Exploring the financial impact of non-technical energy losses & emerging best practices to curb this scourge

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INTRODUCTION

• Meter equipment tampering and associated energy theft, is a major, widespread problem

• Supply authorities experience losses relating to tampering ranging from 1.25% to 58% of total revenue

• As the cost of energy increases, incidents of tampering & theft WILL increase

• Energy thieves and meter equipment tampering MUST be stopped or at least deterred

• Steps taken to curb energy theft - a case study

• NRS 096 & NRS 055 as tools
PROBLEM DEFINITION

Increased emphasis is being placed on the severity of energy loss as a result of meter tampering and illegal connections. Supply authorities experience losses relating to tampering ranging from 1.25 – 58% of total revenue. The intent of tampering is to reduce the account, without reducing consumption. It is by nature fraudulent. As the cost of energy increases, incidents of tampering & theft WILL increase. Unless supply authorities institute proactive steps to deter these fraudulent actions, energy theft will continue unabated and will keep on eroding the profitability & sustainability of energy distributors.

Even with a fine tuned and highly focused Revenue Protection programme, it is unrealistic to state that the problem will be eliminated completely, but it can be deterred through the implementation of uniquely numbered, tamper indicative seals & simple sealing protocols.
IMPLICATIONS OF THIS PERPETUATED ENERGY THEFT

- Plunged into an energy crisis earlier this year, it may not be so far fetched to attribute some portion of the crisis to the ineffective manner in which energy theft, wasteful usage or non-payment has been handled by policy makers & supply authorities.

- Reference to a statistic published in recent editorials,

  - ‘…the impact of lost revenue of the electricity distribution industry due to theft and unpaid electricity of about 12 934 Gwh per annum, is about R5.34 billion per annum.’

- This is more than the cost of building a new power station.

- Non-technical losses are equivalent to the Eskom target saving of 3Gw.

- Even when the generation capacity problem is solved, the financial shortfall created by this theft cycle, will not miraculously go away.

- Do these frightful statistics shake us up?

- Should meter sealing with appropriate seals deserve a slightly more elevated rank of importance in the strategy of municipal managers and industry leaders?
DEFINITION OF A SEAL

- A security seal is a passive, one time locking device, with a unique number / identification / bar-code that is used to provide a reliable indication of tampering (unauthorized removal or attempted removal) or entry.

- By virtue of its construction, the security seal provides limited resistance to an intentional, pre-meditated attempt to open it and gain access to the meter or metering equipment that is sealed with the seal.

- Quality security seals are not able to be manipulated to construct a secondary functional seal from the tampered component parts.

- Seals require inspection to indicate whether tampering has occurred or entry has been attempted.
IS A SEAL A STAND ALONE SOLUTION...? NO...

It will however bring more measurable benefit than having nothing or un-numbered lead seals & ferules BUT...

For optimum, long term benefit, these have to form part of the process:

• Ownership for the problem & a dedicated, ongoing management commitment to address it (Reference NRS 055)
• Sealing policy & associated strategy implementation (Adopting NRS 096 framework)
• Training & awareness, community involvement & non-stop communication
• Results vs objectives measurement
THE CASE STUDY

• 19 utilities & supply authorities in Southern, Eastern & Central Africa (customers of ICS and non-customers)

• Conducted over a period of 4 months

• Responses as at 18 July 2008

• Questions essentially cover: size of the customer base, classification of customer base, annual consumption, annual revenue, split between conventional and pre-paid meters, the prevalence of tampering and energy theft, % of energy loss attributed to meter tampering & illegal connections, the % this constitutes of annual revenue, the monetary value of the NTL, who is likely to engage in tampering, whether there is a dedicated revenue protection programme, whether a formal sealing policy exists, what method of sealing is used, what are the advantages & disadvantages of this, whether legislation addresses energy theft with adequate severity, are seal numbers recorded in a database, what is the quality of the database, would a seal tracking system be of benefit, what is the extent of community training & awareness, familiarity with sealing options, their benefits & disadvantages, criteria influencing the purchasing of seals

• Quantifiable ‘before’ & ‘after’ scenario difficult to document

• Yielded some interesting feedback
FINDINGS

100% experience meter equipment tampering and energy theft
The reported percentage of annual revenue loss due to energy theft ranges between 1.25% and 58% of total revenue

100% reported that consumers are most likely to engage in fraudulent activities, in addition

16% reported that their own staff are most likely to engage in fraudulent activities

16% reported that contractors are also likely to engage in fraudulent activities

84% of utilities & supply authorities have dedicated Revenue Protection programmes

37% have formal sealing policies in place to control the use of uniquely numbered seals

91% of users of lead seals & ferules confirm the ineffectiveness of this sealing method

42% are currently utilizing plastic, uniquely numbered seals

100% of users of uniquely numbered seals feel that tampering is deterred more successfully than when using ferules, lead seals or no seals

58% are using uniquely numbered seals (plastic, metal or self adhesive seals)

29% of users using uniquely numbered seals, have no or inadequate databases in which unique seal numbers and associated information is recorded

100% feel a seal tracking system would be of benefit (either a simple paper based system or web based)

61% feel the current legislation is inadequate in addressing the severity of energy theft

53% place an emphasis on community awareness training and education
CONCLUSIONS

1. The primary conclusion is that strong leadership and focus in management, underpins the success of any revenue protection endeavour.

2. The secondary conclusion one draws from this research is that supply authorities who utilize lead seals or generic ferules are more vulnerable to non-technical losses than those supply authorities who have stringent sealing policies in place, and who use plastic, uniquely numbered seals.

3. Thirdly, community awareness & training enhances buy-in and cooperation in terms of energy theft prevention and resource conservation

4. Fourthly, the importance of data integrity was emphasized. The seal number has to be recorded & has to be associated with other data, ie the meter number and the person who applied the seal.
### PUTTING THE ESTIMATED SOLUTION SPEND INTO PERSPECTIVE

<table>
<thead>
<tr>
<th>Name</th>
<th>Total Annual Revenue</th>
<th>Size of customer base</th>
<th>Theft &amp; tampering prevalent</th>
<th>% Energy loss due to theft and tampering</th>
<th>Annual value of loss</th>
<th>Cost of Seals</th>
<th>Potential Recovery</th>
<th>Actual % Recovery on losses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENTITY 1</td>
<td>R 1,320,000,000</td>
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<td>1</td>
<td></td>
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<td>R 63,360,000</td>
<td>R 3,555,650</td>
<td>R 41,863,045</td>
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<tr>
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<td>R 10,000,000</td>
<td>1,500</td>
<td>1</td>
<td></td>
<td>5%</td>
<td>R 500,000</td>
<td>R 10,500</td>
<td>R 342,650</td>
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<tr>
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<td>2.31%</td>
<td>R 2,102,100</td>
<td>R 118,188</td>
<td>R 1,388,738</td>
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<td></td>
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<td>R 100,000,000</td>
<td>R 2,204,251</td>
<td>R 68,457,024</td>
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<td>ENTITY 19</td>
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<td>683,000</td>
<td>1</td>
<td></td>
<td>58%</td>
<td>R 1,411,430,000</td>
<td>R 4,781,000</td>
<td>R 984,654,300</td>
</tr>
</tbody>
</table>

|        |                      | Total                  |                  |                                    |                      |                |                  |                  |                             |
|        |                      | 100%                   |                  |                                    |                      |                |                  |                  |                             |

Many acknowledge the existence & impact of the problem, but struggle to quantify it and resource & capability are real challenges.

Outsource to a consultancy who specialise in revenue improvement & revenue turnaround strategies
REASONS CITED FOR THE LACK OF METER SEALING WITH APPROPRIATE SEALS & SEAL CONTROL

1. No dedicated revenue protection initiative
2. Ignorant to the problems associated with old ineffective methods of sealing
3. Ignorant to the steps that can be implemented to ensure better management control
4. No budget allocated for quality, uniquely numbered seals
5. Apathy in implementation of the necessary controls
6. Sealing ranks low in importance requiring management focus
7. Apathy in people management discipline
8. Lack of ownership, who’s problem is it anyway…?
HAS THERE BEEN ANY PROGRESS?

• SARPA Convention, July 2006, panel discussion: What are the benefits of sealing and what are the preferred options?

• Confirmation, need for uniquely numbered seals (both conventional and pre-payment)

• Preference for plastic or paper uniquely numbered seals

• Need expressed for a working group to establish a sealing standard

• Request for the development of a system to help control uniquely numbered seals

• Subsequently NRS 096: Sealing standard for electricity metering equipment was developed and published earlier this year

• System request: no industry norm but pursued in our private capacity to develop a tool which will benefit the industry

So the answer is yes!
NRS SPECIFICATIONS

• Cover range of electro-technical topics
• Guidelines for use in the ESI in South Africa
  • Purpose: Establish & promote uniform requirements across industry disciplines
• Developed in collaboration with StanSA & SABS
  • Frequently adopted by PIESA
• NRS 096: Part 1 – Sealing of electricity meters
  • Supports NRS 055 – Code of practice for Revenue Protection
NRS 096: SEALING OF ELECTRICITY METERS

• No formalised guidelines existed previously
• Sets outs requirements for sealing & applications
• Provides guidelines on the management of the seals
• It emphasizes the need to implement an effective sealing policy (from authorised procurement to seal disposal)
• Explores sealing options available to the market with application specific recommendations
• Offers insight into the features of seals which enhance security & traceability
• It proposes a colour code to be used to identify various tasks performed on metering equipment or to signify the status of that particular meter
• Recommendation for inclusion: numbering formats of seals
• Copies available to engineering members
CONCLUSION

No supply authority is immune to the prevalence of meter tampering & subsequent energy theft

There is a very definite correlation between entities who take a firm stand to reduce their losses by getting the basics right and following five steps:

1. Management commitment to addressing the problem – adopt a zero tolerance policy
2. Implementing a dedicated revenue protection programme with measurable objectives
3. Replacing archaic lead and ferule sealing methods with plastic, tamper indicative, uniquely numbered seals
4. A dedication to community awareness training and education
5. Ensuring data integrity and an action trigger when seals are found to be breached

Draw the line…implement that little watchdog and start taking small steps to curbing this debilitating scourge called *undetected energy theft*
THANK YOU FOR YOUR ATTENTION & INTEREST

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