policies exist at a national level to promote renewable and energy efficiency, very little evidence is found of municipalities that utilize their legislative powers to pass bylaws to encourage or enforce the promotion of these approaches within the municipality. The Municipal Systems Act does empower municipalities to pass bylaws for energy efficiency and renewable energy, however, the preferred approach by municipalities has been to develop policies, plans and strategies. It should be noted that policies, plans and strategies do not impose the same legal obligation as created by bylaws. Municipalities with detailed energy efficiency and renewable energy strategies, and a clear motivation for initiating energy efficiency and renewable energy initiatives, have been more successful in implementing these than municipalities approaching this area of work on an ad hoc basis. It is imperative for detailed action plans to be developed alongside these strategies.

The national legislative environment also imposes numerous challenges for municipalities to implement these initiatives. This includes not clearly specifying the role/mandates of municipalities in implementing energy efficiency and renewable energy measures. For example, some policies might set targets for the implementation of energy efficiency and renewable energy at a national level, without clearly identifying the municipal mandate in this regard. If municipalities are expected to contribute, as broadly identified in policy, these need to be translated into specific Key Performance Areas (KPA's) within municipal management systems. The Municipal Financial Management Act (MFMA) is also complex in relation to municipal procurement abilities for both energy efficiency and renewable energy technologies.

The National Energy Regulator of South Africa's (NERSA) lack of enforcement of the *Dx license conditions*, which empower the regulator to enforce stricter energy efficiency and renewable energy conditions on municipalities that have specified minimum requirements, is seen as being a barrier, or opportunity missed, in the implementation of energy efficiency and renewable energy initiatives.

As noted in Section 1 above, the market development that is beginning to see rooftop PV becoming affordable at a household and business level, and on-ground installation of systems and grid feed-in applications, also means that local government have to engage with this sector.

3. The municipal energy picture

3.1 State of the data and data protocols

Energy data is not collated along the lines of municipal geopolitical boundaries, making the exercise of putting together a local energy picture, for individual municipalities, complex. Most Metros have done detailed State of Energy studies and a number of the 'secondary cities' are beginning to follow suite. However, there is limited information for some of the smaller towns. Data collated here comes predominantly from Sustainable Energy Africa's State of Energy in South African Cities reports (2006 and 2011), which in turn have drawn on local state of energy reports and some original data collation, and data recently compiled through the SALGA SDC and ICLEI Urban-LEDs Programme for secondary cities. *Figures therefore come from different years and are indicative, but cannot be examined comparatively.*

The following particular difficulties exist in relation to developing a local level energy picture:

- a. Liquid fuel data is made available, as per latest ruling of the Competitions Commission, after a 'reasonable time period', which, for annual consumption data, is six months after the period in question. This is a reasonable time frame and this outcome of the Commission is welcome. However, data is still measured along magisterial district lines, making local estimations somewhat clumsy. SEA have provided a national 'tool' that makes a broad sweep estimation that can be used by municipalities, but detailed local level studies should refine this.
- b. Municipal electricity departments are happy to make electricity data available. At a high level this is easily accessible, but sector breakdown becomes difficult due to different billing structures. Eskom data is not measured according to municipal boundaries. However, they are sometimes able and prepared to provide high quality data approximating these boundary lines, in other instances they do not permit this to be made available, or at least published, due to customer confidentiality (for e.g. where they may supply only one or two large customers in an area the concern is that the publication of this data would be considered a breach of confidentiality) as well as Municipal-Eskom competition issues.
- c. Coal and LPG is not regulated and data very hard to quantify, or apportion.
- d. Harvested fire wood and other biofuel use is hard to quantify.

State of energy reporting for South African cities and towns follows global norms and protocols for local level energy and GHG emissions reporting. This means that all energy consumed within an area, is counted within that area. A full set of municipal energy data, should therefore, by definition, add up to national energy consumption totals. Available local level data⁶ is presented in Table 2.

⁶ NOTE: this data is compiled from existing data and is not from a single source year, making any comparisons between cities and towns difficult. However, the data is able to provide broad strategic indications. A data update exercise, through SEA's City Energy Support Unit, is scheduled to take place in 2014. A full set of data, with data sources noted, is to be found in Appendix 3.

Table 2: Municipal energy overview 2014*NB Figures come from different years and are indicative, but not comparative.*

Municipality	Code	Energy (GJ)	Electricity (GJ)	Liquid Fuel (GJ)	tCO ₂	Population	GVA (millions)	GJ/GVA (millions)	GJ/capita	tCO ₂ /capita	Data year
METROS											
Buffalo City	A	21,434,507	4,655,834	14,914,690	2,513,420	724,308	34,357	624	30	3.5	2007
Cape Town	A	195,994,461	48,303,379	144,635,091	24,081,610	3,497,097	182,518	1,074	56	6.9	2009
Ekurhuleni	A	181,112,506	39,547,868	141,564,637	20,314,662	3,178,470	159,724	1,134	57	6.4	2011
EThekweni	A	191,122,738	42,427,468	140,977,007	22,815,537	3,584,680	176,100	1,085	53	6.4	2010
Johannesburg	A	142,612,254	52,493,812	85,977,722	21,302,088	3,888,182	285,926	499	37	5.5	2007
Mangaung	A	18,163,624	5,042,761	12,870,963	2,360,628	662,063	17,955	1,012	27	3.6	2004
Nelson Mandela Bay	A	32,191,176	11,133,645	20,430,591	4,669,993	1,050,934	54,398	592	31	4.4	2007
Tshwane	A	104,513,830	42,497,981	52,583,464	16,573,293	2,345,909	169,205	618	45	7.1	2007
SECONDARY CITY											
KwaDukuza	B2	5,315,012	2,299,023	3,015,990	866,873	231,189	24,358	218	23	3.7	2012
Mbombela	B1	11,684,300	1,204,936	10,479,364	1,081,531	527,203	11,544	1,012	22	2.1	2007
Msunduzi	B1	25,034,993	6,447,101	10,069,502	3,229,878	616,733	17,057	1,468	41	5.2	2007
Polokwane	B1	11,461,953	1,842,075	9,619,878	1,197,410	561,770	18,949	605	20	2.1	2007
Sol Plaatje	B1	5,642,450	1,338,037	4,236,374	684,566	243,015	10,772	524	23	2.8	2007
Tlokwe	B1	4,332,903	1,393,402	2,919,927	712,768	129,075	3,823	1,133	34	5.5	2004
RURAL											
King Sabata Dalindyebo	B2	5,055,483	974,635	4,065,745	560,514	451,711	12,301	411	11	1.2	2011
Thulamela	B4	2,445,150	911,129	1,534,021	366,073	618,462	No data	No data	4	0.6	2011
INDUSTRIAL											
Rustenburg	B1	57,183,679	39,630,023	11,439,133	12,640,515	549,575	26,620	2,148	104	23.0	2011
Saldanha	B2	23,477,790	4,021,563	3,004,343	2,690,743	78,985	4,359	5,386	297	34.1	2007
Sedibeng	C1	88,944,560	40,532,772	16,015,511	15,325,469	800,833	22,845	3,893	111	19.1	2007
Steve Tshwete	B1	19,782,826	10,988,089	8,794,737	3,771,142	229,831	No data	No data	86	16.4	2011
uMhlathuze	B1	60,263,447	51,780,470	7,116,064	15,315,773	360,002	13,664	4,410	167	42.5	2004

3.2 Local energy demand, supply and related carbon emissions

Whilst noting that the data sets are far from comprehensive, the data provides important indications for the strategy development process. The most concentrated consumption of energy takes place within the metros: **31% of national electricity consumption and 66% of liquid fuel (petrol, diesel, LPG, HFO, etc.) consumption takes place within these 8 municipalities.** This offers important opportunities for economies of scale and reduced transaction costs.

Table 3: Municipal vs. national energy consumption

Municipality type	Liquid fuel (GJ)	% of national	Electricity (GJ)	% of national	Ave % contribution municipality type
Metro (data for 8 cities)	613,954,165	65.6%	246,102,749	31.3%	4%
Secondary city (data for 6 city/towns)	40,341,035	4.3%	14,524,574	1.8%	0.3%
Rural (2 municipalities)	5,599,766	0.6%	1,885,764	0.2%	0.1%
Industrial (5 towns)	46,369,788	5.0%	146,952,918	18.7%	3.7%
Remainder	228,988,562	24.5%	375,765,996	47.9%	Approx. 0.2%
National*	935,253,316	100.0%	785,232,000	100.0%	

1. National electricity figure: Eskom 2007 Annual Report
2. National liquid fuel figure: 2007 SAPIA fuel sales data

A closer analysis of the proportion of transport fuels (petrol and diesel) shows that over half of the consumption of these fuels takes place within the metros and secondary cities, and close on 60% of national petrol consumption takes place in dense urban areas, indicating that urban spatial form, urban management and local transport options may have a major role to play in levels of consumption.

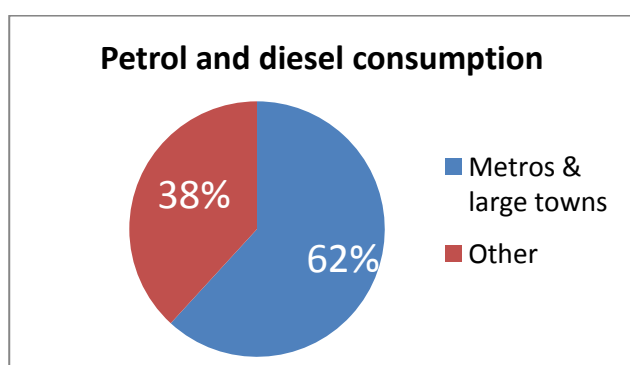


Figure 1: Urban transport fuel consumption as a portion of national (SAPIA, 2007)

Despite the inclusion of some of the important ‘secondary cities,’ such as Mbombela, Polokwane and Msunduzi, the 13 other municipalities for which data is available account for only 10% of national liquid fuel consumption and 21% of electricity use. The industrial nature of municipalities such as Rustenburg (platinum mining), Steve Tshwete (steel production), uMhlathuze (aluminium smelting) and Saldanha (steel production) account for the relatively high proportion of electricity use in these 13 municipalities.

While per capita energy consumption is reasonably similar within the metros and 'secondary cities,' energy consumption per capita in the smaller, more rural and/or less developed towns, such as King Sabata Dalindyebo and Thulamela, is very low. Both of these municipalities fall into former 'Bantustans' areas created by the Apartheid government and, as a result, lags other municipalities in infrastructure development. As a comparison, whilst Polokwane and Thulamela municipal areas both have a similar-sized population (roughly 600,000), Thulamela's energy consumption per capita is drastically lower; almost by a factor of ten (4 GJ/capita versus Polokwane's 35 GJ/capita).

The energy picture is fossil fuel dominated: Liquid fuel is derived from imported oil and produced from coal and natural gas (over 30% of total liquid fuel consumption)⁷. Electricity is from Eskom generation, of which final consumption is 90% coal-derived, 5% nuclear and 5% hydro derived (IRP 2010). Renewable energy via the REIPPP comes on line this year (2014) and by 2030 should represent 9% of final consumption. Heavy coal dependence has implications for GHG emissions and potential carbon taxes.

Within Mpumalanga, where most of South Africa's coal-fired electricity-generating power plants are situated, this is also a very local problem: air pollution due to the power stations results in respiratory illness, and land and water degradation. Coal trucks ferrying coal to the power stations damage roads. Municipalities within Mpumalanga noted that coal mining has a huge and damaging 'footprint.'

Considering energy-related carbon emissions per capita, the average amongst the metros is 6 tonnes of CO₂ per person. This is equivalent to large cities globally (Paris, London, Berlin). However, these international cities have far higher levels of development. Amongst secondary and smaller South African municipalities for which data is available, it is clear that heavy industry pushes per capita carbon emissions to extremely high levels. Notable is that in a number of secondary cities the per capita emissions falls between 1-3 tonnes CO₂. This is low by global standards and close to the global 'fair share' of carbon per capita (approx. 2 tonnes/person). While this often represents underdevelopment and poverty, it also offers an opportunity/challenge to ensure that the required future development enhances and supports these low emissions averages.

⁷ US Energy Information Administration: South Africa, January 2013 update

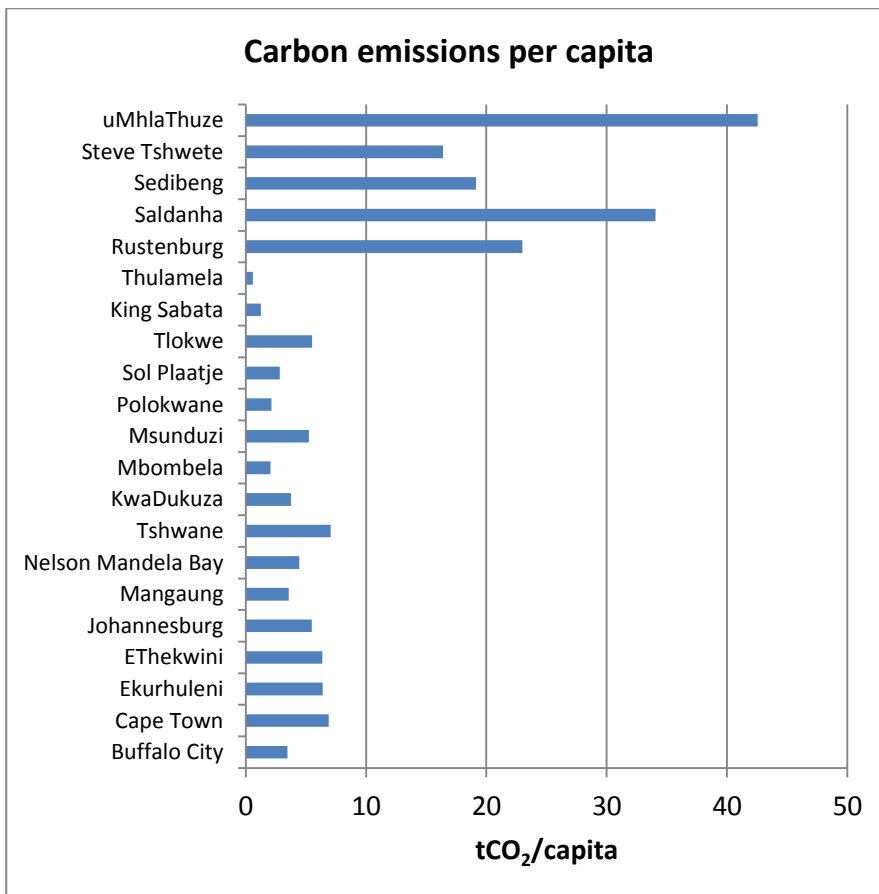


Figure 2: Carbon emissions per capita in South African municipalities (SEA, 2013)

The overarching data picture indicates that metros and secondary cities will be crucial partners in meeting energy-related emission-reduction goals (where intervention transaction costs may be lower). The majority of the poor, given urbanisation, also live in larger cities and towns, making these important centres for addressing energy poverty. In municipalities with smaller populations and lower levels of urban infrastructure, the most vital energy issues may relate to energy access for residential and productive development and ensuring that the infrastructure development path facilitates a low-carbon trajectory. Where transaction costs are higher, it makes sense to consider centralising as many interventions as possible. This must be done through engagement with local government, rather than top-down and not taking into account local imperatives and systems (e.g. reporting time frames differ from national to local government).

3.3 Sector breakdowns

Within municipal energy consumption, the **transport sector** (generally includes, petrol, non-industrial diesel, aviation gas, international marine fuel and jet fuel consumption) accounts on average for half of total consumption. Within the metros that house airports and harbours, and towns with limited industry, this figure is even higher (60-77%). In municipalities with substantial industry, this proportion can be lower (example: 13% in Rustenburg).

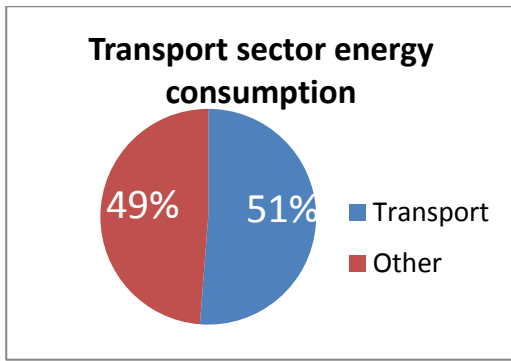


Figure 3: Average transport sector related energy across all municipalities with available data (SEA, 2013)

Municipal energy efficiency must, critically address the transport sector. This needs to consider efficient vehicles, cleaner fuel, public transport, smart/unified transport systems. However, urban form and 'healthy' densification, as well as lifestyle changes must form part of this.

Data also indicates that non-motorised transport (walking and cycling) forms a huge proportion of all mobility in our municipal areas. Within the metros, in 2001, this was on average **43% of all mobility** (Ekurhuleni is the outlier with a much smaller proportion of 'foot' transport); and in the 'secondary' and smaller towns this was, on average **53%**⁸. It must be noted that the data is old, as the 2011 StatsSA Census did not include transport mode-related queries for comparison. Nevertheless, even if substantial improvement has occurred, these figures are sizeable and, from the perspective of addressing poverty, inequality and access it is important this be noted. Non-motorised transport support should be a cornerstone of any transport/mobility-related municipal strategies.

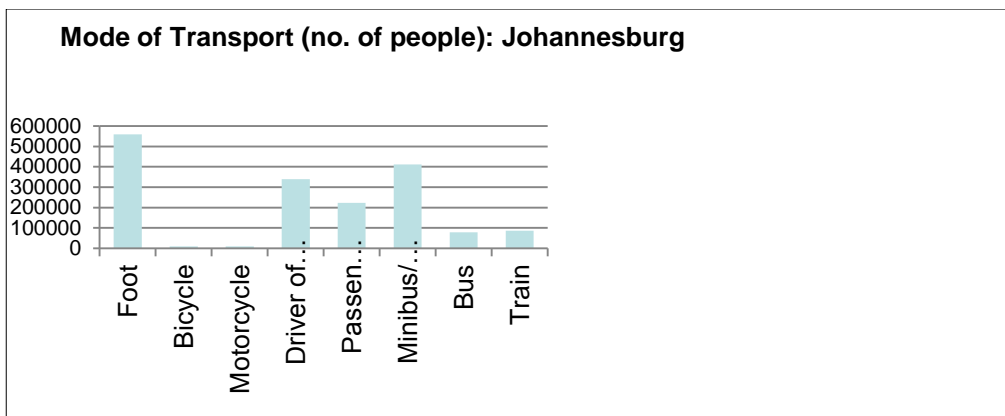


Figure 4: Mode of transport to work and school, 2001, StatsSA

Of the non-transport related sectors (industry, commerce and residential), the industrial and residential sectors make up the next-largest chunk of energy consumption, followed by the commercial sector.

Non-metro municipalities follow, broadly, the same pattern, save for slight variations: more rural municipalities have low levels of industry; and very high industrial energy consumption in industrial towns throws all other energy consumption proportions out (when industry data is removed, the remaining consumption exhibits similar characteristics to other towns). See Figure 5 below for illustrative purposes.

⁸ StatsSA Census 2011

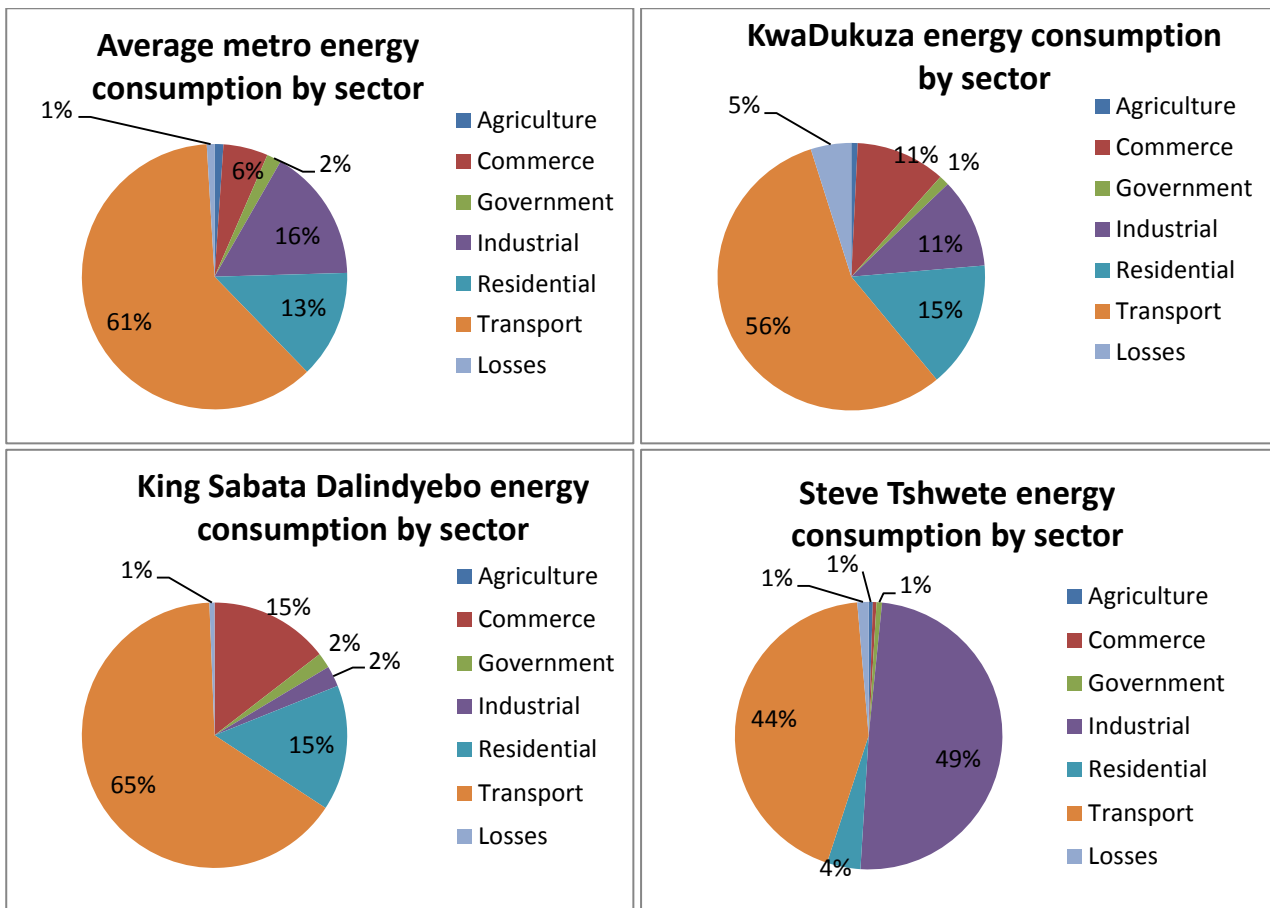


Figure 5: Average energy consumption by sector across metro cities and typical secondary and more rural municipalities. Note: excludes international marine fuels

The **commercial and residential sectors** both largely relate to the built environment. While households usually comprise some 15-20% of total energy consumption, within *electricity* consumption they consume **30-40% of the municipal total**, and this often during peak load times, thus representing an important energy efficiency and renewable energy opportunity (with lower load levels, the country can lower its installed capacity requirements, facilitating renewable energy development). Greater efficiency in the built environment of a town can also support business in the area. Security of supply is also important for business development.

Within the residential sector the Integrated National Electrification Programme (INEP) of government has had a substantial impact on electrification levels across the country: amongst the metros, the average electrification level amongst households is 89%; and amongst other municipalities within the data study, 87%. Rural electrification levels are lower, with only around 55% of rural population having access to grid-electricity⁹. The outstanding households are usually in more rural settings, where it is extremely costly to extend the grid connection, or amongst informal settlements in the urban context where issues of land rights, electrification standards, or accessibility inhibit electrification. However, it should also be noted that the figures for electrification include not only formal electricity connection, but informal, or 'illegal' connections. Formal electrification is often far lower and this means that many poor households, while they have access to electricity for lighting, do not benefit from the national energy poverty subsidy via the Free

⁹ US Energy Information Administration: South Africa, 2013.

Basic Electricity Grant, and suffer intermittent access, dangerous connections and often costly electricity that is paid for through a third party.

Whether formal or not, a positive trend with increasing access to electricity, is the reduction in paraffin consumption amongst households in South African municipalities¹⁰. Figure 6 below provides a visual overview of change in fuel source for cooking and lighting in South African households from 1996 – 2011. The increase in electricity is sizeable, particularly from 2001 – 2011. This seems to have directly replaced paraffin consumption.

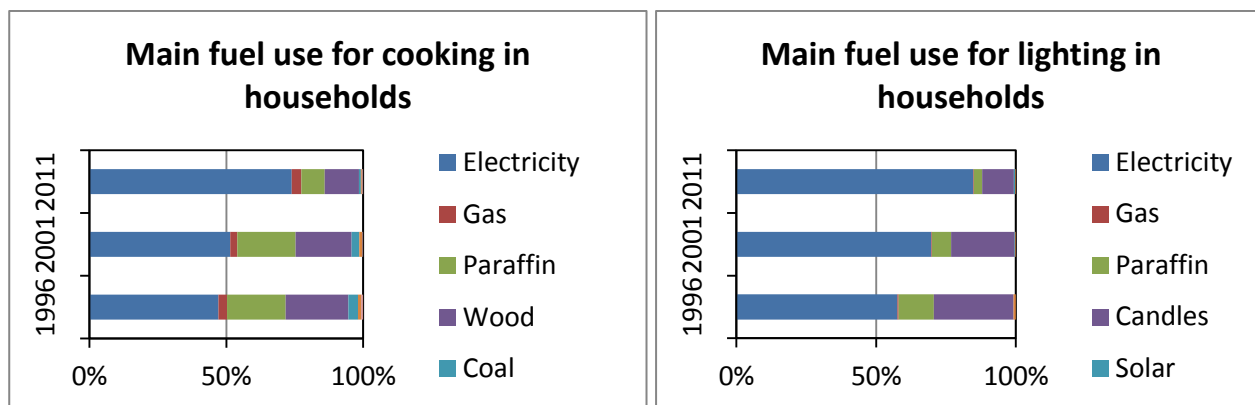


Figure 6: Main fuel use for cooking and lighting in households in South Africa 1996-2011 (Source: StatsSA Census 1996, 2001, 2011)

Despite impressive improvements, substantial households still suffer the burden of energy poverty, either through lack of access to modern, safe forms of energy (and consequent health/safety impacts), through badly designed housing that has very low thermal performance, or through the increasing proportion of household income that is spent on meeting energy needs. Addressing the hundreds of thousands of households suffering in these conditions is a primary task of South African municipalities wishing to address sustainable energy (EE/RE) issues.

Within mid-high income households in South Africa, the major fuel used for lighting, cooking and heating is electricity. This offers some scope for the possible expansion of cleaner fuels for cooking, such as LPG or natural gas. Within electricity consumption, the most sizeable end use is in heating of water. Geysers and water heaters have been implemented successfully in a number of municipalities and the potential for the expansion of solar water heating/heat pumps has long been understood. A national subsidy has been available to help overcome the major upfront capital cost barrier to uptake of solar water geysers or heat pumps. Mass rollout of the technology remains elusive and many municipalities have been exploring viable ways to support this. A challenge is that legal review indicates the difficulty of municipalities installing SWHs as municipal owned infrastructure within private properties, thus leaving the uptake entirely in private hands. The City of Cape Town has recently launched a programme of endorsing service providers who offer sound products with good associated financing options.

Amongst the built environment (commercial, residential and industrial) all new building, including low income housing, is now subject to the new, energy efficient building regulations captured in SANS 10400-XA. This requires that a specified efficiency per square meter is met in the building design, and a minimum of 50% of heating requirements must be met through solar water heating/heat pump. Challenges in

¹⁰ StatsSA Census 1996, 2001, 2011

enforcing the new regulations need to be addressed for the full effectiveness of these regulations to be realised.

Municipalities have some control over industry in their jurisdictions, through building regulation, electricity supply metering, Air Quality control and business licensing. However, real influence in industrial processing is usually vertical, through industrial bodies or business associations.

Sustainable energy development and GHG emissions: rapid municipal analysis tool¹¹

The table below is based on a growing understanding of key energy issues across the country. It is designed to support rapid analysis of energy development and GHG emissions issues and can form the basis of local energy policy and strategy or action plan development.

A and B2: metros and large towns	
Profile	Key issues
<ul style="list-style-type: none"> significant contribution to national energy consumption: some 40% of national electricity generated is consumed within the largest cities and towns; and over 50% of petrol and diesel; relatively high per capita carbon footprint (around 6-7 tons/capita for largest 5 metros; 4 tons/capita for large towns, smaller metros); transport responsible for over half of energy consumption and around 30% of emissions households responsible for around 30% of emissions – most of this occurring amongst mid-high income households, through electricity consumption industry can be substantial built environment broadly is a significant emissions contributing sector landfill gas can account for as much as 10% of GHG emissions Municipal activities account for only about 1 – 2% of emissions, but important area for quick wins and ‘leadership by example’. 	<ul style="list-style-type: none"> Critical partner in meeting national energy (security and efficiency) and GHG emissions reduction targets city economies vulnerable to increasing costs of energy and carbon majority of the country’s poorest now live in cities and larger towns and thus high proportion of the country’s energy poverty resides here need to reduce energy intensity through greater efficiency, renewable energy and encouraging diversification of economic activity and improved mobility improved mobility (better public transport and transport networks) can also address livelihoods opportunities/economic mobility of people mid-high income households are large contributors to emissions profile; usually 50% of household electricity in this sector is for water heating, so introduction of solar water heating is critical enforcing efficient building regulation to improve efficiency of the built environment engagement with commerce and industry to support more efficient electricity use unsafe energy use in poorer households contributes to fires and health issues – important to move to 100% electrification improve thermal efficiency of poor households, possible provision of solar water heating, for greater resilience (better health, reduction of energy poverty) waste recycling and management of landfill gas is an important area to address town planning and economic development approaches into the longer term
B3, C1: large town as core, and small towns with largely commercial farms	
Profile	Key issues
<ul style="list-style-type: none"> broad profile similar to cities: liquid fuels (mostly for transport) contribute around 50% to energy consumption; but electricity is the largest contributor to GHG emissions carbon footprint ranging from approximately 2 – 6 tons/capita (4 tons/capita is the global average) Mid-high income households contribute significantly to electricity emissions 	<ul style="list-style-type: none"> poor and informal households suffer from energy poverty – thermally efficient houses and access to affordable, modern energy sources and efficient transport/mobility is important mid-high income households large contributors to emissions profile; usually 50% of household electricity in this sector is for water heating, so introduction of solar water heating critical, but not a primary municipal function (information, endorsement, encouragement role) waste recycling and management of landfill gas is an important area to address; waste treatment – ‘buy back’ recycling centres may reduce waste and contribute to

¹¹ This has been developed from the GHG Emissions and Energy Development Analysis Table in the DEA/SALGA/COGTA ‘Let’s Respond: Toolkit to integrating climate change risks and opportunities into municipal planning’, 2012

<ul style="list-style-type: none"> Municipal activities account for from 1 – 2% of emissions, and offer important area for quick wins and ‘leadership by example’. 	livelihoods
B4, C2: rural villages and largely retail service towns	
Profile	Key issues
<ul style="list-style-type: none"> energy consumption constrained – energy for residential and productive development still needed electrification of rural areas is still major issue carbon footprint very small (1 – 2 tons/capita) – ‘carbon space’ for development transport is large energy consumer households are the major contributors to electricity consumption; with commerce and agriculture following Municipal activities account for from 1 – 2% of emissions, and offer important area for quick wins and ‘leadership by example’, but this should focus on fairly simple interventions, which should be centrally coordinated (e.g. rollout of efficient municipal lighting). 	<ul style="list-style-type: none"> unsafe energy use (wood and coal fires, paraffin, candles, illegal/poor electricity connections) in poorer households contributes to fires, accidents and poor health which will be worsened by climate change electricity distribution often 100% in hands of Eskom – need close cooperation to continue with electrification programme Rollout of off-grid electrification requires intensification as well as information and education amongst recipients Technical capacity within municipalities is limited deforestation where wood is used for cooking and heating economy and welfare held back by intermittent electricity supply and low voltage times efficiency in lighting and appliances can contribute significantly to energy cost savings improved thermal quality of housing will reduce need for indoor heating (and related pollution/cost) and improve the health of residents improved transport networks needed likely potential for energy from landfill or waste water gas is small; but some emissions savings may be gained through better management and/or technologies deployed in waste management

4. Energy access¹²

4.1 Universal access to electricity, backlogs in delivery and pro poor policies

Access to electricity is determined by physical connection to either the grid, or an alternative off-grid solar system, as well as the affordability of that electricity – poor households need to be able to afford electricity to benefit from its use.

In 1994, a key objective of the newly elected government was universal access to electricity for all of its citizens by 2012. To this end the government embarked on an accelerated national electrification programme, targeted at low-income households under the Integrated National Electrification Programme (INEP). Household electrification was increased from 36% in 1994 to 87% (5.7 million households and mostly in urban centres) in 2012¹³, a significant milestone for South Africa and unprecedented internationally.

¹² The information on energy poverty in this section is from a Heinrich Böll Stiftung Southern Africa-funded research project called: **Tackling Urban Energy Poverty in South Africa – A Report**, undertaken and compiled by Sustainable Energy Africa, January 2014.

¹³ DoE, 2012

However government recognised that due to infrastructure constraints and increasing growth rates in household's electricity demand, that the goal of universal access would need to be adjusted. The DoE's Electrification Roadmap commits to reach 97% access by 2025.

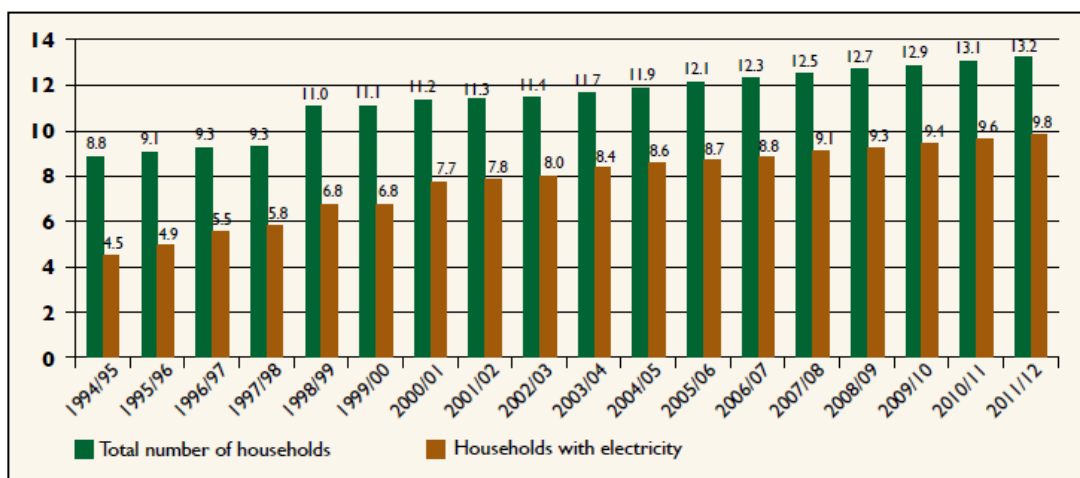


Figure 7: Comparison of total number of households and electrified households electrified in South Africa (in millions) (DoE, 2013)

The current electrification backlog stands at 3.3 million households comprising 1.2 million informal households and 2.1 million formal households requiring an electricity connection¹⁴ and this is expected to grow at 2% on a national average per annum¹⁵. Access to electricity has been slower in rural areas than in urban centres. South Africa's electrification programme has been grid focussed due to the INEP programme out of, and building on, the Eskom grid-electrification projects of the late 1980s. 'Off grid' electrification, although becoming part of the INEP Programme on its establishment in 2000, has lagged. Between 1994 and 2010 some 46 000 households, 3 000 schools and 345 clinics in rural areas were supplied with non-grid electricity (relative to 5.2 million grid electrified households and 12 000 schools connected during this time)¹⁶.

According to the 2011 census 85% of households have access to electricity based on those using electricity for lighting. This figure includes approximately 1.2 million households that are not metered, such as backyard dwellers. If these households are considered 'unelectrified' (as INEP figures show), then the percentage of households with a metered supply of electricity falls to 77%. This has implications in terms of the actual picture in the country and for government to reach its 2025 target. Resolution of issues relating to informal/illegal connections vests with municipalities.

Government's major poverty energy poverty subsidy is the **Free Basic Electricity (FBE)**, which states that every indigent household should receive 50kWh of free electricity per month in order to meet basic energy needs. According to the DoE (2013) 69% of poor households are benefitting from free basic energy policies, however, the indications are that this figure may be lower as the method of measure is unclear – many municipal indigent registers do not include all poor households (for example, in eThekweni, the figure is as low as 37% of the extreme indigent and 13% of all poor households¹⁷). Some municipalities give FBE based

¹⁴ DoE, 2013

¹⁵ DME, 2007

¹⁶ DoE, 2013

¹⁷ Euston-Brown, Durban Climate Change Response Strategy: Sustainable energy report, 2013

on electricity consumption and in this case there is leakage of the subsidy to wealthier households and where two or more poor households are connected to one meter (as is the case with the backyard dweller) their consumption takes them above the benefit threshold.

Recognising that FBE and electrification will not reach all households in the near future, national government introduced the **Free Basic Alternative Energy (FBAE)** policy in 2007 to support indigent households by providing them with the equivalent of R56.29 per month of alternative fuels/technology such as paraffin and Liquefied Petroleum Gas (LPG). To date the number of households receiving FBAE is small. There are significant challenges for municipalities to roll out FBAE as it is very difficult to administer and monitor.

To address the fact that poor households are spending a far higher proportion of the household income on electricity¹⁸, the National Electricity Regulator of South Africa (NERSA) in 2010 introduced the **Inclining Blocked Tariff (IBT)** to help cushion low income electrified households from the particularly sharp electricity price increases. The system introduces higher per unit charges as the rate of consumption increases. A secondary goal of the IBT was to promote energy conservation through applying high tariffs in the upper consumption brackets. PDG have undertaken fairly detailed research into the impact of IBT in terms of meeting the primary affordability objective. Significant findings include the fact that only some 30% of municipalities have implemented these tariff structures, the rest have continued with other structures – usually flat rates per unit. This may well relate to the challenges in implementing the IBT:

1. Technical constraints to introducing this within the pre-payment metering system.
2. Multiple households share a single meter such as the case of backyard dwellers, which results in the benefits of free or below cost allocation defined by the lower first consumption block of the IBT not being achieved.
3. IBTs may also subsidise wealthier customers with low consumption, as well as irregular users of electricity, such as wealthy customers who own a holiday home.
4. Municipalities may lose important revenue streams from high use customers who would then reduce consumption (elastic demand).

The second major finding of the study is that, where it has been applied, the IBT system has had a very small impact on affordability: the impact on bills compared to the flat rate tariffs applied previously is marginal and yet a large amount of cost and effort has been required to implement these new tariffs.

Finally, the study concluded that the poor have not been insulated from increases in electricity tariffs. The way forward would be to allow for flexibility with regard to the IBT tariff structure (those who have applied it continue to do so, those who have not yet, maybe continue with flat rate) and focus efforts on keeping the bill for low income consumers as low as possible¹⁹.

4.2 Household Energy Use Patterns

According to the survey undertaken by the DoE²⁰ in 2012, 47% of South Africans are energy poor as they spend more than 10% of their income on energy needs. Energy poverty is also manifest in the persistent multiple fuel use patterns displayed by poor households across South Africa despite being electrified (see

¹⁸ PDG, 2013

¹⁹ PDG, 2013

²⁰ This was a nationally representative survey undertaken by the DoE in 2012 to gather information on energy related behaviour and perceptions in South Africa with a particular focus of energy poverty.

Figure below). This means that almost 7 million households continue to largely rely on unsafe, unhealthy forms of energy such as paraffin, coal and biomass, when they cannot afford to buy electricity.

Household energy use patterns emerging over the last 10 years show an increased uptake in electricity to fulfil basic household energy needs over time particularly with respect to lighting and cooking— see Table 6 below. The use of electricity for cooking has shown the largest increase (23%) relative to other end uses.

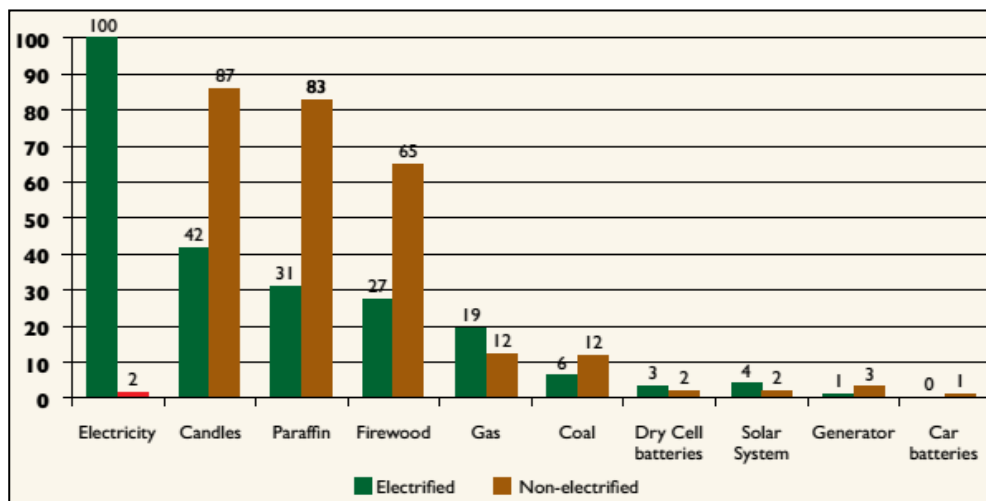


Figure 8: Multiple energy sources used by electrified and unelectrified poor households (Source: DoE 2012).

According to the DoE 2012 survey a breakdown of household energy patterns shows:

Lighting:

- Electrified households across South Africa almost exclusively use electricity for lighting (97% of the survey sample) with a small component of households continuing to rely on candles.
- Two thirds of unelectrified households rely on candles as the main lighting source while the remaining third rely mainly on paraffin.

Cooking:

- 76% of households use electricity for cooking. In formal urban areas this is as high as 91%.
- In urban informal settlements two thirds of households use electricity for cooking (68%), while close to third (27%) of households rely on paraffin.
- 8% of electrified households continue to rely on firewood for cooking.
- Non-electrified households use paraffin and firewood as the dominant energy source for cooking (50% and 40% respectively).

Space heating:

- Two thirds of South African households (65%) utilize an energy source for this end use, the remaining third keep warm by dressing up warmly and using blankets.
- 38% of households use electricity as the main source of energy for space heating. In households in formal urban areas electric heating predominates (50%).
- 12% of households use paraffin and 9% use firewood. Coal, gas and other sources are utilised by less than 5% if households.

- In non-electrified households 40% use firewood, 4% coal and 18% use paraffin.
- Urban informal areas tend to use paraffin for heating (20%), while 5% use firewood.

Rural households tend to rely more on biomass resources than those living in towns: an estimated three quarters of households in rural, traditional authority areas and 60% of rural farm dwellers use firewood as an energy source, compared to only 11% of households in formal urban areas, and 17% in informal settlements²¹.

Urbanisation and informality

South Africa continues to experience rapid urbanisation, with approximately 64% of the country’s population currently residing in urban areas (Figure 8 below) of which 40% are located in the metropolitan municipalities, the rest in smaller towns and peri-urban settlements. Urban populations are forecasted to reach 70% by 2030 and 80% by 2050²². The national census data of 2001 and 2011 reveal that the metros (South Africa’s largest cities) are growing in population size on average at a rate of 2% per annum, and the number of households is also increasing at a rate of 3%.

Despite national government’s enormous progress in universal access to free and basic services, municipalities are struggling to keep pace with the increasing demand of their fast growing populations. Research has pointed to trends in developing countries where urbanisation, if managed well will generate significant opportunities for growth, poverty reduction and environmental sustainability and if not will lead to increasing levels of poverty leaving many people without access to basic services.

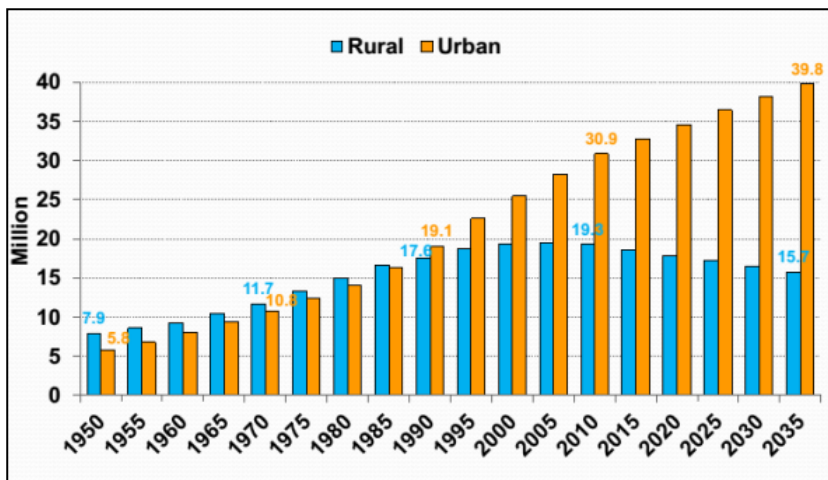


Figure 9: Urban versus rural population growth in South Africa from 1950-2035 (Source: Institute for Futures Research, University of Stellenbosch, 2013)

Informality commonly occurs in situations of rapid urbanisation. South Africa has some 1.96 million households living in informal dwellings²³. This equates to approximately 13.6 % of the national population. Energy poverty is particularly prevalent in informal settlements (usually situated on land unauthorized or not zoned for residential development), which includes those households living in backyard shacks of formal properties in overcrowded conditions. The majority of informal settlements are situated on the

²¹ DoE/HSRC Household Energy Survey, 2012

²² NDP, 2011; SACN, 2011, COGTA, 2013

²³ An informal dwelling defined by Statistics South Africa is a “Makeshift structure not approved by a local authority and not intended as a permanent dwelling. Typically built with found materials (corrugated iron, cardboard, plastic, etc.)...”

periphery of cities and many do not have formal access to Eskom or Municipal distributed electricity. Those that are electrified are generally receiving electricity through illegal connections although there is a drive to electrify informal settlements.

5. Energy efficiency and Demand Side Management

Extensive work has been undertaken to explore the energy efficiency potential within municipalities (with a focus on the dense urban component) in order to understand the role of local level action towards national and local goals and targets²⁴. Given the frequently raised barrier to efficiency uptake – that it will impact negatively on revenue in already cash-strapped municipalities – the research has also explored the implications of efficiency uptake on municipal electricity consumption and related revenue impacts.

5.1 Potential impact of interventions in terms of energy savings on a Municipal level

Research and modelling (drawing predominantly on data derived through the M&V process within the Eskom IDM Programme) provide an indication of the kind of savings that could be expected from tried and tested energy efficiency interventions. Figure 10 below indicates which interventions will make the greatest impact on electricity use reductions within a typical metro city, i.e. of the total possible efficiency, which interventions contribute what proportion. In this regard solar water heaters (25%) and efficient lighting (9.6% + 12.2% = 21.6%) for the residential sector are the dominant interventions, with HVAC (13.2%) for the commercial sector and efficient motors (7.6%) for the industrial sector also carrying some weight. It does need to be noted that further, detailed data analysis is required on the efficiency output of solar water heating as this intervention is highly behaviour dependent, and M&V data has indicated lower than anticipated efficiency results²⁵.

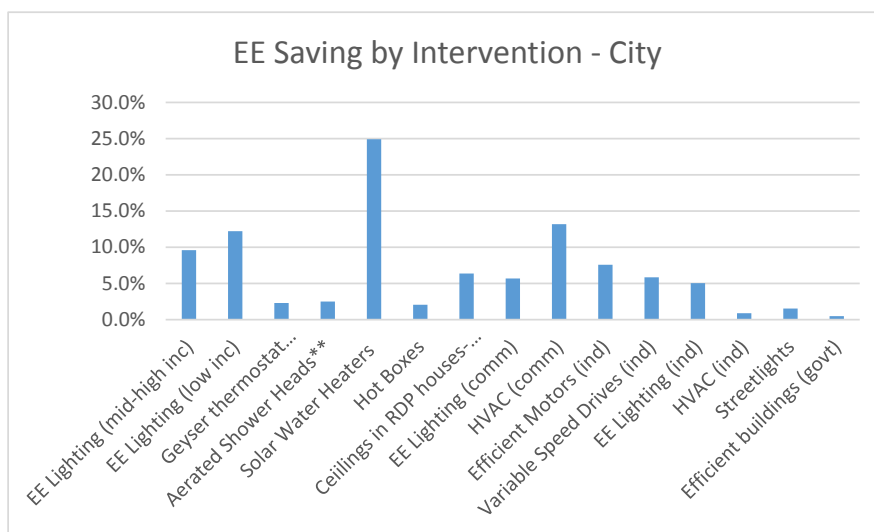


Figure 10: Relative contribution of different interventions towards energy efficiency potential within a typical metro (SEA, 2014)

The impact by intervention for a typical smaller town is still dominated by SWHs and efficient lighting, but even more so than in a typical city's case. These results are indicated graphically in Figure 11 below.

²⁴ This draws on over fifteen years of peer reviewed project work of Sustainable Energy Africa, based also on Eskom M&V figures. Most recent calculations presented here are derived from with completed in a REEEP-funded project exploring the impact of energy efficiency and renewable energy on municipal revenue.

²⁵ Pers com. Eskom IDM Programme (John Philby) and City Power (Paul Vermeulen), March 2014.

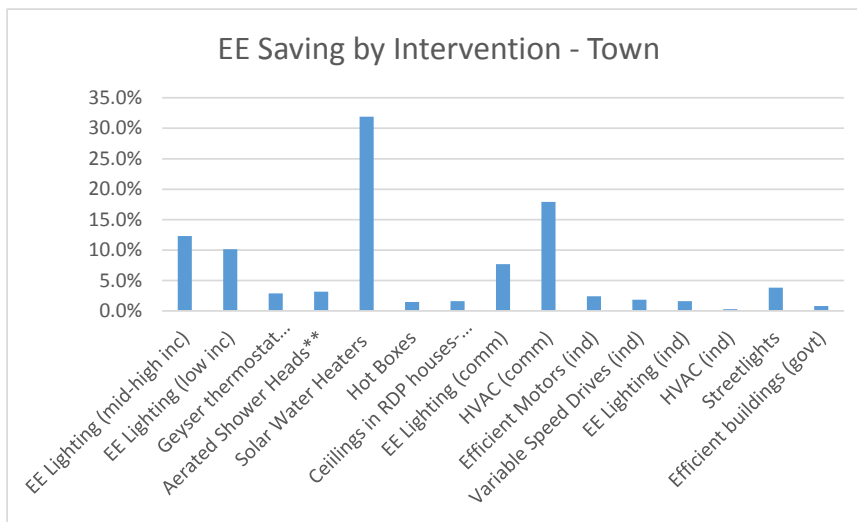


Figure 11: Relative contribution of different interventions towards energy efficiency potential within a typical smaller town (SEA, 2014)

Strategically important energy efficiency interventions, considering municipal ‘reach’, impact on energy savings and addressing poverty, are:

1. efficient lighting in low income housing
2. ceiling retrofit (thermal efficiency) in existing low income housing stock
3. efficiency retrofit (SWH or heat pump) of residential mid-high income water heating appliances – through endorsement and other schemes
4. efficiency retrofit of HVAC systems in commercial sector – through information and other schemes
5. efficient lighting across all sectors.

5.2 Potential impact of interventions in terms of effective demand management for municipalities

Load management is particularly important for municipal electricity distribution business. A trend in the larger cities is a decrease in total demand against a ‘business as usual trajectory’ (in many cases we are seeing demand sitting at 2006 or 2007 levels), but this is not accompanied by a reduction in maximum demand, or peak. This is largely driven by the growth in residential sector connections. Low income household electricity consumption is relatively small, and few efficiency opportunities exist as poor households do not waste electricity. However, these households drive a short, sharp morning and evening spike in demand which is extremely costly to Municipal distributors as these customers are cross-subsidised from revenue from wealthier customers and at peak this electricity is at its most expensive to supply.

This makes demand management of peak within low income households an important area of energy management. The indications are that water heating is a large component of this peak, as well as cooking, making the rollout of low pressure solar water heating and possibility of expanding gas usage for cooking, something that needs to be pursued.

5.3 Potential impact of efficiency on electricity sales at a Municipal level

Municipalities around South Africa are currently experiencing a drop in electricity sales, particularly in the residential sector. While it is not completely clear why the sales are dropping, it is most likely due to

implementation of more energy efficient interventions, and behaviour change, in response to rapidly increasing electricity prices.

To determine the potential impact of energy efficiency and behavioural interventions on electricity sales, a spreadsheet has been developed by Sustainable Energy Africa (SEA), the results of which are presented below for both a typical city, and a typical smaller town²⁶.

Table 4 below indicates that if all sectors (residential, commercial, industrial and municipal) were to implement energy efficiency and behavioural interventions (100% implementation), electricity sales would reduce by 21.2%. However a complete rollout will take time, and it is estimated that uptake in 10 years' time will be of the order of 50%-85% (Rogers curve estimation). Based on this assumption, a reduced electricity sales impact of 10.6%-18% is expected.

Table 4: Impact of energy efficiency on city electricity consumption and related revenue

City	Potential total energy reduction			Uptake by 2024		Impact as % of all interventions
	Technology	Behavioural	Total	Low (50%)	High (85%)	
Residential (34% of total consumption)						
EE Lighting (mid-high inc)	1.8%	0.3%	2.0%	1.0%	1.7%	9.6%
EE Lighting (low inc)	2.1%	0.5%	2.6%	1.3%	2.2%	12.2%
Geyser thermostat adjusting (10 degrees)	0.0%	0.5%	0.5%	0.2%	0.4%	2.3%
Aerated Shower Heads	0.5%	0.0%	0.5%	0.3%	0.4%	2.5%
SWH	5.3%	0.0%	5.3%	2.6%	4.5%	24.9%
Hot Boxes	0.4%	0.0%	0.4%	0.2%	0.4%	2.0%
Ceilings in RDP houses-isoboard	1.3%	0.0%	1.3%	0.7%	1.1%	6.4%
Sub Total	11.5%	1.2%	12.7%	6.3%	10.8%	59.9%
Commercial (16% of total consumption)						
EE Lighting	0.7%	0.5%	1.2%	0.6%	1.0%	5.7%
HVAC	1.9%	0.9%	2.8%	1.4%	2.4%	13.2%
Sub Total	2.6%	1.4%	4.0%	2.0%	3.4%	18.9%
Industrial (41% of total consumption)						
Efficient Motors	1.6%		1.6%	0.8%	1.4%	7.6%
Variable Speed Drives	1.2%		1.2%	0.6%	1.0%	5.8%
EE Lighting	0.8%	0.2%	1.1%	0.5%	0.9%	5.0%
HVAC	0.1%	0.0%	0.2%	0.1%	0.2%	0.9%
Sub Total	3.8%	0.3%	4.1%	2.0%	3.5%	19.3%
Municipal (3% of total consumption)						
HPS Streetlights	0.3%		0.3%	0.2%	0.3%	1.5%
Efficient buildings	0.1%		0.1%	0.0%	0.1%	0.5%
Sub Total	0.4%	0.0%	0.4%	0.2%	0.4%	2.0%
Total	18.2%	2.9%	21.2%	10.6%	18.0%	100.0%

A similar study was performed on a small town, and the results in Table 5 show a potential drop of 13.5% - 22.9% in electricity sales by 2024. This figure is higher than a typical city due to the higher percentage of overall consumption by the residential sector where the EE gains are the greatest

Table 5: Impact of energy efficiency on 'smaller' town electricity consumption and related revenue

²⁶ An interactive tool has also been developed through the SEA REEEP-funded project. This enables a municipality to input their own data and evaluate the impact of various efficiency scenarios. The tool is available on: <http://www.cityenergy.org.za/category.php?id=2#1>.

Town	Potential total energy reduction			% uptake by 2024		Impact as % of all interventions
	Technology	Behavioural	Total	Low (50%)	High (85%)	
Residential (45% of total consumption)						
EE Lighting (mid-high inc)	2.9%	0.4%	3.3%	1.7%	2.8%	12.3%
EE Lighting (low inc)	2.0%	0.8%	2.7%	1.4%	2.3%	10.1%
Geysers thermostat adjusting (10 degrees)	0.0%	0.8%	0.8%	0.4%	0.7%	2.9%
Aerated Shower Heads	0.9%	0.0%	0.9%	0.4%	0.7%	3.2%
SWH	8.6%	0.0%	8.6%	4.3%	7.3%	31.9%
Hot Boxes	0.4%	0.0%	0.4%	0.2%	0.3%	1.5%
Ceilings in RDP houses-isoboard	0.4%	0.0%	0.4%	0.2%	0.4%	1.6%
Sub Total	15.1%	2.0%	17.1%	8.6%	14.6%	63.6%
Commercial (27% of total consumption)						
EE Lighting	1.2%	0.8%	2.1%	1.0%	1.8%	7.7%
HVAC	3.2%	1.6%	4.8%	2.4%	4.1%	17.9%
Sub Total	4.5%	2.4%	6.9%	3.4%	5.9%	25.6%
Industrial (17% of total consumption)						
Efficient Motors	0.7%		0.7%	0.3%	0.6%	2.4%
Variable Speed Drives	0.5%		0.5%	0.3%	0.4%	1.9%
EE Lighting	0.3%	0.1%	0.4%	0.2%	0.4%	1.6%
HVAC	0.1%	0.0%	0.1%	0.0%	0.1%	0.3%
Sub Total	1.5%	0.1%	1.7%	0.8%	1.4%	6.2%
Municipal (7% of total consumption)						
HPS Streetlights	1.0%		1.0%	0.5%	0.9%	3.8%
Efficient buildings	0.2%		0.2%	0.1%	0.2%	0.8%
Sub Total	1.3%	0.0%	1.3%	0.6%	1.1%	4.7%
Total	22.2%	4.5%	26.9%	13.5%	22.9%	100.0%

Strategically, it is important for municipalities to accept that rapidly increasing energy efficiency intervention uptake is a market driven reality over which they have little control. In this light, a municipality needs to be adopt approaches to manage this reality in such a way that it optimally benefits their community. These approaches include:

1. Facilitating energy efficiency programmes that support local manufacture, sales, installation and maintenance of EE interventions (e.g. the City of Cape Town SWH installer accreditation programme, which endorses installers of good quality locally manufactured product, and raises awareness around the technology). Such programmes grow the local economy and create jobs.
2. Saving on municipal energy costs by implementing energy efficiency in street and traffic lights and municipal buildings
3. Seeing the freed up electricity demand as an opportunity for growth and densification within the municipality, which will increase sales again.
4. Acknowledging that money saved by end users from EE interventions can feed back into the local economy and grow it further

Amongst the built environment (commercial, residential and industrial) all new building development is now subject to the new, energy efficient building regulations captured in SANS 10400-XA. This requires that a specified efficiency per square meter is met in the building design, and a minimum of 50% of heating requirements must be met through solar water heating/heat pump. Challenges in enforcing the new regulations need to be addressed for the full effectiveness of these regulations to be realised.

5.4 Municipal 'own' consumption

Comprehensive data on energy used by municipalities within their facilities and operations is often difficult to obtain as municipalities do not always record electricity consumed, or record of this is included in the broad commercial sector tariff category. Comparison of average consumption by category of use (per

municipal operation) is also difficult as each municipality may record slightly differently. On average, 'own' energy consumption for municipalities (metro and smaller) is between 1 – 2% of total energy consumed in the municipality. Although this is a relatively small proportion, municipalities are often the single largest consumer in an area. They have control over this domain and can show leadership by example, making it an important potential area for energy efficiency implementation.

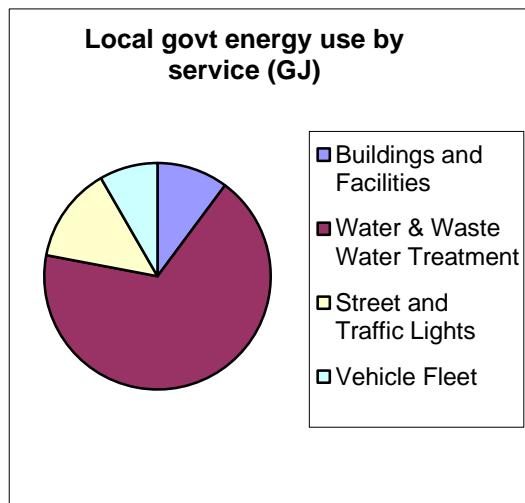


Figure 12: Illustrative example of the spread of energy consumption between typical municipal operations

A detailed study, commissioned by the SA Cities Network, is underway to explore the energy savings potential of these sub-sectors in more detail²⁷ and data emerging from the DoE Municipal EEDSM programme should also provide insight into savings that can be achieved. Based on information available to date, the following is indicated:

1. **Traffic lighting:** LED lighting has become the standard efficient retrofit technology. Where incandescent and halogen light bulbs require replacement every four months, LED traffic light fitting last 5 – 8 years, substantially reducing maintenance costs. Operating costs are substantially reduced due to lower wattages and payback periods are short. LED technology is easy to retrofit as it fits the existing aspects.
2. **Street lighting:** this often represents a sizeable portion of municipal 'own' consumption and savings of 20% within the sub-sector can be achieved. It is important to get all the aspects of lighting right – lamp, reflector, ballast and power switch – in order to achieve maximum efficiencies and procurement specifications should ask for the unit price and output of a Lighting Scheme rather than of the luminaire only. Municipalities are exploring a range of efficient technologies, including high pressure sodium (HPS), LED, induction and CFL.
3. **Building efficiency:** the results of a detailed study²⁸ examining 3 classes of public buildings (medium sized multi-storey office blocks, single storey, multi building compound and large multi storey office block), indicated that:
 - a. Single storey compounds offer the least efficiency savings potential (13 – 22% as opposed to 17 – 35%);

²⁷ Report is to look at the nine SA Cities member cities. Report is due June 2014.

²⁸ Analysis Report: Baseline, energy savings potential and energy efficiency Programme in Public buildings in South Africa, prepared by Sustainable Energy Africa for GIZ V-NAMA Programme, 2012.

- b. Maximum efficiency benefits would come from retrofitting the large multi-storey office blocks typically found in cities and larger towns;
- c. In terms of intervention choice, efficient lighting should be prioritised due to its high savings potential in all building types and ease of implementation (easy to apply even in capacity constrained municipalities);
- d. All on-ground building engineering staff noted that capacity to monitor and manage energy buildings is critical; as is the knowledge to ensure that new build and refurbishment of public buildings adhere to all efficiency regulation.

Table 6: Municipal building efficiency target recommendations

Municipal type	Programme	Interventions	Potential savings
Metro and larger towns	All multi-storey office buildings; Larger building compounds	Full suite of interventions (lighting, HVAC, water heating)	17 – 35% off baselines
‘Smaller’ municipalities	All office buildings above 1 000sq m	Efficient lighting	13 – 16% off baselines

Source: Analysis Report: Baseline, energy savings potential and energy efficiency programmes in Public buildings in South Africa, prepared by Sustainable Energy Africa for GIZ V-NAMA Programme, 2012.

- 4. **Water pumps:** this is a new area of interest and data should shortly be forthcoming.
- 5. **Fleet management:** municipalities indicate that substantial savings can be achieved in liquid fuel consumption through: Procurement of efficient vehicles, improved driving skills, reorganisation of trips and trip management. Savings potential has yet to be developed.

5.5 Management of losses

Technical and non-technical electricity losses are an important aspect of municipal electricity efficiency that requires attention²⁹. Reports of losses of as much as 1/5th of all electricity entering a municipal area have been recorded. Non-technical losses are often as much within industrial and commercial areas, as much as it is an issue of illegal household connections. Loss management requires a tightening up of billing systems and administrative management, and electricity infrastructure that is well maintained and managed. Distribution businesses must include investment in grid infrastructure development and maintenance.

6. Renewable Energy

Large-scale renewable energy supply is a national government function. Local renewable energy generation is, however, starting to become financially viable. Local government distributors and Eskom distribution have only recently started developing frameworks to allow small generators to connect to, and feed into the grid in a way that is feasible for both the distributor and small-scale generator. The regulatory system remains unclear regarding the need for licensing of small generators (between 100kW-1MW). NERSA guidelines issued in 2011³⁰ indicate that generation ‘for own use’, below 100kW, does not require a license. This guidance requires greater legal clarification, including the definition of ‘own use’ (the working assumption is that this is based on annual net generation being lower than net consumption).

²⁹ SACN State of Municipal Finances looks at this in some detail.

³⁰ NERSA: Standard Conditions for Embedded Generation within Municipal Boundaries (less than 100kW), 2011

There are concerns regarding the impact on municipal revenue of large-scale adoption of solar PV and other small scale embedded generation options. Appropriate tariffs will need to be developed and implemented to avoid this situation. However, there is work underway (led by DoE and Eskom) to design a standard offer approach in line with the national REIPP Programme that would purchase energy from embedded generators at a set prices so as to render municipalities indifferent between their Eskom supply and embedded generators (IRP 2010 Update Report, 2013).

Because capital investment for embedded generators is borne by the owner and not government or the national utility, and job creation potential in this industry is significant, promotion of such generators has the potential to be economically very beneficial for municipalities and the country as a whole. This is reflected in the IRP 2010 Update Report, 2013, which explores a fairly aggressive local PV uptake. Limits will need to be set to ensure grid stability. The draft NRS097-2-1 (which governs small scale embedded generation and is set to replace the existing NRS097 sometime this year) limit PV installations to 25% of maximum demand of each site in most circumstances. Given capacity factors this effectively limits total contribution of grid linked PV to 10% of total demand.

Municipalities themselves have potential renewable energy resources, including landfill gas, sewage methane and micro-hydro on water distribution systems. Landfill gas electricity generation has potential to be an economically feasible and important low carbon supply option. However experience shows that implementation and ongoing operation is demanding. Its feasibility therefore needs investigation before being pursued by individual municipalities.

Sewage methane electricity generation, usually for on-site electricity requirement reduction, holds promise as being a financially attractive low carbon energy option in many cases. Again, the threshold feasibility of this generation option needs to be clarified so that municipalities can be guided regarding its pursuit. Micro-hydro installations, sometimes embedded in the water supply network of municipalities, can be viable in certain circumstances. Clarity is needed on conditions for viability.

Some Provinces (KZN, Eastern Cape, and Western Cape) have identified small scale renewable energy projects that could be developed by municipalities and are developing support activities. Whether municipalities can themselves be Independent Power Producers within REIPPP requires clarification.

Biofuels are an important component of a low carbon energy trajectory for urban areas. However promotion of liquid fuel mix changes largely rests with national government, not local government.

7. Municipal sustainable energy development underway

Substantial energy efficiency and renewable energy development is underway in South African municipalities. Some 13 cities/towns in South Africa have Energy and Climate Change Strategies either developed or underway. These are mostly within metros and secondary cities. Provincial strategies, with local municipal support programme, are also in place in the Eastern Cape, Western Cape and Gauteng Provinces. Substantial institutional development has accompanied these strategies, with at least 3 cities having developed new units employing from 2 – 10 dedicated staff. The figure below provides a visual indication of the kind of institutional and governance growth in this area from 2006 – 2014 (as the field develops, the kind of indicators in fact need adjustment, but included here as is for purposes of demonstrating institutional expansion/growth).

Municipal energy and climate change governance matrix																				
	Data and policy						Regulation			Institutional development			Implementation							
	Audit of municipal energy use	State of energy data report	Energy and Climate Change Strategy or policy	Energy and climate change visible in IDP	Routinely collected energy and climate related data	Planning framework speaks to energy efficiency issues, e.g. densification	Transport plan incorporates low carbon city goals	Green procurement: efficiency an aspect of fleet procurement	Regulation relating to sustainable energy development/emissions reduction	Energy efficient building codes or guidelines	Dedicated energy and climate change staff	Energy and climate change management structure	Budget allocated to energy and climate change management	Community - commerce, citizens, industry - energy or climate forum	Renewable energy generation in municipality or purchase	efficient water heating/ SWH programme underway	Government housing delivery: efficiency, notably ceilings, included in TOR	Engaged in lighting (street, traffic, building) efficiency retrofit	Community awareness program around efficiency or climate change	Smart meter roll out programme underway
Cape Town																				
Ekurhuleni																				
eThekweni																				
Joburg																				
Tshwane																				
NMBMM																				
Buffalo City																				
Mangaung																				
SPM																				
Polokwane																				
Saldanha																				
Sedibeng																				
Tlokwe																				
Mombombela																				
King Sabata																				
uMhlatuzi																				
uMsunduzi																				
STM																				
KwaDukuza																				
Rustenburg																				
			2006																	
			2011																	
			2013																	

Figure 13: Source: Sustainable Energy Africa, State of Energy in SA Cities, 2011

Although metros are pioneering this area of work at a substantial scale, the sense is that a great many secondary cities and smaller municipalities are engaging with the issues and beginning to address efficiency/renewable energy related work. Work underway includes³¹:

1. policy development and the inclusion of energy efficiency and renewable energy into IDPs
2. municipal 'own' consumption: building and facility efficiency retrofit; efficient street and traffic lighting retrofit
3. energy efficiency: commercial energy efficiency activities (real time metering, communications forum); behaviour campaigns; solar water heating rollout, geyser ripple control, enforcement of new EE building regulations
4. energy poverty: thermally efficient low income housing delivery
5. renewable energy: waste to electricity, renewable energy purchase
6. transport: bus rapid transit, non-motorised transport support (pavements, pedestrian walkways or bridges, bicycle lanes/schemes)
7. urban/spatial planning and efficient development planning processes.

Currently the major programme supporting Municipal 'own' energy efficiency is the DORA-funded Municipal EEDSM Programme, run by the Department of Energy. This programme, begun in 2009, has now been running for nearly five years, and has supported some 20 – 30 municipalities across all types (A-B) in the retrofit of traffic, street and building lighting, as well as the audit of buildings and increasingly also in the area of municipal water pumping. Increasingly, there are applications by residents and businesses to feed in renewable energy source power to the local distribution grid.

³¹ See Appendix 1 for a more detailed, though still partial, overview of renewable energy and energy efficiency projects underway across the country.

No comprehensive register of energy efficiency and renewable energy projects at the local level exists. The Eastern Cape Province is busy developing a registry for its local municipal areas. This will be an important pioneering document for the country. The table below outlines projects underway that were presented within the municipal consultation process relating to this strategy development. It is extremely important that the experience developed here is expanded and built upon.

Table 6: Overview of energy efficiency and renewable energy projects currently underway in South African municipalities.

Energy Efficiency	
Municipal EEDSM funded projects	<ul style="list-style-type: none"> A number of municipalities have been part of the DoE municipal EEDSM Programme. Street and traffic lighting projects as well as energy efficiency awareness programmes have been funded through these funds.
Eskom projects	<ul style="list-style-type: none"> Eskom has carried out its residential CFL mass rollout programme in a number of municipalities.
Municipal funded projects	<ul style="list-style-type: none"> Some municipalities indicated that they have used their own funds for lighting retrofits in municipal owned buildings.
Renewable Energy Projects	
Municipal waste-to-electricity	<ul style="list-style-type: none"> A number of municipalities have conducted, or are in the process of conducting, feasibility studies on landfill gas to electricity. However, one municipality that has completed such a study indicated that no developers seem interested in carrying out the project although the feasibility study indicated a potential for this. SALGA & GIZ are providing assistance to Umjindi municipality on developing a waste to electricity project. Studies on generation of electricity for on-site operations from wastewater indicate feasibility.
Solar water heater installation	<ul style="list-style-type: none"> Low pressure solar water heaters are being installed in some municipalities as part of the national solar water heater programme run by Eskom & the DoE. High pressure SWH campaign being run by City of Cape Town (endorsement programme).
Solar PV installations	<ul style="list-style-type: none"> Some larger municipalities (and provinces) are installing PV on municipal building rooftops for grid feed-in.
Solar PV traffic lighting	<ul style="list-style-type: none"> Pre-feasibility studies are being carried out on the installation of solar PV panels on traffic lights in a couple of municipalities.
Hydropower	<ul style="list-style-type: none"> Hydropower generation being developed at the municipal owned Witbank dam. Micro hydro feasibility studies have been done on the water distribution pipes in eThekweni and a project under development.
Rural Off-Grid PV electrification	<ul style="list-style-type: none"> Most rural municipalities indicated that their municipalities are recipients of the national small-scale solar PV installation programme being run by Eskom & the DoE.
Wave energy/power	<ul style="list-style-type: none"> One coastal municipality indicated that it was investigating generating 40GW electricity from the Agulhas Current System (Indian Ocean)
Bio-fuels	<ul style="list-style-type: none"> Feasibility studies on potential bio-fuel projects have either been conducted or are in the process of being carried out in some municipalities. Some of the municipalities are working with sugar producers and Eskom around development of such projects. While some are community run projects.

The institutional framework

There are a number of national, provincial and local structures that either have a bearing on, or offer potential towards, local energy development.

Sphere	Organisation /Area of relevance for local energy development
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National sphere	Policy, regulation, monitoring, funding, capacity support
<i>Government departments</i>	Department of Energy (SANEDI, SAGEN), Environment, Cooperative Government and Traditional Affairs (MIG, MISA), Trade and Industry (SANS), Public Works, Human Settlements, Science and Technology, National Treasury (Green Cities, DORA, MFMA, ADAM, Transverse), Presidency (SIPS)
<i>Government regulatory or state-owned enterprise</i>	NERSA, Eskom
Provincial sphere	Representation in national sphere, strategy, monitoring, forum/networking, information support and capacity
<i>Provinces</i>	Relevant provincial departments (Economics, Environment, Local government)
<i>Intergovernmental representation</i>	South African Local Government Association (SALGA) Provincial Offices
District level	Shared services/capacity, forum/networking, strategy
<i>District municipalities</i>	
<i>Intergovernmental representation</i>	National department 'deployed' staff (DEA, DWA) and can host 'shared services'; DoE via INEP hosts District Energy Forums, AMEU branches, Eskom regional offices.
Local level	Strategy and implementation, technical and capacity support
<i>Municipalities</i>	
<i>Technical and capacity support</i>	<i>National government:</i> COGTA-MISA, academic institutions, range of private training organisations (e.g. CEM training); <i>Municipal associations:</i> South African Local Government Association (SALGA), Association of Municipal Utilities (AMEU), Institute for Municipal Engineers (IMESA); <i>NGOs:</i> SA Cities Network, Sustainable Energy Africa, ICLEI, National Business Initiative

A concern relates to the fairly large number of players within the sector and across spheres of government and a need to simplify and clarify institutions so that Municipalities have a clear line of access to support. SALGA is seen by municipalities as providing a critical platform for local government to engage with national institutions around this area of work. A recently developed Memorandum of Understanding between SALGA and the AMEU provides a strong and functional working relationship between these two bodies.

Conclusion: Strategic Issues to be addressed

Based on the status quo data analysis and the issues raised within the consultation process³², it is clear that multiple energy issues reside at the local level and that the rapidly changing energy landscape requires that municipalities engage and manage these issues towards strengthening national energy security and climate response, addressing poverty alleviation and ensuring sustainable service delivery. There is a strong commitment and desire amongst local government to do this; however, circumstances are challenging and coordinated support is required.

The following key issues must be addressed within the Municipal Energy Efficiency and Renewable Energy Strategy:

Leadership and political direction

- Build on and develop the existing strength of feeling and commitment towards tackling these issues
- Energy efficiency and renewable energy must be 'translated' into the language of local government, i.e. basic service delivery
- Must address local priorities – poverty alleviation – hence energy poverty/access issues must be included
- Must be visible, with tangible benefits (pilot projects recommended)
- Greater engagement between national and local government in policy development
- SALGA has key role to play here

Mandates, institutions and governance

- Role of municipalities must be made clearer in national policy and guidance (directive) issues as to the articulation of the policy at local level
- This must also address the capacity of municipalities in meeting these responsibilities
- New or clarified responsibilities must be integrated into the system – job description of Municipal Manager and into IDP requirements and related systems
- Internal energy for municipal own facilities and operations: start here
- Strengthen the SALGA platform for municipalities in this area of work, and the SALGA-AMEU working relationship
- Municipal revenue models that can support this work

Energy planning and Electricity business within municipalities

- Data to do proper energy and electricity planning must be available
- Electricity service delivery must be sustainable and requires better planning, billing, metering and for this – capacity is needed
- Address capacity shortages and particularly within technical positions
- Clarify regulatory framework, particularly relating to embedded generation
- Streamline data reporting requirements
- Grid maintenance
- Revenue protection (including eradication electricity theft), grid stability relating to RE uptake

Implementing energy efficiency and renewable energy projects

³² A full set of minutes from each workshop is available from SALGA, and a summation of all issues raised can be found in Appendix 1.

- Capacity support, possibly through technical unit (technical, financial)
- Funding streams to be expanded (including ring-fencing of efficiency savings, inclusion of embedded generation within the RE Independent Power Producer Programme (REIPPP) funding streams, private-public partnerships, amongst others)
- Training of existing staff (e.g. in enforcing SANS 204)
- Supporting partnership development for renewable and efficiency development (PPPs)
- Networking platforms, innovation hubs, knowledge sharing
- Importance of practicality and viability of projects; avoidance of any technology dumping

Implementation Priorities

- Internal energy for municipal own facilities and operations: start here
- Alignment of bulk infrastructure projects across departments and inclusion efficiency within all projects
- Access to energy for the poor including: thermal efficiency low income housing; Energy packages for poor: electrification (on and off grid), improved wiring, FBE/FBAE, tariffs, efficient lighting and alternative/clean appliances/ technologies for cooking, lighting
- Clarity of where this mandate lies within municipalities as it is not within the licensed mandate of utility distribution licenses under NERSA/the Electricity Regulation Act
- Built environment – enforce new energy efficiency regulations
- Spatial planning to stem urban sprawl and inefficient growth
- Non-motorised transport and public transport support
- Community awareness and education

The support required is extensive and, although this strategy is to be held by municipalities and led by SALGA, achievement of the strategy will require enormous levels of cooperation and partnerships across government and between government and the private sector and the NGO/academic/research sector.

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Appendix 1: Compilation of EE and RE work underway amongst municipalities represented within the consultation process

Note: this list is limited to capturing some of the input received and gathered in the consultation workshops, rather than a comprehensive audit (this was not formally covered in each workshop). Even with these serious limitations, it provides an indication of just how extensively involved municipalities already are in this area of work.

Kwa-Zulu Natal	
Municipality	EE and RE Initiatives underway
Dannhauser LM	<ul style="list-style-type: none"> Internally funded rural PV installation Programme RE Biofuel generation potential (feasibility studies conducted) RE
Hibiscus Coast LM	<ul style="list-style-type: none"> EE awareness programme being run with Eskom – including rollout of CFLs Ocean Current power generation (potential 40GW within the Agulhas Current) – RE EE retrofits of municipal’s own buildings including the Mayor’s Office UGU District Municipality’s 20-year Growth and Development Strategy incorporates RE & EE development
EThekweni	<ul style="list-style-type: none"> EE awareness campaign still ongoing Solar PV facilitation – RE EE street & traffic lighting retrofits (EEDSM funded Programme) Metro engaging sugar producers around biofuel & electricity generation but most plantations fall outside the metro’s boundaries RE EThekweni developing a programme for selling “Green Power” as a different product so as to deal with the MFMA restrictions.
Emnambithi/Ladysmith LM	<ul style="list-style-type: none"> Rural PV electrification project by the DoE (KES Energy Services) RE Waste-to-energy biogas project proposed RE
iLembe DM	<ul style="list-style-type: none"> Peaking power plant being built by French company (air-to-electricity) RE Enterprise iLembe – part of the CoGTA funded “Corridor Development Project”
Mandeni LM	<ul style="list-style-type: none"> Rural Cooperatives have been established to produce biofuels from the <i>Moringa</i> tree RE SAPPI looking into installing gas turbines to generate power Fuel switching
Msunduzi LM	<ul style="list-style-type: none"> Private developer looking at installing a 1MW PV system to feed into the municipal grid
Ingwe LM	<ul style="list-style-type: none"> Proposed development of Biofuels plant RE
Endumeni LM	<ul style="list-style-type: none"> CCC Biogas project (cow dung/chicken waste etc.) RE
Umvoti LM	<ul style="list-style-type: none"> Biofuels production from sugar cane RE
Umzinyathi DM (Endumeni & Nquthu LMs)	<ul style="list-style-type: none"> Municipalities part of DoE’s Rural PV electrification programme being implemented by KES Energy Services RE
Eastern Cape	
NB: a detailed registry is available in the Province	<p>Summary of work underway</p> <ul style="list-style-type: none"> In Province logging of all EE/RE policy and projects has been made, capacity support has been provided to some of the municipalities.

	<ul style="list-style-type: none"> • Waste management in smaller municipality has been implemented • Alien plant species are currently eradicated and there will be solar panels installed which will onset “off-grid electrification” in one small municipality (Cofimvaba). • Climate change and renewable energy strategies has been developed in BCM. • There are biogas and biomass projects that are under way which would generate electricity and sell it to ESKOM. The biogas comes from the concept of “zero waste.” • There is hydro scheme currently under development. • Wind energy is also under development. • Free basic access to energy has also been implemented in some smaller municipalities, in others is under exploration to move away from paraffin to other cleaner and safe sources like electricity and LPG. • Internal EE has been implemented with possible exploration of Solar PV. • EE buildings and street lighting retrofitting is also under implementation. • ESKOM has provided supply of FBE and provided technical support on SWH, CFLs and Demand Side Management.
Mpumalanga	
Chief Albert Luthuli LM	<ul style="list-style-type: none"> • 400 low pressure solar water heaters installed by Eskom & DoE
Msukaligwa LM	<ul style="list-style-type: none"> • Eskom’s residential CFL mass rollout programme was implemented (EE) • Streetlight retrofits internally funded by municipality (dead inefficient lights being replaced with EE ones) (EE) • Municipality currently considering installing solar PV panels (RE) for its traffic lights (however solar might not be a viable solution considering weather variability in the Ermelo region). Mountainous and located in high pressure area
Emalahleni LM	<ul style="list-style-type: none"> • Landfill gas-to-electricity feasibility study completed and found that there is sufficient methane but no developers seem interested in taking the project further. One company was interested but due to tedious process of stakeholder engagement and applications the project fell through. Not sure how to gain interest of private investors. They would like a national programme to support them in obtaining such investments and possibly an ease of legislation to increase the attractiveness of such projects. Engage MESA on this issue to practically go and do these studies for opportunities (RE). • EEDSM funding for street and traffic lighting retrofits (EE) • EE awareness programme has also been initiated using the EEDSM funds • Municipality in collaboration with Tshwane University of Technology (TUTs) currently working on a hydropower generation project (RE) from the municipally owned Witbank Dam (<i>biggest municipal owned dam in the Southern Hemisphere</i>) <ul style="list-style-type: none"> ○ Water extraction permit has been granted by the DWEA (water use rights reside with DWEA, as the State owns all water/dams) ○ This project is being developed as an educational (research) project with the university ○ Funded by the Swedish/ German government (not sure on

	<ul style="list-style-type: none"> fundings) ○ Electricity to be used to power the municipality’s own Water Pumping stations (Bulk Water Supply) ○ Emalahleni Municipality – provides the infrastructure (piping, buildings etc.) and allows for the use of its dam ● Ripple Control project funded by Eskom is also being implemented within the municipality (demand-side management) – the switches being installed cost R800/unit. ● Municipality currently developing an ENERGY MASTER PLAN – funding is currently being sort. This PLAN will be separate from the Electricity Plan. ● As part of the Ripple Control Project Emalahleni Municipality has a contractual agreement with Eskom to shed 10MW between 0600 – 0800 (morning) and the same between 1800 – 2000 (evening time)
Mbombela LM	<ul style="list-style-type: none"> ● Hydropower project might be developed mentioned in SoE Report (RE) ● Munic also received funding under the DORA EEDSM programme for street and traffic lights retrofits
Umjindi LM (though not present @ workshop)	<ul style="list-style-type: none"> ● SALGA & GIZ assisting municipality in developing a waste-to-energy project
IMESA	<ul style="list-style-type: none"> ● MoU between SALGA and the IMESA providing support to Free State municipalities project funded by COGTA
Gauteng	
Tshwane	<ul style="list-style-type: none"> ● Smart grid metering – off balance sheet financing ● Scale public transport and NMT ● Building by-laws ● PVT sector leverage – waste to energy recycling ● Financial sustainability impact
Midvaal	EEDSM, 7 million for street lighting, 5 million for buildings.
Western Cape	
NB: a full registry is under development within the province	

Appendix 2: Objectives, priorities and possible actions or intervention Programmes as emerging from the municipal consultation process

Priorities: Poverty alleviation, job creation, energy access, environmental protection, economic growth, reduce stress on municipal distribution grid, security of supply

- **Uptake of EE**
 - Municipal buildings have EE measures
 - Street and traffic lighting is EE: again, guidance to be provided (is an existing guide, but to update this with more detail now that several municipalities have been developing experience of different technologies) in response to concerns articulated about the efficiency and cost and reliability of LED lighting.
 - Consider possibility of Eskom incentivising the street lighting tariff to promote efficient technology; and whether there cannot be some form of premium charge where municipalities are inefficient or cannot account for usage.
 - Must use the planning approval process to ensure that radically new and more energy efficient ways of doing things are built into new developments from the outset – in the primary design. Where lack of capacity, this should be developed or supported.
 - Projects must be viable and practical
 - Uptake of electric vehicles
 - Efficient fuels for cooking (and stabilisation LGP price through regulation)
 - Education /awareness
 - Support from Eskom: rollout of CFLs, SWH, DSM and provision of technical support
 - Consideration of time zones to decrease the electricity peak loads
 - Get EE into the planning phases of all municipal projects, e.g. low income housing development, transport planning, etc.
 - Build EE into procurement processes
 - Involve SABS in ensuring that technology uptake is sensible, viable and based on sound technologies (avoid technology dumping).
- **Alternative sources of energy that are environmentally friendly - RE**
 - Solar rooftop PV on municipal buildings
 - Waste to energy projects/ biogas/ biomass
 - Micro hydro energy generation
 - Development of inexpensive electricity storage devices
 - Regulation of LPG to stabilise price and facilitate rollout to poor under FBAE
 - Need to include small scale supply at the local level within national energy and electricity plans. For instance, can these schemes receive funding through the national REIPP Programme, i.e. be included in the IEP and IRP and have funding streams come down to them – that way local government can draw in private partnerships for their development. It does not make sense for local government to get into complex wheeling agreements so that small-scale embedded can benefit from REBID funding stream via the Eskom Single Buyers Office.
 - National government, via the IEP and Electricity Regulation Act (ERA) must provide greater clarity on ‘grey areas’ relating to local, embedded, small scale RE (‘own use’) that must be handled by municipalities.

- Changes in national supply approaches should be mapped as these have implications for local government that need to be considered and when national energy planning requires new approaches from local government, the appropriate skills and resources for new capacity development must be considered and provided – e.g. of natural gas coming online and how municipalities will need to reticulate this.
- Regulation and processes must be in place relating to small-scale RE feed in to local grids and this is a challenge for all local government, but particularly smaller (concerns around additional time in relation to grid maintenance should there be feed-in taking place can be alleviated given that inverter technologies can build in automatic islanding processes; however this is why it is so important that feed-in takes place in a regulated and ‘legal’ manner rather than ‘cowboy’ style). Need SABS guidelines on technologies for metering, inverters, etc.
- The actual type of meter and the billing/accounting process makes the process of embedded feed in more or less difficult. Some areas do not have technology or systems that can easily accommodate the new approaches required by RE feed-in. Support will be required here.
- Address issues of power storage relating to rooftop PV or other systems.
- **Access to electricity / ‘safe/ modern’ energy for all**
 - Fair and transparent electricity pricing system
 - Capacity building in communities to understand efficient and safe use of energy
 - Explore Electrification, LPG or PV as alternative to paraffin distributed under FBAE
 - All housing delivery MUST ensure that funding is allocated to include thermally efficient measures, as required by SANS 10400, and these aspects are included in housing delivery.
 - Location of housing should not relegate the poor to the furthest margins thus reducing access to jobs, information, education resources, etc.
 - Subsidy allocation – concern that with indigent policy many of the poor are not being reached; also, with ‘illegal’ connections the poor don’t receive the subsidy, so informal areas should be connected (SEA resource).
 - Strategy: Within low income – important to continue to electrify (formally so that receive subsidy), awareness, thermally efficient homes, wood in rural municipalities (KSD, Thulamela, Polokwane).
- **Energy security, and the institutions to manage it**
 - Eradication of electricity theft
 - De-link municipal revenue and electricity revenue to ensure money retained for maintenance of infrastructure and that efficiency is pursued
 - Grid expansion and maintenance plans important (integrate with development plans, etc.). Currently there is an erosion of infrastructure – 6% of revenue meant to go to maintenance, but this is not ring fenced, so can end up being far less in practice. There is an NMBMM GIZ research study which can provide some detail on the issues.
 - Appointment of expert to look at tariff structures (possibly via Eskom).
- **Integrated energy planning and systems**
 - Integrated planning across departments, this relates to housing, transport, spatial development, electricity, etc. – again must build into IDP system, but even this not enough – still planning in silos – so beyond and work out ways to integrate and align separate funds and processes (e.g. electricity planning, housing and street planning).
 - Need better access to data
 - Establishment of smart grid and net-metering, hybrid mini grids: exploration of this, where applicable, where not; cost vs benefits. SANEDI/MISA done studies on this. This information

should be drawn on and a guide provided to all municipalities as to the application of this technology. This could also use case studies, for example, Tshwane is in the process of rolling out a smart meter programme.

- Alignment of investment for bulk infrastructure projects across all spheres of government (particularly transport, housing); does the ADAM programme, looking to address infrastructure backlogs, and the MIG, offer opportunities here?
- Engagement of local government with national energy and electricity planning processes: local government are often called on to distribute or implement aspects of the plan, or are affected (tariffs, cost recovery, capacity, mandate, and revenue) by aspects of the plan and their issues must be represented and heard within the planning process.
- **Good town planning in support of efficiency and mobility**
 - Paths for cycling and walking
 - Location of new urban developments – reducing sprawl and improving healthy densification
 - Noted that spatial form has a large impact on fuel consumption, and this must be taken into account in all infrastructure and development planning
 - Institutionally – consider close alignment between transport and urban planning
 - Functional regional planning: Planning should increasingly be based on functional units and not only geopolitical boundaries (case in point being transport planning across Gauteng).
- **Efficient transport**
 - Improved public transport
 - Freight to rail
 - Large public transport programmes are developed by national government and goals may not align with local government – SALGA needs to have these discussions at national level
 - Noted that efficiency often only considers electricity – need to make specific message to bring in Transport into this area.
 - Public transport needs to be desirable.
 - Challenge of smaller towns – people commute from rural areas into urban centre, or from one urban centre into another – how address this transport challenge – currently taxis.
 - Consideration of regulation around private transport, e.g. congestion charging.
- **Policy and mandates**
 - Messaging: climate change is not a good message for local government. The message should be in terms of local government business, which is first and foremost service delivery, and it should balance social, environmental and economic aspects.
 - Clarify mandate – SALGA has a role here – must detail what local government should be doing (for example, is it the mandate of local government to get involved in electricity or energy supply, or just the reticulation of it?). As noted below, this should include comment on interpretation of the MFMA in relation to EE and RE for guidance to Finance Departments.
 - SALGA support to create platform between local government and provincial and national government.
 - Layered mandates: some areas must become part of business as usual, others can be pursued on more voluntary basis
 - Well defined strategy to address EE/RE and clear roles and responsibilities
 - Resources to match responsibilities

- Political and top management buy-in: this urgent and highest priority – must be able to ‘make the case’ (value of tangible, real pilots, e.g. EE in government buildings)
- Must build into municipal systems: IDP, KPIs, Procurement, planning approval processes
- Consider de-linking EE and RE: phased approach with EE as the priority
- Reporting on EE/RE: as per Eastern Cape, Provinces could play a role in ‘logging’ all municipal EE and RE projects underway and monitoring and providing capacity support required; also if brought into the IDP, then there is a requirement to report on projects listed in the IDP and their budgets and KPIs.
- With changing energy landscape and the increasing emphasis on demand/energy consumption as well as more diverse and often embedded supply systems, it is important that local government are more actively involved in the national policy process. Smaller local governments noted that they often don’t have the capacity to engage in this and this could be a support role performed by SALGA.
- **Institutions and capacity**
 - Possibility of an energy unit established at the District level and filtered down to the municipalities with one rep of the unit sitting in each municipality
 - Also technical expertise units – along lines of the MISA, possibly within MISA
 - Knowledge sharing platforms, coordinated by SALGA, bringing together Metros, Eskom and the District municipal offices
 - Training, capacity and awareness building of new staff within units; and awareness raising of all staff.
 - Information portal (note SALGA-SEA urban energy support web platform underway)
 - Draw on SALGA capacity and develop this further, particularly in relation to supporting the unlocking of funding streams
 - FET programmes to address municipal need for technical and policy skills in these new areas
 - Resource mobilisation: funds and human capacity, development for start-up motivation to senior management. There is a need to generate incentives to take new approaches on board.
 - Local level energy strategies useful, these need to be approved by council, included within IDPs and KPIs.
 - SALGA to provide an overarching Municipal EE and RE Strategy (under development here) and this should be rolled out via the Working Group and adopted by municipalities via the Municipal Manager. This should then hold municipalities accountable. SALGA would play the role of monitoring and facilitating implementation.
 - There is a need for the transformation of the weighting of Key Performance Assessment (KPAs) and SALGA could provide support towards this.
 - Municipalities need to ensure that they are able to retain important technical skills and capacity
 - In natural gas comes online, appropriate training/skills provision for municipalities that must reticulate this.
 - Noted that financial compliance is the priority in municipalities and all resources go into this, rather than budgets towards technical skills. National government, with SALGA, need to emphasise the need for municipal job creation in area of technical staff.
 - Lack of ‘new’ capacity and little, or no, succession for technical/engineering positions. SETAs are failing and there are lots of ‘dis-enablers’ in the education sector.

- Possibility of re-initiating the system of municipal bursaries for technical courses/degrees.
- Artisanal training (pre dating SETAs) was considered effective: local people were trained up and were thus more likely to be retained by the municipality.
- Streamline data requirements by national government. This is considered a Big Jo, but important – creation of one reporting/data system that lines up requirements from IDP, NT, DoE, NERSA, Eskom, DEA, etc.
- SANEDI can act as innovation hub to share and test new approaches.
- Call for SALGA to support communication with DoE in the EEDSM Programme as there have been experiences of challenges to communication (in both directions).
- **Financing/ funding**
 - The savings from EE measures should be ring-fenced for expansion of programmes
 - Need to develop a new financing model that does not depend on electricity revenues in local governments – urgent need for government to develop and funding and revenue model that can support this work
 - Primarily, the EE/RE work must be linked to core business of the municipality and be aligned to the main funding processes
 - MIG could offer additional funding
 - Partnerships with private sector for investments beyond the core business of municipality
 - What is the scope of inclusion of small-medium scale, embedded Municipal RE projects within IRP so that funding streams for more expensive RE come down to the local level
 - Funding for innovation and new approaches to overcome rigid system
 - NT to provide clarification note on MFMA in relation to EE and RE procurement: what is ‘value for money’, is it just cheapest option, or is there a more nuanced opinion. Direction needs to be given to Finance Departments who take the more conservative view point.
- An approach proposed:
 - Lead by example / high level buy in – achieve this through tangible pilots, such as EE in government buildings (strong agreement that municipalities must lead by example in their own buildings and facilities),
 - Secondly, EE/RE within municipalities must address the area of highest priority/ need – poverty reduction – and undertake passive thermal housing interventions.

These two areas therefore should be primary, beyond this, more voluntary and flexible approaches to be adopted as and where there is interest, motivation, opportunity.

Appendix 3: Full data sets with data source

Part II: Local Government EE and RE Strategy

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Introduction and background

‘Sustainable energy’ proposes that the solution to energy challenges must contribute to, and be consistent with, resolving other major problems such as poverty and environmental degradation. This approach resonates with the priority areas raised by local government officials and leaders within the Municipal Energy Efficiency and Renewable Energy Strategy development process: energy efficiency and renewable energy must contribute to the overarching goals of service provision, poverty reduction and environmental protection. A *needs*-based approach to energy development – looking at who needs energy for what purpose - has a focus on the end-uses of energy and the services that energy provides human beings. This brings energy planning solidly into the domain of local government.

The energy sector is substantial and lies at the heart of the economy and of society. This energy in South Africa is substantially (98%) fossil fuel derived, with high levels of associated carbon emissions. Municipalities have been very responsive to the call for local energy management and proactive in responding to the challenge of climate mitigation. However, an energy transition involving a significant reduction in fossil fuel consumption is complex. In order to align with levels of emissions ‘required by science’ to curb catastrophic climate impacts, a fairly radical departure from ‘business as usual’ needs to take place within municipal business. Thus, efficiency and renewable energy – in the experience of those who have pioneered implementation at the local level – cannot simply be ‘added on’ to municipal business, but requires that capacity, systems, service delivery and revenue models must be addressed. This strategy intends to prepare the ground.

Strategy development process

This strategy has been developed in consultation with municipalities across the country. A consultation workshop was convened by the local SALGA office in each of the 9 provinces. These workshops were extremely participatory, combining a process of developing an understanding of local energy issues, presenting local energy data for analysis and discussion, and strategy discussion. Levels of participation from an array of officials, spanning electricity, water, planning, environment, health sectors, was extremely good and this strategy reflects the issues and concerns raised in these sessions, and proposed responses. It also draws on the fifteen-plus years of local energy experience generated by pioneering municipalities in the country. Current research, stakeholders and leading experts have been consulted; however, the vision, priorities and goals presented here flow from the municipalities themselves.

The strategy presented here has two components: a strategy for municipal implementation of energy efficiency and renewable energy and a related support action plan for SALGA. SALGA will further develop their component of the strategy into an action plan. The strategy is not prescriptive to municipalities, and requires that municipalities similarly adopt and adapt the broad strategic direction presented here, towards their own strategy and action plan. **The Status Quo Report** developed to inform this strategy has a lot of useful and important information and data ‘making the case’ for and illustrating the various interventions. It will be important to consult this document for quantitative support for your strategic direction.

The strategy presented here is comprehensive and is applicable to all municipalities. However, being comprehensive, it runs the risk of overwhelming municipalities. It is very important that municipalities identify their priorities from within the broad strategic direction, in line with their own local goals and capacity. A rule of thumb is that meeting service delivery priorities must be first priority, then tackling energy efficiency (more economic than renewable energy) and only addressing renewable energy

development where it provides an obvious economic opportunity for the municipality and/or there is pressure from residents relating to renewable energy development that must be addressed.

It is understood that in the face of enormous capacity constraints and service delivery backlogs, this area of work will often not receive sustained, focussed attention. To this end a “Key first steps plan” is also presented. For many of the resource-poor municipalities, with very low levels of energy consumption, this is sufficient activity. However, as is noted in the Status Quo document, changes in the energy domain are happening, whether led by municipalities or not, and the strategy presented here provides a sound programme towards ensuring that municipalities are able to respond to change in such a way that best protects and enhances their ability to deliver on Constitutional service delivery responsibilities.

It is also well understood, through experience, that actual implementation is the real challenge. This strategy points towards the kind of technical support that will be required for this to happen. Realising the levels of technical and implementation support will be dependent on galvanizing national government and stakeholder capacity.

Local Government Energy Efficiency and Renewable Energy Strategy

Vision elements

- The welfare of citizens is supported through the eradication of energy poverty
- Effective municipal institutions exist that are able to support the efficient use of electricity through smart systems, provide effective energy services into the future, and *manage their* operations sustainably
- Municipal areas are well planned and are designed for people rather than cars, the need for travel is reduced, safe public transport is widespread, and where non-motorised transport is facilitated and cities are walkable and safe for children
- Municipalities have clean air through the adoption of clean energy technologies and practices and reduction of polluting private vehicles on the road
- Municipal officials from all departments, the private sector and citizens alike embrace the radical new approaches in planning, operations and lifestyles to meet the sustainable energy challenges

Strategy Overview: Priority Areas, Goals and Strategies

Priority Area	Goal	Strategies
1: Local energy Governance	Good governance through the development of local, flexible and integrated energy plans and leadership that can engage in applicable national energy-related development planning	Institutionalise a local level energy ‘mandate’ Build political and senior management leadership Develop local level energy policy and plans Support local energy plan implementation
2: Municipal ‘own’ Energy Efficiency	Efficient institutions able to manage energy consumption in their own facilities and	Implement building and lighting efficiency Implement water and sanitation service efficiency

	operations and transform local waste to energy where viable	Develop an efficient vehicle fleet Support waste reduction, management and waste to energy development
3: Energy access for all	All households have access to affordable, safe and clean energy sources	Electricity tariffs and subsidies support use of electricity by poor households Electrification expanded to reach all households, including informal households in urban/dense settlement areas and rural households Workable Free Basic Alternative Energy models are developed and rolled out where appropriate Thermal performance in poor households is improved, focussing on existing houses without ceilings Develop a household energy service package approach
Energy efficiency in the residential, commercial and industrial sectors	Effective institutions able to support the efficient use of electricity throughout the built environment and economy	Encourage and enforce efficiency through building and development approval processes Promote efficiency (and localisation, where appropriate) through information provision and product/systems/supplier endorsement programmes Encourage and enforce efficiency through electricity services technical interventions
5: Renewable Energy Development	Renewable energy options are a significant component of local energy supply where they are technically and economically feasible, contributing to low carbon development and local economic growth/sustainability	Promote small-scale embedded generation, with an initial focus on solar PV Facilitate landfill gas and wastewater gas electricity generation where appropriate Facilitate micro-hydro generation where feasible
6: Electricity Services	Sustainable electricity service delivery that can accommodate and promote access to electricity, efficiency and renewable energy development	Adopt sustainable revenue models in response to revenue loss challenges resulting from efficiency, embedded generation and requirements of infrastructure maintenance and expansion Facilitate small-scale embedded generation in a way that preserves financial and technical integrity of the distribution system Rollout informal settlement electrification Introduce 'Smart' technology, appropriately and based on a detailed understanding and long-term vision of its role Reduce electricity theft to protect revenue
7: Efficient Transport and Mobility	Walkable, 'smokeless' municipalities that support safe mobility for all and good transport networks; and where public transport is a sought-after mode of vehicle transport	Develop integrated, local transit (i.e. all mobility modes) plans Develop Non-Motorised Transit (NMT) facilities Develop and improve public transport modalities Support and promote greener fuels and fuel efficiency

8: Spatial Planning	Well-planned municipalities where all citizens have access to amenities and economic opportunities	Spatial Development Frameworks support mobility, transport efficiency and access by the poor to amenities and economic opportunities Land development criteria support urban objectives of improved mobility and transport efficiency, and energy efficiency and renewable energy implementation Spatial plans and transport plans are closely coordinated to support common objectives
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Prioritising and Phasing of the Strategy

As noted in the introduction to the Strategy, the idea is to provide a comprehensive Sustainable Energy (or Energy Efficiency and Renewable Energy) Strategy to guide all municipal action. The actions contained in the Strategy document are of relevance to all municipalities; however, the reality is that there are vast differences in capacities and functions across the different municipalities. Municipalities will have slightly different priorities, capacities and contexts and these will guide what and how they take this work forward. A broad approach of prioritising and phasing the Strategy is provided below.

National level

Mandates and institutions

Clarification of the energy responsibility at the local level is a vital first step towards local energy development. This needs to be coordinated by SALGA, and led by Departments of Energy and Cooperative Governance. Once clarified, this needs to be institutionalised.

Technical and implementation support

Boosting of the existing support, such as that provided through the Municipal Infrastructure Support Agency, needs to be done.

Local level

Policy, strategy or action plan

A local plan outlining activities, responsible departments and budgets needs to be developed by each municipality, and integrated into municipal planning processes, such as the IDP, SDP and Electricity Master Plans.

The energy planning process can be an extensive and detailed activity (important for metros and secondary cities where monitoring and reporting important, issues complex), resulting in a municipal Strategy; or can be a more simple process, identifying priorities (drawing on this Municipal EE and RE Strategy), and including these into the existing municipal planning processes. What is important is for the municipality to have a clear idea (strategic rather than ad hoc) of where they are taking this work and how it relates to their municipal development goals.

Implementation

As a 'rule of thumb', the following phasing and priority actions should apply:

Phase 1	Phase 2	Phase 3
Delivering sustainable energy services for all	Becoming efficient	Growing renewable energy services and economies
Key actions	Key actions	Key actions
<ul style="list-style-type: none">- all new government housing is efficient, in line with new regulation- Retrofit existing housing with ceilings- Upscale electrification (formal	<ul style="list-style-type: none">- Meter and record municipal energy consumption- Retrofit water pumps with efficient alternatives- Awareness programme amongst staff	<ul style="list-style-type: none">- Develop clear and simple procedures (in line with NRS097-2-1) for the application and adoption of small-scale embedded generated power

<p>and informal areas)</p> <ul style="list-style-type: none"> - Develop an energy services ‘package’ for households - Tighten and improve electricity distribution and billing systems - Begin ‘own’ efficiency: retrofit municipal building lights with efficient alternatives - In line with legislation: enforce SANS 10400-XA and SANS 204 in building approval processes 	<ul style="list-style-type: none"> - Vehicle procurement to look at operating (life cycle) cost not just capital cost - Efficient driving: driving management and trip monitoring or changing - Engage with smarter technology, and private sector programmes, to improve residential, commercial and industrial efficiency - Support solar water heater rollout programmes through endorsements schemes, information, subsidy programmes (where available) 	<ul style="list-style-type: none"> - Establish feasibility, develop business plan and possibly engage with private sector on waste to energy projects - Engage with the development of natural gas as an energy supply option
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It is important that there are one or two visible pilot projects undertaken and that these are used to generate political will and leadership, as well as community support. While growing renewable energy may not be a priority, particularly where municipalities are struggling to meet service delivery commitments, in many instances municipalities are being forced to tackle this issue through pressure from the ground – requests for renewable energy grid feed-in, approaches from developers, and the municipality needs to be able to respond.

Funding and financing

The Strategy notes that further work on financing and funding of this work needs to take place. This will largely rest with national government. However, much of this activity CAN be achieved through existing municipal budgets. Obtaining donor funding, where possible, for funding of pilot initiatives, can provide important learning and awareness-raising opportunities.

Strategic Priority Area 1: Local energy governance

Goal

Good governance through the development of local, flexible and integrated energy plans and leadership that can engage in national energy-related development planning.

Strategies

Institutionalise a local level 'energy mandate'

Build political and senior management leadership

Develop local level energy policy and plans

Support local energy plan implementation

Status quo and key challenges synopsis

- A substantial portion of national energy consumed relates to activities that are influenced by the built environment and infrastructure over which municipal government has substantial powers and functions.
- Modelling indicates that without intervention, energy consumption and related emissions will increase at an unacceptable rate given resource limitations and climate change commitments. This trajectory is also likely to be economically costly³³.
- The responsibility to delivery free basic services, including energy, rests with local government; other functions and responsibilities of local government that have a bearing on national policy relating to energy efficiency and renewable energy development are detailed in Table 1 below.
- Responsibilities relating to energy efficiency are relatively new (emerging out of the Energy White Paper of 1998, the Energy Act 2008 and the Energy Efficiency Strategy 2005) and need to be institutionalised. This is complex as energy efficiency is requires new approaches to existing executing current powers and functions, rather than an additional power or function, and also occurs across multiple sectors.
- Renewable energy is not a mandate of local government per se, but may be brought into local government policy and operation through the pursuit of local economic development, environmental and sustainability concerns and the built environment. National government's renewable energy programme may also impact on local government as it takes place in local areas, and increasingly may even be 'embedded' within the distribution network of local governments.
- The National Climate Change Response White Paper (2011) identifies local government as an important partner in meeting national mitigation and adaptation targets (Section 10.2.6) flowing from their responsibilities as detailed in the objectives and powers and functions accorded to local government in the Constitution of South Africa (108 of 1996) and the Municipal Systems (32 of 2000) and Structures (117 of 1998) Acts. These climate response responsibilities include energy efficiency at the local level, and renewable energy development. SALGA is specifically identified here as a key support in enabling local government to realise the national climate response.

³³ Long Range Energy Alternatives Planning (LEAP) modelling for Cape Town and Durban give an idea of potential growth trajectories (SEA 2013); however, demand trajectories are also undergoing rapid change, making this an important area for further research and investigation.

- A number of metropolitan areas and secondary cities have developed detailed energy data reports and energy and climate change strategies and are actively implementing these.
- Municipalities across the country feel strongly that they wish to contribute to an efficient and sustainable future, but require the financial ability and capacity to do this. There are also very real barriers to taking this forward, for example, not wishing to place strictures on possible development that might lead to local economic growth.

Mandates, powers and functions

A detailed overview of legal work to date on the issue of sub-national energy and climate change mandates is provided in the accompanying Status Quo Review document. Below is an overview of the interaction between national energy objectives and related municipal powers and functions.

Table 1: Local Government powers and functions (Schedules 4 and 5, Constitution RSA 1996) relevant to achieving national energy objectives (as set out in the Draft Integrated Energy Plan, 2012, and derived from the Energy Act (2008))

8 Key National Integrated Energy Objectives	Related municipal mandates, or functions (Constitution of RSA 1996; Municipal Systems Act, Municipal Services Act)
9. Ensure the security of supply	Electricity reticulation; Free Basic Alternative Energy
10. Minimise the cost of energy	Electricity reticulation (tariff setting, cross subsidisation); Human settlements (housing delivery); Public transport (limited); Non-motorised transport;
11. Increase access to energy	Electrification; Free Basic Alternative Energy; Human Settlements (thermal efficiency); Public transport; Spatial planning
12. Diversify supply sources and primary sources of energy	Electricity reticulation; Waste management
13. Minimise emissions from the energy sector	Electricity reticulation; Building codes and planning approval
14. Promote energy efficiency in the economy	Manage public facilities; Building codes and development approval; Air quality management; Electricity distribution
15. Promote localisation and technology transfer and the creation of jobs	Local economic development
16. Promote the conservation of water	Water service delivery

Related standards, policies

Energy Act 2008 (and Integrated Energy Plan; Integrated Resource Plan 2010)

The National Energy Efficiency Strategy (2005; Rev 2008; 2011) and related National Energy Efficiency Action Plan (2012)

White Paper: Renewable Energy (2003)

National Climate Change Response Policy (2011)

The Green Economy Accord

The National Development Plan (2012)

Related Programmes

Programmes specific to other Priority Area goals are recorded in each Area, but it is worth noting that inside South Africa programmes that support the broad development of local energy planning and implementation include:

SALGA: EE Monitoring and Performance Pilot in 5 Cities (SDC funded, closing 2013/2014)

Sustainable Energy Africa and the City Energy Support Unit Programme (technical and capacity development support to Metros, and broader network of cities and towns)

ICLEI – Urban-LEDs Programme (2 cities – detailed support; 5 cities secondary support levels).

At the international level, a number of South Africa metros and towns engage in this global initiative through programmes such as the Mexico Pact, the C40 Cities and the Earth Hour City Challenge.

National Treasury: Sustainable Cities Programme.

Funding mechanisms

Municipal Infrastructure Grant (MIG)

Integrated Sustainable City Grant (NT for cities only)

Strategy and action plan

Action	Responsible department/s	Support needed and SALGA Action
Institutionalise a local level 'energy mandate'		
<p>Appoint a department to be 'home' to the energy mandate. <i>This should ideally not be prescriptive, but based on capacity and functional appropriateness in any particular municipality, e.g. Mayor's office, Environment, Electricity and Energy Services. Build on existing initiatives wherever possible.</i></p>	<p>Municipal Manager Local "champion"</p>	<p>Municipal EE/RE Strategy is adopted by SALGA with a clear plan of action for taking it forward; Local level energy mandate/responsibility is clear and officially circulated; Mandate is funded: ensure resources match responsibilities through economic and fiscal research (SALGA in partnership with NT); Include new responsibilities within Job Description of Municipal Manager and related KPAs; Explore the option of efficiency and renewable energy requirements in the distributor license requirements (NERSA).</p>
<p>Establish cross-sector energy coordinating committee <i>The relevant departments to include should be based on functional need rather than prescription – draw in those who have a role to play in line with the municipal energy plan.</i></p>	<p>Municipal Manager Local "champion"</p>	<p>Energy efficiency related indicators are included within IDP, SDF and Sector Plan requirements - <i>Possible consideration of an Energy Efficiency Sector Plan as requirement of IDP.</i></p>

Build political and senior management leadership		
Train and inform political leadership <i>Efficiency, more sustainable development approaches, are often seen as possibly retarding local economic development. Development awareness and understanding of impacts, short and longer term, is important.</i>	SALGA	Information and training provision; manage and run Climate Change committee
Develop appropriate messaging and visibility <i>Energy and climate needs to be packaged in a service delivery mode, with demonstrable social, economic and environmental benefits</i>	SALGA	Pursue funds to support pilot projects; Explore viability of a benchmarking awards system (<i>Note, this should only be pursued if will NOT increase reporting requirements of municipal staff, but rather encourage and support initiatives and action</i>)
Develop a platform for engagement of local government in provincial and national policy development <i>This is particularly important as energy domain broadens into areas of energy demand and distributed energy supply; also issues of gas reticulation should this come on line.</i>	SALGA Energy 'unit' or champion Electricity Transport	Provision of policy briefing notes and or information sessions and collation of input from municipalities on key policy directions; Representation of local government in inter-governmental forums
Develop local level energy policy and plans		
Develop a local level energy picture <i>This can be a commissioned exercise, compiling detailed data on energy demand and supply; or simply draw on information from the Municipal EE and RE Status Quo analysis, accessible data and local knowledge and experience (noting local level energy data can be challenging to collate – see Status Quo Report).</i>	Municipal Manager and energy 'unit' or champion department	Engage national data holders to facilitate easy collection of data required to compile a local level energy picture: Eskom, DoE, StatsSA
Develop an energy strategy and/or action plan <i>This can be a detailed strategy process, commissioned out (this may be the case for metros and larger towns), but recommendation for most municipalities is simply to draw on the SALGA Municipal EE and RE Strategy for action appropriate to the location. Obtain input into strategy from all departments and stakeholders to ensure that it is robust and 'buy-in' is developed. This can also build on existing plans and actions, e.g. Electricity Master Plans.</i>	Municipal Manager and energy 'unit' or champion department	SALGA Municipal EE/RE Strategy in place; Circulation of guidance and best practice examples ; Facilitation support
Inclusion of council approved strategy/plan into Sector plans and municipal monitoring systems: IDP, KPIs, SDBIPs, and Electricity Master Plans.	IDP office Provincial Local Government departments (IDP) Energy 'unit' or champion department	Ensure technical support to sector plan efficiency components is available: explore institutional options for location of technical support, noting that these should be wide and varied (e.g. MISA, regional DoE, Provincial SALGA offices, NGOs/academics); also including web based information.
Identify additional funding requirements <i>As far as possible align actions to core business of the municipality and main funding processes</i>	Energy 'unit' or champion department	Identify, drive and coordinate appropriate funding streams Support municipal business plan capacity development

		Technical unit – NT – to support development of PPP where appropriate <i>* National Treasury and stakeholders to explore new municipal revenue models to enable the energy transition.</i>
Support local energy plan implementation		
Integrate planning across departments and alignment of bulk infrastructure projects within municipalities and across spheres of government <i>Ensure energy aspects are considered within the planning phases of all municipal projects, e.g. housing delivery</i>	Champion department Sector departments	Ensure large infrastructure programmes (ADAM, MIG) are energy conscious
Introduce efficiency requirements into Procurement systems	Procurement	Provision of “green procurement” guidance and direction based on best practice; Clarify interpretations of the MFMA in relation to integrating resource efficiency, sustainability and life cycle accounting into Procurement processes
Develop monitoring and reporting systems	Energy ‘unit’ or champion Electricity All implementing departments	Support (or commission) a process to explore streamlining of national data/reporting requirements (IDP, NERSA, Eskom, DoE, DEA); Share best practice
Develop skills, knowledge and capacity	SALGA All relevant departments COGTA (MISA) Provincial departments Regional offices of national departments other	Engage with and provide information on training courses, capacity development programmes and knowledge sharing platforms; Address technical staff shortages in municipalities: including failure of SETA’s, consider bursary schemes and Artisanal training (pre-SETAs), tackle issues relating to ‘cadre deployment’ and political interference in technical decision making; Develop technical capacity support: government to coordinate regional platforms and central ‘shared service’ opportunities; boost existing national tech support units (MISA, SANEDI as tech / innovation ‘hub’) Develop web based information portal Strengthen Energy Forums (with DoE and provincial SALGA offices)
Secure financing and funding <i>As far as possible align actions to core business of the municipality and main funding processes</i>	Energy ‘unit’ or champion, MM, Implementing departments	Identify, drive and coordinate appropriate funding streams/ enhance and expand funding streams Support municipal business plan capacity development through Technical unit – NT – which can also support development of PPP where appropriate; Lobby NT to clarify interpretations of the MFMA in relation to barriers to energy efficiency contracting.

More information and supporting documents: <http://www.cityenergy.org.za/category.php?id=1>

Important or interesting ideas to take forward

Provincial support:

Provincial level energy and climate strategies that can guide all district and local municipalities (Gauteng, Eastern Cape and Western Cape have examples)

Provincial level Energy efficiency and Renewable Energy registries (Eastern Cape Province is about to publish a best practice registry; similarly, the Western Cape is busy finalising a Sustainable Energy Projects database of energy efficiency, renewable energy and sustainable transport projects being implemented in the Western Cape.)

Strategic Priority Area 1: SALGA Support Strategy and related Action Plan

SALGA Action	Support organisations
Institutionalise a local level 'energy mandate'	
Adopt the Municipal EE/RE Strategy and a clear plan of action for taking it forward <i>This would need to include an evaluation of capacity and process for adoption</i>	Working Group SALGA executive
Drive legal/mandate clarification, and resource alignment <i>Draw on existing legal opinions; May require economic and fiscal research to ensure resources match responsibilities</i>	COGTA, DoE, NT and others
Include new responsibilities within Job Description of Municipal Manager and related KPAs	COGTA
Explore the option of efficiency and renewable energy requirements in the distributor license requirements	NERSA, AMEU
Develop energy efficiency related indicators and drive inclusion into IDP, SDF and Sector Plan requirements <i>Possible consideration of an Energy Efficiency Sector Plan as requirement of IDP.</i>	COGTA, DoE
Build political and senior management leadership	
Coordinate the Climate Change committee and other leadership programmes, and conduct training for political leadership <i>Energy and climate needs to be packaged in a service delivery mode, with demonstrable social, economic and environmental benefits</i>	
Provide a platform for local government to engage national around policy development that affect them; and ensure local government suitably briefed: <ul style="list-style-type: none"> - Provision of policy briefing notes and or information sessions - collation of input from municipalities on key policy directions - 	
Represent local government in inter-governmental forums	DoE, DEA, other relevant national departments
Explore 'awards' and/or benchmarking system for local government energy management (to promote visibility, but also international benchmarking). <i>Note, this should only be pursued if will NOT increase reporting requirements of municipal staff, but rather encourage and support initiatives and action</i>	GIZ, EEA, SEA
Develop local level energy policy and plans	
Engage national data holders to facilitate easy collection of data required to compile a local level energy picture: Eskom, DoE, StatsSA	SEA, DoE, Eskom, StatsSA, SACN
Support facilitation support	SEA, ICLEI
Initiate discussions around appropriate institutional capacity support for new energy mandates/functions: shared service approaches, technical support availability, provincial support capacities and roles.	DoE, DEA, COGTA, NT, Provinces, SALGA Provincial offices, SAGEN, NGOs
Develop and enlarge technical capacity support (including business/financial) <i>Noting that these should be wide and varied and build on/boost existing platforms, e.g.</i>	MISA, AMEU, IDP offices SALGA Provincial

<p><i>MISA, DoE Energy Forum, NGOs/academics; consideration of shared service opportunities, consideration of SANEDI as tech / innovation 'hub'; Specific support areas raised include threshold feasibility of waste to energy projects, PPP development, business plan development skills.</i></p>	<p>offices, SAGEN, NGOs, NT units...</p>
<p>Develop web based information portal</p> <p><i>This to include information relating to approaches, technical issues and best practice with regard to all areas of this Strategy</i></p>	<p>SEA</p>
<p>Support local energy plan implementation</p>	
<p>Engage large infrastructure programmes (ADAM, MIG) to ensure that energy efficiency considerations are present</p>	<p>NT, MISA</p>
<p>Reduce financial barriers through driving clarification of MFMA interpretations</p> <p><i>This particularly in relation to integrating resource efficiency, sustainability and life cycle accounting into Procurement processes and in relation to barriers to energy efficiency contracting</i></p>	<p>NT</p>
<p>Support (or commission) a process to explore streamlining of national data/reporting requirements (IDP, NERSA, Eskom, DoE, DEA)</p>	<p>DEA, DoE</p>
<p>Provide information on training courses, capacity development programmes and knowledge sharing platforms</p>	
<p>Address technical staff shortages in municipalities and present an action plan to take this forward</p> <p><i>Including examination of issues raised: failure of SETA's, consideration of bursary schemes and Artisanal training (pre SETAs), tackling issues relating to 'cadre deployment' and political interference in technical decision making.</i></p>	
<p>Identify, drive and coordinate appropriate funding streams/ enhance and expand funding streams.</p> <p><i>Also to specifically identify funding for pilot projects to enhance visibility and leadership and community 'buy-in'.</i></p>	<p>NT, DoE, Eskom, International Green Funds, Other</p>

Strategic Priority Area 2: Municipal 'own' Energy Efficiency

Goal: Efficient institutions able to manage energy consumption in their own facilities and operations and transform local waste to energy where viable

Strategies

Implement building and lighting efficiency

Implement water and sanitation service efficiency

Develop an efficient vehicle fleet

Support waste reduction, management and waste to energy development

The status quo and key challenges

- Data on internal energy consumption of municipalities in delivering services is not readily available. The reasons are varied: historically this has often simply not been measured or monitored; municipalities record data differently, making comparisons difficult.
- Where data exists, it points to local government consuming some 1-2% of total energy consumed within the municipality across all municipal types.
- Local government may not represent an enormous proportion, but it is the single largest consumer (usually – save for towns housing large industry) and thus is in a position to have a fairly sizeable impact on consumption.
- The Constitution requires municipalities to deliver services in a sustainable manner (get the detail)
- Efficiency will bring savings to the municipality – this is also an important signal to citizens.
- Savings potential is difficult to determine precisely, as municipal 'own' consumption data is challenging to collect, but studies indicate potential savings within vehicle management, public lighting (street and traffic), building efficiency and efficiency in wastewater pumping. Savings of 17 – 35% can be realised through building efficiency. The data indicates targeting multi-storey office blocks for full retrofit programmes, and simply rolling out efficient lighting in smaller, single storey compound facilities.
- Major challenges experienced by municipalities include funding of efficiency retrofits.
- The need for improved waste management was raised, but, as with the Water Services Sector, much of the strategies and actions relating to this are held elsewhere. This strategy will only look at specific energy related aspects.

Mandates, powers and functions

The municipal responsibility relating to efficiency (financial and environmental) within its own operations is drawn from the three overarching objectives accorded to local government within the Constitution of the Republic of South Africa, 1996 (section 152 (1)), namely to ensure the provision of services to communities *in a sustainable manner*; to promote social and economic development and *to promote a safe and healthy environment*.

Related standards, policies

New energy efficiency building regulations SANS 10400-XA would apply to all new buildings or major renovation of public buildings.

SANS 10098-1 detail the technical standards for public lighting on Group A and B roads.

Related Programmes

Municipal Energy Efficiency and Demand Side Management Programme (Department of Energy / NT): funds public lighting (street, traffic signal and building) and building efficiency audits and retrofit (HVAC, efficient water heating, and energy management devices).

Public Works Programme relating to retrofit of government owned buildings

GIZ funded V-NAMA vertical integration pilot process (Public Works, DEA, DoE, pilot cities)

Eskom IDM: Integrated Demand Management Programme provides funding towards a variety of efficiency retrofit interventions.

SACN-commissioned detailed analysis of 9 metropolitan cities 'own' energy consumption and set of detailed recommendations around potential efficiency (underway).

Funding mechanisms

DoE: Municipal EEDSM (Grant)

Strategy and action plan

Action	Responsible department/s	Support needed and SALGA Action
Implement building and lighting efficiency		
Install meters in municipal owned buildings and ensure consumption is recorded and monitored	Building Management Electricity	
Retrofit all building lights with efficient alternatives and, where practical, energy saving devices such as motion sensors, etc.	Procurement Architecture/ Building management	Engage DoE/Eskom in a rollout programme; clarify financing barriers with NT (re MFMA and procurement and ESCO contracting); involve SABS in ensuring that technology uptake is sensible, viable and based on sound technologies – avoid technology dumping; Clarify insurance issues relating to new lights in old fittings
Replace all incandescent traffic lighting / signals with LED	Procurement Roads and traffic	Engage DoE / NT in discussion on upscale existing to national rollout programme; information provision

		Explore options to make this mandatory.
Retrofit street lighting with appropriate, energy efficient alternatives <i>These need to comply with SANS standards for road lighting</i>	Electricity Procurement Roads infrastructure	Engage DoE / NT in discussion on upscale existing to national rollout programme; Provide latest research and information on technologies
Retrofit council hostels and facilities/depots with large hot water consumption, with solar water heaters	Procurement Architecture/ Building management	As above. Provincial Departments of Human Settlements can also ensure effective water usage awareness in rental stock and handover of government delivered housing.
Undertake full building efficiency audit and retrofit processes <i>As per note above, this need only apply to multi-story, office-blocks; for smaller buildings simply replace lighting</i>	Procurement Architecture/ Building management	Guidance on contracting of private ESCOs; best practice information provision via web portal
Insert all new efficiency technical specifications are included within the Procurement process	Procurement	Share best practice and experience
Establish 'green procurement' principles in office equipment purchase and operation	Procurement	Provide guiding documents via web portal
Develop and run behaviour campaigns to make the energy consumption of facilities visible and encourage energy-savings practices <i>NB publish and demonstrate savings</i>	Energy unit or champion, Building management, Environment	Provide best practice examples and information
Train building managers in energy efficiency approaches and monitoring	Environment Building Management	Share best practice and training information
Implement water and sanitation service efficiency		
Ensure energy efficiency objectives are visible in Water services planning, and water infrastructure development plans	Water services Energy unit Electricity SDF Infrastructure master plans	Engage with water sector KPIs; Engage with MIG; Provision of technical information on efficient pumps and other approaches (pipe sizing to reduce leaks, etc.) – build on and develop technical services available via MISA and DWA
Improved water infrastructure maintenance	Water Services IDP and budget	Liaise with relevant water sector processes to ensure energy efficiency is held here
Procurement of efficient water pumps	Water services Procurement	Explore funding programmes – expansion DoE EEDSM Programme; Ensure technical information is provided for procurement update
Promote efficient water consumption through awareness campaigns	Water services Communications	Support DWA programmes underway
Promote appropriate installation and use of household water tanks	Water services Communications	
Develop an efficient vehicle fleet		
Work with Vehicle fleet procurement to bring in operational and life cycle costing into assessments	Procurement	Develop best practice information; Develop capacity of Procurement staff; Clarify within MFMA the understanding of “efficient” in terms of upfront capital costs vs life cycle costs.
Trip efficiency: trip tracking, advanced driving courses to improve efficiency	Fleet management Waste management services	Review and share best practice and identify the capacity needed to promote this; Training opportunities

Support waste reduction, management and waste to energy development		
Track waste truck trip routes and explore more efficient options for fuel consumption reduction	Waste services	Share best practice
Run awareness campaigns relating to reduce, re-use, recycle	Waste services Communications	Support programmes underway within the sector; share best practice
Recycling initiatives feasibility		Support programmes underway within the sector; share best practice; may be useful to establish 'threshold' feasibility to not pursued when not viable
<i>Establish feasibility of using wastewater gas for energy to reduce on-site energy consumption</i>	<i>See Renewable Energy Objective</i>	
<i>Waste to energy feasibility</i>	<i>See Renewable Energy Objective</i>	
<i>Waste or wastewater project development</i>	<i>See Renewable Energy Objective</i>	

More information and supporting documents: <http://www.cityenergy.org.za/category.php?id=2>

Important or interesting ideas to take forward:

There are enormous transaction costs for each municipality to undertake efficiency retrofit interventions, so it would make sense to try and identify where opportunities for programmatic interventions are possible, for example a centralised Eskom-DoE-COGTA programme rolling out efficient building lighting across all smaller municipalities building/facility stock.

It is also important to get new, efficient specifications into Procurement processes in order to avoid 'rebound' effects and in order to ensure that funding is catalytic and results in system change, rather than 'once off'. This should be a condition of participation in any funding programme.

Municipalities should ensure that efficiency is part of any general refurbishment or council housing stock upgrade process.

Strategic Priority Area 2: SALGA Support Strategy and related Action Plan

SALGA Action	Support organisations
All 'own efficiency' strategies	
Initiate debate and discussion on upscale existing to national rollout Programme in relation to municipal building lighting, street and traffic lighting, council solar water heating facilities and water pumps. Lobby for the inclusion of Procurement adjustments as a requirement of the Programme.	DoE, Eskom, NT
Explore the possibility of systematizing (through regulation) efficient procurement within all municipal systems and develop a plan of action to do this <i>– this could achieve efficient street lighting across the country within 3 years, at MINIMAL COST.</i>	
Share information relating to efficient building management and support officials to engage in training	CEM
Lobby NT to provide clarification (in official circular) addressing municipal financing barriers with regard to procurement and ESCO contracting	NT
Coordinate and develop technical capacity to: <ul style="list-style-type: none"> - provide assurance, on an ongoing basis, that technology under consideration is sensible, viable and technically sound; - provide latest research and information, for example on LEDs, water pumps and water distribution systems; - provide quick access to 'threshold' feasibility on recycling and waste/wastewater to energy - and to clarify related technical issues, such as insurance issues relating to new lights in old fittings 	MISA, SABS, SANEDI
Provide latest research, information and guidance (via web portal and events) on: <ul style="list-style-type: none"> • Technologies • Contracting of ESCOs • Green building / public building retrofit processes • Energy savings behaviour campaigns • Waste reduction campaigns and community initiatives • Public vehicle fleet efficiency 'smart drive', vehicle maintenance and trip tracking approaches • Green Procurement across the board: vehicles, public lighting, appliances 	DWA, SEA, GBCSA, others
Engage with water sector KPIs, and other processes underway, to ensure energy efficiency is present	DWA, Water sector in SALGA
Engage with MIG (held in governance)	
Support relevant sector programmes underway (waste and water management)	

Strategic Priority Area 3: Energy access for all

Goal: All households have access to affordable, safe and clean energy sources

Strategies

Electricity tariffs and subsidies (FBE) support use of electricity by poor households

Electrification expanded to reach all households, including informal households in urban/dense settlement areas and rural households

Workable Free Basic Alternative Energy models are developed and rolled out where appropriate

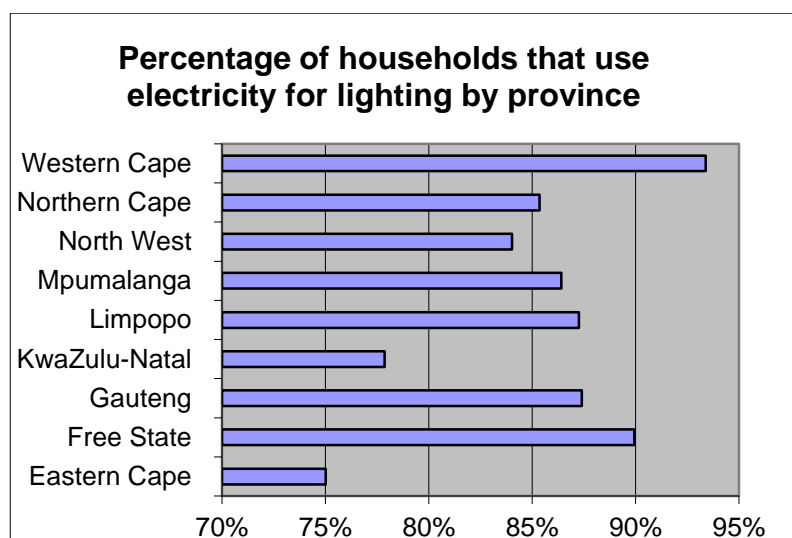
Thermal performance in poor households is improved, focussing on existing houses without ceilings

Develop a household energy service package approach

The status quo and key challenges

- The national electrification drive to support poverty alleviation has reached almost all urban, and the vast majority of rural, formal houses and electrification is being extended into informal settlements by some municipal distributors. However, a proportion of rural households and informal settlements still do not have access to electricity because of distributor grid limitations or because settlements are located on land which precludes electrification – such as private land, power line reserves or swampland. The provinces of the Eastern Cape and Kwa-Zulu Natal have particularly low rates. More research on the particular challenges to electrification encountered here is required.

Table 2: Electrification levels across South African provinces, 2011



Data from: StatsSA census 2011

- A steady urbanization rate (1.2%pa) has led to a growth in informal housing as the national housing programme has not been able to keep up with the demand. Currently around 13.6% of South Africa's population live in urban informal housing. National or local government support services

reach few of these people, and even though informal settlement electrification is gaining ground in the country, this group remain amongst the most marginalized.

- National government funds low income electrification, and provides an ongoing Free Basic Electricity (FBE) consumption subsidy for indigent households. While electricity is recognised as the most sought-after and beneficial energy source, national government has also attempted to introduce an indigent subsidy for non-electrical energy (such as LPG or ethanol gel) but implementation of this Free Basic Alternative Energy (FBAE) scheme has proven problematic, and no effective and workable FBAE rollout models are yet in existence.
- Roll out of the national electricity/energy subsidy is not reaching all indigent households. Some municipalities use an indigent register, but the indications are that not all poor households are registered; households may also be receiving their electricity through an informal or illegal connections, and are thus excluded from the subsidy (for example, although some 90% of households in eThekweni are using electricity for lighting – the StatsSA proxy for electrification – the number of FBE grant claims represents only 37% of ‘extreme indigent’ households and a mere 13% of all poor households³⁴). Subsidy ‘slippage’ occurs in municipalities that provide the FBE to all households below a set consumption level: wealthy households with low consumption levels receive the subsidy intended for the poor, while poor households with many occupants, or servicing multiple houses on a single connection, will consume above the subsidy allocation level.
- In addition to FBE, municipal distributors are required by NERSA to institute an inclining block tariff which allows poor customers (i.e. low electricity consumers) to purchase electricity relatively cheaply. Municipalities cross subsidise these customers from other consumer groups.
- While the inclining block tariff is a sound principle, in practice the situation is more complicated, as customers often on-sell to backyard shacks or adjoining informal houses, pushing their consumption up into the more expensive tariff brackets. There are also safety concerns with such informal wiring extensions. In addition, they often on-sell at a very high rate as a means of income generation, and the backyard shacks and adjoining informal households therefore receive no benefit from the subsidised tariff. Some municipalities are now providing meters for backyard shacks, but the situation is likely to persist until a formal electricity supply is available to all households.
- Large-scale state sponsored low-income housing programmes have delivered over 3 million houses in the past decades. However these houses generally have poor thermal performance, thereby experiencing reduced comfort levels and higher expenditure for space heating. Since 2009 houses build in the Southern Coastal Condensation Problem Area have included ceilings, and legislation released in 2013 requires all low income households to include ceilings, insulation and other sensible thermal performance improvements (as detailed in the subsidy quantum letter issued by the Department of Human Settlements (December 2013). However over 2 million households around the country were built prior to these initiatives, and retrofitting them to improve their thermal performance remains a huge challenge.
- Electrification has seen a significant decline in the consumption of hazardous household fuels, such as paraffin and candles. However, the use of such fuels still persists and subjects the very poor to ill health and fire, which has devastating consequences, destroying not just houses, but entire asset bases of the poor.
- Integration of housing delivery planning with service delivery, including electrification and transport planning, is often a challenge.

Mandates, powers and functions:

Electrification within municipal areas is within the mandate of municipalities who are electricity distributors, and this includes informal electrification. However funds for such electrification are provided

³⁴ Euston-Brown, M, for Durban Climate Change Strategy Introductory Report: Sustainable Energy, 2013

by national government. Some municipalities also draw on their own funds for this purpose. Where municipalities are not distributors, Eskom undertakes all electrification.

FBAE is also intended for implementation by municipalities, although the capacity and resources to implement FBAE must be sourced from within the municipality and the existing equitable share.

Subsidised housing is a provincial function, although larger municipalities also may implement housing projects.

Related policies, strategies and standards:

Free Basic Electricity (FBE) 2005

Free Basic Alternative Energy Policy (FBAE) 2007: this policy outlines the intentions of national government regarding the provision of FBAE to indigent households.

Policy Guidelines for the Electrification of Unproclaimed Areas – DoE 20 Jan 2011 rev6 (p8): National government response to electricity service provision in different categories of informal settlements.

Enhancements to the National Norms and Standards for the Construction of Stand-Alone Residential Dwellings and Engineering Services and Adjustment of the Housing Subsidy Quantum. Department of Human Settlements, 19/12/2013: This communication lists the thermal improvements to be included in subsidised housing and quantifies the subsidy increase available for this.

Integrated National Electrification Programme (INEP) 2012/2013 – sets out guidelines in line with the Energy White Paper for the electrification Programme.

New Households Electrification Strategy, June 2013 – defines universal electrification, 90% will be grid and remainder non grid solar systems and develops a plan to increase efficiency in planning and delivery

Related Programmes

INEP, Eskom electrification, Free Basic Alternative Energy

Funding mechanisms

Equitable Grant, INEP, FBE, FBAE, Donor funding

Strategy and action plan

Action	Responsible department/s	Support needed and SALGA Action
Lobby for and support the development of a national Energy Poverty/ Integrated Energy Services Delivery Policy	DOE	SALGA to provide municipal input and contribution
Electricity tariffs and subsidies support use of electricity by poor households		
Implement appropriate tariff regime which provides cheap electricity to the	<i>Addressed under Electricity</i>	

poor, yet is financially sustainable for the municipality	<i>Services– revenue models</i>	
Identify and implement suitable metering arrangements to reduce excessive charges for on-selling <i>This may initially be focused on backyard shack metering</i>	Electricity Department	Facilitate necessary research; sharing of experience from Eskom and bigger municipal distributors regarding metering options (with AMEU)
Improve indigent registry processes	Social services	Monitor subsidy targeting
Electrification expanded to reach all households, including informal households in urban/dense settlement areas and rural households		
Implement informal electrification programmes <i>This involves assessing the extent of informal housing, identifying priority electrification projects, and securing the resources for such electrification.</i>	Electricity Department	Facilitate clarity on available resources, and lessons sharing from municipalities with experience in informal electrification
<i>If municipality not a distributor:</i> Engage with Eskom to undertake informal settlement electrification	Services/utilities or Electricity Department	Clarity on Eskom informal electrification programme, and role for municipalities to encourage rollout thereof (SALGA and AMEU); Ensure that resources for electrification are properly aligned between Eskom and Municipalities (i.e. Municipalities electrifying in Eskom areas without concomitant resources)
Implement rural electrification programmes	Services/utilities or Electricity Department Eskom	Coordinate status quo on rural electrification; Support community awareness development around renewable off-grid alternatives.
Improve wiring levels in electrified households	Electricity departments/Eskom	Share best practice
Workable Free Basic Alternative Energy delivery models are developed and rolled out where appropriate		
Clarify where the mandate for FBAE lies within municipalities as it is not within the licensed mandate of utility distribution licenses under NERSA/the Electricity Regulation Act	DoE, Energy offices, Electricity departments	Work with DoE and COGTA to clarify this, ideally within the framework (action above) of developing an integrated energy poverty, or energy services delivery policy.
Based on proven FBAE rollout models, undertake FBAE rollout in appropriate areas and under suitable conditions (to be identified in 'Support needed').	Mandated or interested department	Develop workable models for FBAE rollout, including appropriate areas and conditions for rollout, and pilot implementation thereof before further rollout. This is to draw on pilot projects already undertaken, and find solutions to the current unsatisfactory funding arrangements and lack of municipal capacity to implement such schemes
Thermal performance in poor households is improved, focusing on existing houses without ceilings		
Source resources and implement ceiling retrofit programmes in <i>existing</i> housing stock	Human Settlements Department	Lobby national government and facilitate the securing of resources to implement ceiling retrofit programmes.
Ensure thermal requirements in terms of SANS10400 are included in the delivery of	Human Settlements	Circulate new information

<i>all housing post April 2014</i>	Department	
Solar water heater programme implementation	<i>see Energy Efficiency section</i>	
Develop a household energy service package approach		
<p>Consider and evaluate household energy service package components that may make sense. This could include, for example:</p> <ul style="list-style-type: none"> - Safety and efficiency awareness training or information - ‘hot box’ rollout for efficient cooking - Solar lights for non-electrified households - Regular rollout of CFLs for electrified households <p>This may also include demand side management measures, such as low pressure solar water heating, to reduce cost of electricity supply to this sector (see Electricity services).</p>	Communications, Social services, Electricity, Human Settlements departments (LG and provinces)	Information and best practice sharing. Provinces can also assist through including energy efficiency / electricity usage awareness information in their consumer education training sessions provided to beneficiaries at the time of taking occupation of homes.

More information and supporting documents: <http://www.cityenergy.org.za/category.php?id=4>

Important or interesting ideas to take forward:

Department of Human Settlements, Joe Slovo housing development “efficiency” case study

FBAE rollout of bioethanol gel pilot project in three municipalities (Aganang, Bushbuckridge, and Great Letaba) in Limpopo Province

City of Cape Town ceiling retrofit programme funded through the Green Economy Fund

Strategic Priority Area 3: SALGA Support Strategy and related Action Plan

SALGA Action	Support organisations
Overarching: support and encourage the development of an Integrated Energy Poverty /Energy Services delivery Policy This to include identifying and clarifying the responsible local government department/s	DoE
Electricity tariffs and subsidies support use of electricity by poor households	
Support the development of pro-poor metering arrangements <ul style="list-style-type: none"> - Facilitate necessary research; - sharing of experience from Eskom and bigger municipal distributors regarding metering options 	AMEU Metros
Monitor FBE subsidy targeting	NT
Electrification expanded to reach all households, including informal households in urban/dense settlement areas and rural households	
Facilitate clarity on available resources for informal electrification and lessons sharing from municipalities with experience in informal electrification	DoE-INEP SEA guide
Obtain clarity on Eskom electrification Programme (formal, informal, rural, urban)	DoE-INEP AMEU Eskom
Support programmes to promote community receptivity to off-grid, modern, renewable energy systems where grid is not feasible.	Eskom DoE-INEP
Ensure resources for electrification are properly aligned between Eskom and Municipalities (i.e. Municipalities electrifying in Eskom areas without concomitant resources)	DoE-INEP Eskom AMEU
Workable Free Basic Alternative Energy delivery models are developed and rolled out where appropriate	
Develop workable models for FBAE rollout, drawing on pilots already undertaken, addressing: <ul style="list-style-type: none"> - identification of appropriate areas and conditions for rollout - solutions to the current unsatisfactory funding arrangements and lack of municipal capacity to implement such schemes - practical piloting before rollout 	
Thermal performance in poor households is improved, focusing on existing houses without ceilings	
Lobby national government and facilitate the securing of resources to implement ceiling retrofit programmes	
Circulate new information relating to the application of SANS 10400-XA in low income housing delivery	
Develop a household energy service package approach	
Information and best practice sharing	

Strategic Priority Area 4: Energy efficiency in the residential, commercial and industrial sectors

Goal: Effective institutions able to support the efficient use of electricity throughout the built environment and economy

Strategies

Encourage and enforce efficiency through building and development approval processes

Promote efficiency (and localisation, where appropriate) through information provision and product/systems/supplier endorsement programmes

Encourage and enforce efficiency through electricity services technical interventions

The status quo and key challenges

- The IRP 2010 Update Report indicates that there are limited supply side solutions to meeting the current electricity supply constraints in the country and notes the importance of efficiency in the next couple of years if we are to avoid costly load shedding (IRP Update Report, 2013, (13.5)).
- The residential and commercial and industrial (built environment) sectors in South African municipalities are largely reliant on electricity to meet energy needs, with some use of liquid fuels (LPG, paraffin), coal and wood for indoor heating and cooking, and some solar for water heating.
- Industrial processing, manufacture and agriculture are also very dependent on electricity as their major energy source, with some coal, gas and diesel for certain industrial processes.
- This substantial dependence on coal-based electricity means that the built environment and economic sector activities contribute substantially to GHG emissions. South Africa has had, historically, very cheap electricity, which resulted in entrenched inefficiency in electricity consumption.
- Greater efficiency will contribute to climate change mitigation goals, but will also result in financial savings and economic efficiencies.
- However, upfront capital costs and high transaction costs related to implementing energy efficiency measures act as barrier to uptake, despite financial viability.
- Further, municipalities that are distributors rely on revenue from electricity sales to support municipal revenue and cross subsidise other services and free basic service delivery. Under these circumstances, energy efficiency poses a challenge to municipal finance.
- Studies point to a 20% plus potential for energy saving through efficiency. Strategically important energy efficiency interventions, considering municipal 'reach', impact on energy savings and addressing poverty, are:
 - efficient lighting in low income housing
 - ceiling retrofit (thermal efficiency) in existing low income housing stock
 - efficiency retrofit (SWH or heat pump) of residential mid-high income water heating appliances – through endorsement and other schemes,
 - efficiency retrofit of HVAC systems in commercial sector – through information and other schemes
 - efficient lighting across all sectors
- Two of the larger metros, for which data has been analysed, have seen an approximately 10% reduction in energy consumption amongst mid-high income households post the 2008 price increases. Total electricity sales in these municipalities have begun to flatten out/decline, without a

correlative decline in economic growth, pointing to efficiency across the municipality (further research is needed to get clarity on the decline: whether suppressed demand, fuel switching, behaviour or technological change has been involved).

- The energy efficiency standards for new buildings (SANS 10400-XA), recently issued by DTI, are an important step forward for the country. Local government has the responsibility for the implementation of these standards. Serious capacity shortages in this regard need to be addressed.

Mandates, powers and functions

Although these sectors lie within the private domain, local government has important powers relating to building and development approval and electricity distribution (Constitution RSA 1996, Section 56 (1) and Schedules 4B and 5B). Building approval regulation now has efficiency requirements, which local government must enforce. As distributors, municipalities are in a strong position to influence electricity consumption through pricing, information and communication (including behaviour campaigns, smart and real time metering). Retrofit Programme to improve the efficiency of existing building stock is more challenging. Industrial processes are also very specific and will usually be tackled vertically through industrial bodies.

Related standards

Both the SANS 10400-XA:2011 and SANS 204:2008 documents cover energy use in buildings. SANS 10400-XA supports the National Building Regulations which are mandatory for all new buildings and extensions and additions to existing buildings. 10400-XA requires that new buildings comply with the energy efficiency requirements set out in 204.

SANS 204 has tables which stipulate the maximum energy demand and the maximum annual energy consumption for various kinds of buildings in the various climatic areas of South Africa. Any performance above these maxima must be justified through rational design by a competent person. Electrical appliances in new buildings are required to have an energy rating while thermal system equipment and components have to have insulation which minimises heat loss or gain.

There is a specific requirement for solar heating of at least 50% of the hot water unless a competent person can prove that it is not feasible. In such cases it is necessary to make up the solar shortfall from waste heat recovery, heat pumps, or something similar. There is a more general requirement that renewable energy sources are to be maximised and can be utilised to mitigate where the maximum allowable demand and energy consumption have been exceeded.

Related Programmes

Eskom Integrated Demand Management (IDM) Programme (current status unclear)

National Energy Efficiency Accord, managed by the National Business Initiative and Business Union South Africa

Private Sector Energy Efficiency Programme (PSEE), managed by the National Business Initiative (NBI)

National Cleaner Production Centre: runs the National Cleaner Production Programme (NCPP) and the Industrial Energy Efficiency Improvement Programme

Manufacturing Competitiveness Enhancement Programme (MCEP)

Green Building Council of South Africa

Funding mechanisms

Eskom Integrated Demand Management (IDM) Programme (current status unclear)

Green Energy Efficiency Fund

Strategy and action plan

Action	Responsible department/s	Support needed and SALGA Action
Encourage and enforce efficiency through building and development approval processes		
Enforcement of the new SANS 10400-XA regulation	Planning	Review of available training; identify capacity needs; develop plan to meet these needs. Engage with DTI and COGTA (MISA) around provision of interim capacity in shared capacity approach.
Develop and run behaviour change campaigns and ensure that efficiency awareness is developed within education curricula.	Environment Communications Electricity	Share best practice approaches and material (including technical savings sheets – SEA)
Continue to grow and develop the Planning approval process towards green building best practice and an increasingly radically new and more energy efficient ways of developing	Planning	Share best practice and grow knowledge in this sector; share Green Building Council of South Africa toolkit
Explore options around de-linking municipal revenue from service sales in order to ensure that efficiency does not have a substantial impact on revenue		Disseminate research and planning tools; Liaise with NT around municipal revenue models
Promote efficiency (and localisation, where appropriate) through information provision and product/systems/supplier endorsement programmes		
Support efficient water heating in the residential sector <ul style="list-style-type: none"> - Pursue national funding for low income housing rollout (this NB for peak demand management) - Explore supplier endorsement programmes for mid-high income rollout - Explore options to rollout SWH as a component of municipal energy services <p><i>Consider appropriate localisation requirements in all endorsed products.</i></p>	Electricity Environment Communication	Provision of information and best practice; Ensure national rollout programmes involve local government in planning and have adequate maintenance programmes.
Explore and encourage more efficient	DoE	Pursue regulation of gas price.

fuels for cooking, such as gas <i>This requires being able to ensure price stability</i>		
Provide information to customers to support efficient technology uptake, including information on tax rebates and subsidy schemes	Electricity	Provide and circulate up to date information, including information relating to energy audits (PSEE, NCPP) and technology. (NT, DoE, SANEDI, IDM)
Host commercial and industrial energy forums for information exchange		
Encourage smart irrigation system uptake/solar boreholes in the agricultural sector		
Encourage a 'green' Hospitality and tourism sector	Communication Environment	Disseminate information and tools to support, e.g. Fair Trade in Tourism, free audits via NCPC and the PSEE of the National Business Initiative
Encourage and enforce efficiency through electricity services technical interventions		
Geyser ripple control installation	Electricity	With MISA, provide best practice information
Engage top consuming customers via meter processes: this can include real time feedback, preferential treatment in load shedding if efficiencies achieved	Electricity	
Create an effective meter and billing system to ensure revenue collection is robust	Electricity	Support capacity initiatives to improve this area (MISA)

More information and supporting documents:

<http://www.cityenergy.org.za/category.php?id=2>

Important or interesting ideas to take forward:

New approaches to electricity connection size to encourage developments to meet additional energy needs through renewable energy or efficiency (Midvaal Municipality)

Riversdale – small town SWH programme amongst the mid-high income group

City of Cape Town Solar Water Heater Supplier endorsement programme

Strategic Priority Area 4: SALGA Support Strategy and related Action Plan

SALGA Action	Support organisations
<p>Encourage and enforce efficiency through building and development approval processes</p>	
<p>Review training available on SANS 10400-XA/SANS 204 and support municipalities to attend</p>	
<p>Engage with DTI and COGTA (MISA) around provision of interim capacity in shared capacity approach, to ensure new regulations are enforced.</p>	<p>DTI and COGTA (MISA)</p>
<p>Liaise with NT around municipal revenue models and disseminate information on approaches and planning tools</p>	<p>NT, AMEU, NERSA, SEA</p>
<p>Promote efficiency (and localisation, where appropriate) through information provision and product/systems/supplier endorsement programmes</p>	
<p>Provision of supporting information and guides on:</p> <ul style="list-style-type: none"> a. Behaviour campaigns and related material b. Commercial and industrial energy efficiency forums c. Energy efficiency funds or tax incentives for private sector uptake (NCP, PSEE) d. Models and examples of efficient water heating programmes for mid-high income e. Support material for rollout of national SWH programme amongst low income communities. f. Green building regulation and development best practice. g. Green hospitality support (e.g. greening manuals such as that with Fair Trade Tourism) h. National Cleaner Production Centre, and Private Sector Energy Efficiency Programme, free audit process for hospitality and other sectors 	<p>Various cities, GBCSA, SEA, DoE, NT, NBI, NCPC</p>
<p>Provide a communications platform to ensure that national programmes with municipal rollout are well-managed, involve local government in planning, have adequate maintenance plans and do not result in negative consequences or costs for municipalities (e.g. for rollout of low pressure solar water heaters).</p>	<p>DoE, Eskom, local municipalities</p>
<p>Encourage and enforce efficiency through electricity services technical interventions</p>	
<p>Provide best practice information on technical interventions that have been successful</p>	<p>Learning networks; AMEU</p>

Strategic Priority Area 5: Renewable Energy Development

Goal: Renewable energy options are a significant component of local energy supply where they are technically and economically feasible, contributing to low carbon development and local economic growth/sustainability

Strategies

Promote small-scale embedded generation, with an initial focus on solar PV

Facilitate landfill gas and wastewater gas electricity generation where appropriate

Facilitate micro-hydro generation where feasible

The status quo and key challenges

- While small-scale embedded renewable electricity generation has been technically feasible for decades, it has only recently become a financially feasible option for end users due largely to consistent large national electricity price increases
- Local government distributors and Eskom distribution have only recently started developing frameworks to allow small generators to connect to, and feed into the grid in a way that is feasible for both the distributor and small-scale generator. Many distributors have not yet engaged with this issue.
- In the absence of workable frameworks for connecting to the grid, experience shows that such systems are installed without official approval. Such installations are accelerating rapidly at present, with potential safety and power quality concerns.
- There are concerns regarding the impact on municipal revenue of large-scale adoption of solar PV and other small scale embedded generation options. Appropriate tariffs will need to be developed and implemented to avoid this situation. However, there is work underway (led by DoE and Eskom) to design a standard offer approach in line with the national REIPP Programme that would purchase energy from embedded generators at a set prices so as to render municipalities indifferent between their Eskom supply and embedded generators (IRP Update Report, 2013).
- The regulatory system remains unclear regarding the need for licensing of small generators and the role such embedded generators have in national electricity generation plans (the IRP)
- Because capital investment for embedded generators is borne by the owner and not government or the national utility, and job creation potential in this industry is significant, promotion of such generators has the potential to be economically very beneficial for municipalities and the country as a whole.
- Landfill gas electricity generation has potential to be an economically feasible and important low carbon supply option. However experience shows that implementation and ongoing operation is demanding, and its feasibility therefore needs investigation before being pursued by individual municipalities.
- Sewage methane electricity generation holds promise as being a financially attractive low carbon energy option in many cases. The threshold feasibility of this generation option needs to be clarified so that municipalities can be guided regarding its pursuit.
- Micro-hydro installations, sometimes embedded in the water supply network of municipalities, can be viable in certain circumstances. Clarity is needed on conditions for viability.

- Greater clarity is required with regard to IPP access to municipal “assets”, such as municipal waste streams, landfill gas, water pressures, etc. Are these considered as “assets” to be disposed of under the Asset Transfer regulations? The concern is that following the usual Public-Private Partnership (PPP) approach might kill many potential projects.
- Biofuels are an important component of a low carbon energy trajectory for urban areas. However promotion of liquid fuel mix changes largely rests with national government, not local government.

Mandates, powers and functions

While electricity generation is not a function of municipalities, they may apply to NERSA for a licence for such generation, for example in the case of landfill gas methane electricity production.

Small scale embedded generation: Existing legislation requires that anyone generating electricity “not for own use” must obtain a generating license from the National Energy Regulator of South Africa (NERSA). Clarity is still required whether feeding surplus generation back onto the utility grid and then drawing the same amount of electricity off the grid at a later stage for consumption is regarded as being “generation for own use”. The most recent NERSA guidelines imply that a license is not required for generators with generation capacity less than 100kW, and thus that municipal distributors can accept such systems, subject to applicable technical standards, without a NERSA license, and provided they do not generate more electricity than is consumed on the site on average.

Systems larger than 100kW, which would include city-owned landfill or sewage gas generation, require a license from NERSA, who will in-turn see that it is in accordance with the current IRP.

Biofuels promotion is largely a national government function.

Related standards

Small-scale embedded generation: NRS 097-2-1 (Part 2: Small Scale Embedded Generation). This document serves as the standard for the interconnection of SSEG’s to the utility network and applies to embedded generators smaller than 1000kVA connected to LV networks of type single, dual or three-phase.

South African Renewable Power Plants Grid Code (SARPPGC). This document sets out the technical and design grid connection requirements for renewable power plants (RPP) to connect to the transmission or distribution network in South Africa.

Related Programmes

SALGA, Eskom, GIZ and Sustainable Energy Africa are supporting local government with developing procedures to facilitate the rollout of **small scale embedded generation**, with a focus on **solar PV**.

Cities such as eThekweni, Johannesburg and Cape Town have developed application procedures which clarify technical and other requirements **of small scale embedded generation installations, focusing on solar PV**.

Several municipalities are various stages of feasibility analysis or implementation of **sewage methane or landfill gas** projects.

EThekweni has undertaken a feasibility analysis of **micro-hydro** potential in their main municipal water pipes.

Funding mechanisms

An embedded generation subsidy, within the REIPP Programme, to render Eskom and embedded RE power cost neutral for municipalities, is under discussion and development (DoE and Eskom)

Strategy and action plan

Action	Responsible department/s	Support needed and SALGA Action
Promotion of small-scale embedded generation		
Develop clear procedures for the application and adoption of small-scale embedded generators into the municipal grid. <i>These procedures need to ensure that technical issues specified in the NRS097-2-1 amongst others are adhered to in order to ensure safety, power quality and grid stability standards.</i>	Electricity Department	Facilitate dissemination of documents and experience from metros that have developed procedures to other distributors; Clarify regulatory situation regarding small scale embedded generators under 1MW with regard to licensing requirements and definition of 'own consumption' (and possible lifting of cap for those not requiring a license to 1MW, with annual municipal reporting to NERSA)
Develop and implement tariffs which protect municipal revenue in the face of large-scale rollout of small scale embedded generators <i>This is necessary to ensure that such generators continue to contribute to the operation and maintenance of the distribution infrastructure. Revenue impact studies have been completed to inform this work.</i>	Electricity Department	Facilitate dissemination existing of revenue impact studies. Engage with NERSA around acceptable approaches to tariff redesign
Facilitate landfill gas and wastewater gas electricity generation		
Clarify status of municipal energy streams and applicable disposal regulations	Supply Chain Management	COGTA and NT to develop a brief clarifying applicable regulations.
Implement landfill gas electricity generation projects where feasible <i>Such projects can be demanding and are only financially feasible under certain circumstances. Detailed feasibility analyses are advisable before proceeding.</i>	Electricity Department, Solid Waste Department	Development of general threshold feasibility guidelines for landfill gas projects. Facilitate technical support and information exchange from a central unit and experienced municipalities
Implement sewage methane electricity generation projects where feasible <i>Such projects are relatively new in South Africa and are only financially feasible under certain circumstances. Detailed feasibility analyses are advisable before proceeding.</i>	Electricity Department, Water and Sanitation Department	Development of general threshold feasibility guidelines for sewage methane projects (and technical support capacity for business plan development where feasible). Facilitate technical support and information exchange from pioneer municipalities.

Facilitate micro-hydro projects		
<p>Undertake feasibility analyses and implement micro-hydro projects where feasible. These may be within the municipal water distribution system ('run-of-pipe') or separate hydro schemes.</p> <p><i>Run-of-pipe projects are relatively new in South Africa and are only financially and technically feasible under certain circumstances. Detailed feasibility analyses are advisable before proceeding.</i></p>	<p>Water and Sanitation Department, Electricity Department</p>	<p>Develop general guidelines on feasibility of different configuration micro-hydro schemes. Facilitate technical lessons sharing from experienced municipalities.</p>

More information and supporting documents: <http://www.cityenergy.org.za/category.php?id=3>

Important or interesting ideas to take forward:

Establish simple application procedures for very small embedded generators: Current technical standards and application procedures for small embedded generators are demanding to the extent that they will be out of proportion to the costs of very small systems - say below 5 or 10kW. In these circumstances aspiring generators are likely to install systems 'under the radar' without seeking official approval. This may result in compromised safety and power quality standards. It is important that simpler requirements are put in place for such very small systems to avoid a proliferation of unapproved installations.

Engagement with large-scale RE developments in municipal boundaries: there may be a need for information and support to be provided to municipalities around engaging with large scale RE developers with regard to issues such as Environmental Impact Assessment; community development.

Strategic Priority Area 5: SALGA Support Strategy and related Action Plan

SALGA Action	Support organisations
Promotion of small-scale embedded generation	
Facilitate dissemination of documents and experience from metros that have developed small-scale, embedded generation application procedures to all municipal distributors	AMEU, SEA, City of Cape Town, eThekweni, others
With AMEU, engage with NERSA to clarify the regulatory situation regarding small scale embedded generators under 1MW <i>with respect to licensing requirements and definition of 'own consumption'</i>	AMEU, NERSA, GIZ
Support processes to minimize the impact of efficiency and small-scale RE on revenue: <ul style="list-style-type: none"> - facilitate dissemination of existing of revenue impact studies - Engage with NERSA around acceptable approaches to tariff redesign 	NERSA, SEA
Facilitate landfill gas and wastewater gas electricity generation; and micro-hydro generation	
Clarify status of municipal energy streams and applicable disposal regulations	COGTA and NT
Development of general threshold feasibility guidelines for: <ul style="list-style-type: none"> - landfill gas projects - sewage methane projects - different configuration micro-hydro schemes 	MISA, SANEDI
Develop centralized technical support capacity to assist with pre-feasibility, feasibility and business plan development	MISA and others
Facilitate technical support and information exchange from pioneer municipalities.	Various cities, learning network platforms

Strategic Priority Area 6: Electricity Services

Goal: Sustainable electricity service delivery that can accommodate and promote access to electricity, efficiency and renewable energy development

Strategies

Adopt sustainable revenue models in response to revenue loss challenges resulting from efficiency, embedded generation and requirements of infrastructure maintenance and expansion

Facilitate small-scale embedded generation in a way that preserves financial and technical integrity of the distribution system

Rollout informal settlement electrification

Introduce 'Smart' technology, appropriately and based on a detailed understanding and long-term vision of its role

The status quo and key challenges

- National power shortages, together with fast rising electricity prices and the economic downturn of the past few years have changed the dynamics in the municipal electricity sector significantly. Amongst the key impacts has been a slowing or stagnation of demand growth, greater focus on electricity efficiency amongst customers, and an accelerated adoption of alternative generation technologies by end-users, including solar PV.
- At the same time, maximum demand is not reducing. This is largely driven by low income households. Supply of electricity to this sector is costly and reducing peak demand would benefit electricity distribution business.
- The above trends pose challenges for municipal electricity distributors. Chief amongst these is the impact on revenue. Efficiency, small embedded generator installations, and general reduction in demand due to its price elasticity all tend to reduce electricity revenue. This is of great concern, since electricity revenue is often an important source of income for municipalities to enable cross-subsidisation of the poor and funding of other important municipal services.
- In many municipalities general pressures on finances or political interference has led to inadequate allocations for electricity grid maintenance and expansion, with escalating fault levels and associated pressure on electricity department staff. Some municipalities have had to turn new customers away due to an inability for the network to accommodate them. This situation is now recognised as being critical, as a medium- to long-term deterioration in municipal electricity infrastructure because of other short-term budget pressures will destroy the 'golden goose' of the municipality – the electricity revenue generating system.
- Electricity departments face new challenges with the rise of small-scale embedded generators such as solar PV, and many struggle to find the capacity to address the necessary technical and billing challenges that emerge.
- In the face of fast changing electricity supply and demand environment, including the prevalence of embedded generation and efficiency, municipalities need to rework their tariff models and introduce a level of sophistication that they often do not have the capacity to tackle.
- Long-term planning in electricity departments was dealt a blow when the Regional Electricity Distributors (REDs) were announced, as many electricity departments halted such planning in the face of the imminent new institutional regime. The regime never materialised, but electricity

planning has generally not been adequately reinstated in municipal distributors for staff capacity reasons.

- Electricity departments are increasingly under pressure to electrify informal areas. While this is a necessary and sound developmental strategy, it stretches the capacity of many municipalities who are already understaffed.
- Theft of electricity is serious in some municipalities (with reports of as much as 1/5th of revenue lost through non-technical losses). Revenue loss from theft is significant, as the municipality still pays Eskom for the purchase of the power, but receives no revenue for its sale. Municipalities seldom have the capacity to address this situation adequately.
- There is an increasing focus on ‘smart’ technologies (smart meters, smart grids, etc.) as being an important component of future electricity supply systems, yet there is a general lack of clarity concerning whether and how to introduce such technologies into municipal operations. Guidance, based on a thorough understanding and a long-term vision, is urgently needed.

Mandates, powers and functions

Municipal distributors are responsible for sustainable electricity service provision in their areas of jurisdiction.

They are under legal obligation to apply stringent safety standards as per the various applicable technical standards.

Many such distributors are also *de facto* responsible for boosting municipal coffers.

Related standards

Multiple standards apply and policies relate (including: NRS, Grid code, Electricity Regulation Act, MFMA, PFMA)

Related Programmes

The Financial and Fiscal Commission has undertaken studies which identify the critical need for municipal revenue allocations to ensure adequate network maintenance and expansion. (*Sustaining Local Government Finances*, 2013. Financial and Fiscal Commission)

Sustainable Energy Africa has undertaken assessments of the impact of energy efficiency and small scale embedded generation on municipal revenue (2014)

Funding mechanisms

Strategy and action plan

Action	Responsible department/s	Support needed and SALGA Action
Adopt sustainable revenue models to respond to the challenges of revenue loss through embedded generation and energy efficiency, requirements for infrastructure maintenance and expansion		

Undertake studies to explore and develop sustainable revenue models. <i>These should:</i>	Electricity Department, Treasury	Facilitate resources to undertake revenue model studies. Liaise with National Treasury around studies and recommendations for municipalities.
<ul style="list-style-type: none"> - Undertake demand projections for municipalities, including consideration of elasticity of demand - Ensure adequate revenue for network maintenance - Allow for network expansion to meet growth needs - Preserve revenue in the face of energy efficiency and small scale embedded generation adoption 		
Undertake studies to develop appropriate tariffs to support a sustainable revenue model	Electricity Department, Treasury	Facilitate the undertaking of tariff studies. Liaise with NERSA and AMEU regarding such studies.
Facilitate the adoption of small scale embedded generation in a way that preserves financial and technical integrity of the distribution system		
(actions under 'Renewable Energy' section)		
Increase informal settlement electrification		
(actions under 'Access to Energy' section)		
Consider peak reduction strategies in the low income household sector, for example solar water heating; and, in the longer term, the expansion of gas for cooking.	Electricity Dept. Energy	
Introduce 'Smart' technology appropriately, based on a detailed understanding and long-term vision of its role		
Introduce Smart technologies as appropriate, based on guidelines	Electricity Departments	Research and develop guidelines on the adoption of Smart technologies (smart meters, smart grids etc.) in municipalities. <i>This work is to consider the long-term implications of adopting different systems, issues regarding proprietary technologies, financial, billing and revenue implications, associated data production and analysis abilities, ongoing staff capacity and maintenance implications, amongst others.</i>
Reduce electricity theft to protect revenue		
Implement programme to identify and reduce theft through forensic audits and other means.	Electricity Department, Treasury	Facilitate necessary financial and technical support to implement theft reduction programme.
Create an effective meter and billing system to ensure revenue collection is robust	Electricity	Support capacity initiatives to improve this area (MISA)

More information and supporting documents: <http://www.cityenergy.org.za/category.php?id=5>

Important or interesting ideas to take forward: Midvaal: by law passed that all sectional titles will only be allowed 20 amp connections; remainder they must themselves meet through alternatives.

Strategic Priority Area 6: SALGA Support Strategy and related Action Plan

SALGA Action	Support organisations
Adopt sustainable revenue models to respond to the challenges of revenue loss through embedded generation and energy efficiency, requirements for infrastructure maintenance and expansion	
Facilitate resources to undertake revenue model studies. Liaise with National Treasury around studies and recommendations for municipalities.	SEA (tool), NT
Facilitate the undertaking of tariff studies to develop appropriate tariffs for sustainable service delivery under changing conditions. Liaise with NERSA and AMEU regarding such studies.	NERSA, AMEU
Introduce 'Smart' technology appropriately, based on a detailed understanding and long-term vision of its role	
Research, collate existing information and develop guidelines on the adoption of Smart technologies (smart meters, smart grids etc.) in municipalities. <i>This work is to consider the long-term implications of adopting different systems, issues regarding proprietary technologies, financial, billing and revenue implications, associated data production and analysis abilities, ongoing staff capacity and maintenance implications, amongst others.</i>	MISA
Reduce electricity theft to protect revenue	
Facilitate necessary financial and technical support to implement theft reduction programme	MISA
Support capacity initiatives to improve theft reduction	MISA

Strategic Priority Area 7: Efficient Transport and Mobility

Goal: Walkable, 'smokeless' municipalities that support safe mobility for all, and good transport networks; and where public transport is a sought-after mode of vehicle transport

Strategies

Develop integrated, local transit plans

Develop Non-Motorised Transit (NMT) facilities

Develop and improve public transport modalities

Support and promote greener fuels and fuel efficiency

The status quo and key challenges

- A substantial portion of mobility in our municipalities takes place on foot. Figures for this are outdated (latest census didn't record this in this manner), but the indications are that on average within the Metros, this represents some 43% of all mobility and in the 'Secondary' and smaller towns this is, on average 53% (StatsSA 2001). These figures are sizeable and from the perspective of addressing poverty, inequality and access it is important this be noted, and non-motorised transit support be a cornerstone of any transport/mobility related municipal strategies.
- Petrol and diesel contribute over 50% to the energy consumption across all municipalities (save for industrial municipalities where this proportion is skewed). This indicates that the transport sector is the single highest energy consuming sector in our municipalities.
- Although liquid fuel from the transport sector still contributes less than electricity to GHG emissions, this is the most rapidly growing GHG emissions sector in South Africa.
- Substantial dependency on oil-derived fuels, with long supply lines, render municipalities vulnerable to price hikes, fuel shortages and, in the long run, enormous economic costs.
- Municipalities exhibit the legacy of apartheid planning, with sprawling suburbs, townships outside of urban centres, poor integration and poor public transport.
- The majority of government subsidies go towards bus and rail (privileging metros and larger towns), while the majority use taxis or walk to places of work or school.
- Very low densities mean that viable public transport systems are not feasible in many secondary and smaller towns and rural municipalities. Efficient transport networks and innovative use of private transportation need to be supported and developed in these instances (e.g. promotion of shared car-trip systems).
- Rapid growth in car ownership is being experienced in South Africa and this puts pressure on local road infrastructure and parking capacity and increases congestion (affecting quality of life, health, and environment).
- Climate change (increase in storm severity and intensity), along with a lack of budgeting and procurement towards infrastructure maintenance and upgrading, is resulting in road degradation, particularly in rural areas.
- Effective, efficient linkages and mobility are a cornerstone of economic and social development.
- There is a need to include transport planning within urban and regional land use and economic planning frameworks.

- Rural South African municipalities face the particular challenge of transport “peak” situations on ‘market’ (pension/social grant) days. Policy and programmes to address these challenges are underway, including exploration of ‘periodic access systems’ and the strengthening and regulating of the “bakkie” sector as means to address a variety of rural freight and passenger transport needs.

Mandates, powers and functions

Part A of schedule 4 of the Constitution of the Republic of South Africa (1996) assigns concurrent national and provincial legislative competence with regard to public transport to both national and provincial government. Public transport is also assigned to municipalities as indicated in Part B of Schedule 4 of the Constitution. Section 84 (1) (g) of the Municipal Structures Act, 1998, further assigns powers and functions relating to the regulation of passenger transport to district municipalities³⁵. The National Land Transport Act (NLTA), 2009, further assigns functions: Section 11 (1)(a) – national, Section 11 (1)(b) and Section 11 (2) – provincial and Section 11 (1)(c) and Section 11 (4) – local. This act is currently under review and may assign greater functions to local government, based on capacity to implement.

However, many transport planning functions lie outside of municipal jurisdiction: rail and major roads rest with national government, busses tend to be provincial and fuel mix standards are a national function. However, municipalities all have functions relating to the related areas of town planning and urban development, roads and traffic management.

Related standards, policies

The National Land Transport Act 5 of 2009 (NLTA), administered by the Department of Transport; White Paper on National Transport Policy, 1996, Public Transport Strategy and Action Plan, 2007 (modal upgrading and IRPTNs); Rural Transport Strategy of South Africa (RTSSA, packaged in the IRMA project).

SALGA: Accelerating a move towards prioritisation of efficient public transport: a discussion document

Related Programmes

Public Transport Strategy and Action Plan (PTSAP) (2007 – 2020):

Vehicle recapitalisation and fast track development of high quality IRPTNs (rapid rail and bus corridors) in 12 cities; public transport network package for 6 rural districts (idea was that this would cover over half of the country’s population).

Rural transport strategy: to address rural access and mobility needs in a sustainable manner (“beyond roads”): promote coordinated rural nodal and linkage development and demand-responsive, balanced, sustainable rural transport systems.

Funding mechanisms

³⁵ SALGA discussion document: Accelerating a move towards prioritization of efficient public transport.

Public Transport Infrastructure Grant (PTIG)

Public Transport Network Operations Grant (PTNOG)

Municipal Infrastructure Grant (MIG)

Public Transport Operations Grant (PTOG)

Municipal Own Revenue, Provincial equitable share,

Taxi scrapping allowance (TSA)

Scholar transport subsidy

Strategy and action plan

Action	Responsible department/s	Support needed and SALGA Action
Develop integrated, local transit plans and regional linkages		
Develop integrated transit plans – inclusive of all mobility modalities and also include these ideas and plans into the mandatory integrated transport plans <i>ITP – integral part of the IDP - located in terms of the NLTA with all municipalities = cornerstone of efficient transport planning</i>	Transport IDP	Include technical support to undertake ITP into tech capacity support expansion; Support municipalities to attend Transport training courses
Review national policy and programmes to ensure local priorities are well supported (e.g. transport subsidies only directed to larger towns and metros) and enhance implementation		Take forward the SALGA discussion document recommendations (inclusion of all municipalities within current national transport programmes and action plans; and coordination and consolidation of dedicated funding to support transport plans)
Play a proactive role in regional transport planning forums and development of plans and policies, notably the RTSSA and the PTSAP	Transport Town planning Economic Development	Identify all regional planning forums and convey information to municipalities; pursue the SALGA discussion document towards improved delivery of these national strategies; support development of dedicated funding streams (beyond MIG and equitable share)
Ensure that roads and transport related infrastructure and NMT are supported within budget and regularly undertaken	IDP Infrastructure: roads and storm water LED Transport Town planning Procurement	Assist in the development of KPIs and IDP evaluation by Provincial Local Government IDP offices; Develop procurement capacity relating to roads maintenance contracts
Develop Non-Motorised Transit (NMT) facilities		
NMT micro engineering and construction: do a street audit and identify pedestrian safety problem areas	Infrastructure: roads, transport	Lobby NT, with DoT, for inclusion of public transport in the public municipal services component to cater for NMT facilities (funding for implementation of measures, e.g. traffic calming, better signage, improved drop-curbs); Explore possibility of Expanded Public Works

		programme for support for small-scale changes (can involve training of artisans to implement); Identify linkages with RTSSA
Build pavements, bridges and public walkways and cycle paths where required	Infrastructure: roads, transport	MIG Identify linkages with RTSSA
Plant trees along walking routes for shade/cooling	Environment/ Parks	Funding Involve leadership in tree planting...
Develop information and awareness campaigns showing benefits from walking and cycling (health, financial, environmental)	Communications Environment/ Parks	Generate and share general information or best practice campaign material.
Develop and improve public transport modalities		
Improve infrastructure and safety and security for public transport (bus and taxi ranks, linkages)	Infrastructure: roads, transport LED Policing/communi ty safety	Explore MIG Provide best practice guidance Identify linkages with RTSSA Lobby NT, with DoT, for inclusion of public transport in the public municipal services component to cater for public transport facilities
Engage with developers on contributions to public transport development, walking and cycling options, (rather than car transport and traffic engineering) where appropriate and good opportunities	Town planning: building approval Infrastructure: roads, transport	Best practice examples
Develop BRTs: ONLY for metros and larger secondary cities or towns.	Infrastructure: roads, transport	Linkages via the PTSAP
Support and promote greener fuels and fuel efficiency		
Optimise traffic management systems to reduce idling and speeding: consider traffic circles in place of traffic lights	Infrastructure: roads, transport/Street and traffic lighting	Best practice information Capacity and Funding
Zoning and land use review/ SDF development to examine densification, in-fill residential and mixed-use development - considering implications for transport efficiency and social and economic development	Town planning Transport planning	Support finalization of single land use planning system across the country; Training and best practice on SDF and sustainable resource management; Build and develop political leadership.
Road maintenance and storm water management and maintenance	Infrastructure: roads, transport LED	Links with RTSSA; Source funding and develop expanded public works programme / local artisan training (possible Green or Climate funds)
Promote Travel SMART ideas – multiple occupancy of vehicles – through information campaigns, parking plans , engage large employers to initiate Programmes, review schools transport systems/involve schools	Communication Education Environment Transport	Share best practice ideas

Important or interesting ideas to take forward:

- Begin to pilot functional regional planning approaches in Gauteng
- George Integrated public transport plan as a best practice approach for secondary and smaller urban areas

- The message to be translated into what matters for people: quality of life, safety of children, financial relief, health and quality of life, jobs.

Strategic Priority Area 7: SALGA Support Strategy and related Action Plan

SALGA Action	Support organisations
Develop integrated, local transit plans and regional linkages	
Include technical support to undertake ITP into technical capacity support expansion activity	DoT, COGTA, MISA
Support municipalities to attend Cities Transport training course (under development) and develop short course appropriate to smaller cities and towns (NT Green Cities, DoT, UCT, WWF, SEA, others
Pursue recommendations of SALGA discussion document and engage with key national programmes to ensure LG well represented: PTSAP and RTSSA.	DoT
Enhance regional transport planning approaches through identifying all forums and supporting local government participation in these.	DoT, Provinces
Ensure the development of KPIs and IDP evaluation processes relating to efficient transport and mobility; Provide best practice on budget for infrastructure maintenance and resource efficient SDF development.	COGTA, DoT
Target municipalities most in need of support and develop procurement capacity within municipalities relating to roads maintenance contracts	DoT
Lobby national government (DOT, NT) to consolidate and coordinate funding for public transport, related facilities and NMT <ul style="list-style-type: none"> a. Inclusion of public transport within public municipal services component b. Ensure funding streams include ALL municipalities across the country c. Review national policy (as outlined in SALGA discussion document) for equity between urban and rural, different transport modes, etc. d. Provision of funding information to all municipalities. 	DoT, NT
Encourage the development of political leadership through supporting municipalities to develop visible projects, such as improved taxi/bus ranks, tree planting, local artisans in NMT/storm water infrastructure development (source funding and information).	
Develop Non-Motorised Transit (NMT) facilities and public transport/traffic optimisation related facilities	
Explore possibility of expanded public works programme to support municipal NMT development and roads maintenance (small-scale changes), including supporting business plan development (can involve training of artisans to implement).	EPWP
Lobby for inclusion of public transport in the public municipal services component to cater for NMT facilities (funding for implementation of measures, e.g. traffic calming, better signage, and improved drop-curbs) and public transport linked facilities.	NT, DoT
Generate and share general information or best practice safe and healthy mobility campaign material	Other cities
Support and promote greener fuels and fuel efficiency	
Develop political leadership around densification and mixed-zone, in-fill development through training and awareness	
Provision of information and best practice on 'Travel Smart' approaches	Academic institutions, other cities

Strategic Priority Area 8: Spatial Planning

Goal: Well-planned municipalities where all citizens have access to amenities and economic opportunities

Strategies

Spatial Development Frameworks support mobility, transport efficiency and access by the poor to amenities and economic opportunities

Land development criteria support urban objectives of improved mobility and transport efficiency, and energy efficiency and renewable energy implementation

Spatial plans and transport plans are closely coordinated to support common objectives

The status quo and key challenges

- South African cities are generally sprawling and low density. This has resulted in energy inefficient cities which make sustainable transport implementation difficult.
- Apartheid-based urban layout led to poor communities being located on marginal land. The spatial aspects of the apartheid urban form change slowly and still prevail. In fact some argue that it is now harder to change this inequity due to its being entrenched by the infrastructure investment programmes which targeted these areas.
- The large-scale national housing programme has delivered over 3 million houses in the past decades. However these houses often perpetuate the low density urban characteristic, and are usually located on land far removed from city. Poor residents therefore remain far from economic opportunities, benefit little from urban amenities and have high transport costs.
- Municipalities must produce Spatial Development Frameworks and Integrated Transport Plans. While these documents are very interdependent, communication and coordination between the responsible departments is often seriously lacking. Sustainable transport efforts need to be supported by urban densification, potentially along corridors, and the firm holding of appropriate zoning schemes and an urban edge.
- Analyses in South Africa and internationally are clear on the financial and other benefits of a denser (healthy densification), appropriately zoned city, and this imperative is now generally accepted.
- Developers implementing projects on land are currently under little obligation to support urban sustainable energy objectives such as energy efficiency or facilitating transport to their development, beyond the national building standards detailed in SANS 10400-XA. Some cities are placing such further obligations on developers, and this should become more widely adopted.

Mandates, powers and functions:

Local governments have a strong influence over the spatial form of the urban landscape primarily through the zoning schemes, which are derived from Spatial Development Frameworks, and are legally binding. Development applications can be required to conform with sustainable energy criteria specific to the municipality through the establishment of an overarching sustainable energy policy which is referred to in the zoning scheme (such as Johannesburg has done). Densification and urban edge policies can also be developed by municipalities to promote a more sustainable urban form.

Related standards

Related Programmes

The Department of Cooperative Governance, with the SA Cities Network, is developing an Integrated Urban Development Framework which seeks to align spatial planning, transport planning and other urban functions towards a more sustainable future (see *Towards an Integrated Urban Development Framework*, COGTA, 2013)

Strategy and action plan

Action	Responsible department/s	Support needed and SALGA Action
Spatial Development Frameworks support mobility, transport efficiency and access by the poor to amenities and economic opportunities		
Lobby for well-located land for urban development owned by national or state-owned enterprises be made available for the location of human settlements	Town planning, Human Settlements	
Spatial Development Frameworks are developed so they explicitly address objectives linked to sustainable energy. <i>These include appropriate public transport facilitation, densification, mixed-use zoning, and provision of well-located land for the poor, and urban edge parameters and measures, amongst others (refer also to Local Energy Governance)</i>	Town Planning	Develop and disseminate guidelines on how sustainable energy issues can be incorporated into the SDF. Facilitate information sharing forums with experienced municipalities.
Land development criteria support urban sustainable energy objectives		
Develop criteria for land development planning approval which promote sustainable energy objectives. <i>These include improved mobility and transport efficiency, and energy efficiency and renewable energy implementation</i>	Town Planning (Building Planning Approval)	Develop and disseminate guidelines on how sustainable energy issues can be incorporated into the development planning approval process. Facilitate information sharing forums with experienced municipalities.
Spatial plans and transport plans are closely coordinated to support common objectives		
Institute joint planning procedures with transport and spatial planning departments so that they are mutually supportive in pursuing sustainable transport and energy agendas. <i>This includes promotion of public transport viability via priority node/corridor development and densification, non-motorised transport facilitation, and trip avoidance through suitable zoning mixes, amongst others.</i>	Town Planning, Transport Department	Develop and disseminate guidelines on key issues to be addressed in joint spatial-transport planning process, and proposed structure of such a joint process.

More information and supporting documents: <http://www.cityenergy.org.za/category.php?id=6> and www.planning.cityenergy.org.za

Important or interesting ideas to take forward:

The City of Johannesburg has developed criteria for development approval which support sustainable energy objectives

The Western Cape Province Department of Human Settlements has developed and utilises a Sustainability Criteria document for land development planning approval, in line with the objectives of resource sustainability and enhanced social development through healthy densification and access to services.

Strategic Priority Area 8: SALGA Support Strategy and related Action Plan

SALGA Action	Support organisations
All spatial development and planning strategies	
Develop and disseminate guidelines on how sustainable energy issues can be incorporated into the SDF (all municipalities) and into the development planning approval process (target those with capacity to implement)	Experts, various cities, Web platform
Facilitate information sharing forums with experienced municipalities guiding others	Learning networks; Various cities (NB City of Johannesburg for planning)
Develop and disseminate guidelines on key issues to be addressed in joint spatial-transport planning process, and proposed structure of such a joint process.	

Conclusion

Implementing the Strategic Framework

SALGA, through its national office and provincial offices, will work together with all role players to implement this Strategic Framework. As the formal representative of Local Government, SALGA will assume responsibility for ensuring the development of the detailed activities and strategies to give effect to this framework.

The next steps will include adopting a programme of action, drawn from the Strategic Framework, with phases of implementation and associated time frames.

The support required is extensive and, although this strategy is to be held by municipalities and led by SALGA, achievement of the strategy will require enormous levels of cooperation and partnerships across government and between government and the private sector and the NGO/academic/research sector.

Resources and support documents

Urban Energy Support website: www.cityenergy.org.za (a Sustainable Energy Africa – SALGA partnership initiative)

GOGTA/SACN: Towards an Integrated Urban Development Framework: discussion document, October, 2013

National Treasury Technical Assistance Unit, 2013, Energy Efficiency Guidelines, Guide for Municipal Officials in South Africa (Project No. 662): provides a stepped approach to developing internal energy efficiency policy within municipalities or provinces and detailed guidance on undertaking building/facility efficiency project implementation.

National Treasury Technical Assistance Unit, 2013, Increasing Investment in Climate Change Related Projects at the Sub National Level, Phase 1: Diagnostic Report: Barriers and Challenges to Implementing Climate Change Projects (Project No. 662), Prepared by Misuka Green Development Solutions: provides an overview of challenges faced at the local level in developing climate response projects and proposed key interventions to overcome these.

National Treasury Technical Assistance Unit, 2013, Increasing Investment in Climate Change Related Projects at the Sub National Level, Phase 2: Towards a Financing Framework for Implementing Climate Change Projects (Project No. 662), Prepared by Misuka Green Development Solutions: provides detailed technical financial information towards supporting investment in local level climate response projects.

SA Cities Network: Consolidation of Lessons Learnt for EE and RE Initiatives within Cities, Development of a Roadmap for Future Uptake, November 2013. Prepared by Aurecon.

SEA guides and supporting documents, including: Public Lighting guide, HVAC and Commercial Building Lighting guide, Informal Electrification guide, How to Energise SA Cities guide, Green Procurement guide.

SEA: State of Energy in SA Cities 2006 and 2011