

# The Impact of Energy Efficiency and Renewable Energy on City Revenue: Resulting impact on service delivery to the poor

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## Contents

Overview of issue .....	3
Summary of Local Government Income and Expenditure.....	5
Provision of free basic services and other focussed poverty alleviation costs.....	6
Non focused poverty alleviation .....	6
Current allocation of electricity department income to alleviate poverty.....	6
Impact of RE and EE on subsidisation of the poor .....	8
Business as Usual (BAU) Scenario .....	8
Strategies to address the losses.....	8
Decoupling Scenario .....	11
Additional cost of supplying electricity to informal settlements.....	12
Conclusion.....	12
Annexure A: Local Government Equitable Share Grant (LGES) .....	14

## Overview of issue

Over the past 5 years, the market for energy efficient lighting, water heating, HVAC, electric motors, variable speed drives and power factor correction products has increased significantly. At the same time there has been a marked increased interest from residential and commercial sector in installing rooftop photovoltaic panels (PV) for own use.

This increase in uptake has been a result of

1. rapidly increasing electricity prices due to Eskom's new build programme for two more coal fired power stations – Kusile and Medupi.
2. Eskom's increased efforts to implement demand side management (DSM) to assist in relieving the pressure from the grid. This has been implemented through several financial incentive schemes to encourage uptake of EE products in the residential, commercial and industrial sectors.
3. Increased awareness raised through electricity savings campaigns run by Eskom, local and national government.

These factors, coupled with a slower economy, have made a marked impact on levels of electricity use in South Africa. For the first time in 2012/3, electricity usage for the country dropped, and several Metro electricity departments have reported a drop in electricity sales over the last 1 to 4 years. Also for the first time, analysts are seeing that economic growth is increasing within the context of this lack of electricity growth, implying a degree of decoupling of these two indicators which in the past were joined at the hip.

While this situation must be viewed positively from a sustainable development perspective due to a more efficient economy, reduced impact on natural resources and a low carbon growth path, there is another condition to consider:

In South African cities, the distribution of electricity to customers is a function of local government, and to a smaller degree Eskom. Local government finances have been set up in such a way that surplus income from their electricity service (and to a smaller degree their water service) is needed to balance the books. Figure 1 below indicates this graphically for a typical municipality. The red line is the rates account, which does not cover the costs of running the municipality's other functions. Electricity and water effectively cross subsidise these. Many of these functions are linked to poverty alleviation and social upliftment and include: health clinics, housing, refuse removal, waste water removal, public lighting, roads and public recreation areas.

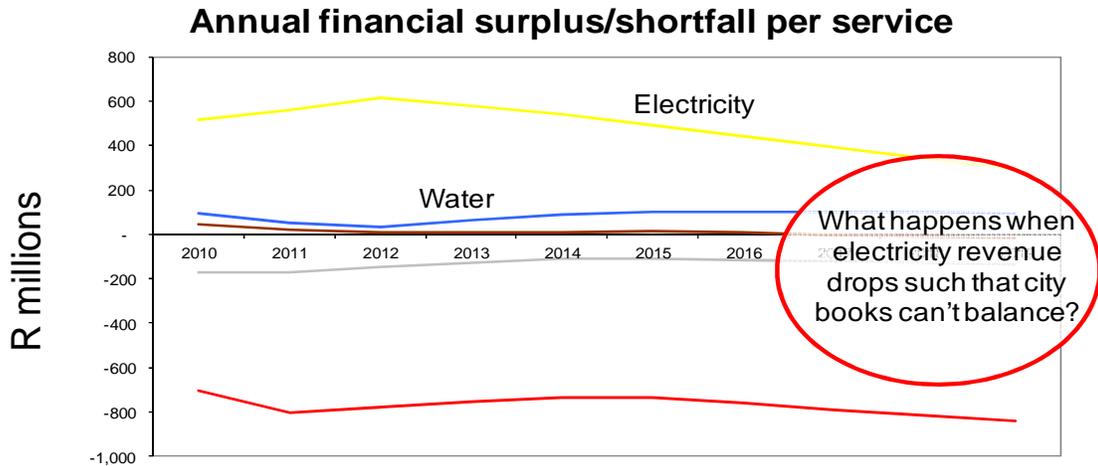
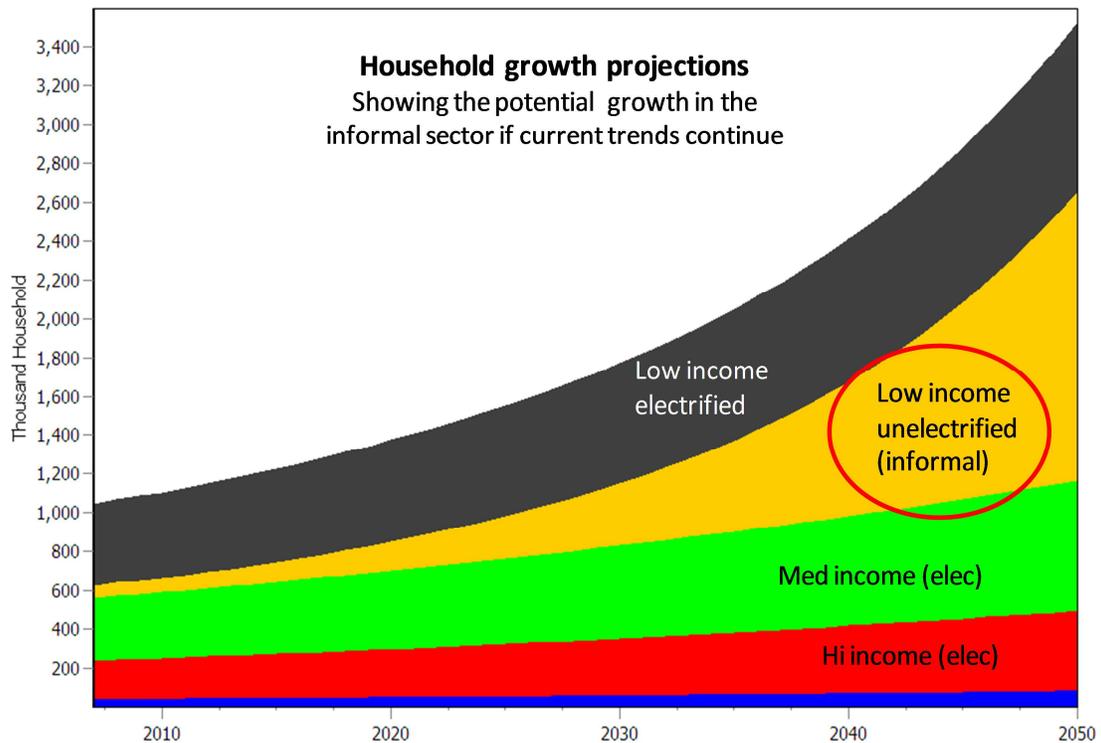


Figure 1

Furthermore, informal settlements are growing in South African Cities, and there is increasing pressure for local government to provide safe electricity to these communities at subsidised rates.



The question which arises then is: If electricity revenue drops as a result of increased uptake levels of RE and EE in the residential, commercial and industrial sectors, while there is an increased demand for subsidised low income electrification into the future, what will the overall impact be on service delivery within a municipality, particularly to the poor?

This report sets out to answer this question

## Summary of Local Government Income and Expenditure

Currently, the majority of local government income is derived from

1. Grants from the National fiscus via National Treasury (typically 10%). This includes
  - a. Local Government Equitable Share Grant (LGES) – for free basic services
  - b. Housing grants
  - c. Health grants
2. The rates account, paid by property owners (typically 20%)
3. Services - electricity, water, sewerage and refuse removal (typically 55%)

Together this typically accounts for 85% of local government income. Below is a table of projected in income for the City of Cape Town for 2013/14

<i>Income Source</i>	<i>R bn</i>	<i>% of budget</i>
Grant income	2.6	10%
Rates	5.5	21%
Elec	9.7	37%
Water	2.3	9%
Sewerage	1.2	5%
Refuse	0.9	3%
Other	3.8	15%
<b>Total income</b>	<b>26</b>	<b>100%</b>

This table shows electricity to be the largest income generator for local government. However, one needs to examine typical local government expenditure to see the whole picture:

<i>Income Source</i>	<i>R bn</i>	<i>% of budget</i>
Staff costs	8.4	32%
Depreciation	1.9	7%
Bulk purchases	6.9	27%
Contracted services	3.2	12%
Other	5.6	22%
<b>Total income</b>	<b>26</b>	<b>100%</b>

Bulk purchases (mostly for electricity and water) account for 27% of expenditure. Of this electricity would typically be 85% and water 15% (60% of revenue is typically paid on for bulk purchase). This means that electricity would provide a net surplus of:

37% (total income) – 21.6% (bulk purchase s= 15.4% to the city budget).

Much of this is required to keep the electricity business operational. However, electricity regulations currently allow an electricity transfer of 10% of overall income into the rates account to cross subsidise other City functions. **This amounts to 3.7% of the overall city budget that electricity currently cross subsidises.** This leaves the operational component at approximately 11.7% of overall city budget.

The money moving over to the rates account from electricity is not allocated specifically, and can be used at the discretion of the administration.

### **Provision of free basic services and other focussed poverty alleviation costs**

The City of Cape Town currently allocates R1.54 bn to free basic services, while the government LGES grant covers R1.23bn. The City therefore provides an **additional 1.15% of budget** to cover the additional costs.

Subsidised housing top structure and rental rates account for R368 million or **1.42% of City budget**.

Subsidised rates for indigent households amount to R1.13 billion or **4.35% of City budget**.

Total city expenditure budget allocation (excluding grants) for focussed poverty alleviation amounts to **6.92% of total City budget**.

### **Non focused poverty alleviation**

Much of the remaining city budget goes towards the effective administration of the City, which has a positive impact on the population as a whole. Much of this work will be focussed on poorer communities in the municipality (roads, parks, libraries, health, disaster management, security) while some will assist in the supporting economic development of the municipality as a whole, thereby improving employment opportunities.

### **Current allocation of electricity department income to alleviate poverty**

Electricity departments around the country currently provide a minimum free basic electricity grant to indigent households (under R2300/month based on 2011 census data) of 50kWh. Furthermore, low income households are subsidised with a reduced electricity tariff. Typically national grant funding through the LGES grant can cover the free basic electricity component. However, the additional cross subsidisation required to cover the additional costs to deliver electricity to the poor must be recovered by the mid-high income and non residential (commercial and industrial) sectors. A typical example of a municipal electricity department cross subsidisation allocation is provided in Figure 3 below

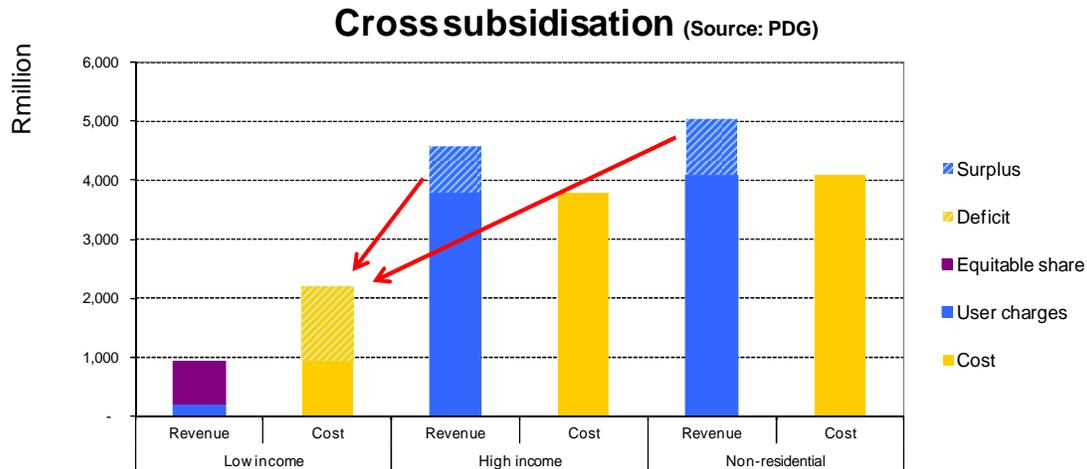


Figure 3

As the City of Cape Town has been used as an example of a typical Metro's finances in this report so far, an analysis follows of how the CCT Electricity Department subsidises low income households.

In Cape Town, low income households are cross subsidised exclusively by mid-high income households. Figures provided by the CCT Electricity Department indicate the following:

1. Currently there are 306 000 Lifeline customers (low income households)
2. They receive 50kWh per month free (valued at R32.47 per customer per month for a total of R119m for the year excl VAT). This is drawn from the local government equitable share grant (LGES)
3. Lifeline customers also receive subsidised tariffs
4. On 2012/13 tariffs, the tariff subsidy equates to R146.74 per month per customer (incl VAT)
5. This translates into R1 760.93 per customer for the year for a total tariff subsidy of R539m for the year
6. With an 7.86% increase, this becomes R585m in 2013/14
7. Current policy is that this subsidy is retrieved from within the Residential Consumer group
8. This means that 266 000 Domestic mid-high customers effectively have to pay R183.24 per month each more than they otherwise would have.
9. This does NOT include the 10% further subsidy that is paid to the Rates Account
10. Therefore, it can be shown that for a customer using 600kWh per month, next year of the R868.40 total account, ONLY R598.32 or 69% goes to their own electricity.

In summary, the CCT will cross subsidise approximately R585 million this year from mid-high income to low income. This equates to 6.03% of total electricity revenue. On top of this a further 10% of revenue (R970 million) will be passed on to the rates account to support service delivery elsewhere in the City. This effectively means that 16.03% of electricity revenue goes towards subsidising the poor or improving the quality of services to the City as a whole. This surplus revenue comes directly from the higher tariffs charged to the mid-high income residential, commercial and industrial customers. A summary of this is provided in the table below.

<b>Domestic Clients</b>	Electricity revenue contribution	Contribution to rates	Contribution to lifeline cross subsidy	Overall contribution
High Users( >450kWh)	29.7%	2.97%	6.08%	<b>9.05%</b>
Low Users (<450kWh)	16.6%	1.66%	0%	<b>1.66%</b>
Commercial Clients	17.1%	1.71%	0%	<b>1.71%</b>
Industrial Clients	32.6%	3.26%	0%	<b>3.26%</b>
Municipality	4.1%	0.41%	0.0%	<b>0.41%</b>
<b>Total</b>	100.0%	10%	6.08%	<b>16.08%</b>

## Impact of RE and EE on subsidisation of the poor

Modelling by SEA for the CCT Electricity Department has been completed to indicate the impact of EE and RE on municipal finances. The model has been run to represent a set of feasible future scenarios. Each of these will have a different impact on subsidisation of the poor and are discussed below.

### Business as Usual (BAU) Scenario

The business as usual scenario is based on the assumptions that the tariff continues to increase as a blended energy and service figure. Within this context, an uptake of SWHs, PV and EE interventions over the next 10 years is projected.

If this projected uptake of RE and EE into the future in Cape Town actualises, 6.08% of total revenue will be lost by year 10. 3.53% of this loss will come from the residential sector, and 2.55% from the commercial and industrial sector.

This is presented in the table below:

<b>Domestic Clients</b>	Contribution to rates	Contribution to lifeline cross subsidy	Overall contribution	Expected losses from EE/RE
High Users( >450kWh)	2.97%	6.08%	<b>9.05%</b>	<b>-3.53%</b>
Low Users (<450kWh)	1.66%	0%	<b>1.66%</b>	<b>0%</b>
Commercial Clients	1.71%	0%	<b>1.71%</b>	<b>-2.55%</b>
Industrial Clients	3.26%	0%	<b>3.26%</b>	
Municipality	0.41%	0.0%	<b>0.41%</b>	<b>0%</b>
<b>Total</b>	10%	6.08%	<b>16.08%</b>	<b>-6.08%</b>

### Strategies to address the losses

The losses predicted must be absorbed, and how they are absorbed is a matter for municipal management to decide. The following options are available:

#### *Reduce the contribution to the rates account*

In this strategy, the electricity department will need to cover its internal costs before making a contribution to the rates account. In other words, internal expenses currently required to allow the electricity department to operate cannot be cut. This means that the cross subsidising of the poor by the wealthier customers will need to occur prior to the rates

contribution taking place, and that the overall contribution to the rates accounts will be reduced. Therefore the contribution to the rates account will be reduced by **6.08% to 3.92%**.

Possibility of being implemented: Fair.

The maximum allowable rates contribution from electricity is 10%. Several municipalities in South Africa are contributing less than this as they cannot afford further budget cuts to keep the distribution grid operational. In the case of the City of Cape Town, the municipality will have to deal with a loss in overall revenue of 2.2%. These losses will need to be absorbed at the discretion of City management. Current poverty subsidisation levels for rates, housing and electricity – amounting to 6.8% of total revenue- would be at risk though.

Impact on the poor:

Electricity subsidisation for the poor will be unaffected. However due to the reduced money available to the municipality, the budget allocation (excluding grants) for free basic services and other poverty alleviation costs (housing, rates) could be reduced by up to 32% (2.2% of total budget).

#### ***Reduce electricity department operational and capital costs***

Further cost cutting by the electricity department will be required. However this is not advisable, as electricity departments are struggling to keep up with the network maintenance and upgrading within the current budget allocations.

Possibility of being implemented: Fair for a portion

The electricity department may not be required to absorb all of the losses, but may be required to absorb an equitable portion.

Impact on the poor:

Minimal if the electricity department manages to find ways to cut its operational and capital budget effectively

#### ***Reduce the contribution to the lifeline subsidy***

As the expected losses and the lifeline subsidy amounts are very similar, they could cancel each other out and lifeline customers would need to pay an increased (unsubsidised) tariff.

Possibility of being implemented: Very unlikely

A steep increase in low income electricity tariffs at a rate higher than increases for mid-high income would in all likelihood not be approved politically.

Impact on the poor:

Substantial due to increased tariffs

#### ***Increase electricity tariffs for mid-high income residential, commercial and industrial customers***

The losses in sales are compensated for by a proportionately increased electricity tariff for mid-high income residential, commercial and industrial customers

Possibility of being implemented: Fair

There is currently a large tariff divide between low income customers and the remaining electricity customers. Further increasing this will spur a negative reaction from the affected customers. However, such a shift is far more politically acceptable and manageable compared to a low income tariff increase. The warning around this approach is that such a move will further encourage customers to implement EE and RE due to the improved payback periods for the various interventions, thereby further increasing losses

Impact on the poor:

Minimal, provided high usage customers do not implement RE and EE interventions *en masse* which would result in substantially larger losses than projected in this scenario, and would affect the stability of the electricity department.

### ***Increase the rates tax***

Adjusting the rates tax to compensate for the losses from the electricity department is a measure which will begin to address the imbalance of the current municipal finance structure. In other words the rates bill must cover all other municipal costs outside the service utilities (electricity, water, sewage and refuse).

Possibility of being implemented: Fairly unlikely

An increase in the rates bill is seen as a political no go area, and will probably not be approved by councils, unless there is sufficient financial pressure on them to do so. Given the losses predicted from electricity, this may be considered.

Impact on the poor:

An increase in the rates tax will affect low income households which currently pay rates. This will not affect the poorest of the poor, but will have an impact on poorer communities in the municipality

### ***Source additional grant finance from national government***

The case for an increase in the LGES grant to cover the subsidised electricity to poor households can be made.

Possibility of being implemented: Unlikely in the short term

Lobbying to change grant allocations is a timely process. There is a possibility in the long term that additional national funding will be provided to ensure that municipalities continue to run effectively.

Impact on the poor:

None

### ***Blend of the above***

By cutting overall costs within the municipality and the electricity department, and minimally increasing tariffs and the rates tax, the absorption of the losses can be shared by the municipality as a whole.

Possibility of being implemented: Likely

This approach will most likely be the least controversial, although how the losses are allocated will need to be determined. The net result could however still impact on the poor through equitable City budget cuts. At the same time, these impacts can be minimised through tightening the municipal operations and capital budget, and increasing the load on mid-high residential, commercial and industrial customers through increased electricity and rates tariffs.

## Decoupling Scenario

In this scenario, the electricity tariff is broken up into an energy component and a service charge component. This approach allows the municipality to recover operational costs, regardless of the amount of energy sold. This tariff approach is called decoupling or unbundling. The benefits of this approach to the electricity department are:

1. No loss of income to the electricity department operational component. Losses will only be registered in sales on Eskom's side
2. Reduced energy tariffs will make payback calculations for RE and EE less attractive to customers, and losses will be minimised.
3. Cross subsidisation of the poor will be minimally affected.

There are some problems associated with this approach:

1. It is more punitive on lower consumers and more beneficial to higher consumers
2. Prepaid meter customers will have to adjust to paying large service charges before being allowed to purchase electricity.
3. While the electricity department will secure operational capital required to keep it afloat, the overall reduced revenue will result in a lower transfer of surplus to the rates account from electricity.

The first problem can be overcome using an inclining service charge for consumption blocks. The second problem can be addressed with communications and advertising. The third problem can only be solved if NERSA changes their regulations. Technically, as the municipality is not experiencing a net loss, it should be able to provide the same surplus as previously, even if the gross revenue is down due to decreased electricity sales.

It is unlikely that municipalities will implement such an extreme approach to tariffs initially. It is more likely that the tariff will not be substantially reduced, and that a smaller service charge will be imposed, in a blended option. This will still result in losses to the municipality, but the level of losses will be reduced, depending on the degree of decoupling decided upon.

The strategies in dealing with these losses will be the same as per the business as usual scenario above. However the overall losses can be minimised, with the benefit of less impact on service delivery to the poor.

This approach to the problem appears to be a very good one if the municipality wishes to stabilise its finances into a future with increasing RE and EE interventions being implemented.

## **Additional cost of supplying electricity to informal settlements**

The additional cost of subsidising electricity tariffs for low income households in informal settlements, once they become connected to the grid, will also have an impact on electricity department income.

Currently the money for cross subsidising these customers is included in the mid-high income residential and commercial tariffs. However, if the major household growth is going to be in the low income sector, then the subsidies from the slower growing mid-high income and commercial sectors will have to increase to accommodate this.

By way of example, Cape Town's 266 000 mid-high residential customers currently cross subsidise on average R180 per month to the 306 000 low income customers. This equates to a R159 subsidy per low income household per month. If in the next 10 years, the number of electrified low income households increase at 5000 per year, while the number of mid-high income households increase at 1000 per year, the mid to high residential subsidy in today's Rands would increase to R205 per month, a 14% increase. However, the increase would be built into the tariff at approximately 2.6c/kWh (R25 extra for average 950kWh/month). This appears to be a manageable increase when considered in isolation. However, with additional tariff increases to make up for the loss of income from EE and RE, the mid to high income sector will be further incentivised to install EE and RE interventions to reduce monthly energy costs.

## **Conclusion**

While the losses an electricity department can expect from EE and RE can be calculated, the impact of these losses on service delivery to the poor is a more complex one to assess. This is due to the many ways in which the impact of electricity sales losses can be absorbed by the municipality. This report has indicated that the loss of income can be channelled through many different strategies.

Overall electricity revenue losses for the four Cities modelled range between 2% to 6%. If municipal management so chooses, these losses are sufficient to either:

1. Seriously impact cross subsidisation of electricity tariffs for the poor by the electricity department,
2. Seriously impact additional free and subsidised services provided to the poor through the municipal budget, over and above current grant funding (housing, rates, additional free basic electricity) or
3. Impact all municipal functions in a small way if the losses are spread across the municipal budget

Other strategies to address the problem which are less likely to affect the poor could be:

1. Increasing mid-high residential, commercial and industrial tariffs to recover the loss,
2. Increasing the rates tax
3. Lobbying for further grants from National Government
4. Implementing the decoupling of energy and service charges in the electricity tariff

Increased electrification of informal settlements will place an increased load on larger consumers, as they will also require cross subsidisation.

These factors all need to be weighed up to determine the most equitable approach to dealing with the problem. The negative impact on poverty alleviation will need to be consciously managed by the municipality, while at the same time avoiding further losses in the mid-high residential, commercial and industrial customers as they react to increased tariffs.

## **Annexure A: Local Government Equitable Share Grant (LGES)**

National Government currently makes allocations to cater for the service delivery needs of the poor. These allocations are distributed through the Local Government Equitable Share Grant (LGES). The LGES is a non conditional grant, leaving it up to the discretion of the municipalities receiving it as to how it should be allocated. Currently it is typically allocated in such a way that a portion of electricity, sanitation, refuse and water be provided free of charge to poor households. These are called Free Basic Services, and typically equate to electricity at 50kWh per month, water at 6kl per month, free refuse and waste removal. If municipalities choose free basic services policies that are more generous than these norms provide for, then it is up to them to fund those additional levels of service.

Poor households are defined as those with a monthly income of less than R2300 in the 2011 Census. Several weaknesses have been identified with defining poverty in this way, including that households that reported income of just above R2300 in the 2011 Census have no allocation made against them in the formula, despite being little better able to pay for their own services than those reporting an income of just below R2300.

South Africa still faces major backlogs in access to municipal services. Many households still do not have access to the infrastructure necessary to provide them access to water, sanitation, electricity and refuse removal. National government funds municipalities to build infrastructure to provide access to these services through several conditional grants (including the Municipal Infrastructure Grant, Urban Settlements Development Grant and Integrated National Electrification Programme Grant). However, despite billions of rands in investment over the last decade-and-a-half, major backlogs still remain across the country.

The LGES allocates funds for both those poor households that have access to services and those that do not, but at different rates. The equitable share formula only allocates 45 per cent of the amount per service to un-serviced households that it allocates for serviced households. This ensures that municipalities do not receive funds for services they are not actually providing (they should however be providing alternative services to un-serviced households). It also creates an incentive for municipalities to increase access to services among poor households as this will ensure greater equitable share allocations in the future. Unfortunately this incentive effect will not be very effective if the data used in the LGES formula is only updated every 10 years. Between censuses, municipalities will have to bear the cost of newly serviced households without immediately receiving an increased LGES allocation. In order to alleviate this problem, in 2011/12 the level of the subsidy for un-serviced households was increased from 33 per cent to 45 per cent, on the assumption that a large proportion of these households would now be receiving services and be costing municipalities more (large increases in the amount allocated through the LGES in previous years also assisted to cover the costs of more households gaining access to services).