



THE TARIFF CODE

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Abbreviations

Abbreviation	Full description
ZERA	Zimbabwe Energy Regulatory Authority
ROR	Rate of Return
O & M	Operation and Maintenance
ROA	Return on Asset
CPI	Consumer Price Index
WACC	Weighted Average Cost of Capital
CAPM	Capital Asset Pricing Model
ERP	Equity Risk Premium
SPA	Special Pricing Agreement

FOREWORD

The tariff code has been developed recognizing one of the key functions of the Zimbabwe Energy Regulatory Authority (ZERA) contained in section 4 (f) the Energy Regulatory Authority Act (Chapter 13:23) of 2011 that says: “to ensure that the prices charged by licensees are fair to consumers in the light of the need for prices to be sufficient to allow licensees to finance their activities and obtain reasonable earnings for their efficient operation”.

Section 53 (1) of the Electricity Act (Chapter 13:19) of 2002 also states that: “no prices or tariffs in connection with the provision of an electricity service or operation of an electric power system by a licensee of proposed licensee shall have effect unless such prices or tariffs have been approved or, in the case of any service determined by the Authority after consultation with the Minister, fixed by the Authority in terms of this section”.

The basic guiding principle of the tariff code setting methodology is that all consumers of electricity have to pay an electricity tariff that covers the cost of supplying electricity services to them.

The tariff code outlines the rate of return (RoR) methodology that is used in the calculation of annual revenue requirements of electricity utilities in the electricity supply industry. The rate of return (RoR) methodology allows providers of the electricity service to recover their efficiently incurred costs as well as realize a reasonable return as calculated through a weighted average cost of capital.

It is the Authority’s sincere belief that users of the tariff code will find it user-friendly, clear and helpful.

Zimbabwe Energy Regulatory Authority (ZERA)

1. Purpose of the tariff code

The purpose of the tariff code is to set out information requirements and the procedures for calculation of the appropriate tariff level in accordance with section 51 of the Electricity Act (13:19) of 2002.

The tariff code is designed in pursuit of the following objectives as set out in section 53 (1) of the Electricity Act:

- (i) To enable a licensee to recover the full and efficient costs of its business activities, including a reasonable return;
- (ii) To provide incentives for the continued improvement of the technical and economic efficiency with which the services are provided;
- (iii) To protect consumers while keeping them informed about the cost their consumption imposes on the licensee's business;
- (iv) To avoiding undue discrimination between customers and customer categories and
- (v) To phase out or substantially reduce cross subsidies.

2. Tariff review period

The period over which tariffs will be approved shall be determined by the Authority. However, the principles contained in the tariff code can be applied to one year and longer periods as determined by the Authority.

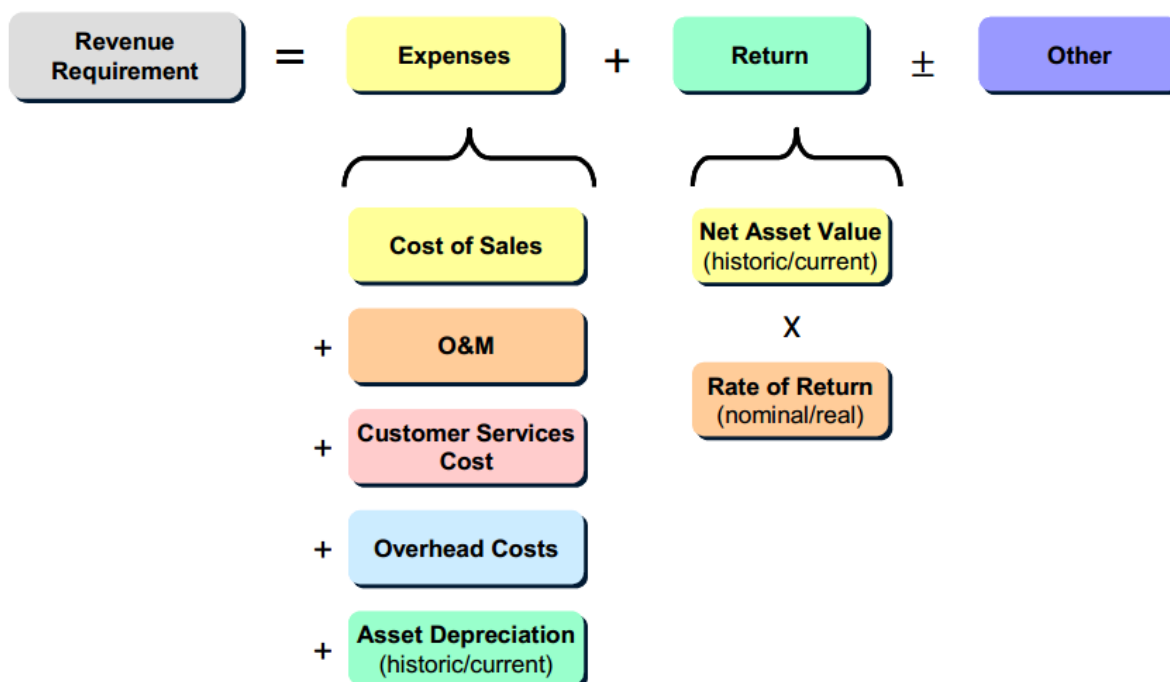
3. Application of the code

The tariff code shall apply to holders of licenses which are provided for in the Electricity Act from section 42 to 44 being generation license, transmission and bulk supply license and distribution and retail license.

4. Electricity Pricing Methodology

The pictorial demonstration below shows the building blocks of the rate of return (RoR) methodology that shall be used in electricity pricing:

Figure 1: Rate of return



The methodology is based on the principle that the revenue to be earned by a utility should be equal to the cost to supply electricity i.e. the utility's expenses plus a fair return on the utility's rate base plus any other costs as approved by the Authority.

5. Forecast demand for electricity

The backbone of estimating revenue requirement of a utility is a correct estimation of the forecasts of future demand. Projection of future demand is an important aspect of the pricing methodology and has to be based on scientific approaches to ensure that the error margin is minimized. It is necessary to make proper estimates of forecast peak electricity demand, electricity consumption and customer numbers for the tariff review period. It is the onus of the licensee to prove that projected sales are correct.

6. Qualifying criteria for allowable expenses

The rules that govern allowable expenses are the following:

- (i) Expenses should be incurred in an arm's length transaction and suppliers are treated equally without prejudice;
- (ii) Expenses must be necessary and related to the production, transmission, and distribution and supply of electricity;
- (iii) Expenses must be prudently incurred after careful consideration of available options. The least cost option must not be at the expense of quality, effectiveness and efficiency;
- (iv) Expenses must be incurred in the normal operations of the business. An expense that is incurred under abnormal or extraordinary circumstances may be spread over a number of years to match the time periods over which the benefit is derived;
- (v) Expenses on research and development (R&D), charitable donations, lobbying expenses and advertising may or may not be allowed in costs of supply;
- (vi) All transactions with subsidiaries and sister companies need to be clearly shown. Licensee shall demonstrate that such transactions are necessary, reasonable, market based and procured through arm's length transacting;
- (vii) Licensee shall demonstrate transparency when conducting transactions i.e. competitive bidding should always be practiced when procuring services and products. The utility should demonstrate that such bidding has been conducted.
- (viii) All expenses should not be incurred at rates above market rates.

7. Basic elements of electricity cost of supply

Cost of supply includes all expenses that are incurred in the production and supply of electrical energy. All expenses shall have to pass the above criteria for them to be included in the calculation of the tariff.

Allowable expenses include:

- Cost of sales (production costs);
- Operating and Maintenance (O&M) costs
- Manpower costs;
- Administration costs;
- Customer services costs;
- Depreciation of property, plant and equipment.

All expenses that are not relevant to the production and supply of electricity shall not form part of the cost to supply electricity.

Typical Expense Categories

Generators	Single Buyer	Transmission	Distribution
Primary energy costs	Power supply cost (domestic and imports)		Power supply cost
	Ancillary Services Cost		
Transmission losses	Transmission losses	Transmission losses	Transmission losses
			Distribution losses
Transmission network costs	Transmission network costs	Transmission network costs	Transmission network costs
Manpower	Manpower	Manpower	Manpower
O&M costs		O&M costs	O&M costs
			Customer services costs
Depreciation	Depreciation	Depreciation	Depreciation
Overhead costs	Overhead costs	Overhead costs	Overhead costs
Return on asset requirement	Return on asset requirement	Return on asset requirement	Return on asset requirement

Definitions of allowable expenses

(a) Primary energy costs - this reflects the cost of fuel for the generating stations and includes expenses for the procurement of coal, diesel, oil and water and chemicals.

(b) Purchased supply costs - includes the costs of procurement of electricity at wholesale. It also includes the cost of imported power.

The procuring utility shall demonstrate that it has developed efficient mechanisms to purchase power from all the potential sources.

The procuring utility shall demonstrate that fuel and power have been purchased at the lowest possible cost and that transactions have been concluded on an arm's length basis.

(c) Ancillary services costs - reflect the expenses incurred by the single buyer to maintain acceptable quality of supply standards. Bilateral agreements between service providers and the single buyer normally govern these expenses.

(d) Transmission line losses - is the cost incurred by the transmission entity for losses incurred on the transmission system. This cost shall be recovered from the generators, single buyers and distributors. Not all costs to do with losses shall be allowed. Licensee shall provide a program towards reduction of these costs.

(e) Distribution losses - is the cost incurred by the distribution entity for losses incurred on the distribution system comprising both technical and non-technical

losses. Not all costs to do with losses shall be allowed. Licensee shall provide a program towards reduction of both types of losses.

(f) Operation and Maintenance (O & M) costs - reflect the cost to operate and maintain the assets in generation, transmission and distribution systems.

(g) Lease arrangements - plant or equipment that is leased must pass the *used, useful and prudent* tests used for plant. The transactions must be properly recorded either as a capital lease or an operating lease. Licensee shall demonstrate that these transactions are conducted on an arm's length basis.

(h) Customer service costs - include the costs for metering, billing, mailing, call center and other customer services. Informational advertising costs and other related costs may or may not be considered as necessary expenses.

(i) Overhead costs – the costs reflect the usage of central corporate functions and other activities to support the main activity. These costs are to do with the support of the activities of generation, transmission and distribution of electricity.

(j) Depreciation - the costs reflect the recovery of initial investment and are to be added to other expenses. Depreciation shall be calculated on a straight-line basis over the expected life of the assets that are used in the generation, transmission, distribution and supply of electricity. Gold plating shall not be allowed.

The depreciated assets must qualify under the criteria of “used and useful”.

Land and redundant buildings shall not be considered.

Depreciation of assets shall be based on the latest valuation of assets that is supported by an evaluation done by an independent asset valuer.

A complete depreciation schedule shall be provided to support the depreciation costs.

8. Return on Asset (ROA) requirement

The return on assets is equal to the reasonable return percentage multiplied by the appropriate capital employed (the rate base). It is the return to the licensee on the investments made.

9. The Rate Base

The utility's rate base is the total of the investor funded facilities and investments used in the generation, transmission and distribution and supply of electricity services. The rate base provides the basis to which a fair rate of return is applied to arrive at the amount of authorized return.

In applying for a tariff adjustment, licensees shall use year-end figures to calculate the rate base from the latest asset register that should also be part of the tariff application.

In coming up with the rate base, licensees shall consider the following:

- Assets have to pass the concept of *used and useful*. This means that plant and machinery should be in a condition that makes it possible to satisfy demand in the short term. Any assets that do not conform to this concept should be left out of the rate base calculation.
- Plant that is excessive to the basic assets shall not be included in the rate base.
- Assets that are purchased once to meet objectives over a long term horizon will be considered on an item-by-item basis and the costs may be spread to reflect the period during which benefits are being enjoyed.
- Plant should not be gold plated - the facilities should be reliable and adequate to the needs of providing service. Plant should not be extravagant or extreme.
- Fixed assets must be long term (fixed) in nature.
- Mothballed stations and other fixed assets that are not in a “used and useable” form shall be excluded from the asset base.
- Sales of plant or equipment that have occurred since the last base rate review must be removed not only from the asset register, but also from accumulated depreciation and depreciation expense for that year.
- Subsidized assets and customer funded assets have to be excluded from the rate base.

The following costs should not be included in the calculation of the rate base.

10. Work under construction

Work under construction shall not be included in the calculation of the rate base. Only that portion incurred during a particular year shall be included.

11. Future Planned Investments

Future planned investments should not be included in the calculation of the rate base. Any new assets created in the previous year will be included in subsequent tariff application and approval processes.

12. Calculation of asset values

For the purpose of revenue requirement calculations, the following approach shall be used:

- Depreciated historic cost asset values shall be used to determine the rate base for generation,
- Depreciated current cost/replacement cost asset valuations shall be used to determine the rate base for transmission and distribution.

Current cost asset values should be derived from independent asset valuation studies. A licensee shall have to show proof of such independent evaluation.

The determination of the current asset value should be based on the following formula:

Asset Value (current) = Asset value (previous year) * {USCPI (current)/USCPI (previous)}.

13. Working Capital adjustment of the rate base

The rate base shall be adjusted to reflect the cost of working capital in the following way:

Generation and transmission

The following additions to the Rate Base are required:

Total annual revenue from electricity sales	x	45/365
Less: Annual operating costs	x	30/365
Less: Annual capital expenses	x	30/365
Plus: Stock level		
Equals: Working capital to be added to Rate Base.		

Distribution

The following additions to the Rate Base are required:

Total annual revenue from electricity sales	x	45/365
Less: Annual operating costs	x	30/365
Less: Annual capital expenses	x	30/365
Plus: Stock level		
Equals: Working capital to be added to Rate Base figure		

14. Externally funded assets

Assets not funded by the utility shall not be included in the rate base and therefore shall not realize a return. Such assets include:

- Assets funded by Government including rural electrification assets;
- Assets funded by customers
- Assets funded by developmental organizations.

14. Rate of Return calculation

The rate of return reflects the cost of capital. This percentage is expressed as a weighted average cost of capital (WACC). WACC is the cost of equity and the cost of debt weighted by the capital structure.

The nominal pre-tax WACC is used in conjunction with historic cost asset values to determine the return requirement of generation.

The real pre-tax WACC is applied to the current *cost rate* base values of transmission and distribution to determine the return needs of licensees.

The return on working capital is calculated using the nominal pre-tax WACC.

An optimum balance between debt and equity in order to minimize the overall cost of capital has to be maintained. An efficient capital structure is 60% debt and 40% equity.

The rate of return shall be calculated using the Weighted Average Cost of Capital (WACC) in the following formula:

Pre-tax WACC (nominal pre-tax) = $g \cdot K_d + (1-g) \cdot K_e / (1 - T_c)$

Post-tax WACC (nominal post-tax) = $g \cdot K_d (1 - T_c) + K_e / (1 - g)$

Pre-tax WACC (real pre-tax) = $(1 + \text{WACC (nominal pre-tax)}) / (1 - \text{USCPI}) - 1$

Post tax WACC (real post-tax) = $(1 + \text{WACC (nominal post-tax)}) / (1 - \text{USCPI}) - 1$

Where:

g = gearing (net debt as a % of net funding)

K_d = Cost of Debt

K_e = Cost of Equity

T_c = Corporate tax rate. A corporate tax rate of 30% is assumed.

The cost of debt is determined as:

$K_d = R_f + p$

Where:

R_f = Risk-free rate of debt.

p = Debt premium.

The cost of equity is estimated using the standard Capital Asset Pricing Model (CAPM), thus:

$$K_e = R_f + B * ERP$$

Where,

R_f = Risk-free rate of debt.

B = equity beta.

ERP = Equity Risk Premium.

The cost of capital can be calculated in real or nominal terms. The relationship between the rates is given by:

$$1 + \text{Post tax } WACC_{\text{nominal}} = (1 + \text{Post tax } WACC_{\text{real}}) * (1 + \text{inflation rate}).$$

It is necessary to maintain an optimum balance between debt and equity in order to minimize the overall cost of capital. The target capital structure is 60% debt and 40% equity.

15. Determination of the required adjustment in tariff

In a simplified manner the RoR methodology shall be applied as follows:

$$R = E + (V - d + w) r$$

Where:

R = the required revenue of the regulated entity

E = the operating expenses or, as mentioned above, the cost to supply

V = the value of the qualifying property, plant and equipment

d = the accumulated depreciation on qualifying property, plant and equipment held by the regulated entity

w = the allowance for working capital held by the regulated entity

r = the calculated rate of return using the weighted average cost of capital (WACC)

This would then give the required revenue of the utility. This revenue shall then be compared to the previous year's revenue, to arrive at the percentage adjustment in the revenue of the regulated entity.

16. Reconciliation adjustment

It shall be necessary to undertake a reconciliation adjustment to cater for variances between the allowable regulated revenue for a year and the actual revenue earned in that year.

No other variances other than those emanating from the following factors will be entertained:

- Differences in budgeted costs and actual costs
- Differences in forecast and actual sales

The Reconciliation adjustment should not be part of the normal operating risk that should be absorbed by the licensee. The Reconciliation Adjustment balance is cumulative from year to year.

Depending on the size of the Reconciliation Adjustment some amounts may be wholly factored into the tariff application for the following year. In instances where the Reconciliation adjustment is deemed large, the balances may be rolled over several years' tariff adjustments to smoothen tariff adjustments.

The Reconciliation adjustment shall be structured in the following manner:

- Allowed Rate of Return (%) X actual Rate Base
- Plus: Actual reported expenses
- Less: Non-prudent expenses
- **Equal: Revised allowed revenue requirement**
- Less: Actual earned revenue
- **Equals Potential Reconciliation Adjustment**
- Less: Efficiency/Incentive adjustment
- **Equals: Actual Reconciliation Adjustment**

The licensee shall demonstrate that the variation between actual expenditure and the originally allowed expenditure was prudent. Any imprudent expenditure will not be allowed.

17. Special Pricing Agreements (SPA)

SPAs should flow from long-term contractual arrangements (e.g. special supply contracts) between utility and its customers. Such tariff agreements shall only become effective once approved by the Authority as is provided by section 53 (6) of the Electricity Act.

Thus, it will be the responsibility of the licensee to make appropriate submissions for the approval of any non-standard pricing arrangements.

18. Tariff Indexation

Tariffs generally need to be protected from possible erosion caused by movements of important parameters such as:

- Local inflation; and
- Prices of major cost drivers.

The utilities shall justify to the Authority through an application the required changes to any major movement in the major cost drivers.

19. Conclusion

The Authority will exercise its duties in a transparent, impartial and exhaustive manner and may from time to time embark on an information verification exercise before a tariff approval where it deems necessary. The onus is with the applying licensee to provide all the information required by the Authority in the format and manner specified and within the time that enables the Authority to make a decision in the shortest possible time.

The Authority shall reserve the right to make modifications to the tariff code as and when circumstances in the electricity industry require. Adequate time will be given to utilities to adjust to the new changes and inclusions to the tariff code.