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Informal electricity re-selling: Entrepreneurship or exploitation?

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Key findings:

- Houses in informal settlements get electrified but dwellings built on land not proclaimed for housing do not get an electricity connection.
- Connected house owners re-sell electricity to dwellings without an electricity connection via extension cords.
- Those without a connection pay up to eight times more than pay if they had their own electricity connection.
- Both sellers and buyers of such shared meter groups lose out on subsidies from the Free Basic Electricity tariff because their combined purchases often exceed the subsidy threshhold.
- The paper analyses the modalities of electricity re-selling and the benefits and losses to sellers and buyers.

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1. Introduction

South African energy policies have supported universal electricity access since 1994.On 26 June 2013 cabinet approved a new electrification plan which defined universal access to electricity as 97% of all households having access. The plan stated that all households would have an electricity connection by 2025[1].

Energy access does not necessarily mean that households have an electricity connection. The 2011 census reveals that 12.2 million out of the 14.5 million households in South Africa used electricity as their main source of lighting [2], meaning that they had their own connection or used an extension cord to connect to the neighbour. According to the Department of Energy (DOE 2013) 3.3 million households had no electricity connection. If one assumes comparable data, then 1.1 million households had an informal connection which meant they most probably received electricity from a neighbour via an extension cord (Figure 1).

In 1994 only 36% of South Africans had access to electricity, increasing to 85% in 2011 [2], [3]. Those with new connections were mostly poor and the government realised that they could not afford to use electricity as a basic energy. As a result, the Free Basic Electricity (FBE) policy [4] was introduced in 2003 to assist the poor and "ensure optimal socio-economic benefits from the National Electrification Programme" [4]. It allocates 50 kWh per month free of charge to poor households to meet their basic needs for lighting and media plus a limited amount for water heating and cooking. But not all poor households with access to electricity receive FBE. About 3.3 million poor households earning less than R4150 a month and have access to electricity do not get FBE [5]. There are different reasons why many poor households are left out. The most common problem appears to be that the electricity distributors are unable to roll out FBE to all qualifying households. This paper discusses why poor households do not benefit from FBE when sharing electricity meters.

Figure1: Formal and informal electricity lines in Imizamo Yethu.
The black lines are formal and are connected to the municipal distribution box

2. Informal settlements

Since the late 1980s, when black South Africans could freely move to urban areas, many migrated to the cities and built dwelling places wherever they could find space; informal settlements grew rapidly. Statistics South Africa defines an informal settlement as unplanned settlements on land which has not been surveyed or proclaimed as residential, consisting mainly of informal dwellings (shacks) [2]. In 2011 13.6% of all South Africans lived in such areas [2].

There are over 200 informal settlements in the City of Cape Town. Imizamo Yethu in Hout Bay is one - a mixed settlement of 6 011 formal houses and 3 685 shacks [5]. The shacks are made of inferior building

materials – mainly corrugated iron, cardboard, plastic and wood (see Figure 2) and are typical of the informal nature of human settlements in the township [6].

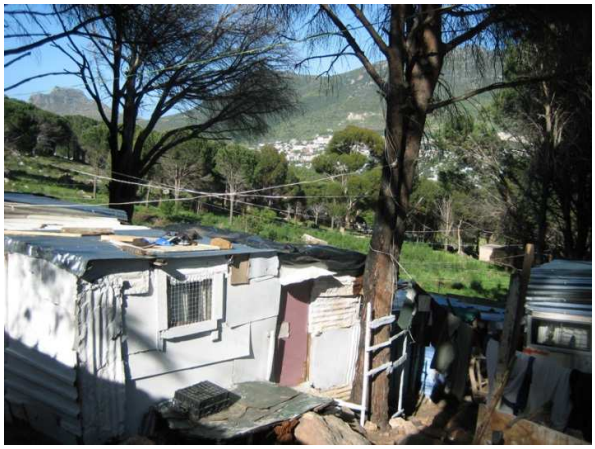

Figure 2: Shacks are built on unproclaimed land, many accessing electricity from other shacks via extension cords

Sharing an electricity meter – a case study: The Joseph household: the unemployed, a frail pensioner and competing food and energy needs

Mrs Josephs (not her real name) is a frail elderly lady in Imizamo Yethu and is the sole breadwinner in a household of four. Tanya, her 25-year-old daughter, has a baby and a six year old son, and is presently unemployed. With her pension of R1200 per month, Mrs Josephs finds it impossible to meet all her household's needs, and as a result they suffer multiple deprivations in order to meet their basic food and energy needs. For one thing, their house is in a poor state of repair and is thermally inefficient; it is too cold, the roof leaks when it rains and the walls are damp from condensation in spite of having a ceiling. There is just not enough money to fix things around the house. Half the monthly pension is spent on food, with bread being a significant component of the diet.

Mrs Josephs shares her meter with her neighbour. In 2012/13, the Josephs and the neighbour each needed to pay R173 (Domestic Tariff 1) to maintain a combined consumption of approximately 400kWh, as shown in the table below.

Year	*Meter*	*Monthly purchases*	*Total nominal cost (inc. FBE)*	*Each pay*
2012/13	Sharing	400kWh	R346	R173
2013/14	Sharing	400kWh	R400	R200
2012/13	If no sharing	200kWh	R125	-
2013/14	If no sharing	200kWh	R127	-

In 2013/14, if consumption is to remain at 400kWh, the individual contribution would need to be R200. Now, if Mrs Josephs was not sharing and maintained an average of 200kWh, she would be paying less. In 2012/13, she would have paid R125, which is a saving of R48. In 2013/14, it would be even less, costing R127 to maintain 200kWh, which is a saving of R73. The energy savings could be used to meet additional food requirements. The problem is not with the tariff, the fundamental problem is that of sharing a meter. Adapted from [5].

Figure 3: Prepayment electricity meter shared between the owner/seller and three other households buying electricity connected by an extension cord [5]

Eighty percent of households in Imizamo Yethu have access to electricity. They have either a formal electricity connection with a prepayment meter or they use an extension cord to access electricity from the formal connection of a neighbour (Figures 1 and 2) [7]. Shacks built on unproclaimed land – unapproved by the City of Cape Town did not approve for settlement - are not eligible for a formal electricity connection. Such households can access grid electricity only from a neighbour (often at some distance) who is willing to resell and with whom they negotiate a monthly price. The seller can connect up to three households to a "ready box" (Figure 3). Sellers market electricity they buy from the municipality; connections are often unsafe and considered illegal by the authorities.

3. Methodology

To estimate the cost to the buyers and the profit to the sellers, a household survey was conducted and an energy use and expenditure questionnaire administered to 40 randomly selected households in the three different areas of Imizamo Yethu – informal dwellings on unproclaimed land with extension cords, informal dwellings on proclaimed land with their own meters, and formal dwellings with their own meters.

The questionnaire asked for electricity use and purchases which were then compared against the actual purchase history. The Revenue Protection Department of the City of Cape Town provided the electricity purchase data from July 2009 to July 2013 for survey participants; prepayment meter numbers were used for identification.

4. Results

Of the 40 households identified, 26 households shared meters. In each case there is one household formally buying from the municipality and informally re-selling to one or more other households. In the sample there were 5 sellers and 21 buyers. The writers collected and analysed detailed electricity purchases and payments for four electricity sellers and their buyers. All groups consisted of one seller and two buyers. (A seller may have had more buyers, but if so they were not picked up in the random sample.) Payment was made either in cash to the selling or the buying household directly purchases electricity for the seller's prepayment meter number; cost of buying and selling electricity is given in Table 1. The monthly purchases in kWh and cost in Rand are averaged over 12 months.

The averaged monthly electricity purchases of the four groups of sharing households range from 321kWh to 411kWh. One seller had zero purchases but sold electricity to two other households and the most likely explanation is that the meter was bypassed.

Each household's use was not measured. It was assumed if the three households (the seller and two buyers) used the same amount of electricity, an individual household's use ranges from 107 to 137 kWh. This is consistent with the average consumption levels for low income households found in other studies [8].This is well within blocks 1 and 2 of the inclining block tariff in 2012/13 (see Table 3). The buying households negotiate with the re-seller and agree on the amount to be paid monthly. This varied from household to household; in this sample it ranged from R200 to R600. The monthly profit of the re-sellers ranged from R120 to R800.

Table 1: Electricity payments for selling and buying households

Re-selling household	*Buying household**	*Domestic tariff 2012/13*	*Average monthly purchases of selling household in 2012/13 (kWh)*	*Cost of purchases to selling household (2013 Rand)*	*Percentage of bill paid by buying households*	*Amount paid by buying household per month*	*Difference compared to single households who pay R74 for 150kWh**	*Monthly profit of meter owner***
1a	1b	2	321	R 424	236%	R600	R526	-R 576
	1c					R400	R326	
2a	2b	1	356	R 287	226%	R450	R376	-R 363
	2c					R200	R126	
3a	3a	1	411	R 361	139%	R250	R176	-R 139
	3b					R250	R176	
4a	4b	1	0	R 0	n/a	R300	R226	-R 800
	4c				n/a	R500	R426	

* The amount paid by a buying household is assumed to be 150kWH of electricity and the cost of 150kWH for individual households on the City of Cape Town's Domestic 1Tariff in 2012/13 is R74 (2013 Rand), which includes 50kWh of FBE.

** The profit is the amount the two buying households pay after the meter owner has deducted his prepaid electricity cost.

Table 2: The nominal vs real cost of electricity between 2006/2007 and 2013/14 for the City of Cape Town

Nominal cost of electricity				*Real cost of electricity in June 2013 rands, month of survey (using CPI = 102.9)*				*Cumulative real increase (2006 base year)*		
Billing year	*Low 150kWh*	*Medium 300kWh*	*High 450kWh*	*CPI month of increase*	*Low 150kWh*	*Medium 300kWh*	*High 450kWh*	*Low 150kWh*	*Medium 300kWh*	*High 450kWh*
2006/2007	R46.34	R115.85	R208.53	66.9	R71.28	R178.19	R320.74	0	0	0
2007/2008	R48.90	R122.25	R220.05	71.6	R70.28	R175.69	R316.25	-R1.00	-R2.50	-R4.50
2008/2009	R56.38	R140.95	R291.83	81.2	R71.45	R178.62	R369.81	R0.17	R0.43	R49.07
2009/2010	R61.44	R153.60	R396.90	85.4	R74.03	R185.08	R478.23	R2.75	R6.88	R157.49
2010/2011	R66.26	R186.77	R478.67	88.6	R76.95	R216.91	R555.92	R5.68	R38.72	R235.18
2011/2012	R70.22	R208.81	R551.12	93.2	R77.53	R230.54	R608.47	R6.25	R52.35	R287.73
2012/2013	R74.02	R227.83	R597.51	97.8	R77.88	R239.71	R628.66	R6.60	R61.52	R307.92
2013/2014	R81.77	R249.87	R641.25	104	R80.91	R247.22	R634.47	R9.63	R69.03	R313.72

Household 1a bought 321kWh for R424 (Table 1) and re-sold electricity to the two households 1b and 1c. The seller made a profit of R576 per month (Table 1) and on top of the profit did not pay for his own electricity. If the buying households had had their own electricity meters and consumed 150kWh, each would have paid only R74 instead of the R400 to R600 they did pay.

Since they actually used less than 150kWh, they could have used slightly more kWh for this amount. In 2011/12 the average purchases for the three customers (1a, 1b and 1c) was higher than the 400kWh purchase limit for Domestic 1 tariff (low – medium purchase; see Table 3) and therefore they were charged with Domestic 2 tariff rates (high-purchase) in 2012/13; as a result they lost out on subsidies and were charged more per kWh than Domestic 1 customers.

In household group 2a, 2b and 2c (Table 1) the buying households made lower contributions than in group 1; profit for the reseller was R363 plus free electricity.

Household group 3 used the largest amount of electricity (411kWh) and the seller made the lowest profit (R139) plus free electricity.

Then total financial profit for the re-sellers was calculated. It was assumed re-sellers did not use more than 150kWh per month at a value of R74; this amount was added to the payments of the buying households. Then re-seller 1 made a profit of R650, re-seller 2 made R437, re-seller 3 made R211, and reseller 4 (a special case) made the highest profit of R800 as this re-seller paid nothing to the municipality.

Re-selling electricity in informal settlements is good and easy business as the re-selling household has to simply check that the prepayment meter is loaded - -welcome extra income in a poor community with high unemployment. Households who do not pay the seller for access during the month when asked can easily be unplugged from the “ready box”; such cases have been found in the survey.

The buying households lose out on several benefits, such as being adversely affected by Eskom’s recent tariff increases and the loss of FBE in cases.

The majority of poor households who have their own electricity meters (and do not share) fall within the low-purchase tariff category and have largely been shielded from tariff increases [5]. On the other hand, poor households who share an electricity meter often fall within the medium or high-purchase tariff category; these households have experienced higher annual real price increases. Table 2 shows the nominal[1] and real[2] cost of electricity in June 2013 Rand between 2006/07 and 2013/14.

It is important to compare costs over different years in real terms to gain a true reflection of increases and so remove the distortion of inflation. All customers did not experience the same level of increase; between 2006 and 2013 the cost of electricity applicable to low-purchase customers (e.g. 150kWh) rose from R71 to R81 in real terms (Table 2), a cumulative increase of R10 in real terms (June 2013 Rand). This is much less than the increase in tariffs applicable to high-purchase customers (e.g. 450kWh) whose tariffs in real terms almost doubled for the same time period -an increase of R314 (Table 2).

Figure 4 shows the result of adding the year-on-year (cumulative) percentage increases in the cost of electricity for different tariff categories between 2006/07 and 2013/14 and compares it to the corresponding increase in inflation (CPI). It is clear from this graph that high-purchase customers – who in many cases are poor sharing households – have had some steep annual increases, particularly between 2008/09 and 2011/12, resulting in a cumulative increase much larger than inflation. They paid 70% more on average for electricity in real terms in 2013/14 compared to 2006/07.

Poor households use 150kWh on average [8]. They should be paying 74 cents/kWh but they paid from 133cents/kWh up to 400cents/kWh. As low-purchase users some paid more than block 4 of the high purchase tariff (Table 3). They paid up to eight times more than if they had their own connection. Some are excluded from FBE -designed to make electricity affordable for the poor, when the total use of three households in the previous year is too high for the FBE allocation in the current year as in the case of group 1 in Table 2 (their 2011/12 average exceeded 400kWh) Moreover, they could not qualify for an electricity connection as they live

[1] Nominal costs are the actual costs that are paid by customers in any given year.

[2] Real costs are deflated by the consumer price index. For example, in 2012/13, the nominal cost for 150kWh on a low-purchase tariff was R74. The real cost in June 2013 Rand = R74 x 102.9/97.8 = R78.

on unproclaimed land. They had nowhere else to go – being bound by job and education opportunities, transport and other services.

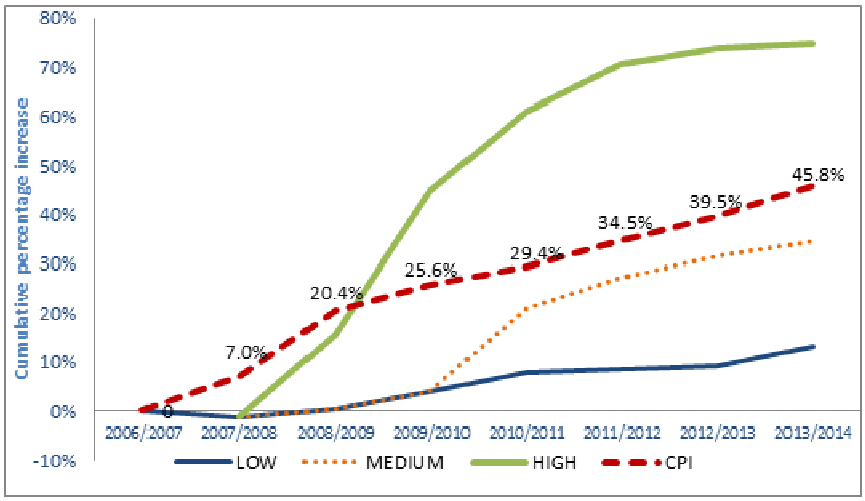

Figure 4: Cumulative real percentage increase in the cost of electricity compared to inflation between 2006/07 and 2013/14

Table 3: The 2012/13 Inclining Block tariff for domestic customers applicable in the City of Cape Town

Domestic Tariff 1: Low to medium-purchase < 400kWh *FBE 50kWh (R37.01)*	
Block 1: 0-150 kWh	74.02 c/kWh
Block 2: 151-350 kWh	102.54 c/kWh
Block 3: 351-600 kWh	134.65 c/kWh
Block 4: >600 kWh	159.81 c/kWh
Note: Customers using less than 400kWh per month get 50kWh FBE	

Domestic Tariff 2: High-purchase > 400kWh *No FBE*	
Block 1: 0-150 kWh	129.05 c/kWh
Block 2: 151-350 kWh	134.64 c/kWh
Block 3: 351-600 kWh	134.64 c/kWh
Block 4: >600 kWh	159.81 c/kWh

5. Conclusion

This paper analyses electricity demand and cost in a poor informal settlement in South Africa. Households with a meter buy electricity from the municipality and re-sell it to neighbours without electricity connection. Cost and benefits to poor households who shared electricity meters were measured. In informal settlements dwellings built on land not zoned for housing do not qualify for an electricity connection, and, therefore, used extension cords to connected to neighbours who were ”switched on”. Re-selling electricity to neighbours without an electricity connection had developed into a business yielding significant profits for the seller, but disadvantaged the buyer as follows:

1. Buying households paid up to eight times more for electricity compared to households with a meter.
2. Electricity tariff increases and subsidies are designed to protect poor customers who use little electricity. There are cases when three or more poor households shared a meter and their purchases exceeded 400kWh a month; they therefore lost their subsidy as they fell within the high-purchase tariff category. .
3. Poor households who shared electricity meters were adversely affected by tariff increases as they were often charged at high-purchase tariff rates – this tariff had the largest increases between 2006/07 and 2013/14.

The problem was households had settled on unproclaimed land and policy stipulated that dwellings built on land not zoned for housing do not qualify for an electricity connection.

Further research should examine alternative energy technologies such as solar power for lighting, TV, cellphone charging and water heating, and gas stoves for cooking. The Free Basic Alternative Energy Policy (FBAE) could provide subsidies for such technologies.

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