Tipping Points:

The Impacts of Rising Electricity Tariffs on Households and Household Electricity Demand

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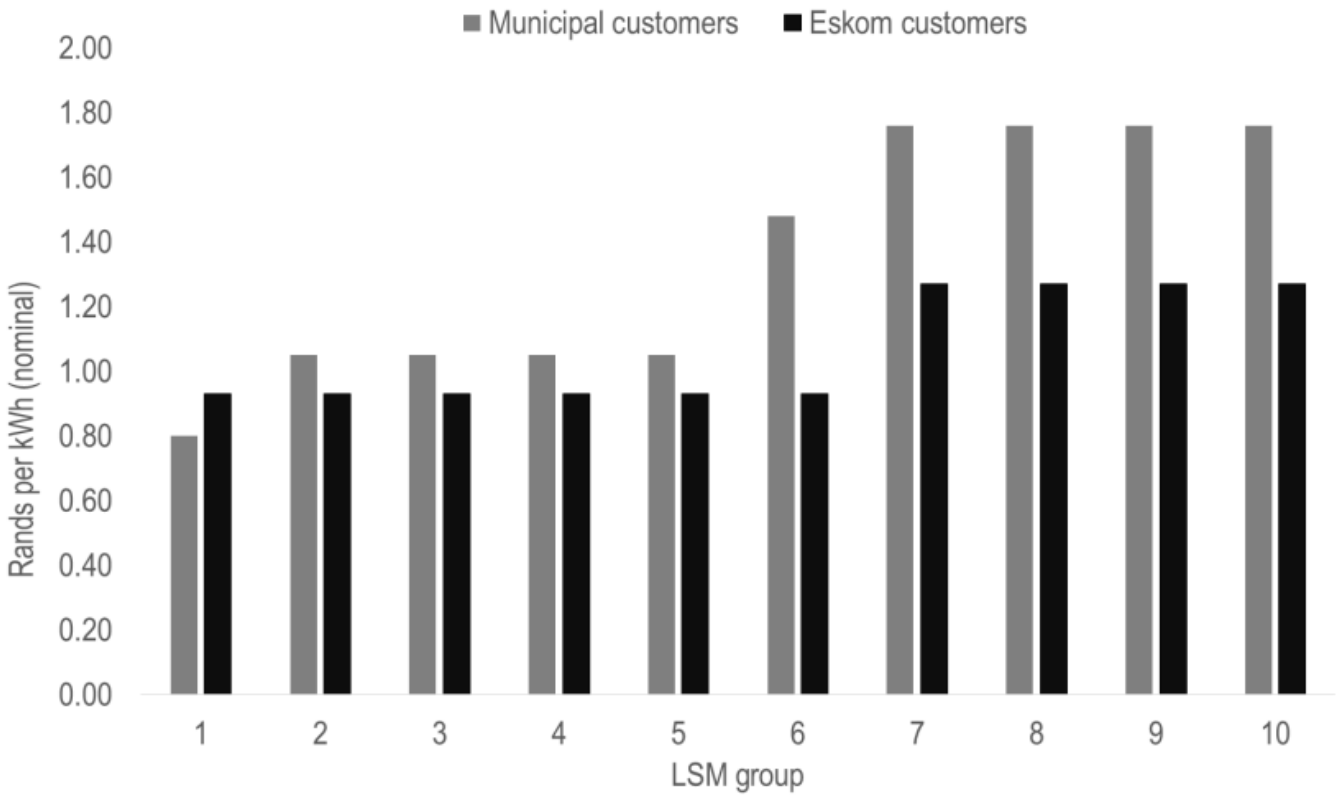
Background

Electricity prices have increased by an average of 18.2 % per year, since 2009

- For Eskom to be financially sustainable, electricity tariffs will have to continue to rise
- Municipal tariffs will be even higher due to the municipal surcharge

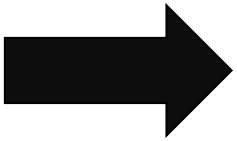
Average tariffs for municipal and Eskom customers in 2015



Source: Authors using information from NERSA and Eberhard (2015)

Households are increasingly under strain, which may lead to decisions on electricity consumption

- Electricity price increases
- High inflation
- High unemployment
- Eroded household disposable income



- Reduce other expenditure
- Reduce electricity usage
- Improve energy efficiency
- Replace existing appliances
- Default on electricity payments

Three objectives of this research:

i. Examine the effect of rising tariffs on **household incomes**
ii. Evaluate the **ability of households to move towards off-grid**/ energy efficient technologies
iii. The potential impact of this decision on **total electricity demand**.

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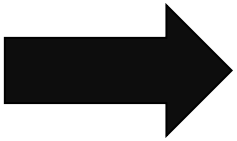

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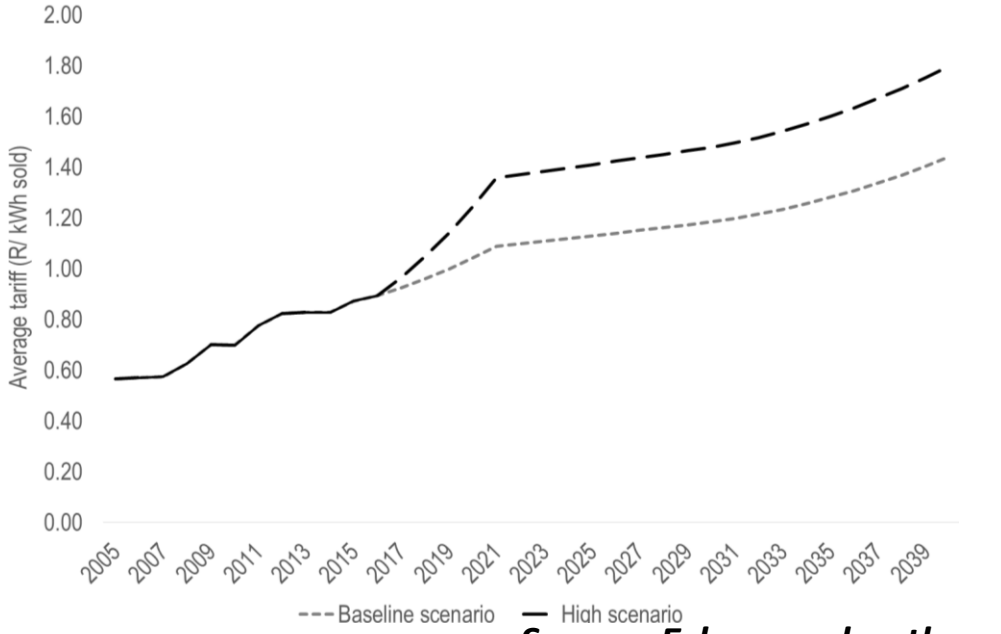
Tariff scenarios used in the analysis

Real tariffs faced by residential customers, current and future

	2015	2030 (projected)
Eskom baseline	0.87	1.18
Municipal baseline	1.05	1.42
Eskom high	0.87	1.48
Municipal high	1.05	1.77

Source: Eskom, NERSA and authors

Comparison of the tariff scenarios on Eskom's tariff path (real)

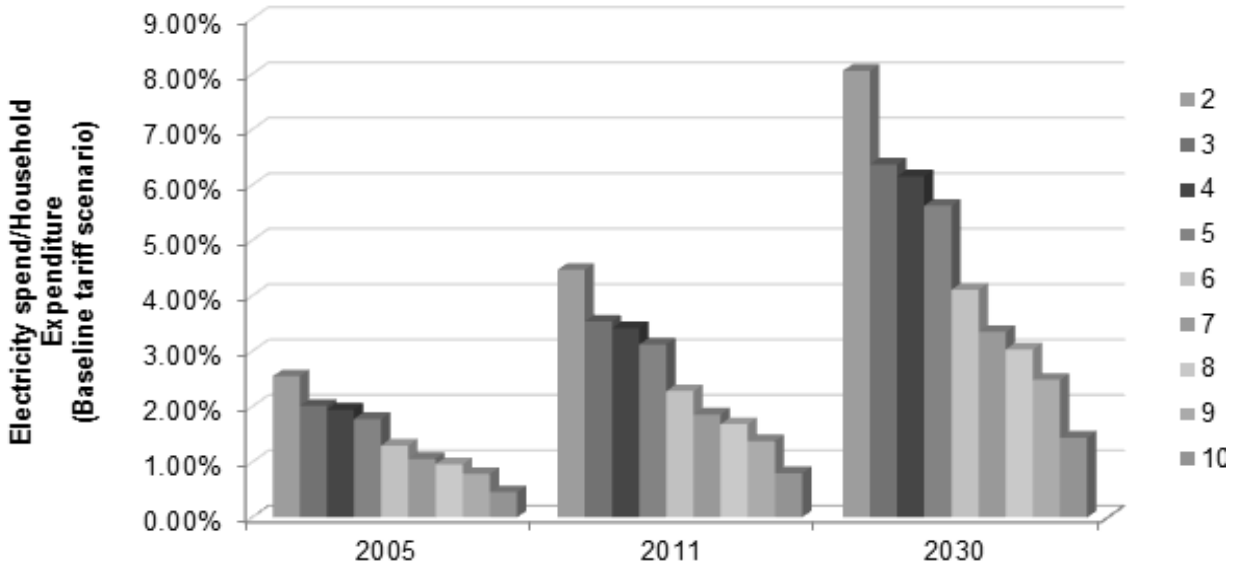


Source: Eskom and authors

i. The effect of rising tariffs on household income

HH electricity spend to nearly double by 2030

Electricity expenditure as a % of HH income by decile (baseline)*



Source: Authors using IES data and tariff assumptions

- Across all deciles, **electricity spend almost doubles by 2030**, in nominal terms.
- Low income HH are worse affected

Households will start looking at ways to reduce their electricity consumption

*Assuming that electricity demand stays constant

ii. Ability to reduce electricity consumption

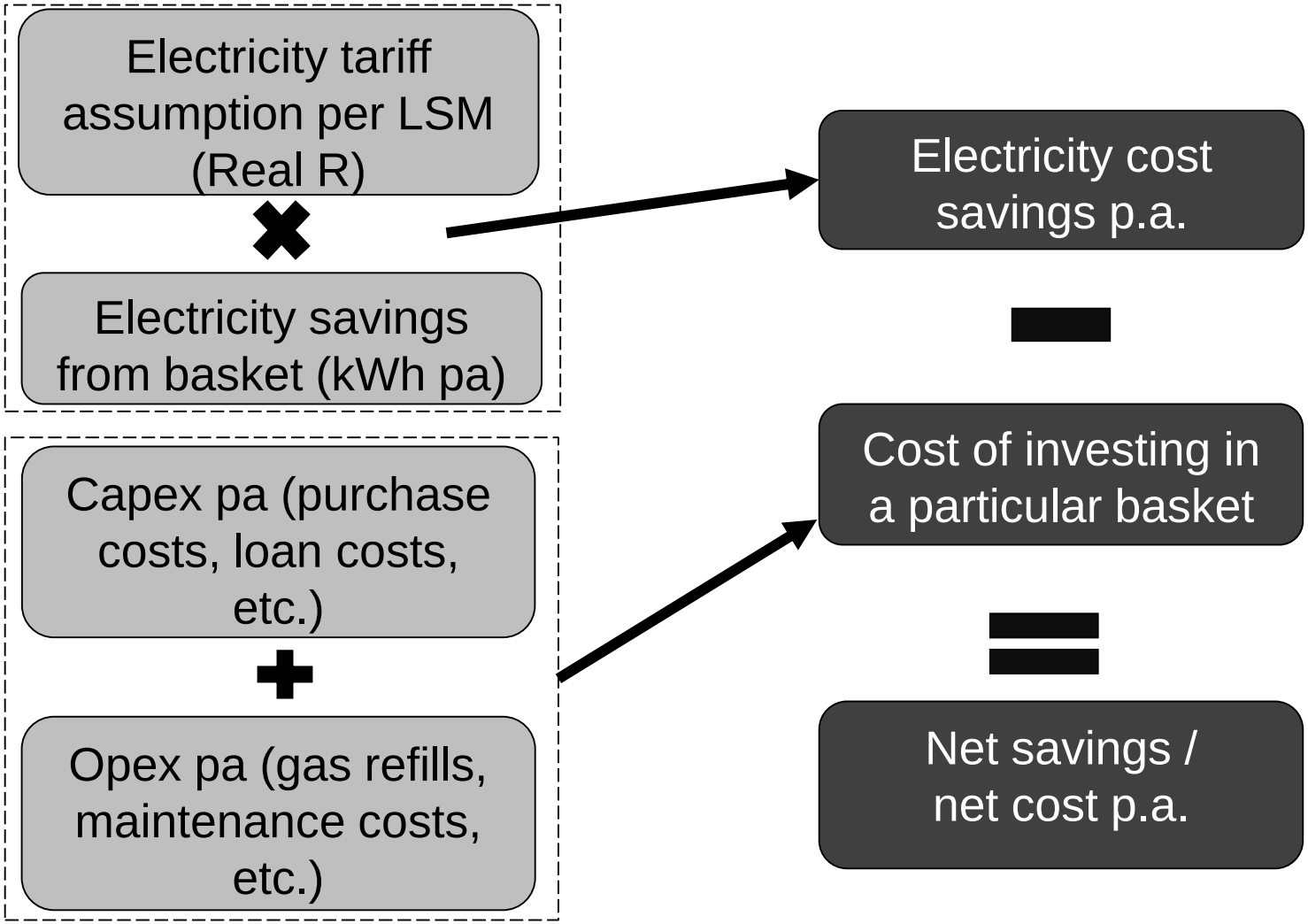
Technologies to reduce HH reliance on the grid

Basket	Contents	KWh savings pa
Basket 1	Gas hotplate 5 LEDs Gas heater	1 878
Basket 2	Four plate gas stove & oven 10 LEDs 2 gas heaters	4 852
Basket 3	Four plate gas stove & oven 10 LEDs 2 gas heaters Solar Water Heater	6 785
Basket 4	Solar PV	6 300

All baskets have a positive NPV

→ **investment costs are outweighed by electricity cost savings**

Methodology



Affordability? Assume HH will only invest in a basket when the total costs of investment in Year 1 will be **less than 5% of annual HH income**

TIPPING POINTS

Many households will soon reach their tipping points to invest in these baskets

	Eskom base tariff (low scenario)	Municipal high tariff (high scenario)
Basket 1	2017: LSM 1-6	From 2018: LSM 1-6
Basket 2	2021: LSM 7 -10 2030: LSM 6	2017: LSM 7 – 10 2020: LSM 6 2029: LSM 5 2034: LSM 4
Basket 3	2023: LSM 7 -10	2018: LSM 7 -10
Basket 4	2024: LSM 7 -10	2018: LSM 7 -10

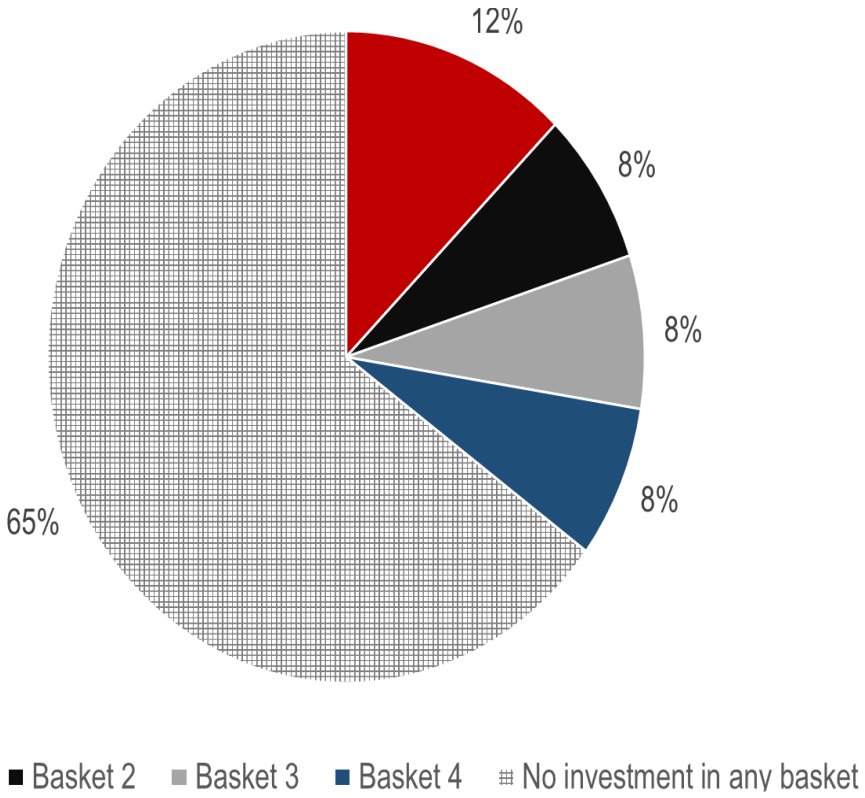
Caveats:

- Assume that all households in an LSM have the same average income and electricity usage
- Assume only LSM's 1- 6 will invest in Basket 1

iii. Implications for electricity demand

It is assumed that 20% of households that can afford to, will invest in a particular basket

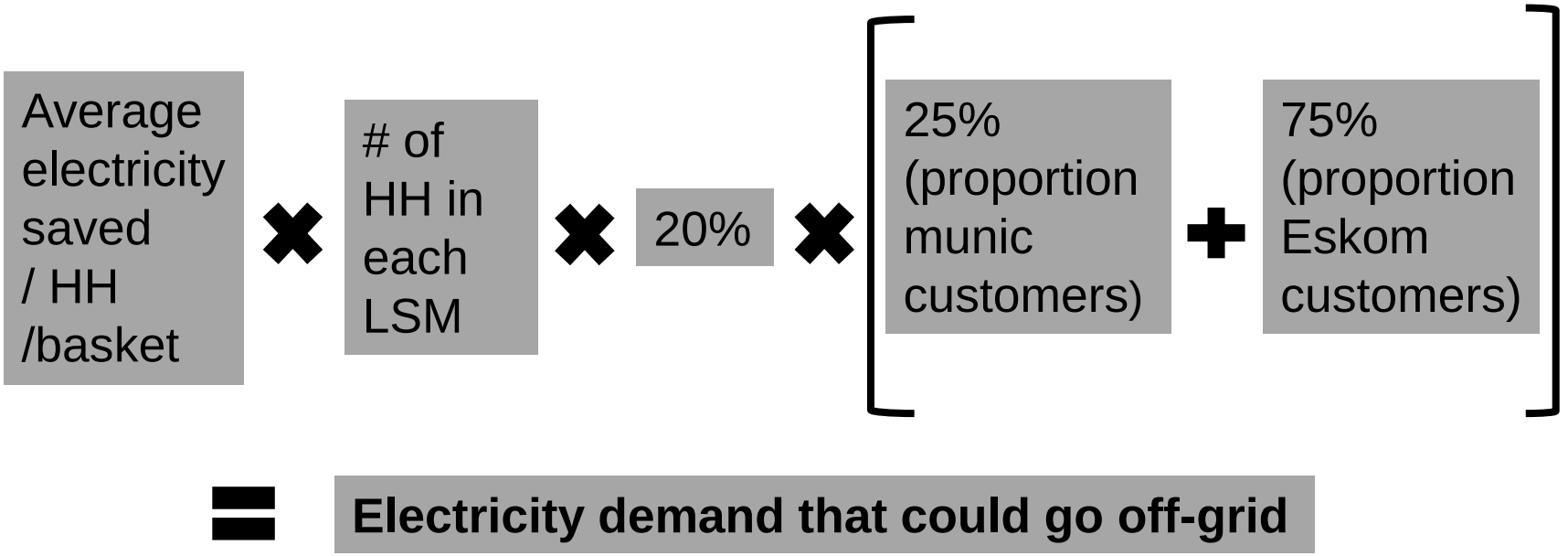
Assumption regarding uptake of technology baskets, as a % of total households



Source: Authors

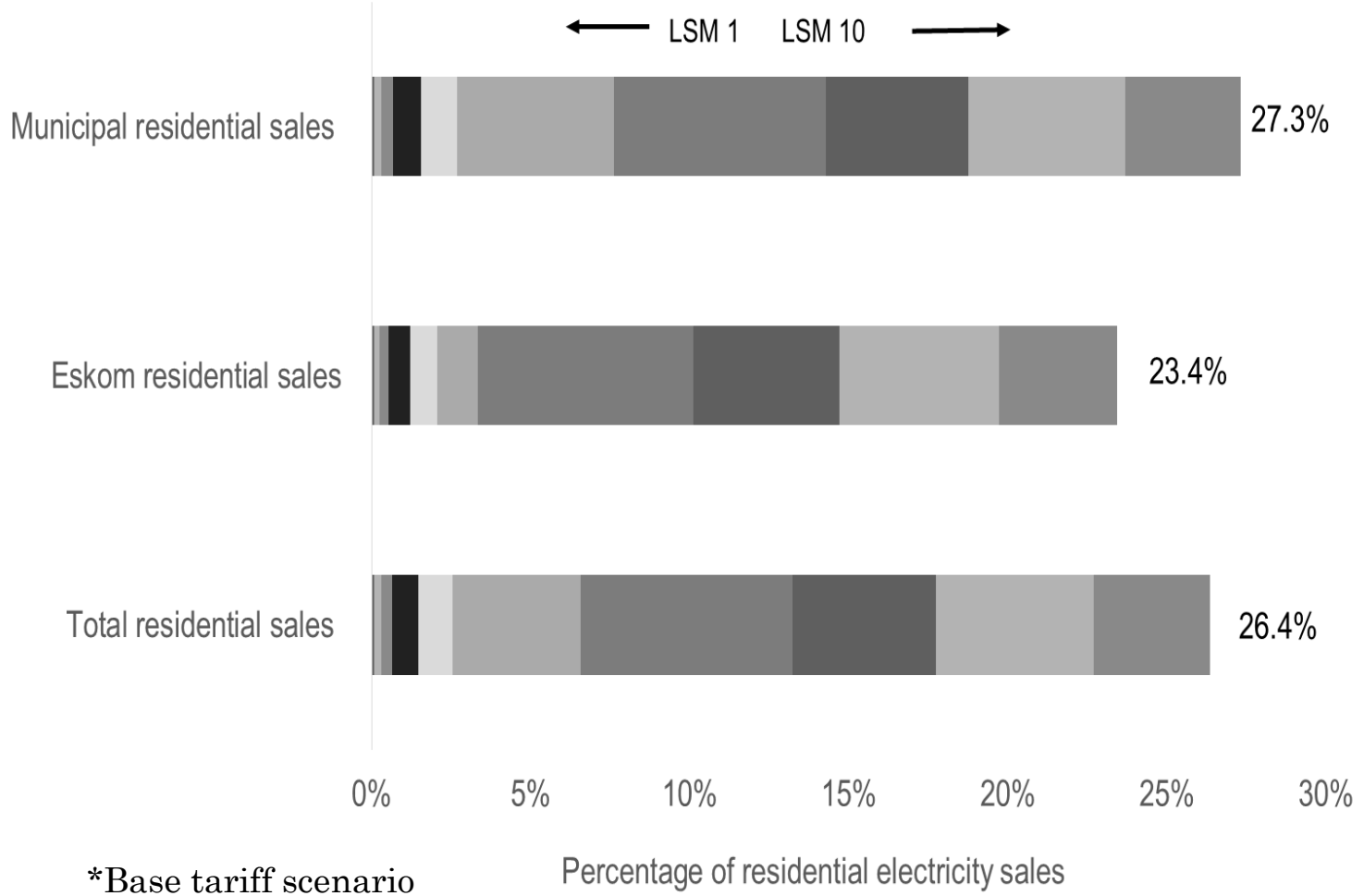
This implies that 35% of all HH will invest in one basket or another

Methodology



26.4% of *residential* electricity sales could go off-grid by 2030

Forgone residential electricity sales due to a 20% uptake*

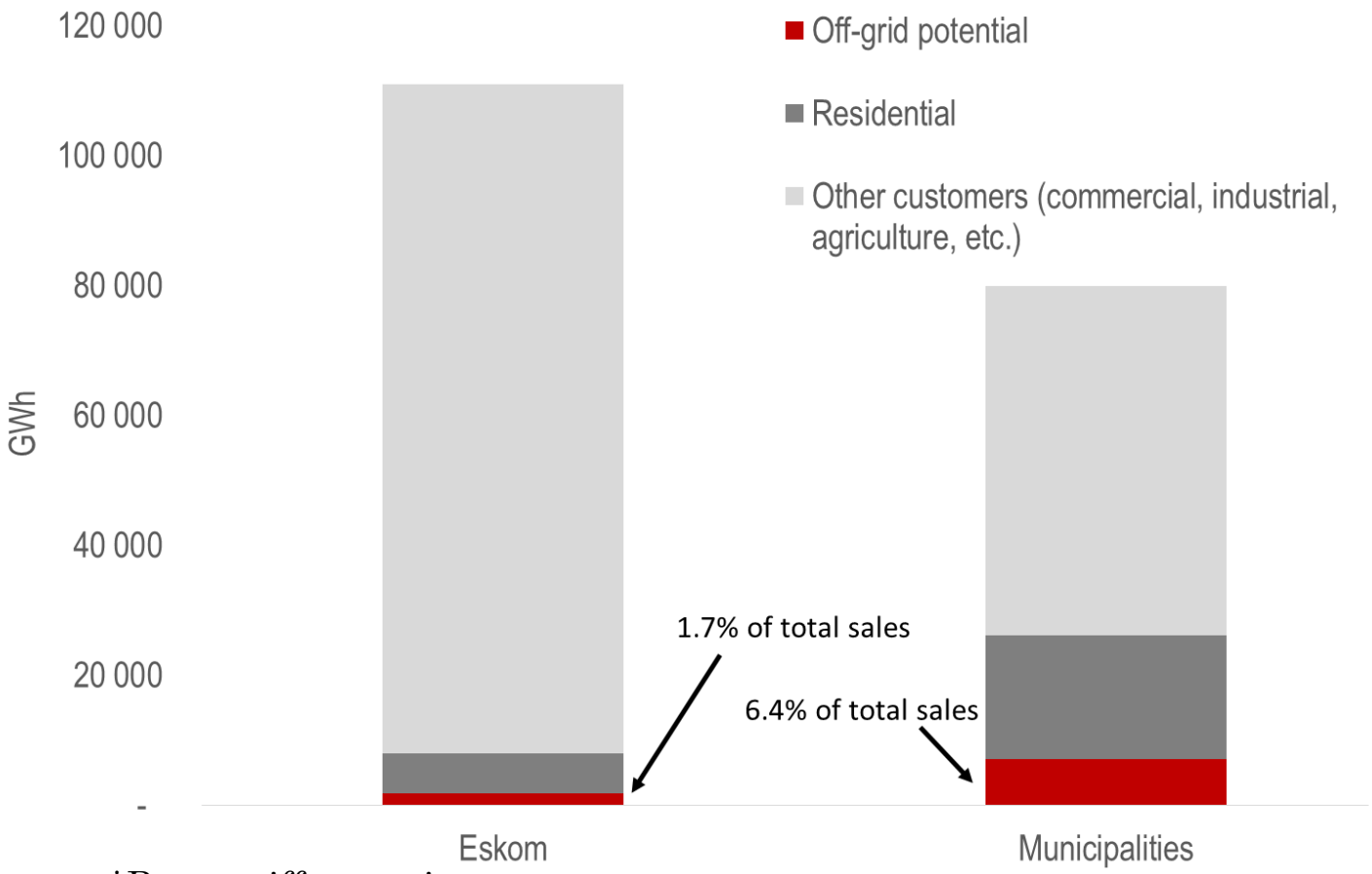


*Base tariff scenario

Source: Authors

Implication for Eskom and municipalities

Uptake in 2030, relative to total Eskom and municipal electricity sales in 2015 (GWh)*



*Base tariff scenario

Source: Authors

Conclusions

Conclusion and Recommendations

- The energy regulator is in a dilemma – but indications are that electricity tariffs will increase faster than the baseline scenario.
  - Tipping points will arrive sooner
- Households should invest in off-grid technologies to protect disposable incomes
  - But some households will need support
- But Eskom and municipalities are going to be severely affected:
  - the bulk of the impact will come from businesses
- Municipalities will need to broaden their revenue streams and invest in renewable strategies
- Eskom's sustainability is seriously at risk
  - The structure of Eskom needs to be ready for these changes
- Implications for electricity planning