Prepaid electricity: Evidence from South Africa

...Discussion

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Discussion

• (won’t go into method etc...)
• Main policy-relevant findings
• Elaborate on these findings in terms of context
  ➔ How could findings serve policy, policy-analysis/policy-formulation
    ➔ Immediate direct advice/messages to policy makers
    ➔ Additional work / ideas
Main findings - 1

1. Prepaid meters in low-income households lead to decreased consumption / forced limited consumption

WHO

a. Households with history of poor-payment or debt on credit meters have larger reductions
b. Also, “full fare” customers have larger reductions
c. Reductions limited for ‘lifeline-tariff’ customers

But clustering
Main findings - 2

2. Prepaid meters in low-income households lead to decreased consumption / forced limited consumption

WHY

a. (prepaid forces)
b. Household with limited liquidity reduce more
c. Bunching at tariff ‘block-increase-point’ suggests customer sensitivity to price
Main findings - 3

3. Customers say

Benefits - helps manage consumption
Disadvantage - hassle of buying electricity

BUT, only 18% use on-line/phone buying
...it seems customer knowledge of tariff, monthly consumption very low
Combining findings

2. Prepaid meters in low-income households lead to decreased consumption / forced limited consumption

WHY

a. ( basic functionality of the technology )

b. Household with limited liquidity reduce more

c. Bunching at tariff ‘block-increase-point’ suggests customer sensitivity to price, but this is achieved ‘reactively’... in response to ‘more expensive electricity later in month’
Policy context

- Prepaid has facilitated extension of access from 30% (apartheid era) to 80%
  - Cannot overemphasize the importance of this
    - South Africa has technically functional, robust pre-paid system

- ...moving to Current Policy Issues
  - Prepaid continues as above
    - Except for non-technical losses, ...unsolved and increasing rapidly recently
  - ...new issues, next slides
Current issues

• financial, economic, and technology combined
  – Poverty and energy poverty: 45% of population live below upper-bound-poverty level, 40% effective unemployment
  – Cost recovery / profit
  – Tripling in bulk supply costs, ditto for tariffs, but much lower for lifeline
  – Cross subsidies
    • Within electricity tariff
    • Of other services
  – Flat consumption growth
  – New connections
  – Theft
  – Own generation in sector that provides the cross subsidy
    • Grid parity of first PV, then PV+storage
Electricity re-distributor energy profits

...sector is bankrupt

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<td>2 888</td>
<td>3 211</td>
<td>3 350</td>
<td>2 454</td>
<td>2 945</td>
<td>2 166</td>
<td>1 151</td>
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<td>Category B (Locals)</td>
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<td>1 251</td>
<td>795</td>
<td>608</td>
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<td>577</td>
<td>341</td>
<td>339</td>
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<td>Large towns</td>
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<td>374</td>
<td>151</td>
<td>214</td>
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<td>Mostly rural</td>
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<td>77</td>
<td>46</td>
<td>50</td>
<td>17</td>
<td>-72</td>
<td>-7</td>
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<td>Category C (Districts)</td>
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<td>-25</td>
<td>4</td>
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<td><strong>TOTAL</strong></td>
<td>5 840</td>
<td>6 129</td>
<td>5 803</td>
<td>4 018</td>
<td>4 165</td>
<td>1 500</td>
<td>-1 421</td>
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Table LG1 – Local government electricity distributors financial viability under threat - Net surplus on electricity sales (South African National Treasury 2013)

➤ Cumulative aggregate maintenance backlog of some ZAR 50Bn
Bulk electricity tariff**

[ ** tariff NE cost ]

Bulk electricity tariff [Eskom 2015]

Average Eskom tariff increase vs. CPI
Cape Town retail electricity tariff

### Domestic tariff for >600kWh p.m. user

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<td>cents</td>
<td>30</td>
<td>50</td>
<td>60</td>
<td>73</td>
<td>91</td>
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Energy Research Centre
Electricity re-distributor energy served and revenues

- Number of customers in each segment 2009/2010
  - Segment 1: 270,660
  - Segment 2 (No FBE): 123,428
  - Segment 2 (with FBE): 168,476

- Number of customers in each segment percent
  - Segment 1: 48%
  - Segment 2 (No FBE): 22%
  - Segment 2 (with FBE): 30%

- Total energy consumption by each segment GWh/year 2009/2010
  - Segment 1: 980
  - Segment 2 (No FBE): 1,731
  - Segment 2 (with FBE): 1,056

- Total energy consumption by each segment percent
  - Segment 1: 26%
  - Segment 2 (No FBE): 46%
  - Segment 2 (with FBE): 28%

- Estimated revenues from each segment ZAR 2012/2013
  - Segment 1: 746
  - Segment 2 (No FBE): 2,530
  - Segment 2 (with FBE): 1,237

- Estimated revenues from each segment: percent
  - Segment 1: 17%
  - Segment 2 (No FBE): 56%
  - Segment 2 (with FBE): 27%
South African electricity consumption

National electricity consumption

GWh/ZAR10m


Electricity consumption (StatsSA)  GDP[real]
City of Cape Town System Energy

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<th>Year</th>
<th>Old Forecast 3.3%</th>
<th>Actual</th>
<th>New Forecast</th>
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<td>791.97</td>
<td>10529</td>
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<td>9681</td>
<td>797.53</td>
<td>10523</td>
<td>9768</td>
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<td>2006</td>
<td>10000</td>
<td>813.40</td>
<td>10401</td>
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<td>2008</td>
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<td>855.45</td>
<td>10201</td>
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<td>2018</td>
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<td>2019</td>
<td>15251</td>
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<tr>
<td>Growth</td>
<td>3.9%</td>
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<td>2.2%</td>
<td>3.0%</td>
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Soooo..., Findings plus Context: ?? Policy/?? Research

• Poverty
  – [ Prepaid has been and remains key to providing access to grid electricity for poor ]
  – From study: pre-payment assists poor to manage electricity expenditure
    • But in quite a “rough” way – (i) forced (ii) reactive...
      ➔ ? Options for better information, ? Impacts/effects
  – From study: demand for basic electricity energy services inelastic: additional knowledge does not reduce consumption much in ‘lifeline’ tariff customers
    ➔ ?? What is elasticity, ?? What is affordable
    ➔ ?? What alternative options are there: efficiency, LPG, PV, storage ( combos) ...( overlaps with financial sustainability )
    ➔ ( social costs of non-supply not an option )
Soooo..., findings plus context: ?? Policy/?? Research

• Poverty
  – [ Prepaid has been and remains key to providing access to electricity ]
  – Disadvantage – transaction costs
  ➔ ?? More details of cash-flows in poor households
  ➔ ?? Options for on-line/innovative payments methods
  ➔ ?? Combining innovative payments methods with better information on tariffs/consumption/budgeting
Soooo...., findings plus context: ?? Policy/?? Research

- Cost recovery / financial sustainability / profit
  - Facing up to the overall situation which the study helps clarify: especially needs and behavior of lifeline group
    - ?? Viability/economics of cost reflective tariffs
    - ?? Future BAU scenarios to inform public policy processes
    - ?? Options within overall financial position and cross-subsidy: especially alternative scenarios to achieve financial sustainability
  - ?? Key research on behavior of other customer segments
    - mid-income ( full fare )
    - mid-high income ( milk-cows )
    - Commercial
    - Industrial
  - Role of milk-cows and 10% profit in maintaining perverse incentives, including institutional (dis)incentives to find/implement solutions
The study surfaces very useful information on one customer segment – Because South Africa already has a comprehensive prepaid grid connected system, with large dynamics, provides ‘field’ for detailed studies.

The current study useful purely in its own right, and provides details of needs for further research in this segment and:

- In other segments, other ‘fields’
- Linked to options for future policies within an overall economic / financial / institutional sustainability analysis.
Thank-you!