ELECTRICITY DISTRIBUTION INDUSTRY RESTRUCTURING: RINGFENCING AND ASSET VALUATION

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1. INTRODUCTION

The Electricity Supply Industry (ESI) in South Africa is poised for fundamental change. The impetus for this change stems from a commitment by Government to implement its policy of restructuring the industry, the guiding principles of which are embodied in the White Paper on Energy Policy. A key objective of the restructuring policy is to achieve a combination of increased competitiveness and focused regulation to ensure a self-sustaining industry ultimately serving to benefit the electricity customers.

The restructuring of the electricity distribution sector has been at the forefront of the ESI transformation over the past decade culminating in a comprehensive sector-restructuring plan being developed for implementation. This plan will see the integration of several hundred electricity distributors (including the electricity businesses of municipalities and Eskom Distribution) into six Regional Electricity Distributors (REDs).

The Department of Minerals and Energy in South Africa has formulated the steps and the time frames to be followed for the restructuring of the Electricity Distribution Industry (EDI). Some of the first activities to be undertaken by municipalities and Eskom will involve the *ringfencing* and *asset valuation* of the electricity departments.

This paper has been written to focus on the ringfencing and asset valuation of municipal electricity distributors. Whilst the general principles developed in the paper will be valid for municipalities and Eskom, there will be differences of emphasis that may lead to differences in the detail of the processes adopted by these two groups of distributors.

Ringfencing of electricity business from within integrated structures such as municipalities is not unique. Similar processes have been undertaken in Australia, Canada and parts of Eastern Europe but the scale and context of the South African EDI poses unique challenges.

Asset valuation approaches are relatively well developed and have been successfully used in a variety of countries worldwide. As in the case of ringfencing though, the specific set of key objectives outlined in the White Paper on Energy Policy as well as the unique structure of the South African EDI warrant the development of an asset valuation approach that is suited to the local context.

In this paper we outline the processes of *ringfencing* and *asset valuation* of the electricity distribution assets in preparation for incorporation into the REDs. The paper starts off by defining ringfencing and outlining the key drivers to ringfencing and the various options open to municipalities and Eskom. This is followed by a description of two asset valuation methodologies namely the Depreciated Replacement Cost (DRC) and Discounted Cash Flow (DCF) methodologies.

2. RINGFENCING

Ringfencing has been defined as "*the identification and isolation of the activities, assets, costs, revenues and community service obligations of services that are provided by an integrated entity, where such services traditionally have been delivered in a limited competitive environment.*"[1]

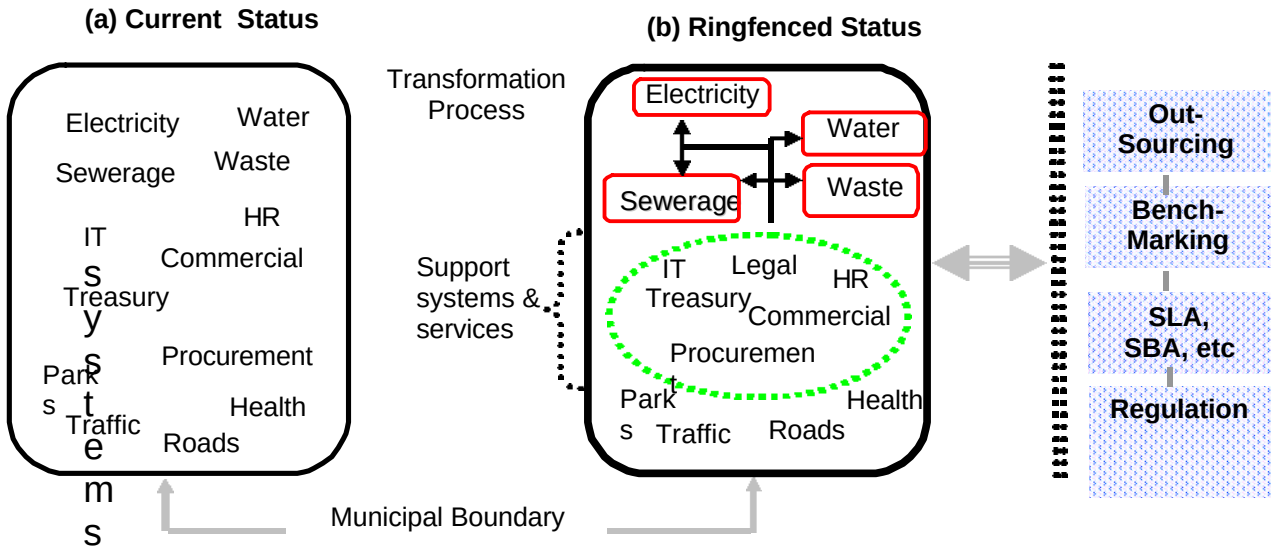
Figure 1 provides an illustration of the concept of ringfencing. In Figure 1(a) a typical municipality providing integrated services within the municipal geographical area is illustrated. In many municipalities, the income from electricity service is used to subsidise the other services within the municipality. The electricity income is a contribution to the central treasury fund as is the income from other services such as water, waste, etc. In addition, the threat of electricity cut-offs is utilised by the municipality as a leverage to encourage ratepayers to pay the rates, which otherwise would be difficult to enforce effectively. The

[1] Source: New South Wales Regulator

municipal accounting system functions on the basis of a *fund accounting system*. In this system, there is no explicit provision for depreciation of assets. The various service departments obtain loans through the treasury in order to execute their approved capital expenditure programmes.

Figure 1(b) provides an illustration of a municipality that has undergone a process of ringfencing of the electricity, water, waste and sewerage services. Here, common support services may be provided centrally on a shared basis and charged to the ringfenced service departments or business units.

Figure 1: Illustration of Ringfencing



Whilst the ringfencing of the electricity distribution industry is a requirement of the restructuring process imposed by the Regulator, municipalities should use the process as an opportunity to maximise the value of their electricity business prior to being incorporated into the REDs. Whilst their interests may become increasingly divergent over time, it is essential that all the role players particular political representatives, council members, labour and the members of the electricity departments work together in formulating the most appropriate strategy for ringfencing.

When embarking on a ringfencing process, the entity should ensure that the following key objectives are achieved:

- Identification of relevant components of business including consideration of shared services, outsourcing of services, etc. with due regard for the possibility of creating stranded assets. A critical consideration is the accountability for billing, collection and other MIS either through separate systems or via shared service agreements
- Preparation for Incorporation into REDs by maximising the value of the electricity business, maximising opportunities for staff redeployment into REDs and maximising the voice of the municipality in the RED
- Enhancement of the ability to measure true financial performance accompanied by the development of commercial benchmarking and efficiency drivers
- Enhancement of cost reflective pricing and the transparency of cross-subsidisation
- Identification of the financial impact of ringfencing and restructuring on the municipality.

The ringfencing of the services can take various forms depending on the size of the municipality and the particular mix of objectives behind the ringfencing process. Ringfencing can be conducted through four progressive stages:

Stage 1: Financial Ringfencing

This involves the identification of the revenue, costs, assets and liabilities with the result being the creation of separate asset registers, financial statements (compliant with GAMAP), budgets and management reports for the electricity distribution business. This stage will require assets to be revalued on the basis of depreciated replacements costs instead of historical costs and the revalued assets used for balance sheet and depreciation purposes. It is important to introduce at this stage efficiency drivers and performance benchmarks.

Stage 2: Operational Ringfencing

Operational ringfencing involves the separation of the operations of the ringfenced business from the integrated entity with the result that the ringfenced business is accountable for all its operational activities. It is critical that in this stage, the shared services and outsourcing arrangements are identified and costs for these are properly allocated. The operational and financial ringfencing will usually go hand-in-hand

Stage 3: Legal Ringfencing

Legal ringfencing involves the creation of a separate legal entity for the ringfenced service and would typically require corporatisation of the ringfenced activities. In this stage, the ringfencing should include enforceable Service Level Agreements, Sale of Business Agreements, regulatory obligations, etc. Close attention should be paid to the potential tax liabilities. In general, obtaining opening balances will be a difficult problem and will require negotiations between the new ringfenced unit and the municipality. In the case of Stage 3 Ringfencing, the financial statements can be utilised as a measure of the financial position of the new legal entity and could form the basis of obtaining commercial loans for capital expenditure.

Stage 4: Ownership Ringfencing

Ownership ringfencing involves the transfer of ownership to a new owner as will take place when the assets of the ringfenced electricity business is transferred to the RED. The shareholding of the municipality in the RED will be determined by the value of the assets contributed by the municipality to the RED.

In order to be in a position for integration into a RED it is necessary that the municipalities achieve at least Financial and Operational ringfencing of their electricity businesses prior to “Day 1” of REDs.

3. ASSET VALUATION

An important requirement in the ringfencing is the assignment of a monetary value to those assets that form part of the ringfenced entity. There are at least four possible purposes for valuation of assets:

- to determine fair compensation to the current owners upon transfer of its assets into the RED
- for financial reporting, management accounting and internal control
- for regulatory purposes and tariff setting
- for determining tax allowances.

Since these applications have distinct legal, regulatory, industry best-practice and practical requirements, it is necessary that the different valuation approaches be investigated and appropriately applied for each purpose. Currently, most municipalities use historical costs in determining the book value of their assets. These book values are often linked directly to the outstanding loan values associated with the assets and usually bear little relationships to the expected technical life of the asset.

In the next section, we investigate the Depreciated Replacement Cost (DRC) and the Discounted Cash Flow (DCF) valuation methodologies and make recommendations regarding the use of these methods for each of the applications listed above.

3.1 Depreciated Replacement Cost Methodology

The Depreciated Replacement Cost (DRC) methodology is a well-known and widely used approach to the valuation of assets. The methodology focuses on the physical attributes of the assets and provides an estimate of what the assets would cost to replace at today's prices and using today's technology, adjusted for the age and condition of the assets.

To the current owners, the DRC value can provide an estimate of the remaining value of the assets based on its remaining life. To a potential purchaser of the assets, the DRC gives a value of the amount that he/she would need to invest in order to physically reconstruct assets with the same physical attributes.

The following are the steps in the DRC methodology:

Step 1: Calibrate the methodology in terms of purpose, timing and basis of the valuation

Step 2: Obtain an inventory of the assets including an assessment of age, condition, function and technology employed

Step 3: Based on the asset inventory develop representative asset classes and expected engineering lives of each asset type. The remaining lives of the assets can be developed on the basis of deterministic engineering lives or probabilistic (survivor curve) analysis

Step 4 Conduct technical due diligence involving an investigation into the technical performance of the system, the asset utilisation, loading, load forecast, system development plans and an identification of stranded assets

Step 5: Derive an optimal equivalent system in which a fictitious 'optimised' equivalent asset base is developed to perform the same function but modified for over-design, over-capacity and redundant assets

Step 6: Determine replacement values for each asset type and derive gross replacement values. Care should be taken to consider the total installed costs and inclusion of costs such as Interest During Construction, design and project management and corporate overhead costs

Step 7: Apply depreciation to the gross replacement values for each asset type based on straight-line depreciation. Consideration should be given to the residual values of assets

Step 8: Determine the Depreciated Optimised Replacement Cost valuation (DORC).

In many jurisdictions a further step, which involves the application of an "economic valuation (EV) test", is introduced. In this step the value of the network, or portion of the network, is the lower of the DORC and the EV. The EV of the asset is the value to the owner should he/she be *deprived* of the assets. In practice the EV is determined by evaluating alternative methods of providing the same service to the customers. This process is known as Optimised Deprival Replacement Cost valuation (ODRC).

The above methodology is a comprehensive DRC valuation approach that includes optimisation. It can provide a very useful tool for regulators in assessing tariffs. The data requirements are however very high and the development of an 'optimised' equivalent asset base requires highly skilled resources. The optimised DRC approach may be appropriate in a mature industry with well-developed asset registers and well-defined analytical processes for evaluating over-design, capacity and redundant assets. However, in the context of the South African EDI the use of optimisation is at this stage impractical. We would therefore recommend that Steps 4 and 5 be eliminated and a non-optimised DRC approach be utilised.

In this simplified DRC approach, Step 2 is the most intensive process, requiring most resources. We have developed two methodologies to accommodate the fact that some distributors will have more detailed data than others. The first methodology uses detailed data available from those distributors that have such data and applies the data in a spreadsheet model in order to calculate the DRC of the assets. The second methodology has been developed in order to value the assets of those distributors that have minimal data. This "proxy" approach is applied to distributors with limited technical asset data and distributors with no technical data.

3.2 Discounted Cash Flow Methodology

The Discounted Cash Flow (DCF) methodology of asset valuation is based on developing a financial model of the electricity entity over a horizon period (typically 20 years) taking into account the current and future income stream potential of the assets and the associated costs. The value of the assets is determined by calculating the Present Value of the profit stream. In some respects this process can be likened to the EV test described above.

The DCF financial model is based on a specific income statement format compliant with GAAP and GAMAP but adapted for practical use. The components of the model are as follows:

Revenue

The revenue is composed of two main elements namely:

Electricity revenue from electricity sales, which is a factor of the number of customers and the demand and consumption details

Other revenue such as service charges, connection fees, subsidies, grants and capital contributions.

Cost of Sales (COS)

Cost of sales is the purchase price for bulk energy

Revenue – Cost of Sales = Gross Margin

Operating Expenses (Opex)

Operating expenses include labour cost, maintenance and administrative costs and general expenses.

Depreciation

The depreciation is the incremental decrease in book value of the assets based depreciated replacement values.

Gross Margin – Opex – Depreciation = Net Profit before Interest and Tax (NPBIT)

Interest

Interest is calculated on existing loans directly associated with the exisitng assets as well as loans on future assets

Tax

This is the tax that the electricity entity will be subjected to.

NPBIT – Interest – Tax = Net Operating Profit After Tax (NOPAT)

The estimated future stream of *NOPAT* is discounted at a suitable rate and summed to arrive at the present value (PV) of the income stream that is equal to the asset value of the business.

The DCF methodology as described is founded on forecasting of parameters and performance over a long period and is of necessity riddled with uncertainty particularly when forecasting growth, demand patterns, tariffs and performance. This uncertainty can lend itself to abuse and manipulation and can make monitoring, regulation and control very difficult. These problems make the DCF methodology unsuitable for financial reporting, tax allowances and for tariff determination.

From the foregoing analysis it is tempting to dismiss the DCF approach altogether. However, the DCF methodology can be adapted to provide a simple yet powerful and practical methodology to determine the fair compensation due to the current owners, in the form of shareholdings in the REDs. The shareholding of distributor *i* in a RED will be determined by the following formula:

$$Shareholding_i = \frac{Value\ for\ distributor\ i}{\sum Value\ for\ all\ distributors\ in\ RED} \quad (1)$$

Since the shareholding will be determined from the relative values of the assets, any revenue or cost elements common to all distributors within the RED (such as bulk tariff) can be ignored.

In the simplified DCF methodology developed by PB Power, the assets are modelled as they would be in the RED once transfer has been effected. Thus, standardised costs and tariffs per customer category can be applied to the financial model. The tariffs should be based on cost reflective tariffs adjusted for subsidies such as those for rural and electrification customers. In addition, adjustments for effects such as collection rates and non-technical losses can easily be incorporated in the DCF.

We further assume that the relative differences in demand growth over the horizon period are too difficult to model accurately and in most cases will be small enough to ignore.

Based on the above assumptions, the simplified DCF is composed of the following steps:

Step 1: Calibrate the methodology in terms of purpose, timing and basis of the valuation

Step 2: Develop standardised customer categories within the RED C={C1,C2…Cn)

Step 3: Develop standardised cost reflective tariffs witing the RED T={T1,T2…Tn)

Step 4: Adjust tariffs to account for subsidies based within RED T'={T1',T2'…Tn')

Step 5: Adjust to account for collection rates and non-technical losses

Step 6: Develop standardised operating expenditure per customer category K={K1, K2,…Kn)

Step 7: Obtain age and condition profile of current assets

Step 8: Obtain standard lifetimes for assets

Step 9: Develop a specific capital replacement programme for the distributor

Step 10: Calculate the value of the assets where value = PV{PBIT)

Step 11: Calculate the shareholding using equation (1)

This simplified DCF requires the development of standardised customer categories, cost reflective tariffs, operating expenses and standardised lifetimes of assets within the RED. However, in order to complete Step 9, the age and condition of the assets are required as in the case of the simplified DRC. Thus, the simplified DCF requires the asset data from the simplified DRC although in somewhat less detail.

3.3 Comparison of DRC and DCF Methodologies for Shareholding Determination

Table 2 illustrates a comparison between the DRC and DCF methodologies for the determination of the fair compensation to existing owners. The two methodologies possess different strengths and weaknesses and are in fact complementary. The DRC is focused on providing a snapshot valuation of the 'wires' side while the DCF is focused on providing a valuation of the 'retail' side of the distributor business. Both aspects are important in obtaining an overall value of the business. It is thus suggested that a combination of these two methods be used to obtain an overall valuation for fair compensation.

Table 2: Comparison between DRC and DCF methodologies for shareholding determination

Test Parameter	Simplified DRC	Simplified DCF
Customer mix	Not considered. Shortcoming	Reflects the income potential per customer category
Tariffs	Not considered. Shortcoming	Utilises cost reflective tariffs
Condition	Reflected in depreciation	Reflected in depreciation and interest on capital replacement costs
Age	Reflected in depreciation	Reflected in depreciation and interest on capital replacement costs
Future Capital Expansion	Capital expansion not modelled. Shortcoming	Capital expansion not modelled. Shortcoming
Future Capital Replacement	Capital replacement requirements are not modelled.	Reflected in depreciation and interest on capital replacement costs
Location (Rural/Urban)	Not considered. Shortcoming	Rural/urban effects (including subsidies) are modelled in tariffs and Opex.
Bulk tariff	Not Considered. Not a shortcoming	Considered
Load growth	Not considered. Shortcoming	Not Considered. Shortcoming
Debts, Grants, Capital Contributions	Can be considered	Can be considered
Utilisation	Full utilisation assumed. Shortcoming	Actual utilisation considered. Reserve capacity ignored.
Losses (tech, non-tech, non-payment)	Not considered Shortcoming	Considers losses
Technical Specifications, Technology and Design employed	Considered	Largely ignored Shortcoming
Opex	Not considered. Shortcoming	Standardised Opex/per customer category

4. CONCLUSIONS

In this paper we have described two key processes of EDI restructuring, namely *Ringfencing* and *Asset Valuation* of the electrical distribution entities and assets. The main drivers behind ringfencing have been discussed and the ringfencing options available have been presented. Two methods of asset valuation have been outlined namely the Depreciated Replacement Cost (DRC) and the Discounted Cash Flow (DCF) Methodologies. The optimised DRC approach may be appropriate in the future for regulatory and tariff setting purposes but is not suitable for application in the current South African EDI context. The simplified DRC methodology is appropriate for the purposes of financial reporting, tariff determination and determination of tax allowances. The simplified DRC provides a good measure of the value of the 'wires' side of the business but does not reflect the value of the 'retail' side.

The DCF methodology does provide a good measure of the value of the 'retail' side of the business. The DCF methodology has inherent problems that make it unsuitable for use in financial reporting, tariff setting and the determination of tax allowances. The simplified DCF is however a powerful yet practical approach that overcomes some of the inherent weaknesses in the simplified DRC approach for determination of fair compensation. Thus, for the determination of fair compensation to existing owners, we propose that a combination of the simplified DRC and simplified DCF methodologies be used.

5. REFERENCES

[1] International Valuation Standards Committee, *International Valuation Standards IVS 2000*, 2000

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[4] South African Department of Finance and the Institute if Municipal Finance Officers, *Generally Accepted Municipal Accounting Practices (GAMAP)*

[5] Ministry of Economic Development, Manatu Ohanga, New Zealand, *Handbook of Optimal Deprival Valuation of System Fixed Assets of Electricity Line Businesses*, Fourth Edition, October 2000.