

Department of Energy

How RE technologies can support EEDSM initiatives?

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IDC Sandton

By: Xolile Mabusela
Director: Energy Efficiency



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Outline

- EEDSM Strategic Approach
- Outputs, Milestones and Indicators
- Municipal EEDSM Performance
- EEDSM Initiatives in Public Buildings/Facilities
- EEDSM Options
- Conclusion



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EEDSM Strategic Approach

Policy Level
National Energy Efficiency Strategy (NEES)
Energy Efficiency Regulatory Framework

Monitoring & Evaluation:

- Outcomes, Costs & Benefits

Measurement, Reporting & Verification (MRV)

- Energy and Monetary Savings

Programme Level
Funding & Subsidies
Energy Efficiency Tax Incentives

Project Level
Energy Savings- municipal Infrastructure & public facilities (traffic signals, street lights, buildings, water services plants)

NEES & EE Targets

- EEDSM Framework
- Funding (DoRA, etc)
- Technical Assistance

M&V of energy savings:
Guidelines



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Municipal EEDSM Outputs, Milestones & Indicators

Timeline	July – Sept (Q1)	Oct – March (Q2 & Q3)	Dec – June (Q4)
Outputs	<ul style="list-style-type: none"> - Energy consumption measured and projected energy savings - Projected Pay-back period - Asset Register/Inventory list compiled 	<ul style="list-style-type: none"> - Energy consumption baseline confirmed - Monthly expenditure reports - Quarterly KWh savings reports 	<ul style="list-style-type: none"> - Monthly expenditure reports - Close-up report with KWh savings and achieved milestones
Milestones	<ul style="list-style-type: none"> - Baseline Determination (technical and commercial viability) - Inventory compilation - Measurement of energy consumption 	<ul style="list-style-type: none"> - Retrofitting process - M&V Process - Awareness process 	<ul style="list-style-type: none"> - Closing up of retrofits - M&V Process - Awareness process
Indicators	<ul style="list-style-type: none"> - Baseline (Energy Audit) Report - Inventory List - Business and Implementation Plan - 8% Expenditure 	<ul style="list-style-type: none"> - Projected energy savings - Monthly and quarterly retrofits - Quarterly M&V Reports, achieved KWh savings - Awareness Reports - 90% project expenditure 	<ul style="list-style-type: none"> - Total number of retrofits - Annual M&V Reports, KWh savings - Final project performance report - 100 % project expenditure



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municipal EEDSM Performance

- Over **60 municipalities** have participated in the municipal EEDSM programme since 2009/10 with over R 1,5 billion allocated budget.
- Focus has been on **retrofitting electrical equipment** rather than introducing alternative energy sources.
- Since the inception of the project, more than 3,500 **temporal jobs** have been created on **energy audits, retrofits, measurement and verification** of energy savings during the investment phase.
- A **monitoring, reporting and verification system** has been developed, and we are currently working on establishing an online platform for submission of proposals, reporting and monitoring.



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municipal EEDSM energy savings potentials

Energy savings in GWh/a achieved/projected 09/10 to 17/18	Achieved GWh savings					Projected GWh savings (based on municipal business plans or projected budget)				
	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	
GWh/a from budget year 2009/2010		22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
GWh/a from budget year 2010/2011			36.0	36.0	36.0	36.0	36.0	36.0	36.0	
GWh/a from budget year 2011/2012				45.6	45.6	45.6	45.6	45.6	45.6	
GWh/a from budget year 2012/2013					39.2	39.2	39.2	39.2	39.2	
GWh/a from budget year 2013/2014						30.7	30.7	30.7	30.7	
GWh/a from budget year 2014/2015							24.0	24.0	24.0	
GWh/a from budget year 2015/2016								34.6	34.6	
GWh/a from budget year 2016/2017									37.7	
Total GWh/a achieved	-	22.0	58.0	103.6	142.8	173.5	197.5	232.1	269.8	
Total <u>cumulated energy savings</u> in GWh achieved since 2009/2010	-	22.0	80.0	183.6	326.4	499.9	697.4	929.5	1,199.3	
Costs in Mio ZAR per GWh for a municipality (1)	0.6246	0.6246	0.6246	0.6246	0.6246	0.6246	0.6246	0.6246	0.6246	
Total cumulated energy costs saving in Mio ZAR since 2009/2010	-	13.7	50.0	114.7	203.8	312.2	435.6	580.6	749.1	



municipal EEDSM energy savings measures

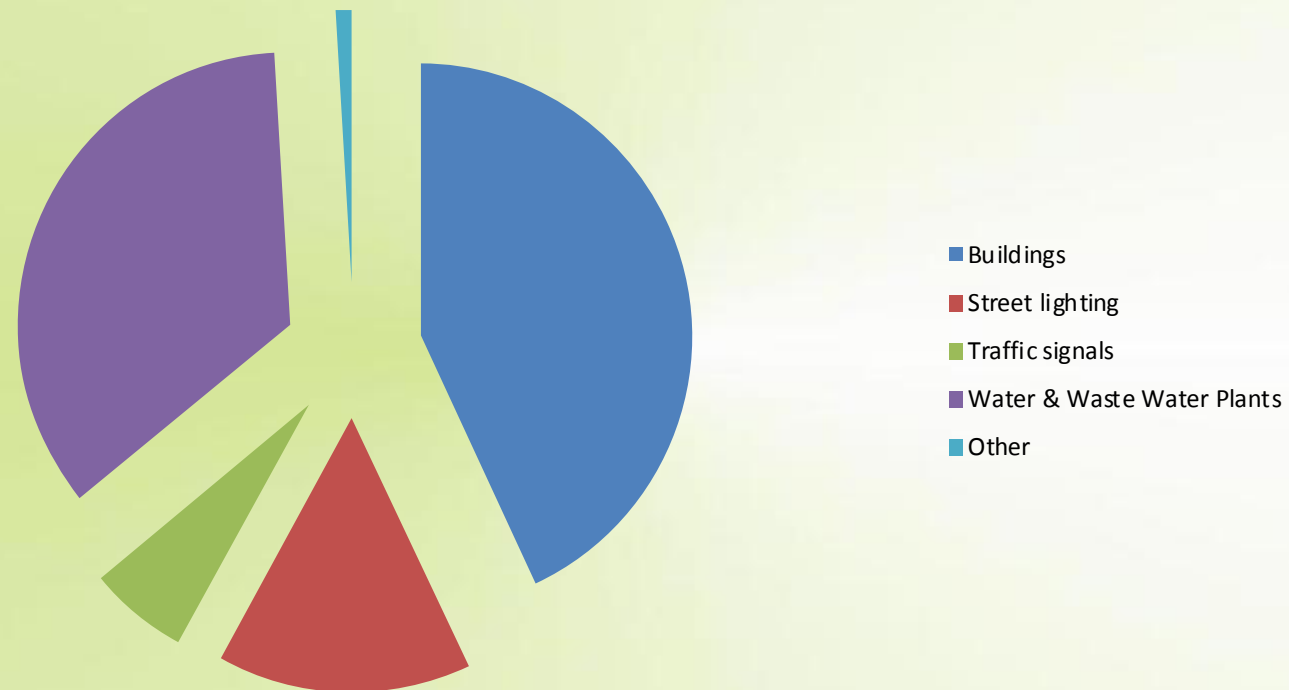
Technical Measure	09/10	10/11	11/12	12/13	13/14	14/15	TOTAL
Traffic Signals	6,132	8,637	9,109	8,741	1,944	8,558	43,121
Street lights	214,765	71,588	68,490	61,766	33,808	8,754	459,172
High masts						1,495	1,495
Building Lights & HVAC	59,690	84,073	16,853	107,761	68,062	71,548	407,988
Water plants (Motors)	-	-	-	6	39	185	230



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Average Municipal Energy Consumption (GWh/a)



Note: (i) municipal baseline consumptions are required for the National EE Monitoring System, (ii) last year of the 2005 National EE Strategy, and a process is underway to define post-2015 targets, (iii) public facilities, municipal infrastructure energy efficiency targets and measures will be developed for 2016 – 2030.



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EEDSM Initiatives in Public Buildings/Facilities

- In recognition of the **role that energy efficiency plays in national objectives** the Departments of Energy, Environmental Affairs, and Public Works decided to work together to **drive energy savings/climate change mitigation** in public buildings/facilities.
- The EEDSM scope of work for public buildings/facilities, include, among others:
 - (a) developing **standardized energy management** systems;
 - (b) Determining **energy consumption baselines** through energy audits/detailed feasibility assessments as part of energy efficiency target monitoring system;
 - (c) Developing a government energy efficiency **policy framework** for the introduction of energy management, performance certification and smart metering technologies;
 - (d) Identification of **alternative clean energy sources** including biogas, Solar PV roof tops, etc;
 - (e) Setting internal energy savings **targets** appropriate to public buildings/facilities which respond proactively to, and are aligned with appropriate government policies and strategies;
 - (f) Introduction of **Shared Energy Saving** contracts in public facilities.



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Energy Efficiency & Demand Side Management Options

(Options - All Energies)

Energy Conservation

Reducing the Consumption of Energy without impacting on Production and/or Safety

Example:
Turning off lights in unoccupied areas or after hours

Energy Efficiency

Included here to show how "pure" EE fits with other options available

Example:
Replacing lights with more efficient alternatives

Energy Substitution

Renewables

Other, e.g. Fuel Switching

Adding renewables or "Green" generation capacity on the demand side of utility supply

Example:
Installation of Solar PV panels/SWHs to reduce electricity purchased from Utility

Switching energy consumption to a different energy source SEE NOTES on fuel switching

Example:
Changing from Electrode boilers to gas-fired boilers or vice versa

Co-generation / Self-Generation

Generating energy from waste which is fed into the demand side of the utility supply to lessen the use of the utility supply

Example:
Generating electricity from waste-water or from burning waste material

To reduce the energy intensity of the South African economy through improvements in energy efficiency, target of 12% by 2015 for all uses of energy is set



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Conclusion

- Biogas recovery for **cogeneration** in municipal Waste Water Treatment (WWT) plants is another EEDSM option being considered as a demand response.
- Currently working with **three 2014/15 EEDSM participating municipalities** identified biogas potential to generate renewable power via co-generation in the form of electricity and heat.
- The plan is to generate **own electricity** to be used to power the Waste Water Treatment plant equipment.
- Some **heat generated** will be used to heat the digester tanks to the optimum temperature.
- The **scoping, detail technical and commercial feasibility** study will form part of the energy consumption baseline assessment, and will be completed by June 2015.



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Conclusion Cont...

- Although detailed feasibility will be completed within 3 - 4 months, the commissioning of the WWT Biogas CHP (co-generation) plant will still **require investments** from either the municipality or private sector.
- Since the biogas cogeneration technology has improve, we believe there is a **significant opportunity for municipalities** to produce power at a cost below retail electricity.



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Thank You!

Xolile Mabusela

Director: Energy Efficiency

Department of Energy

Tel: +27 (0) 12 406 7684

Cell: +27 (0) 79 369 3711

Email: xolile.mabusela@energy.gov.za

Website: www.energy.gov.za



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