sanedi
South African National Energy Development Institute.

mineral resources & energy
Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

clasp
Efficient Appliances for People & the Planet

Minimum Energy and Performance Standard for Street Lighting:

Programme Developments and Facilitation

SAEEC Conference 2022

29 September 2022

Agenda:

- Background
- Programme Developments
- Technical basis of the MEPS
- Implementing MEPS - Example

Background:

- The South African National Energy Development Institute (SANEDI) and CLASP are committed in collaborating to further their shared goals and objectives in regard to supporting appliance and equipment energy efficiency policies in the Republic of South Africa.

- Through this collaboration, SANEDI and CLASP are supporting the Department of Mineral Resource and Energy (DMRE) in its efforts to introduce and implement an energy efficiency standard to street lighting luminaires.

Background:

- The programme is to develop a MINIMUM energy and performance standard for street lighting luminaires (light fitting, lighting product).

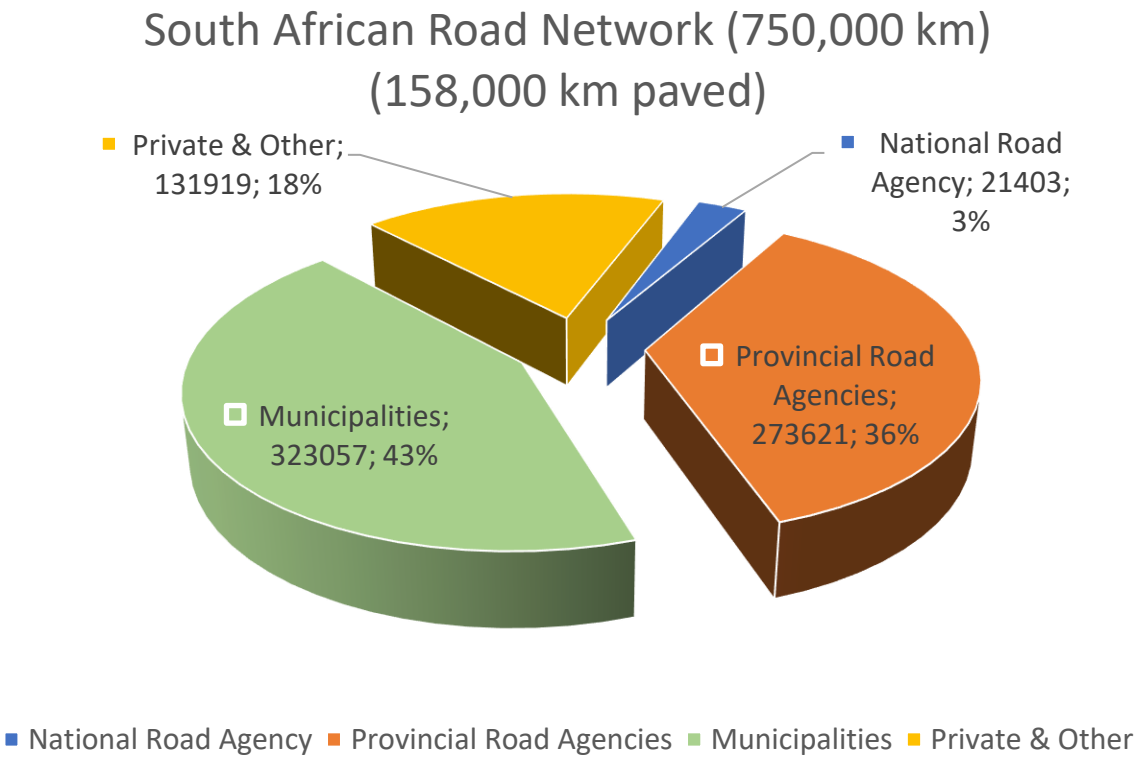
HID Luminaire

LED Luminaire

Background:

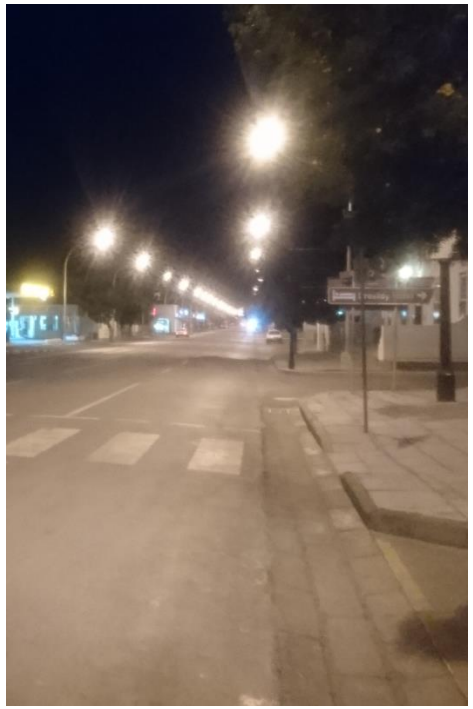
- Street lighting is seen as a service provided to public road users to assist in improving visual safety while driving under low visibility and night conditions.

82% of Roads
is
State Owned



Background:

- Within the DMRE's Energy Efficiency Demand Side Management (EEDSM) Programme, participating municipalities are able to optimise their use of energy, with expected electricity saving potential for street lighting of at least 40%.

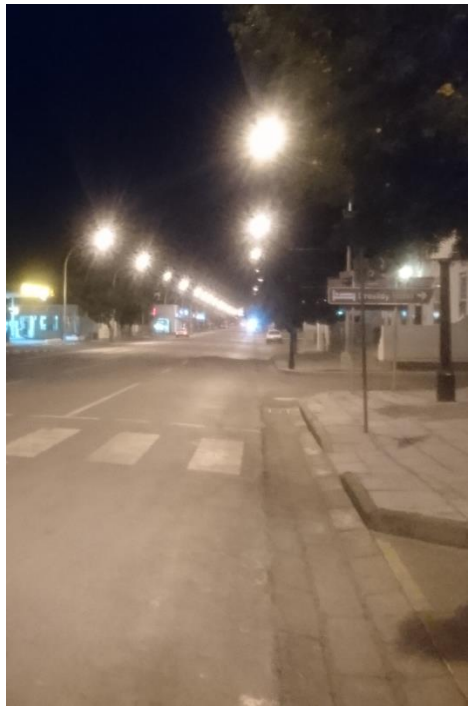


*Reference: https://www.savingenergy.org.za/municipal-eedsm/index.html

Background:

EEDSM programme examples:

- Cape Agulhas Municipality have 100% LED street lighting luminaires.
- Dr Beyers Naudé Local Municipality are nearly at 100% LED street lighting luminaires.



Why is there such a high up take of Energy Efficient Luminaires?

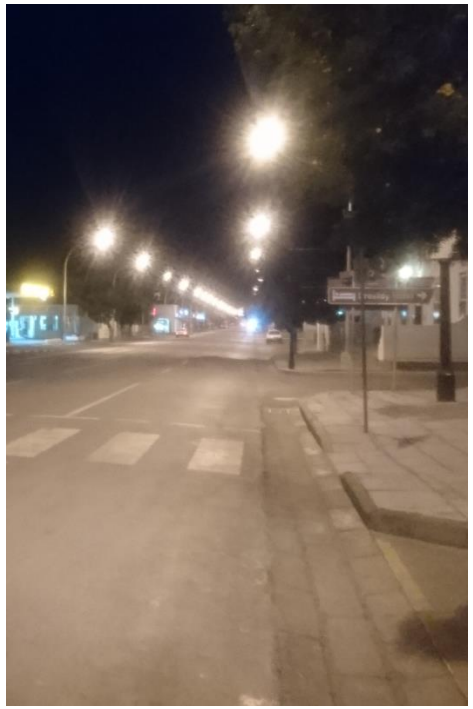
- The EEDSM Programme requires product testing.
- Energy efficiency and performance are key criteria.
- Verification and Measurement Auditing.

Background:

Other “energy efficient” examples:

- Replace 600W HPS luminaire with 2 x 285W LED luminaire
- **5% Energy Saving**
- Solution provides compliant lighting levels with minimal energy saving

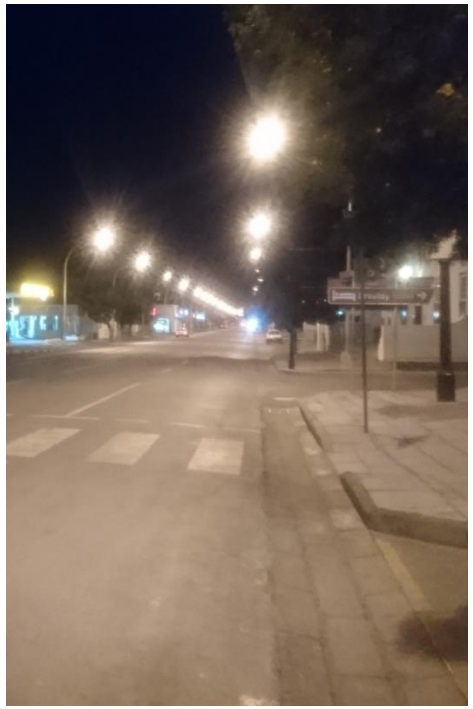
- Replace 250W HPS luminaire with 40W LED luminaire
- **84% Energy Saving**
- Solution maximises energy saving at the expense of safe compliant lighting levels



Background:

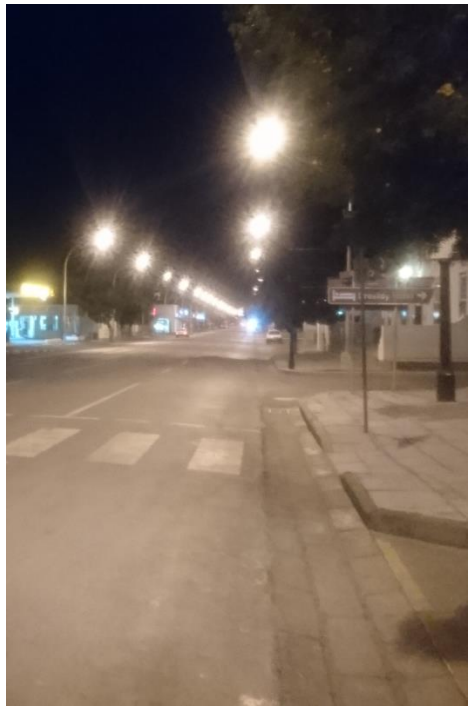
“Energy efficient” street lighting luminaires in the South African market vary in:

- Energy Efficiency,
- Quality,
- Performance, and
- Cost.



Background:

- These variances may lead to:
  - Specified energy savings not being obtained (not meeting NEES, COP26 quota),
  - Poor service delivery to communities,
  - Costly exercises to replace poor quality luminaires,
  - Difficulty in maintaining operational status,
  - Increased expenditure,
  - Public safety being affected, and
  - Additional environmental impact and waste



Background:

- MEPS should promote:
  - National standardisation and regulation of street lighting luminaires,
  - Standardised minimum energy savings being obtained,
  - Contributing to National Energy Efficiency Strategy Plan and EEDSM programmes,
  - Support to end users in the procurement of quality energy efficient street lighting products,
  - Harmonised quality and performance of local street lighting products for exportation to other states,
  - Stimulus within industry, local content,
  - More efficient and sustainable delivery of service to the general public, and
  - Reduced impact on the environment.

Programme Developments:

Feasibility, Risk and Impact Assessment:

- A service provider was appointed to conduct the assessment.
- Questionnaires, surveys, interviews were conducted with various stakeholders.
- Data has been collected and analysed.
- The report is currently being finalized and reviewed.
- The findings detailed in the report are yet to presented to stakeholders
    - Dates yet to be confirmed

Programme Developments:

Future Works:

- Drafting the MEPS
- Presentation of the proposed MEPS to Key Stakeholders
- Presentation of the proposed MEPS to for public comment

Technical basis of the MEPS:

Lowest Price

Budget Friendly?
Sustainable?

MEPS

Middle Ground

High Quality

Budget Friendly?
Sustainable?

Technical basis of the MEPS:

- What are some technical criteria?

Luminaire Energy Efficiency / Efficacy
Public, Road Safety Requirement – Lighting Levels
Luminaire Safety
General Luminaire Performance Criteria
Photometry
Colour Rendering Index
Nominal Corelated Colour Temperature
Displacement Factor
Flicker
Stroboscopic Effect
Life Expectancy and Maintenance Factor
Environmental Waste Management
Marking and EE Labelling

Technical basis of the MEPS:

- Some non-technical influences on the technical criteria:

The Constitution
The Energy Act
The National Energy Efficiency Strategy
Public Finance Management Act
Municipal Supply Chain Management Regulations
National Environmental Management: Waste Act (59/2008)
Product Brand Neutrality

Implementing MEPS - Example

Replacing Existing Lighting Infrastructure – Current Scenario

Existing Lighting

10 x 150W HPS

Annual Energy Consumption	= 10 luminaires x 0,150 kW x 10 hrs/day x 365 days = 5 475 kWh
Annual Energy Cost	= 5 475 kWh x R2.70/kWh = R 14 782.50 per annum

Implementing MEPS - Example

Replacing Existing Lighting Infrastructure – Current Scenario

Existing Lighting

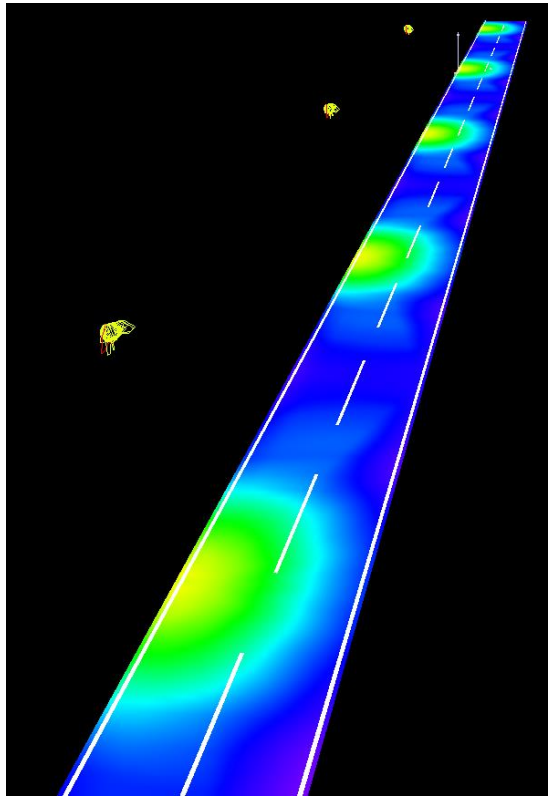
10 x 150W HPS

7m wide road

2 lanes

10 Lux,

44% Uniformity



Implementing MEPS - Example

Proposing an Energy Efficient Alternative #1

Existing Lighting

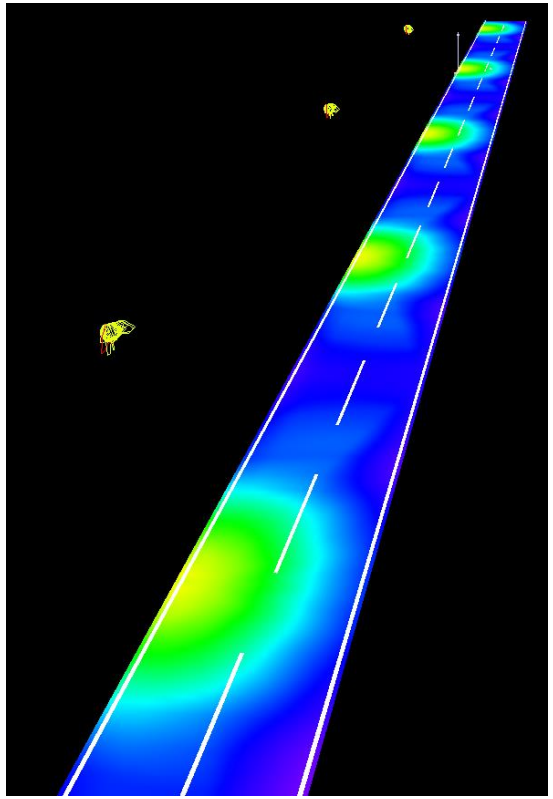
10 x 150W HPS

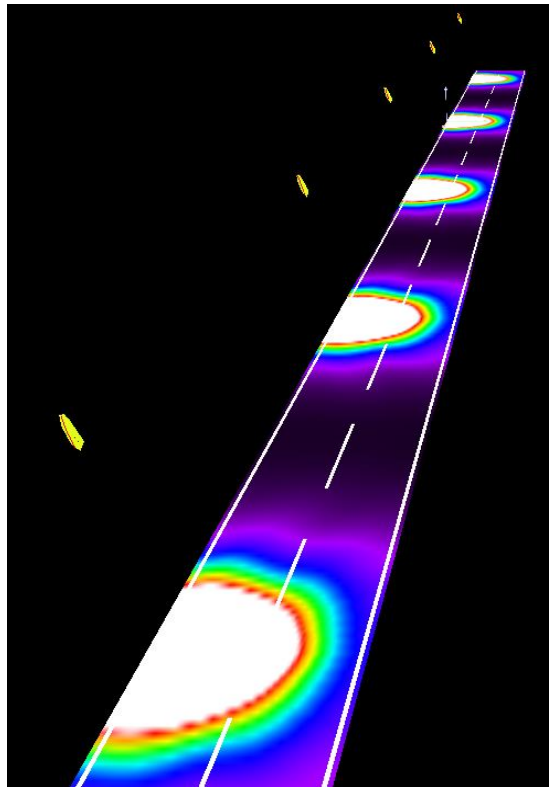
7m wide road

2 lanes

10 Lux,

44% Uniformity





New LED Lighting

10 x 60W LED

Efficiency: 160 lm/W

60% Energy Saving Min

10 Lux,

8% Uniformity

Not a direct replacement

Non-compliant

Implementing MEPS - Example

Proposing an Energy Efficient Alternative #2

Existing Lighting

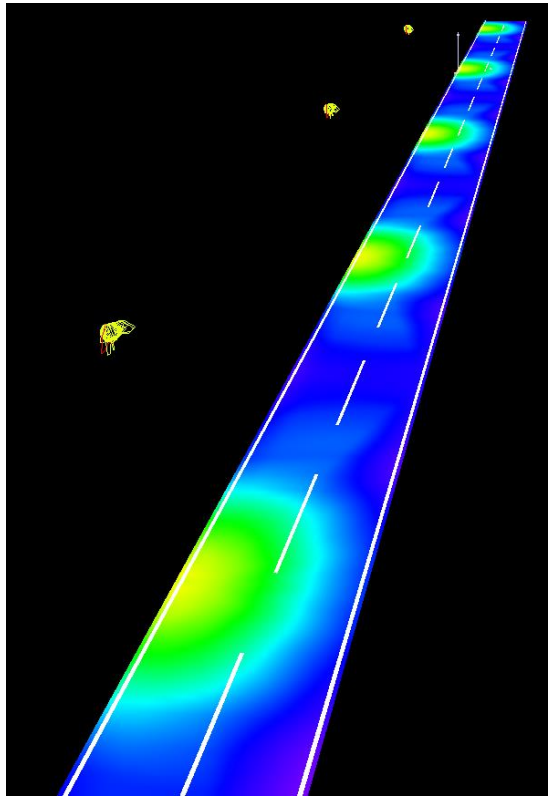
10 x 150W HPS

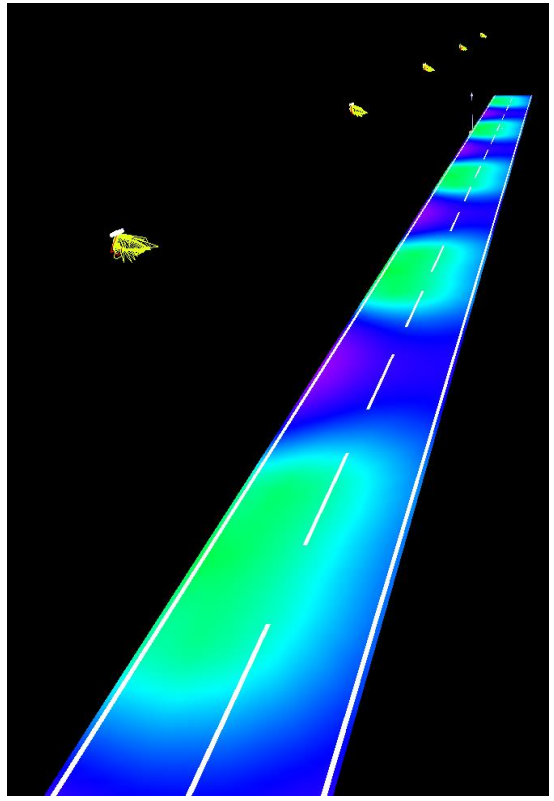
7m wide road

2 lanes

10 Lux,

44% Uniformity





New LED Lighting

10 x 90W LED

Efficiency: 120 lm/W

40% Energy Saving Min

10 Lux,

55% Uniformity

Safe Direct replacement

Compliant

Implementing MEPS - Example

What is the Minimum Energy and Performance obtained:

MEPS Lighting

10 x 90W LED

Annual Energy Consumption	= 10 luminaires x 0,090 kW x 10 hrs/day x 365 days = 3 285 kWh **= 2 190 kWh minimum saving**
Annual Energy Cost	= 3 285 kWh x R2.70/kWh = R 8 869.50 per annum **(R 5 913.00 saving)**

Implementing MEPS - Example

Mt Edgecombe Interchange (N2/M41),
Kwa-Zulu Natal, South Africa
2018 – Prior to it being vandalised

510 LED luminaires installed to provide compliant and safe lighting of the Interchange.

Energy Consumption & CO2 emissions per annum (based on rated wattage of luminaires):

Installed LED Lighting	381,500 kWh 412 Tons CO2
Equivalent HID Lighting	642,475 kWh 694 Tons CO2
Potential savings per annum:	260,975 kWh 282 Tons CO2

40,62% Potential Savings

Queries?

Should you have any queries, please refer your queries to:

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THANK YOU