NATIONAL ENERGY REGULATOR OF SOUTH AFRICA

Cost of supply workshop
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The National Energy Regulator of South Africa

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Background

- The Electricity Pricing Policy (EPP) policy position 23 states that:

  "Electricity distributors shall undertake COS studies at least every five years, but at least when significant licensee structure changes occur, such as in customer base, relationships between cost components and sales volumes. This must be done according to the approved National Energy Regulator of South Africa (NERSA or 'the Energy Regulator') standard to reflect changing costs and customer behaviour"

- In support of this position, the Energy Regulator has developed a Cost of Supply (COS) framework to guide electricity distributors (licensees) when undertaking the COS study in South Africa.

- The framework was consulted upon and approved by the Energy Regulator on 15 October 2015

Cost of Supply Purpose

- The objective of a COS study is to apportion all costs required to service customers among each customer class in a fair and equitable manner.
- COS Framework aims to assist in promoting sustainability of the electricity supply industry while protecting customers against unduly high prices.
- The framework is meant to assist licensed electricity distributors with focus being placed on smaller municipalities that have limited capacity and data base challenges.
- The framework sets the basic requirements for a cost of supply study and should be seen in that context.
- Licensees that have advanced capacity and data warehouses can expand the adopted approach to a level that will meet their specific needs.

Cost Drivers

NRS 058 lists the factors that influence the cost of providing electrical energy to customers:

- the quantity of electricity used;
- the size of the supply required;
- periods when electricity is used;
- the geographic location of the customer;
- the voltage at which supply is provided;
- the power factor; and
- the need for redundant network capacity.

Cost Reflective Tariffs

- A cost reflective tariff allows for reflection of all components of cost drivers (customer service costs, fixed network costs and energy related costs, time of use and seasonal costs).
- The CoS assists with determination and allocation of cost drivers for different customer categories.
- It is not a marginal cost study because it does not provide a view of incremental (change in) unit costs from the provision of additional units of electricity sales.
- EPP allows for cross subsidisation between different customer classes, therefore CoS will assist in ensuring transparency of this.
- It can also be used for assigning and sending signals to consumers in terms of consumption patterns and related costs (where technology is available).

Cost of supply approach and steps

- The cost of supply approach follows a four step process as follows:

- This approach is called the Embedded Cost approach.The approach determines the apportionment of accounting-based revenue requirement using the functionalisation, classification and allocation processes with the ultimate goal of rate setting.

Embedded Cost of supply

- An *embedded cost* (sometimes called an *average historical cost*) *tariff analysis* starts with the total revenue requirement of the utility for a given year and takes the following steps ;
  - The *functionalisation step* attributes costs to the different business functions (Gx, TX, DX).
  - The *classification step* defines costs as demand-related, energy-related or customer-related using a variety of classification methods.
  - The *allocation step* apportions the functionalised and classified costs to the various customer classes using a variety of allocation factors that depend upon the type of cost being allocated.

Embedded Cost of supply (P2)

- Since the revenue requirement is in large part a function of investments made in the past, an embedded cost study essentially attempts to define each class' responsibility for historical costs.
- The main advantages of embedded/average cost studies are:
  - Ease of implementation.
  - Match to Revenue Requirement more easily
  - Minimal change in tariff structures (Given the fact that existing tariffs are based to some extent on average costs.)
- Main disadvantages are:
  - Poor cost signals for efficient consumption and investment decisions
  - Subjective choice of allocation factors since there is no theoretically "right" way to allocate or time-differentiate the costs.

Marginal cost of supply

- *Marginal cost study* analyses how the system is planned and operated in order to determine how costs would change if there were a small increase (or decrease) in energy used in a given period, in load in critical hours, in number of customers of a particular type, etc.
- The main advantages of marginal cost pricing are;
  - Prices signal the economic costs of consumption and investment decisions
  - Regulated tariffs mimic the cost structures faced by competitive suppliers
- The main disadvantages of marginal cost pricing are;
  - It is difficult to implement than a study that uses historical costs.
  - There is almost always a need to reconcile marginal cost revenues to the allowed revenues when setting tariffs

Key Focus Areas

Ring-fencing of costs/revenues

- Ring-fencing study needs to be completed to determine the true costs, revenues and specifically overheads that should be charged to Electricity by the municipality.
- Services being supplied by Electricity to the rest of the LG where no charge is levied to cover the cost of supplying such services. The services involved here include electrical maintenance of LG facilities such as water works, sewerage works, buildings, houses etc.
- Electricity equipment and other resources being used by the rest of the LG with no charge. This typically includes the following: Heavy vehicles, large machinery, meter readers etc.

Ring-fencing of costs and revenues (continued)

- The costs within electricity are identified and then costs are allocated from the various support functions in the municipality towards each of the various functions in electricity.
- Allocation of service function costs (e.g. HR, finance and administration) to line functions including electricity.
- Allocation of costs between networks, customer service, public lighting and energy. Allocation principles need to be established, e.g. asset values, staff numbers, total costs (excluding purchases).
- The trial balance of the municipality and the NERSA D-form figures will be different due to a proper ring-fencing process being followed.

Revenue requirement

- Determining the ROA; Some municipalities apply depreciation based on historic costs and others based on replacement values.
- Some municipalities fund electricity infrastructure costs direct from electricity surplus (no cost of capital shown as part of revenue requirement) and other use loans for this purpose where the financial costs are shown in the income statement as part of revenue requirement.
- The revenue requirement will have to be based on the income allowed by NERSA which is the depreciation plus interest on loans/ROA

Revenue requirement (continued)

- Revenue: This based on billed and pre-paid revenue only considering a fair amount of non-technical losses.
- Depreciation: Based on the replacement value of equipment.
- The Cost of capital and the Return on equity is based on:
  - Calculated on replacement value of assets.
  - Customer funded contributions should not earn a return
  - Operating costs. This based on historic costs with adjustments to reflect improved productivity (prudent and efficient costs).

Network Cost allocation

- Calculation of losses at very network point is required to allocate losses for each customer category.
- To be able to calculate the load on a particular network one firstly has to calculate the profile at every infeed point on the network.
- This is done by calculating the annual load profile generated from the bottom up calculations and comparing that with the actual annual purchase load profile mainly from Eskom.
- Representative load profiles must be obtained to determine the ratio of consumption for each tariff and to calculate the loads in the different segments of the representative network components.

Network Cost allocation (Continued)

- The next step is to allocate demand related costs to all customer categories
- This should be based on the principle that the category of customers who cause the high demand and thus high costs should be based on each category of customer's contribution to the system peak.
- Various approaches could be followed in this respect such as not just using one single peak demand but maybe the average of the highest week or average of the 12 highest demands etc. The problem is that this requires very accurate data.
- The next step is to allocate the network support costs (operations, maintenance and administration) to the different parts of the network and the different customer categories. A ratio of replacement costs of assets per customer category can be used to allocate these costs.

Pre-COS preparation

- Updating physical asset registers with asset replacement costs, useful lives and depreciated replacement costs.
- Correcting Sales and purchase metering data;
  - GL accounts needs to be corrected to reflect correct data, e.g. some journals capture data in Rands not sales volumes, MD charges captured as consumption units.
  - Updating tariff codes and definitions; linking tariff codes to approved tariff names/types.
- Meter audit to ensure that meters that are not active are not included in the determination of customer service and billing costs.
- Energy losses (Technical and non-technical are the biggest stumbling block towards more revenue collection
- Improvement in debt collection efforts is critical.

Progress to date

- More collaboration is taking place between various stakeholders such as SALGA, Treasury, COGTA, Eskom and DMRE to pool expertise from different sector
- There is an improvement in the quality of information that is coming out of the licensees.
- A simplified COS tool has been developed to supplement the work on COS.
- Approval of a number of COS studies y NERSA is underway, with the expectation that at least 8-10 studies to be approved by March next year.

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