



Draft Tariff Methodology for Isolated Grid in Rwanda

August 2020

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Introduction

Pursuant to Law n° 09/2013 of 01/03/2013 establishing Rwanda Utilities Regulatory Authority (RURA) and determining its mission, powers, organization and functioning, especially in article 7 stipulating the power to regulate tariffs and charges;

Referring to law no 52/2018 of 13/08/2018 modifying law n° 21/2011 of 23/06/2011 governing electricity law in Rwanda as modified to date, especially article 29 stipulates that the methodology for electricity tariff setting shall be determined and published by the Regulatory Authority in consultation with the Minister in charge of electricity; and the Regulatory Authority must ensure that the electricity tariffs for renewable energy sources or off-grid electricity for end-users do not exceed the appropriate threshold;

Considering the need to ensure the electricity service affordable, protect consumers and ensure sustainability of isolated grids projects;

The Regulatory Authority hereby issue this methodology governing the tariff determination for isolated grid electricity end-users.

CHAPTER ONE: GENERAL PROVISIONS

Article One: Purpose of the Methodology

The tariff methodology herein aims to provide the approach and procedures that governs the setting of isolated grid electricity end-user tariffs to be charged to all isolated grid electricity consumers in Rwanda.

Article 2: Scope

This methodology applies to registrants and licensees supplying electric power to very small and small isolated grid customers.

Article 3: End-user tariff methodology objectives

The end-user tariff methodology has the following objectives:

- i. Allow the registrants or licensees to recover all prudent expenditures, promote economic efficiency and ensure a cost reflective end- user tariff for the sustainability of the business;
- ii. Ensure availability and affordability of electricity supply in isolated grids;
- iii. Prevent price discrimination;
- iv. Protect consumers by ensuring reasonableness of the tariffs.

Article 4: Definition of Terms

In this Tariff Methodology, the terms hereunder have the following meanings:

- 1° Regulatory Authority:** Rwanda Utilities Regulatory Authority;
- 2° Beta:** the measure of how risky an asset is compared to the market. It measures systematic risk by which cannot be diversified;
- 3° Capital Asset Pricing Model (CAPM):** A model that relates the return that investors require from an asset to the risk of that asset.
- 4° Capital Expenditure:** the actual cost prudently incurred by an licensee/ registrant in procuring and restoring assets and investment costs such as planning, development, construction, installation, completion, testing commissioning and insurance;
- 5° Consumer/ end-user:** a person who purchases electricity services from the licensee or registrant;
- 6° Grant/Subsidy:** financial support from the government, donor or a third party to a licensee/registrant to meet operational or capital expenditures;
- 7° Isolated grid:** a distribution network without connection, whether direct or indirect, to a transmission network that is operated by the transmission Licensee. The isolated grid includes Small Isolated and Very Small Isolated Grid;
- 8° Licensee:** any person who holds a license to operate a small isolated grid issued by the Regulatory Authority;
- 9° Market Rate of Return:** the rate of interest that is readily accepted by borrowers and lenders based on the risk level of the transaction. In other words, the market rate is the standard interest accepted in an industry for a specific type of transaction;
- 10° Registrant:** A person who holds a registration certificate of a very small isolated grid issued by the Regulatory Authority;
- 11° Risk-free rate:** an assumed rate that investors could expect to receive from an investment with no risk. Although a truly safe investment exists only in theory, investors consider government bonds as risk-free investments because the probability of a country going bankrupt is low;
- 12° Tariff:** the price at which electrical energy is supplied to various types of electricity consumers;
- 13° Very Small isolated grid:** An isolated grid that has a net generation capacity that is small than 50kW;

14° Weighted Average Cost of Capital (WACC): a weighted average of the firm's cost of debt and equity capital – the interest that must be paid to lenders and the returns that must be paid to attract shareholders;

15° Working capital: the average amount of capital necessary to finance business operations.

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CHAPTER II: TARIFF APPLICATION AND SETTING PROCEDURE

Article 5: Isolated grid end-user tariff application and setting procedures

The isolated grid end-user tariff approval applicant shall follow this procedure:

1. Any person that intends to operate an isolated grid shall apply to the Regulatory Authority for end-user tariff approval prior to starting construction and installation of the isolated grid.
2. The application for isolated grid end-user tariff shall be submitted to the Regulatory Authority in a manner determined by Regulatory Authority;
3. The isolated grid end-user tariff application shall be accompanied by the documents provided in the annex 2 and Annex 4 of this Methodology;
4. The applicant shall submit to the Regulatory Authority the proposed end-user tariff calculated in line with this methodology. The proposed tariff must be discussed with potential consumers to be served, in collaboration with sector/ cell Authorities of the served area;
5. The Regulatory Authority shall review and define appropriate end-user tariff pursuant to this methodology in consultation with the applicant and relevant stakeholders. The Regulatory Authority shall request for any further information deemed necessary to the processing of end-user tariff.
6. The approved tariff setting shall be communicated to the applicant within thirty (30) working days counted after receipt of complete application and approved by the Regulatory Authority.
7. For existing isolated grids, the owners/operators shall apply for the end-user tariff approval once this methodology comes into force. The approved tariff shall be effective not later than 48 hours after being notified.
8. In case the applicant is not satisfied with the approved end-user tariff set by the Regulatory Authority, the applicant shall lodge a complaint to the Regulatory Authority with relevant arguments. The Regulatory Authority shall thereby examine the complaint of the applicant and make a final decision at its discretion;
9. The end-user tariff may differ from isolated grid to another depending on its operational area and the used technology;

Article 6: Isolated grid end-user tariff revision and adjustment procedure

The review or adjustment of the end-user tariff shall follow the procedure below:

1. The Regulatory Authority can initiate the end-user tariff revision when deemed necessary upon conducting a market study or upon customers' complaints. The licensee or registrant can also request the revision of the tariff when time is due.
In case the tariff complaint is raised by at least 20% of total consumers, the Regulatory Authority shall at its discretion conduct an independent assessment.
Any complaint based on comparison between tariffs charged by different licensees, registrants and large distribution network licensees shall not be valid.
2. The approved isolated grid end user tariff shall remain effective without further regulatory review for at least five (5) years. The Regulatory Authority may initiate tariff review before that period considering additional number of sites per licensee or registrant, increase in demand or any other parameter that may affect end-user tariff at least $\pm 2\%$.
3. Adjustment of end-user tariff shall be done on the request of licensee or registrant after a period of at least twenty four (24) months, and shall be driven by variations in fuel cost (if any) and exchange rate, with an effect of at least $\pm 2\%$ on end-user tariff. Any impact on the end-user tariff that falls below 2% shall be captured during end-user tariff review. In case the aforementioned criteria are not met, the Regulatory Authority will reject the request.
4. The licensees or registrants shall submit to the Regulatory Authority documented evidence to support the end-user tariff adjustment or review application.
5. The Regulatory Authority shall conduct a public hearing before setting or reviewing isolated grid end-user tariff. The consumers' representatives of the served area shall be invited for public hearing.

Article 7: Disagreements resolution

In case of disagreements arising from the application of this methodology between the applicant and the Regulatory Authority, and that the dissatisfaction cannot be solved between the parties, the Regulatory Authority shall make the decision within the powers vested to it by the law. However, the applicant can appeal to the Regulatory Authority' supervising organ.

CHAPTER III: TARIFF SETTING METHODOLOGY

Article 8: End-user tariff structure

1. The isolated grid end user tariff structure shall consist of energy charge in Rwandan francs per kilowatt-hour (Frw/kWh), demand charge if applicable in Rwandan Francs per kilowatt (Frw/kW) or flat rate tariff in Rwandan Francs per period of time.
2. Energy and demand charge if applicable shall be charged to consumers provided with metering devices with the ability to measure those parameters.
3. The set and approved end-user tariff shall be the threshold that the licensee or registrant is eligible to charge its customers.
4. The applicant shall design their tariff structure consistent with the following principles:
 - a. Incentives for the efficient use of energy;
 - b. Due consideration of affordability for the end use customers;
 - c. Undue discrimination in rates and tariffs between customers shall be prohibited, but the applicant may, for purposes of setting tariffs, treat customers differently when the load characteristics or other cost components of serving a customer or category of customer justify disparate treatment;
 - d. To the extent that different customer classes are identified, the revenue responsibility allocated to each class, shall reflect the costs of serving that class;
 - e. Customer classes shall be identified based entirely on their energy related characteristics such as load factor, demand costs, and levels of consumption;
 - f. To the extent that cross-subsidies are required to provide electricity to the lowest-income households within the mini grid's service area, the cost of providing this cross-subsidy may be added to the cost of service allocation of the other customer classes. Such cross-subsidies must be designed and implemented so as to provide benefits solely for those clearly identified customers for whom the benefits are intended to serve and to minimize the cost burden on the remaining customers;
 - g. Tariffs should take particular account of the fixed-variable cost ratio of the isolated grid system and its generating source(s);
 - h. Customer-specific bills may be supplemented to reflect the costs of financing the costs of connections and/or internal wiring.
5. The applicant shall propose customer categorization along with enough details for approval by Regulatory Authority.

Article 9: Revenue requirement determination

The Regulatory Authority uses the Rate of Return (RoR) regulation mechanism to determine the end user electricity tariff. The revenue requirement shall be determined as per annex 1 of this methodology.

CHAPTER IV: ACCOUNTING, REPORTING AND TRANSITION PROVISIONS

Article 10: Accounting separation

Licenses and Registrants shall maintain separate books of accounts related to each licensed or registered isolated grid site following the international financial reporting standards or in a manner prescribed by the Regulatory Authority.

Article 11: Reporting Period

The reporting period shall be the calendar year, which covers twelve (12) months from January to December. Any data from the licensee/ registrant will be referenced to this period.

Article 12: Revenue Collection

The Revenue collection efficiency considered for the isolated grid tariff review or adjustment shall be at least 95% and in case of default of a customer.

Article 13: Transition period

Existing isolated grid sites that were operational when this tariff methodology comes into force shall apply for end-user tariff approval within six (6) months following the publication of this methodology.

CHAPTER V. ANNEXURES

ANNEX 1: Revenue Requirement Determination

The revenue requirement (RR) methodology known as the rate of return (RoR) or the cost of service approach shall be followed.

The tariff to be applied shall enable applicant to recover the operating and maintenance expenses, depreciation, taxes and a return on assets employed to deliver services to consumers (electricity generation and distribution).

The revenue requirement shall be defined as follows:

$$RR = O\&M + D + T + r*(RAB) - OR$$

Where;

RR=Revenue requirement

O&M =Operating and maintenance costs

T= Corporate tax

D= Allowed depreciation

r= Allowed rate of return (WACC)

RAB=Regulatory asset base

OR= Other Revenues

1. Regulatory Asset Base

The regulatory asset base covers all assets employed by isolated grid applicant in generation and distribution of electricity. An asset shall be included in the regulatory asset base if it is used and useful for the purpose of generating, distributing and selling electricity and must be long-term in nature.

Used and useful means that assets should be in a condition to supply demand in the short-term within 12 months and long-term for a period of more than 12 months.

2. Asset Valuation

Asset valuation for the purpose of determining the regulatory asset base will be the historical cost.

3. Rate of return-WACC

The rate of return shall be determined through the weighted average cost of capital based on the weight of debt and equity.

The weighted average cost of capital after tax applicable to the regulatory asset base shall be determined as follow:

$$WACC = k_e \frac{E}{D + E} + k_d \frac{D}{D + E} (1 - T_c)$$

Whereas;

- WACC: Weighted average cost of capital, which is the rate of return (post-tax WACC)
- E: Market value of equity
- D: Market value of debt
- k_e : Cost of equity
- k_d : Cost of debt
- T_c : corporate tax as determined by tax administration office

The cost of equity shall be determined following the capital asset pricing model (CAPM) as given bellow

$$k_e \text{ or } (R_e) = R_f + \beta(R_m - R_f)$$

Whereas:

- k_e or R_e : Cost of equity or return on equity
- R_f : Risk free rate (The Government treasury bond)
- R_m : Market return rate (Lending rate as per Central Bank)
- β : Beta measuring systematic risk (to be benchmarked)
- $(R_m - R_f)$: Is the Market Risk Premium

4. Allowed depreciation

Regulatory depreciation of each asset shall be determined using straight line method using the following formula:

$$\text{Allowed depreciation} = \frac{\text{Asset costs} - \text{Residual value}}{\text{Life span}}$$

Asset costs is the original price of the asset from which can determine its depreciated value over the course of its useful life.

Residual value is the future value of an asset after being fully depreciated.

Life span is the estimated useful life of a depreciable fixed asset during which it can be expected to contribute to the operation of licensee or registrant as per annex 2.

5. Operation and Maintenance costs

The operating and maintenance expenses include all fair and reasonable expenditures incurred entirely and exclusively for generation, distribution of electricity. The costs shall include but not limited to:

- a) Staff costs;
- b) Operation and maintenance costs;
- c) Financing costs (Bank charges);
- d) Working capital (Current assets-current liabilities).

In case an isolated grid licensee/ registrant has more than one site, the overheads costs will be shared based on the customers per site.

The qualifying criteria for allowable operating and maintenance costs are outlined as follow:

- a) Expenses must be incurred in an arm's length transactions;
- b) Expenses must be incurred in the normal operation of generation, distribution of electricity, including a reasonable level of refurbishment, repairs and maintenance costs.

Operating expenses that do not meet the above criteria including fines, penalties and other related costs will not be included in the revenue requirement.

6. Corporate income tax

The corporate tax rate is determined by the law.

7. Other Revenues

Other income related to the normal operation of licensee or registrant shall be deducted from the revenue requirement. It includes among others, revenue from works and fines charged to customers.

8. Regulatory Treatment of Subsidy or grant

Costs/Assets covered by subsidies or grants received for which payback is not required shall not be included in the regulatory asset base. Tariff will take into consideration of depreciation.

9: The average tariff

The average tariff shall be calculated as the ratio of *Average tariff* =
$$\frac{\text{Revenue Requirement}}{\text{Total Energy demand (kWh)}}$$

ANNEX 2: Documents to be accompanied with tariff application

1. Application letter addressed to Regulatory Authority
2. Duly filled table provided in annex 4
3. District approval authorizing the activity on the site;
4. Copy of Memorandum of Agreement with Ministry of Infrastructure;
5. Approved feasibility study;
6. Environmental Impact Assessment Certificate;
7. Business plan for five years outlining financial and technical data;
8. Supporting documents justifying projected investment costs (CAPEX);
9. Copy of minutes on the proposed end-user tariff negotiation between the applicant and the consumers;

ANNEX 3: Regulated fixed asset

Asset	Life span (Years)
Generation	
CIVIL AND ELECTRO-MECHANICAL EQUIPMENT	
A. HYDRO	
Dam/Weir	30
Sand trap and intake	30
Canal	30
Forebay	30
Penstock	30
Power house	30
Slope stabilization	30
Preliminary sites works	30
Turbine	25
Generator	25
Controller	25
B. SOLAR	
Modules	25
Array rack (mounting structure)	25
Inverters	8
Charge controllers	8

Asset	Life span (Years)
Batteries	5
Diesel Generator	20
Distribution system/connection to the grid	
LV ABC conductor and accessories	20
LV Poles	20
Service connection (Pole/costumer)	20
Household installations/appliances	15
Wiring	25
Earthing	25
Metering equipment	25
Protective devices	10
Other Fixed Assets	
Office Equipment (Furniture)	7
Building and fixtures	25
Computers and Software	5
Vehicles	8
Moto cycles	5
Research and Development costs	5

ANNEX 4: Data to be submitted by isolated grid tariff applicant

CAPITAL EXPENDITURES	Cost (Frw)	Grant/Self-Financed	Acquisition date
GENERATION			
A. Hydro			
Civil and Electro-Mechanical equipment			
Dam/Weir			
Sand trap and intake			
Canal			
Forebay			
Penstock			
Power house			
Slope stabilization			
Preliminary sites works			
Roads and bridges			
Other (specify)			
Turbine			

CAPITAL EXPENDITURES	Cost (Frw)	Grant/Self-Financed	Acquisition date
Generator			
Controller			
Others (Specify)			
Total			
B. SOLAR			
Modules			
Array rack (mounting structure)			
Inverters			
Charge controllers			
Batteries			
Others (Specify)			
Total			
Distribution system/connection to the grid			
LV ABC conductor and accessories			
LV Poles			
Service connection (Pole/customer)			
Household installations/appliances			
Wiring			
Earthing			
Metering equipment			
Protective devices			
Others (Specify)			
Total			
OTHER FIXED ASSETS			
Tangible fixed assets			
Office Equipment and Furniture			
Building and fixtures			
Computers and Software			
Vehicles			
Moto cycles			
Other Specify:			
Total			
Intangible Fixed Assets/Research and Development costs			
Development and design			
Insurance-Project			
Environment management			
Other (specify)			

Cost parameter	Frw
Staff costs/Personnel	
Fuel & Lubricant	
Plant Maintenance	
Maintenance of distribution system	
Insurance	
Water and Electricity	
Consumables (excluding office equip)	
Communications and Promotions	
Transport	
Local taxes (Patente,)	
Other-(Specify)	

Estimation of Energy Demand-kWh

Customer category	Number	Daily estimated demand-kWh	Daily hours of consumption / per day
Total all customers			