Provisional Revenue Loss Indications after Phase Two completion of Electricity Ringfencing Projects of Municipal Electricity Entities within South Africa – by Deon Louw, Regional General Manager RED ONE, EDI Holdings (Pty) Ltd, South Africa

1. Introduction

For quite some time data depicting municipal electricity distribution industry has been based on extrapolations of limited pilot studies of select municipalities. Various assumptions have been made from these extrapolations and a picture has been painted of the expected position of this municipal electricity businesses.

Extrapolation has always been hampered by the problem that the municipal electricity business cannot be easily and readily separated from the rest of the municipal businesses.

Much more adequate data could now be obtained when EDI holdings embarked on ringfencing exercises of selected municipalities which ringfenced the electricity business and thereby effectively separated this business from the rest of the municipal businesses. For the first time proper data could be obtained upon which a much better and accurate picture can be painted of the condition that this municipal electricity business find themselves in.

This data obtained now also gives an indication which municipalities are in need of assistance and also to what extent this assistance can be supplied. This is the sort of data that SARPA has been looking for and gives it the eyes and ears that it needed to give effect to its main reason for existence namely Revenue Protection or Revenue Recovery.

2. Background

a. EDI Holdings (Pty) Ltd

Electricity Distribution Industry (EDI) Holdings (Pty) Ltd was established in March 2003 by the Department of Minerals and Energy for the sole purpose of facilitating the restructuring of the National Electricity Distribution Industry in accordance with the requirement of the Energy White Paper and subsequent Cabinet endorsements in this regard.

In meeting the governments' vision of providing South Africans with affordable, reliable and sustainable electricity, the government called for the Electricity Distribution Industry (EDI) to be consolidated, with Eskom distribution and various municipal electricity utilities being amalgamated into Regional Electricity Distributors (REDs). Hence, EDI Holdings (Pty) Ltd has been mandated by the government to ensure that Eskom and the distributing municipalities are able to transfer their distribution business to the new REDs, after which these REDs will assume the responsibility of being the main distributors of electricity to all South African electricity customers. The REDs will be anchored in Six South African Metros and will operate on a sustained, financially viable basis as independent businesses.

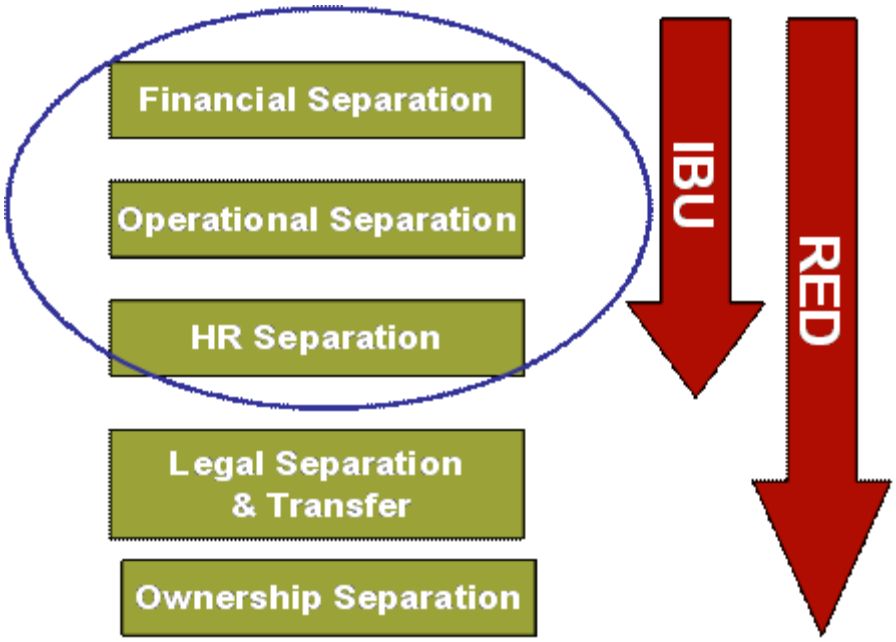
b. Ringfencing

As part of the mandate of EDI Holdings to restructure the industry, EDI Holdings has embarked on municipal ringfencing projects, through which it is intended to accurately determine the electricity distribution business environment within those municipalities that renders an electricity service to their customers.

Ringfencing is defined as:

Ringfencing in the context of this exercise is the initial step of the process towards the creation of Regional Electricity Distributors (REDs), during which all existing electricity distribution activities are separated and ringfenced in their current parent organisations. It should eventually result in the creation of an Independent Business Unit (IBU) ultimately positioned for amalgamation into the RED. The process consists of three types of separation, namely operational, financial and human resource separation.

The following diagram depicts the process to be followed from ringfencing to the creation of Regional Electricity Distributor (RED).



c. Launching Municipal Ringfencing Exercises

EDI Holdings has decided to launch ringfencing exercises in four phases which will coincide with the planned amalgamation of the various REDs. The expected roll-out plan of the creation of REDs was used to identify municipalities that are most likely to be incorporated in a first phase, and those municipalities to be incorporated in subsequent phases. A first phase set of municipalities were thus indentified which amounted to a group of 28 municipalities.

EDI Holdings published a tender to obtain sets of Consultants that would be able to ringfence the municipalities as per guidelines supplied by an EDI Holdings Ringfencing Toolkit.

The names of these municipalities are purposefully withheld until a bigger picture of the industry can be realised and until a formal way forward can be negotiated with all role-players concerned.

The first phase of 28 municipal ringfencing projects has been completed. A second phase of ringfencing projects has also been launched and a further 9 projects have been completed.

The data of the 37 ringfencing projects has been collected. The data related to Revenue Protection or Revenue Recovery has been isolated. This data has been used to generate emerging trends and reflections of the Municipal Electricity Industry current state.

3. Generation of Statistics

As mentioned above the data from 37 ringfencing projects, thus far obtained, have been scrutinised and data has been studied to look at results benefitting understanding of the situation of the Municipal Electricity Industry.

Two main groups of data are reported, which are:

- Revenue Protection Analysis Data
- Distribution Loss Trend Analysis

3.1 Special Notes of Interest in the Data Obtained

a. It must be noted that there are 181 municipalities which distribute electricity. Of these, only 37 municipalities have been ringfenced thus far. The emerging picture that is obtained from these projects does not necessarily reflect the final picture of all of the 181 municipalities, but gives a more accurate picture than has been achieved before,

b. Municipalities have been categorised by EDI Holdings into six groups, which range from Type 1, representing Metros, to Type 6, representing the smallest municipalities. Type 1 municipalities, six metros, are very big and jointly render an electricity service to about 75% of all municipal customers, on average about 700 000 customers per Metro. Type 6 municipalities are very small and would have on average about 1500 customers each.

The table below indicate the quantities of the various types of Municipalities:

Table 1: Distribution of Types of Municipalities within South Africa

Type	RED ONE	RED TWO	RED THREE	RED FOUR	RED FIVE	RED SIX	TOTAL	% of Tot
1	1	1	1	1	1	1	6	3.3
2	0	1	1	2	1	0	5	2.8
3	0	0	0	1	2	3	6	3.3
4	10	6	3	3	5	9	36	19.9
5	13	14	13	5	10	13	68	37.6
6	14	14	8	8	8	8	60	33.1
Total	**38**	**36**	**26**	**20**	**27**	**34**	**181**	**100**

The following table gives an indication of the type of municipalities involved in the completion of the 34 ringfencing projects. (Please note not all ringfencing project deliverables could be successfully completed on all 37 municipalities. For this reason the total amount of municipalities quoted will vary from exercise to exercise):

Table 2: Distribution of Types of Municipalities within the Amount of Ringfencing Projects Done

Type	Quantity	% of 34
1	1	2.7
2	2	5.4
3	3	8.1
4	15	40.5
5	12	32.4
6	4	10.8

c. In certain instances data may be skewed due to:

i. the varying of metering reading dates, some years may have more than 365 days whereas other may have less depending on when meters were read;
ii. introduction of large sections of Pre Payment Meters, during the initial year that pre payment meters are introduced a large swing of income is obtain in the first year of such installation. On average revenue is obtained about two months after credit meters are read, whereas pre payment meter income is obtained one month in advance of electricity being consumed. Changing fro credit meters to prepayment creates a swing of income from two months in arrears to one month in advance, or three additional months of income for the budget year that the pre payment meters have been introduced.

d. Debtor days are defined as the number of days on average that it takes a company to receive payment for what it sells.

e. Average Collection Period (ACP) means the time required for a firm to liquidate its accounts receivable, measured from the date each receivable is posted until the last payment is received.

f. In some instances not all municipality ringfenced projects produced valid data. It will be found that in some cases not all 37 municipalities are used in the comparisons.

3.2 Revenue Protection Analysis Data

3.2.1 Revenue vs. Expenditure

Table 3: Ringfenced Revenue, - Expenditure and Surplus per Municipality Audited

Municipality	Type	Ringfenced Revenue	Ringfenced Expenditure	Surplus as a % of Revenue
28	1	R 1,377,741,569	R 1,253,616,035	9.01
30	2	R 619,106,844	R 534,630,316	13.64
35	2	R 191,081,540	R 126,686,852	33.70
1	3	R 226,251,133	R 245,045,253	-8.31

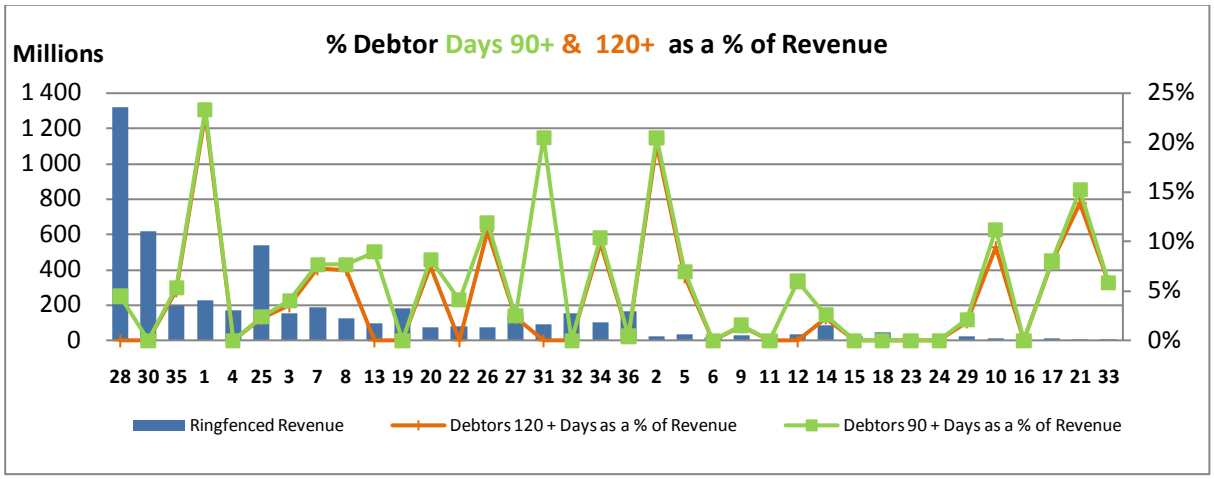
Municipality	Type	Ringfenced Revenue	Ringfenced Expenditure	Surplus as a % of Revenue
4	3	R 171,209,133	R 158,999,419	7.13
25	3	R 540,689,314	R 470,738,309	12.94
3	4	R 157,211,657	R 171,854,267	-9.31
7	4	R 199,014,533	R 152,114,950	23.57
8	4	R 125,973,096	R 107,645,197	14.55
13	4	R 96,189,170	R 93,404,875	2.89
19	4	R 182,223,916	R 142,793,668	21.64
20	4	R 72,535,237	R 65,771,498	9.32
22	4	R 79,081,910	R 73,078,009	7.59
26	4	R 76,322,637	R 64,914,116	14.95
27	4	R 140,999,913	R 125,937,168	10.68
31	4	R 93,682,237	R 85,927,229	8.28
32	4	R 155,061,979	R 114,490,263	26.16
34	4	R 95,840,402	R 89,838,937	6.26
36	4	R 162,820,122	R 153,083,816	5.98
40	4	R 98,772,703	R 75,295,624	23.77
41	4	R 62,971,352	R 53,915,677	14.38
2	5	R 22,566,163	R 24,698,050	-9.45
5	5	R 33,460,044	R 25,709,073	23.16
6	5	R 16,884,112	R 16,016,778	5.14
9	5	R 28,786,026	R 21,605,907	24.94
11	5	R 34,976,040	R 33,282,928	4.84
12	5	R 37,531,477	R 26,291,837	29.95
14	5	R 86,280,718	R 70,849,412	17.88
15	5	R 26,931,093	R 21,264,933	21.04
18	5	R 45,257,552	R 40,873,300	9.69
23	5	R 16,682,574	R 14,555,266	12.75
24	5	R 4,433,212	R 4,290,388	3.22
29	5	R 27,143,110	R 21,991,550	18.98
10	6	R 13,280,713	R 11,624,078	12.47
17	6	R 10,468,013	R 9,523,287	9.02
21	6	R 10,013,235	R 8,006,536	20.04
33	6	R 5,220,743	R 7,068,624	-35.39
Total		R5,344,695,222	R4,717,433,425	11.74

The table above indicates the ringfenced revenue that a municipality has generated, the ringfenced expenditure that a municipality has incurred and the resultant surplus or deficit. In these deficit instances the shortfall in the electricity business has to be cross subsidised by Property Rates and would indicate either a bad billing management or incorrect electricity tariffs or both.

It is noted that within the “Surplus” column that some municipalities have not generated a surplus and do in fact run their businesses at a loss. These have been highlighted in red. In one instance a municipality has shown a deficit of 35%. In previous municipal surplus generating recommendation reports it was indicated the surpluses should not exceed 18%. The instances where municipalities have generated surpluses of more than 20% have been highlighted in yellow in the table above. In such instances it indicates that municipal electricity tariffs are too high and should be reduced to more appropriate values. In most of these instances the Property Rates component of the budget should be increased in order to balance the revenue of the municipality received in total.

3.2.2 Debtor Days

The revenue management ability of each municipality was tested and the debtor days were calculated. The graph below indicates what portion of debt relates to a 90+ day collection and which to a 120+ day collection.

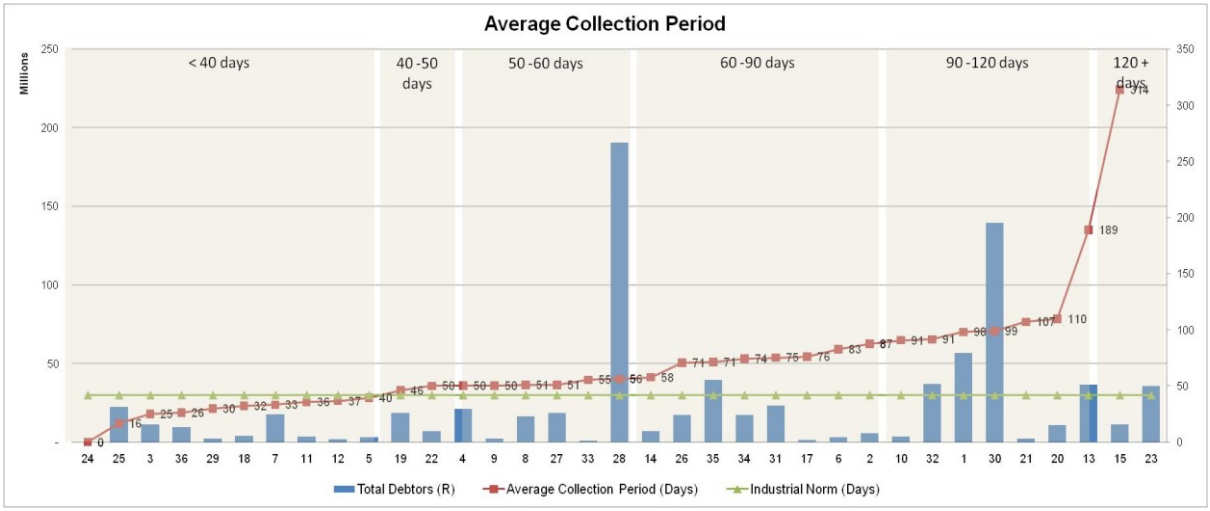


Graph 2: Municipal Debtor Day Spread

The above graph indicates that of the 36 municipalities shown, only 12 (33.3%) have debt not exceeding a 90 debtor day and only 17 (47.2%) not exceeding a 120 debtor day ratio. The highest municipality within the 120+ debtor day debt ratio was recorded at 23% of its revenue.

Graph 3 below shows these municipalities grouped from lowest outstanding debt to highest. The green line indicates the standard industrial norm of 30 days. Only 10 of the 36 municipalities tested had satisfactory outstanding debtor day ratios. The highest outstanding debtor day ratio was recorded at 320 days.

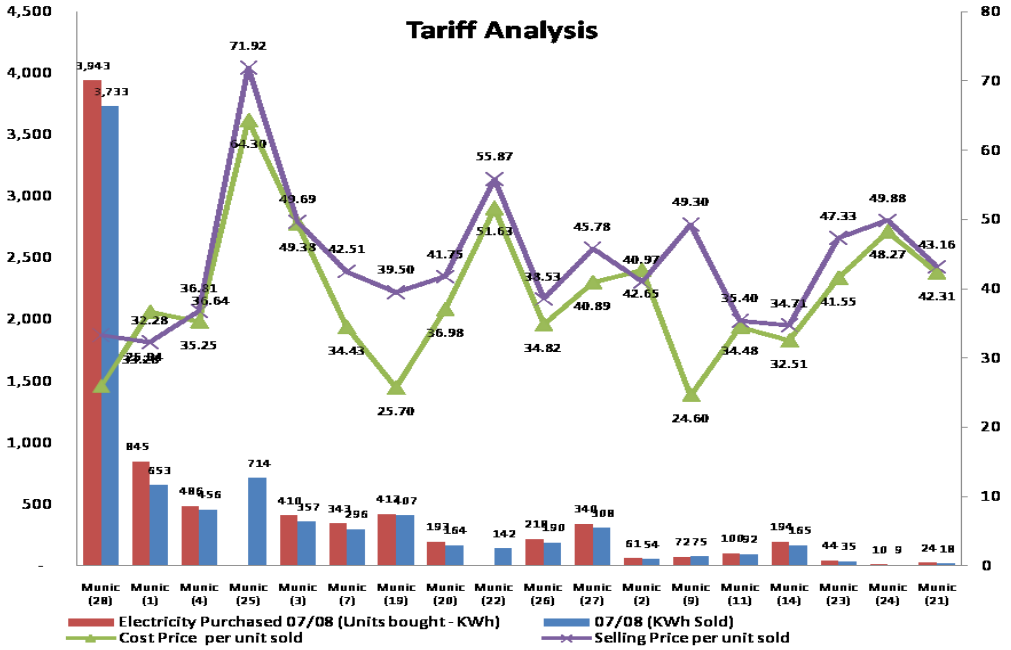
The average ACP for the municipalities tested is calculated as 74 days for these 36 municipalities which is 32 days above the industrial norm.



Graph 3: Municipal Debtor Day Spread – Minimum to Maximum

3.2.3 Tariff Regimes

The effective selling price per kWh was compared with the effective purchase price per kWh of 18 municipalities tested. The effective selling price is calculated by the total amount received divided by the total kWh sold and similarly the effective purchase price is calculated by the total amount paid for electricity divided by the kWh purchased



Graph 4: Municipal Tariff Regime

Note that in one instance there is a serious under recovery of revenue where the effective selling price is lower than the effective purchase price.

3.3 Distribution Loss Trend Analysis

3.3.1 Make Up of Losses Experienced within a network

The losses calculated within a Distribution Network consist of mainly two possibilities:

a. Technical Losses.

These losses are encountered within the network and are due to non perfect networks. Losses is encounter at transformers, cables and overhead lines and is dependent on the quality of the engineering design of the network. An average for the Technical Losses of a distribution network is 7%. A lower value than 7% would mean a better design or a single voltage network. A higher value than 7% could mean multiple voltages and longer feeders with a lot of overhead lines and lower quality designs.

b. Non-Technical Losses

The term “non-technical losses” is an euphemism for theft of electricity, meter mismanagement, fraud or such equivalent term denoting inadequate management of the financial and metering sides of the distribution network.

Benchmark figures for this type of loss is in the order of 2% as achieved by the US and UK utilities. It is normally very costly to reduce losses to lower than this figure and often the expenditure needed to reduce this is more than the loss itself.

c. Total Losses.

The normal network will experience both the losses defined above and with this in mind the average well run network will incur total losses of 9% of energy purchased.

In the tests conducted at municipalities, any losses indicated above 10% were considered to be out of the ordinary and would probably mean that some urgent action need to be taken to detect the problems that cause this situation.

3.3.2 Total Losses Measured

The Table below indicates the energy purchased, energy sold, the losses incurred and the losses expressed in a percentage of the energy purchased.

Table 4: Electricity Purchased, Sold and Losses made per Municipality Tested

Municipality	Type	Electricity Purchased 07/08 (Units bought - KWh)	Total Electricity Sale 07/08 (Units sold - KWh)	Distribution losses (Units kWh)	Annual Distribution losses (%) 2008
28	1	3 641 262 000	3 431 043 442	210 218 558	5.77%
30	2	2 276 328 854	2 074 277 130	202 051 724	8.88%
35	2	81 736 852	75 403 000	6 333 852	7.75%
1	3	843 525 816	660 140 106	183 385 710	21.74%
4	3	530 135 681	456 379 632	73 756 049	13.91%
3	4	409 540 703	357 357 064	52 183 639	12.74%
7	4	758 159 299	721 104 000	37 055 299	4.89%
13	4	66 694 303	60 691 816	6 002 487	9.00%
19	4	417 486 830	407 308 595	10 178 235	2.44%
20	4	193 318 348	163 659 183	29 659 165	15.34%
22	4	180 661 000	141 547 986	39 113 014	21.65%
26	4	218 223 053	189 948 850	28 274 203	12.96%
27	4	339 782 376	307 976 457	31 805 919	9.36%
31	4	245 281 761	243 272 562	2 009 199	0.82%
32	4	449 642 599	389 823 553	59 819 046	13.30%
34	4	224 147 122	196 657 746	27 489 376	12.26%
36	4	387 685 000	353 403 000	34 282 000	8.84%
40	4	275 796 711	240 454 331	35 342 380	12.81%
41	4	168 411 947	121 392 557	47 019 390	27.92%
2	5	61 474 596	54 006 499	7 468 097	12.15%
5	5	80 001 113	63 618 052	16 383 061	20.48%
6	5	52 167 527	35 277 010	16 890 517	32.38%
9	5	81 736 852	75 403 000	6 333 852	7.75%
11	5	100 309 538	91 571 921	8 737 617	8.71%
12	5	60 365 805	49 317 040	11 048 765	18.30%
14	5	193 992 927	165 121 330	28 871 597	14.88%
15	5	33 757 364	30 345 000	3 412 364	10.11%
18	5	92 154 766	67 307 205	24 847 561	26.96%
23	5	44 489 183	35 034 368	9 454 815	21.25%
24	5	9 823 862	8 888 203	935 659	9.52%
29	5	70 016 449	62 840 486	7 175 963	10.25%
16	6	32 084 000	28 455 000	3 629 000	11.31%
21	6	24 494 936	17 863 922	6 631 014	27.07%
33	6	11 510 500	6 780 784	4 729 716	41.09%
Total		**12 656 199 673**	**11 383 670 830**	**1 272 528 843**	**10.05**

a. Values unmarked indicate losses that would normally be associated with a satisfactorily run distribution network.

b. Values highlighted in orange indicate a network that has abnormal losses. These losses are due to three possibilities:
    i) Abnormal Technical Losses – Losses due to inadequate design of the electricity network; or
    ii) Large theft, fraud or mismanagement of billing and metering systems; or
    iii) Both

    Municipalities within this category would need assistance to investigate the source of these losses. It is normally found that finding this source is relatively easy and quick to do, but external assistance is normally required.

c. Values highlighted in red indicate highly abnormal losses. As with b. above these municipalities would need urgent assistance.

d. Values highlighted in purple indicate abnormally low losses. These values are highly unlikely as the Technical Losses alone would exceed this amount. This anomaly would have to be investigated further for other factors, such meter reading date shifts, installation of pre payment meters or similar.

e. Other observations made:

    i) 12 of the 34 municipalities were generating losses that would be within the benchmarks indicated above or 22 of these municipalities would need assistance to bring losses within acceptable standards.
    ii) The average losses of municipalities tested was calculated as 14.55%.
    iii) Three municipalities indicate that they have losses of below 5%.
    iv) The abnormal losses incurred by the municipalities tested above was calculated as 300 GWh per annum which equates to about R100m lost
    v) The 34 municipalities tested in this case, roughly equates to 19% of the total amount of distribution municipalities. If the energy figure above is extrapolated a total loss of 1 580 GWh is calculated, which equates to over R500m lost
    vi) The above amount does not include outstanding debt, which means the situation within municipalities is a matter for huge concern.

f. It is however noted that the total of all those municipalities tested seem to be within a normal tolerance of losses.

4. Emerging Trends and Conclusions Indicated by Statistics

4.1 Revenue Protection Analyses

4.1.1 Debtor Day Analyses

The analyses done on debtor days indicated a rather grim position. This position has, and will progressively worsen as indicated by the following:

- The Debtors Age analysed revealed debt older than 120 days in 20 of the Phase 1 27 (74%) municipalities analysed
- High Outstanding Debtors impact on effectively budgeting for infrastructure development and capital works. It also results in an increase in tariffs, which can be ill afforded by consumers

- Preliminary results show minimal correlation between debt not collected and finance vacancies.
- Of the 27 municipalities analysed in Phase 1 the average Debtors Average Collection Period (ACP) is 74 days which is 32 days above the industrial norm, 22% posted Debtors Days of over +365 days
- There are a few municipalities whose average collection period is below industrial norm. The debt collection practices of these municipalities should be investigated and the best debt collection practices and processes should be replicated across all other municipalities with suspect practices.
- The average of ACP obtained for the 27 municipalities in Phase 1 is 74 days which is 32 days above the industrial norm

4.1.2 Tariff Regimes

The following trends were found in the municipalities tested:

- Average selling price per unit sold varied across the municipalities with the lowest price = 32.28c and the highest price = 71.92c
- Average cost price per unit sold also varied across the municipalities with the lowest cost = 24.60c and the highest cost = 64.30c
- One municipality sold, or indicated to have sold, more units than it purchased
- In many instances the data presented by the municipalities was not fit to be used within the ringfencing exercises and further investigations need to be done to normalise these pieces of data
- More analysis work needs to be performed to show correct figures, per customer category

4.1.3 Original Observations Made in Deciding to Create REDs

In earlier reports the observations were made to back reasons for the intention to create REDs. One such observation made in terms of financial losses within the Electricity Distribution Industry was:

- The losses in the industry is on the increase and this will have a negative impact on the viability of the REDs;

From the above the following key insights are determined:

- The distribution loss trends suggest that municipalities need to determine the root causes to minimise distribution loss (kWh) to acceptable standards
- Distribution losses in the industry are above acceptable levels in the majority of municipalities

The results determined from the insights into the ringfencing projects indicate clearly that:

- Distribution losses are above the acceptable levels

4.2 Distribution Loss Trend Analysis

The following conclusions can be determined from the analysis made:

- Distribution losses in the industry are above acceptable levels in the majority of municipalities

- 12 out of 34 (35%) municipalities showed a distribution loss of less than the 10% (benchmark for acceptable technical and non-technical losses)
- The average annual distribution loss (Technical + Non-Technical), amongst the 34 municipalities tested, is ≈ 14.55%, 4.55% above the acceptable limit of 10%
- The projects indicated that those municipalities above the 10% losses benchmark had a combined loss of 3 000 GWh which equates to R1 billion if calculated at cost
- If this amount is extrapolated to all of the 181 distributing municipalities a loss of 15 000 GWh equating to an amount of R 5 billion of annual losses is calculated

5. Possible Ways to Recover from Negative results and Conclusions

The above ringfencing insights indicate that some municipalities find themselves with serious problems in the running of their electricity distribution businesses. More than 50% of the municipalities participated in these ringfencing projects are rendering results that have indicate large room for improvement.

The position these municipalities find themselves in, result in them having to raise tariffs, limit maintenance and refurbishment, reduce capital expenditure in order to limit expenditure as a result of the escalating costs. It is surmised that these municipalities cannot get out of this negative spiral of escalating cost due their inability to rectify the worsening losses due to non-technical losses, bad debt and unrealistic tariffs.

It is proposed that these municipalities get external help to investigate the reasons for the unsatisfactory losses and bad debt. The municipalities would also need assistance to rectify shortcomings in the management of these losses and bad debt. An organisation that would be able to assist with such a task would be SARPA. Together with funding and supporting entities such as DBSA, National and Provincial Government a real effort can be made to rectify critical short comings of these municipalities.