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The South African S&L appliance programme - Time to strengthen MEPS

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EXTENDED ABSTRACT

South Africa's appliance Standards and Labelling (S&L) programme got off to an inauspicious start. The S&L project office turned the tide and the programme now delivers meaningful electricity savings. Minimum energy performance standards (MEPS) are being strengthened. We argue that greater ambition is possible.

Introduction and Background

South Africa is a middle-income, emerging market with an abundant supply of natural resources; well-developed financial, legal, communication, energy, and transport sectors. With small deposits of natural gas and oil, significant but underutilized renewable energy resources, the country continues to rely heavily on coal to generate electricity. This comes at a hefty environmental cost - for every kWh produced, 1kg of CO_2 is emitted, 1.4 liter of water is used, and 0.37g of particulate emissions are released into the atmosphere[1].

The Department of Mineral Resources and Energy (DMRE) has committed to developing a sustainable energy sector. In 2005 it set a 10% energy usage reduction target for the residential sector by 2015. The same year, the DMRE introduced the voluntary version of an energy efficiency S&L programme. Despite many stakeholder consultations, industry was non-responsive and the DMRE shifted to a mandatory approach with regulations coming into effect in 2015. Ten electrical appliances[2] were selected following a government funded techno-economic study in 2012[3], supported by the Lawrence Berkeley National Laboratory (LBNL). Additional work[4] undertaken by the S&L project office and LBNL in 2014 on electrical water heaters resulted in their MEPS being strengthened by 40%.

In line with international best practice which advocates MEPS revisions every three to five years, the S&L project completed a second techno-economic study in 2019. This study[5] considered available technology, pricing, local manufacturing and included extensive stakeholder consultation. The recommendations are summarized below.

Table 1. Evolution of South Africa's MEPS levels (2012 to 2020)

Appliance	Baseline (2012)	Study Proposal (2012)	Legislation (2015)	Study Proposal (2019)	DMRE Directive to Regulator (2020)
Refrigerators	D Local A Import	B	B	A & A+ (2026)	A
Freezers	F	C	C	B & A+ (2026)	B
Washing Machines	D Local A Import	A+	A	A+ (2022)	A
Tumble Dryers	D	B	D	C (2020)	C

[1] de la Rue du Can *et al* (2019) A South Africa Residential Appliance Standards & Labelling Program Assessment Tool here
[2] Electric water heaters, electric ovens, refrigerators, freezers, dishwashers, laundry, AC, audio and video (standby).
[3] Covary, T *et al* (2012) Energy Performance & Labelling Requirements for Specific Electrical Appliances & Equipment here
[4] McNeil, M. and Covary, T. (2014). South Africa Geyser: Cost Efficiency Technical Study here
[5] Urban Econ (2019) Review of South Africa's energy classes & identification of next set of electrical appliances here

Appliance	Baseline (2012)	Study Proposal (2012)	Legislation (2015)	Study Proposal (2019)	DMRE Directive to Regulator (2020)
Dishwashers	A	A+	A	A	A
Ovens	B	A	B	A	A
Electrical water heaters	E	C	B	B	B
AC	C	B	B	A (2020)	B
Audio visual (standby)	Unknown	N/A	<1W	Unknown	<0.5W

Source: Covary (2012); Urban Econ (2019); DMRE 2020

A separate study (supported by CLASP) considered efficient lighting, the outcome of which prompted the DMRE (2019)[6] to request the Minister of Trade and Industry to introduce first-in-the-region technology-neutral MEPS to eliminate low-efficiency lamps and shift the market to quality LED lamps.

Simultaneously, the DMRE and LBNL collaborated to develop a standalone version of an end-use electricity demand model, based on the methodology developed by LBNL in its BUENAS (Bottom-Up Energy Analysis System) model for the residential sector. The rationale was to provide the DMRE with its own tool to inform current and future MEPS revisions and identify new priority appliances for its S&L programme.

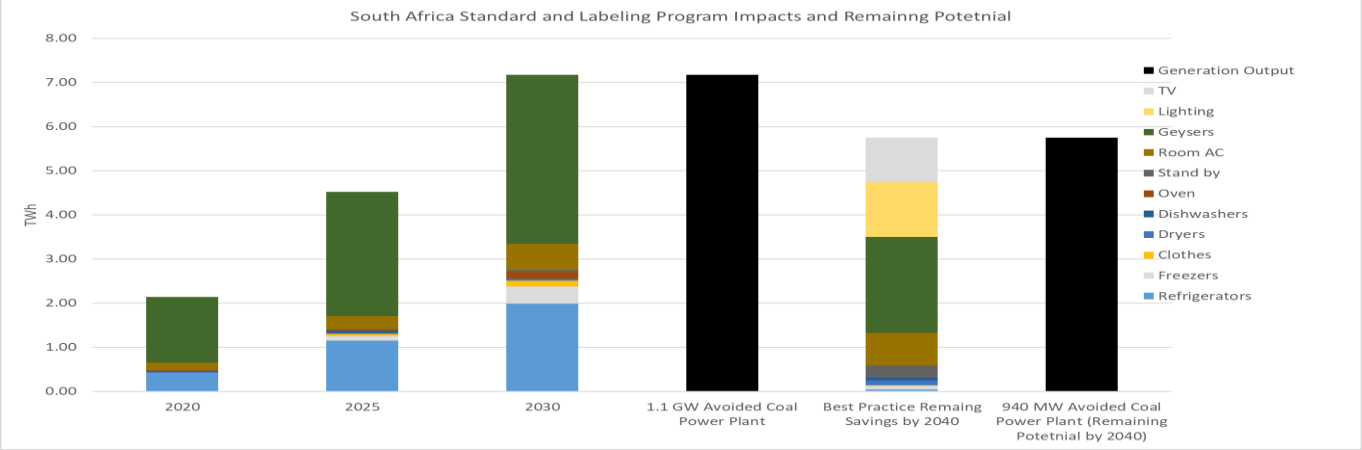
Methodology

LBNL developed a local version of BUENAS for the DMRE. The model projects end-use activity; penetration rates; electricity consumption; and finally, the appliance stock's total final energy consumption by end use from 2015 (base year) to 2040.

Results and Conclusion

Figure 1, an output from the model, estimates that the MEPS revisions will deliver the following benefits:

- 7.1 TWh of electricity (2030) - the total avoided capacity of a 1.2 GW thermal power plant.
- Lighting MEPS would provide an additional 1.5 TWh by 2040 (250 MW thermal power plant).
- Consumers utility bills will decrease by $1.2 billion in 2030 (for the same level of energy services). On average, household utility bills will be $54 lower per year by 2030.
- CO_2 will decrease by 6.8Mt per year (2030), the equivalent of the emissions of a country like Zambia.
- 10 billion litres of water / year by 2030 - material in a water stressed country experiencing frequent droughts
- Particulate emissions will be reduced by 3 kt, sulphur oxide 2.5 Mt, and nitrogen oxide emissions by 24 kt



Source: de la Rue du Can (2019)

[6] Nova Economics (2019) here

Figure 1. South Africa's S&L Programme Impacts and Remaining Potential

Our research highlights the sizable country benefits MEPS provide. The lighting regulations must be prioritised and the DMRE should strengthen and expand the S&L programme with far greater ambition. Industry will and can respond.