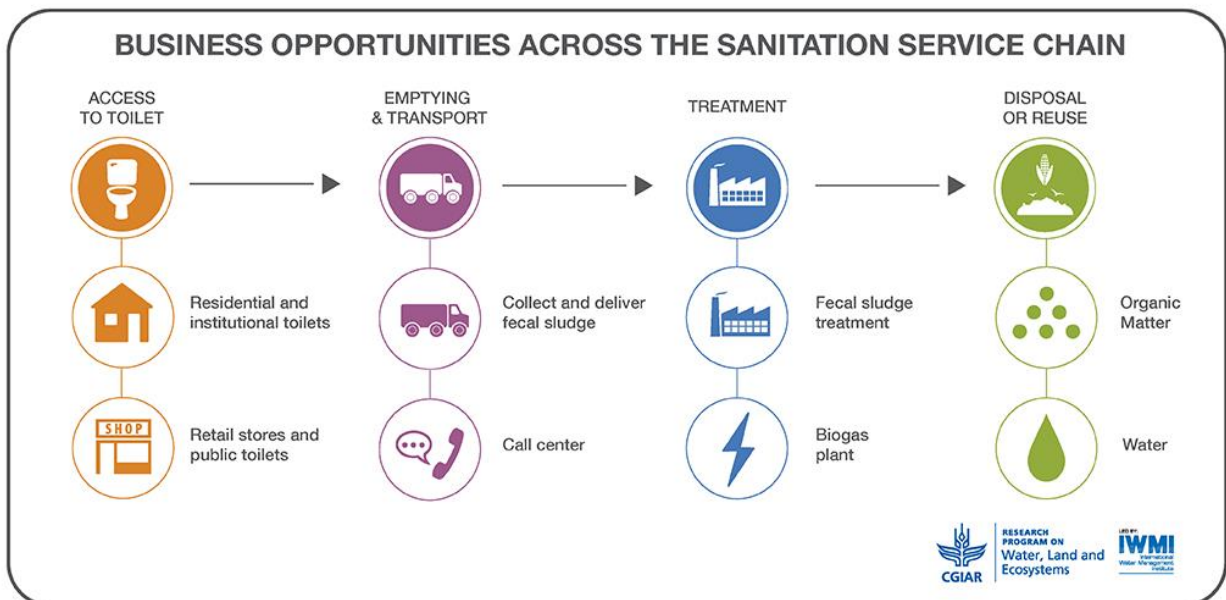




Eastern and Southern Africa Water and Sanitation  
Regulators Association

# Guidelines for Sanitation Services Tariff Setting and Inputs for Tariff Models



March 2020

## Table of Contents

<b>ABBREVIATIONS .....</b>	<b>iii</b>
<b>DEFINITIONS OF TERMS AND CONCEPTS.....</b>	<b>iv</b>
<b>1 INTRODUCTION.....</b>	<b>1</b>
1.1 Background.....	1
1.2 Objective of the Guidelines.....	2
1.3 Scope of the Guidelines .....	2
1.4 Principles of Tariff Regulation.....	2
1.5 Structure of the Guidelines .....	3
<b>2 OVERVIEW OF SEWERED AND NON-SEWERED SANITATION SERVICES .....</b>	<b>5</b>
2.1 Sanitation Business Models .....	5
2.2 Business Models for Sewered Sanitation .....	6
2.3 Business Models for Non-Sewered Sanitation Services .....	7
<b>3 REGULATORY PHILOSOPHY UNDERLYING THE TARIFF GUIDELINES .....</b>	<b>9</b>
3.1 Introduction .....	9
3.2 Length of the Tariff Period .....	9
3.3 Role and Burden of Proof of Submitted Information.....	9
3.4 Affordability and Tariff Design .....	9
3.5 Determining Efficient Costs .....	10
3.6 Sanctions Related to Performance Requirements .....	10
<b>4 TYPES OF TARIFF APPLICATIONS .....</b>	<b>11</b>
4.1 Multi Year Tariff Application.....	11
4.2 Provisional Tariff Application .....	11
4.3 Extra-Ordinary Tariff Application.....	11
4.4 Automatic Tariff Adjustment .....	11
4.5 Tariff Charged by Sanitation Operators .....	11
<b>5 THE PROCESS: TARIFF REVIEW.....</b>	<b>12</b>
5.1 Information Requirement.....	12
5.2 Acceptance of an Application .....	13
5.3 Stakeholders' Consultation.....	13
5.4 Evaluation of the Application .....	14
5.5 Tariff Decision .....	14
5.6 Notification to Stakeholders of the Approved Decision .....	14
5.7 Tariff Decision Communication Strategy.....	15

<b>6</b>	<b>APPROACHES FOR TARIFF REGULATION .....</b>	<b>16</b>
6.1	Cost of Service or Rate of Return Regulation .....	16
6.2	Incentive Regulation - Price Cap Regulation .....	16
6.3	Incentive Regulation – Revenue Cap Regulation .....	16
6.4	Recommended Approach for Tariff Regulation.....	16
<b>7</b>	<b>DETERMINATION OF ALLOWED REVENUE .....</b>	<b>17</b>
7.1	Cost Components along the Sanitation Chain .....	17
7.2	Revenue Requirement .....	25
7.3	Operation and Maintenance (O&M) Expenses .....	27
7.4	Depreciation Charge .....	27
7.5	Taxes .....	28
7.6	Regulatory Asset Base.....	28
7.7	Weighted Average Cost of Capital (WACC) .....	29
7.8	Determination of Replacement, Rehabilitation and Investment Costs.....	30
7.9	Treatment of Government and Donor Grants and Customer Contributions .....	31
7.10	Cost Allocation between Water and Sanitation Businesses .....	31
7.11	Smoothing of Revenue Requirement.....	32
7.12	Revenue Projections .....	32
<b>8</b>	<b>TARIFF DESIGN.....</b>	<b>33</b>
8.1	Characteristics of a Good Tariff .....	33
8.2	General Guidance for Designing Tariff Structure .....	33
8.3	Cost Recovery and Cost Reflective Tariff in Sanitation Services .....	34
8.4	Sewage Conveyance Tariff Design .....	35
8.5	Determination of Sewage & Faecal Sludge Treatment and Disposal Tariff.....	37
8.6	Non-Sewered Sanitation Tariff Design.....	39
8.6.1	Capture and Containment Services.....	39
8.6.2	Emptying and Transportation Services .....	40
8.7	Implementation of Universal Access Charge for Sanitation .....	43
8.8	Disposal and/or Re-Use .....	44
<b>9</b>	<b>MONITORING AND EVALUATION .....</b>	<b>45</b>
9.1	Monitoring .....	45
9.2	Evaluation .....	45
9.3	Sanctions Related to Performance Requirements .....	46
<b>10</b>	<b>REFERENCES .....</b>	<b>47</b>

## Abbreviations and Definitions of Concepts

This section sets out some of the abbreviations and terms used in the Guidelines, especially terms that are used frequently or in several different chapters. The Guidelines, however, rely on ordinary meanings and special definitions that are given in specific sections.

### Abbreviations

AREEN	Autorité de Régulation des secteurs de l'Eau potable et de l'Energie (Burundi)
AURA, IP	Autoridade Reguladora de Águas, Instituto Público (Mozambique)
BOD	Biological Oxygen Demand
CBO	Community Based Organisation
CUs	Commercial Utilities – Zambia
DEWATs	Decentralised Waste water Treatment Plants
EWURA	Energy and Water Utilities Regulatory Authority (Tanzania)
ESAWAS	Eastern and Southern African Water and Sanitation Regulators Association
FS	Faecal Sludge
FSM	Faecal Sludge Management
KPI	Key Performance Indicator
LEWA	Lesotho Electricity and Water Authority (Lesotho)
LWSC	Lusaka Water and Sewerage Company – Zambia
NGOs	Non-Governmental Organisations
NWASCO	National Water Supply and Sanitation Council (Zambia)
O&M	Operation and Maintenance
OSS	Onsite Sanitation Services
RAB	Regulatory Asset Base
RoI	Return on Investment
RURA	Rwanda Utilities Regulatory Authority (Rwanda)
SDG	Sustainable Development Goal
SR	Sanitation Regulator
SS	Suspended Solids
SU	Sanitation Utility
WACC	Weighted Average Cost of Capital
WASAMA	Water Services Association of Malawi

WASCO	Water and Sewerage Company - Lesotho
WASREB	Water Services Regulatory Board, (Kenya)
WHO	World Health Organisation
WURD	Water Utility Regulation Department (Uganda)
WSRC	Water and Sanitation Regulatory Council, Mozambique
WSS	Water Supply and Sanitation
ZURA	Zanzibar Utilities Regulatory Authority (Zanzibar, Tanzania)

### **Definitions of Terms and Concepts**

Automatic Tariff Adjustment	Means a tariff adjustment by the regulated water and sanitation service provider based on changes in non-controllable costs beyond a tolerance threshold, that is, costs that are outside the control of the service provider (e.g. costs resulting from exchange rate fluctuation, electricity tariff, taxes) – which must be passed through to the customers through a change to the existing tariff or charge.
Controllable Costs	Means one that the management have the power and discretion to incur it or not, or to vary the incurred amount within a given period of time.
Cost of Debt	Means interest expense (rate) a company pays on its debt, such as bonds and loans.
Cost of Equity	Means the return a firm theoretically pays to its equity investors, i.e., shareholders, to compensate for the risk they undertake by investing their capital.
Cost Recovery	Means a revenue stream sufficient for a service provider to finance its activities in accordance with its statutory obligations.
Cost Reflectivity	Means a charging system which requires that each consumer (or consumer group) should incur charges that reflect the costs that they impose on the system. In other words, under cost reflectivity practical terms consumers are generally grouped into similar types and their charges are set to reflect the costs that they as a group impose.
Customer	Means a person who purchases or receives regulated services for own use or sale.
Customer Class	Means a category of persons who purchase or receive regulated services and are specified according to the use or sale.
Depreciation	Means a non-cash expense recorded in financial statement that reduces the value of a tangible (intangible) asset as a result of wear and obsolescence.

Non-Controllable Costs	Means those costs which the service provider management lacks the authority to incur it or not, include costs that may be incurred to meet legal and regulatory obligations and unusual/unexpected circumstances such as floods, drought and hurricane.
Rate of Return	Means the expected yield from the company (industry), taking into account the costs of financing the business (cost of capital).
Revenue Requirement	Means the total amount of money a service provider must collect from customers to pay all costs which includes operating and maintenance expenses, depreciation and a reasonable return on investment so as to properly operate and maintain its system and meet its financial obligations and shall be determined from time to time.
Regulatory Asset Base	Means the value of investments on which a service provider can earn a reasonable rate of return
Sanitation	Means access to and use of facilities and services for the safe disposal of human urine and faeces <sup>1</sup>
Subsidy	Means financial support from the government or donor agency to meet all or part of operating expenses and / or capital expenditure.
Tariff Period	Means a period, in a designated number of years, for which the approved tariffs shall apply.
WACC	Weighted Average Cost of Capital, means a rate of return allowed to the company

---

<sup>1</sup> Guidelines on Sanitation and Health, Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO.

# 1 INTRODUCTION

## 1.1 Background

The Eastern and Southern African Water and Sanitation (ESAWAS) Regulators Association is a network of water supply and sanitation (WSS) regulators, formed in 2007 to enhance the regulatory capacity of members to deliver quality and effective regulation to achieve public policy objectives through cooperation and mutual assistance.

The premise of regulation is to ensure efficient, affordable, reliable and quality services while balancing the commercial interest (sustainability) with that of social consideration (affordability). The regulators have generally been mandated to undertake both economic and technical regulation of WSS service provision to ensure a balance between the quality of the service, the interests of consumers and the financial sustainability of the providers.

The attainment of Sustainable Development Goal (SDG) 6 'Ensure availability and sustainable management of water and sanitation for all' is a key target for all water supply and sanitation regulators. 'Sanitation is defined as access to and use of facilities and services for the safe disposal of human urine and faeces' (WHO Guidelines on Sanitation and Health, 2018). Achieving the 2030 target of safely managed sanitation requires an inclusive urban sanitation approach that combines regulation of both sewerage and non-sewerage sanitation service provision.

Consequently, ESAWAS had developed a Regulatory Framework and Strategy for inclusive urban sanitation service provision incorporating non-sewerage sanitation services that specifies regulatory touch points along the entire value chain of non-sewerage sanitation. This means that all links of the sanitation chain need to be operated and managed sustainably to ensure continued service provision that protects both public health and the environment.

To achieve safely managed sanitation services, the tariff setting practice invariably affects the make-up of the sector in terms of sustainability, affordability and quality of service provision. Hence regulators have an interest to adopt good practices in tariff setting that will foster efficiency and viability of providers while guaranteeing an affordable and quality service for the consumer.

Almost all the ESAWAS Members have well documented tariff setting procedures and model for water supply. However, in most cases, the tariff for those connected with sewer system is paid as a proportion of the water consumption while a regulated tariff for non-sewerage sanitation services does not yet exist.

These Guidelines, therefore, provide guidance to Water and Sanitation Regulators with a methodology for tariff setting specifically for the sanitation business and in establishing the cost of provision of sewerage and non-sewerage sanitation services. The Guidelines further provide guidance on the procedure, information requirement, how to set tariffs and monitor the implementation of tariff decisions.

## 1.2 Objective of the Guidelines

The objective of tariff setting guidelines for inclusive sanitation services is to provide a guidance to regulators in the determination of cost reflective tariffs for sewerage and non-sewerage services in line with the tariff setting principles. These guidelines, therefore, provide a set of sound, well-specified methodology that can be used by regulators to improve predictability, objectivity and transparency of the tariff-setting for sanitation services as well as inputs for development of tariff setting models.

## 1.3 Scope of the Guidelines

- (a) The guidelines contain procedures, revenue requirement methodologies, and tariff setting methodologies, all of which have been detailed to enable sanitation regulators to develop tariff models, which are specific to the respective regulator in line with the sanitation service provider's business environment.
- (b) The guidelines, among other things, contain the following salient features in tariff setting and as inputs for developing sanitation tariff models:
  - (i) Types of tariff applications and tariff setting principles.
  - (ii) Procedures for tariff application review for enhanced transparency by sanitation regulators in tariff setting.
  - (iii) Methodology for calculating the revenue requirements which are inputs for development of sanitation tariff models for determining tariffs for sewerage and non-sewerage services.
  - (iv) Establishment of the cost elements in the sanitation value chain;
  - (v) Methodologies for allocating common indirect costs between water and sanitation;
  - (vi) Methodologies for designing of tariff structure and allocation of revenue requirement to customers and tariff design for each customer category in the provision of sanitation services.

## 1.4 Principles of Tariff Regulation

The Guiding Principles for Tariff Regulation are:

- (a) **Economic efficiency:** water and sanitation services are provided in the most efficient manner, i.e. supply costs (financial, resource, and environmental perspectives) should be minimum.
- (b) **Cost-recovery:** tariffs produce revenue sufficient to meet the financial needs of the service provider, including operations, maintenance, and administration of the company.



- (c) **Fairness:** tariffs should treat all consumers equally. The system of subsidies should not interfere with economic incentives. Cross-subsidy needs to be limited to a last-resource tool.
- (d) **Resource conservation:** tariffs should encourage resource conservation by the service provider itself and consumers.
- (e) **Social inclusiveness:** guaranteed provision of water and sanitation services to all consumers regardless of income.
- (f) **Simplicity and understandability:** tariffs have to avoid unnecessary complexity and be clear to service providers, water users and decision-makers.

## 1.5 Structure of the Guidelines

The Tariff Setting Guidelines for inclusive sanitation services comprises nine (9) sections as described below:

- (a) **Section One** provides the introduction, background, objectives, scope of the guidelines and structure of the Guidelines.
- (b) **Section Two** gives an overview of sewerage and non-sewerage sanitation business models and services, from containment, conveyance, emptying, treatment and disposal and/or re-use.
- (c) **Section Three** covers the approach and philosophy of the guidelines, including the length of tariff period, role of information, affordability tests, determination of efficient costs and sanctions related to performance.
- (d) **Section Four** outlines the various types of tariff applications which include multi-year tariff application, provisional tariff application, extra ordinary tariff application, automatic tariff application, and tariff application for services provided by a contracted operator.
- (e) **Section Five** describes the tariff review process and procedures covering stages such as acceptance of the application, stakeholders' consultation, tariff evaluation process, decision by the regulator, and notification procedures. The section implements one of the pillars of tariff setting, which is transparency of the tariff review process.
- (f) **Section Six** highlights the approaches for tariff regulation, including rate of return (cost of service), price cap and revenue cap approaches. It further recommends the most feasible tariff regulation approach for use in developing countries, especially the ESAWAS region.
- (g) **Section Seven** describes the basis for determination of the total amount of revenue required by a Sanitation Service Provider in order to recover all the costs including

costs for operation and maintenance of the system and sustaining the system's present and future viable operations.

- (h) **Section Eight** presents methodologies for allocation of costs for the revenue requirement among different types of customers of sanitation services. The section also highlights tariff design to reflect the cost of providing sanitation service while taking into account issues related to revenue stability, affordability and simplicity of the tariffs to both customers and the sanitation service provider. It further outlines the concepts and application of cost recovery and cost reflectivity concepts.
- (i) **Section Nine** highlights the procedures and methods for monitoring and evaluating the implementation of tariff decisions. It also gives highlights on the possible sanctions and rewards related to performance requirements with a view of improving sanitation services and that customers are getting value for money for the respective sanitation services.

## 2 OVERVIEW OF SEWERED AND NON-SEWERED SANITATION SERVICES

### 2.1 Sanitation Business Models

(a) Categories for tariff determination for sewered and non-sewered sanitation services are dependent on the characteristic of different sanitation business models or their combination. Pursuant to the ESAWAS Regulatory Framework and Strategy<sup>2</sup>, the sewered sanitation services can be provided by four main different business models, namely:

- (i) capture and containment services;
- (ii) conveyance services;
- (iii) treatment and disposal services; and
- (iv) combination of conveyance and treatment services.

On the other hand, non-sewered sanitation services can be provided by three major business models, namely:

- (i) capture and containment services;
- (ii) emptying and transportation services; and
- (iii) treatment, reuse and disposal services.

Each sanitation business model, except for the capture and containment services, has a set of cost components which qualify it to have separate tariffs.

- (b) Based on the nature of each business model, the main service providers for sewered sanitation services are utility (conveyance, centralised treatment services, disposal services, re-use services), private (centralized treatment services), and private/CBOs (re-use services).
- (c) The service providers for non-sewered sanitation services may vary as follows: Households/private/utility (capture and containment), utility/private/CBO (emptying & transportation), utility/private (centralised treatment plant, de-centralised treatment plant), utility/private/CBOs (disposal and re-use).

---

<sup>2</sup> ESAWAS Regulators Association: Regulation Strategy and Framework for Inclusive Urban Sanitation Service Provision Incorporating Non-Sewered Sanitation Services, April 2019

## 2.2 Business Models for Sewered Sanitation

The applicable sanitation service models for a sewered system are summarised in Table 1 and elaborated as follows:

**Table 1: Summary of Sewered Business Model**

Sewered Sanitation Business Models	Investor/ Financier	Service Provider	Customer
Capture and Containment	Customer	Customer	Householder & Non-domestic (commercial, institutions, industries etc.)
Sewage Conveyance	Utility/ Private	Utility/ Private	Householder & Non-domestic (commercial, institutions, industries etc.)
Sewage Treatment	Utility/ Private	Utility/ Private	Not Applicable
Disposal/Re-Use	Not Applicable	Utility	Private/ CBO/ Commercial/ Industries

- (a) **Sewage conveyance model** - is responsible for collection and conveying of wastewater from household, institutions, commercial and industrial customers through a reticulated network of pipes to the wastewater treatment plant. This business model can effectively work if it is combined with the water supply model due to, among other things, having the possibility of charging based on water consumption.
- (b) **Sewage treatment and disposal model** – is responsible for treatment of sewage brought by sewerage pipes and disposal/re-use of treated sewage and disposal/re-use of effluent. This model may be operated by the utility or a private service provider and is responsible for treating waste water from the sewerage system and disposal of treated sewage and effluent. The treatment facility may either be centralised or decentralised.
- (c) **Sewage conveyance and treatment model** – a business model combining sewage conveyance and treatment. Similarly as in (a) above, this model can effectively work if it is combined with the water supply model due to the possibility of having a basis for charging i.e. water consumption.

## 2.3 Business Models for Non-Sewered Sanitation Services

The sanitation service model for non-sewered sanitation include emptying and transport and faecal sludge treatment model as contained in Table 2 and discussed below:

**Table 2: Summary of Non Sewered Business Model**

Non-Sewered Sanitation Business Models	Investor/ Financier	Service Provider	Customer
Capture and Containment	Customer	Householder/ Utility/ Private	Householder & Non-domestic (commercial, institutions, industries etc.)
Faecal Sludge Emptying & Transportation	Utility/ Private/ NGO/ CBO	Utility/ Private/ NGO/ CBO	Householder, institutions, schools, commercial etc
Faecal Sludge/ Sewage Treatment	Utility/ Private	Utility/ Private	Not Applicable
Disposal/Re-Use	Utility/ Private	Utility/ Private	Private/ CBO/ Commercial/ Industries

- (a) **Capture and/or Containment Business Model** - The capture and containment is unique as by nature of the business, the investor for construction of capture and containment facilities and the customer are the same. The Utility, Private or CBO may also provide the services of facilities construction if appointed and paid-for by the customer. The same approach applies to the sewerage business model.
- (b) **Emptying and Transport Business Model** - Emptying can be done manually by using spades and buckets; manually operated mechanical pumping units such as Gulpers, Vacuum pumps; or by using fully mechanized technologies which are powered by electricity, fuel or pneumatic systems. The transportation of sludge is made by standardized or adapted equipment, which may be manual or motorized. Manual and small motorized transport equipment are only suitable for short distances. For long distances, Transfer stations (fixed or mobile) are introduced at an accessible location centrally to the area to be emptied. There are two phases for the operation of transfer stations: primary transport, where the smaller equipment carries the sludge from its origin to the transfer station and a second phase, when the transfer station is full and equipment with higher capacity, such as trucks and storage tanks, collects the sludge and transports it to the treatment facility.

Emptying and transport services can be provided by the licensed Utility or subcontracted out (by permit) to the private/CBOs.

- (c) **Faecal sludge treatment, reuse and disposal model** - This model is responsible for treatment of faecal sludge transported through manual or motorized vehicle and disposal/ re-use of treated sludge and disposal/re-use of effluent. This model may be operated by the utility or a private service provider and is responsible for treating faecal sludge from septic tanks or latrines and disposal of treated sludge and effluent. The treatment facility may either be centralised or decentralised.

## 3 REGULATORY PHILOSOPHY UNDERLYING THE TARIFF GUIDELINES

### 3.1 Introduction

The tariff determination or tariff setting is not a pure science and, as such, significant opportunities for discretion can arise which may in the end undermine the principle of cost reflective tariffs. This discretion is likely to lead to a reduction in investment or the requirement of a higher rate of return for a service provider to undertake investment. Given the need for investment in the water and sanitation sector, it is worthwhile to establish systems that minimize regulatory discretion and so encourage greater investment at as low a cost as possible. Fundamentally, tariff regulation includes three steps, namely; regulation of costs, tariff setting process and final tariffs<sup>3</sup>.

### 3.2 Length of the Tariff Period

The duration of tariff period for incentive-based regime is a multiyear so that the incentives are meaningful. It is advisable that tariff periods should be kept on the short side, at most three years in order to reduce chances of cost differentials which may result into the Service Providers to make significant profits or losses. However, the tariff setting process attracts political risks, hence need to minimise yearly reviews.

### 3.3 Role and Burden of Proof of Submitted Information

The process of tariff determination requires significant information to be available in a timely manner and the Water and Sanitation Service Provider shall be obliged to provide any information as requirement by the Regulator to facilitate determination of the tariff. In all cases when an application or a motion to change a tariff is filed, the burden of proof shall lie with the applicant of the motion.

### 3.4 Affordability and Tariff Design

- (a) The tariff design shall consider a tariff structure for provision of sanitation services in a way that takes into account the viability and sustainability of the sanitation services; and the affordability of basic sanitation to all people in the service area.
- (b) The regulator shall cause and/or conduct periodic affordability studies to determine how each customer group afford sanitation services against the set tariff. However, where such study is not available, as a measure of affordability of tariff bill to the domestic customers, a monthly water and sanitation service bill for domestic

---

<sup>3</sup> World Bank, Tariff Setting Guidelines, Working Paper No. 8, 2009

customers shall not exceed 5% of the total average minimum monthly income of a household.

- (c) The source of data for household income shall be obtained from the national institutions mandated to publish statistics and conducting Household Budget Surveys.

### 3.5 Determining Efficient Costs

The tariff setting under incentive-based regulation requires costs to be forecast for the length of the tariff period combined with projection of the cost components while allowing pass-through costs for those that are beyond the control of the service provider. The regulators may benchmark the projected costs against the costs of other sanitation service providers.

### 3.6 Sanctions Related to Performance Requirements

Economic regulation of utility service providers contains two core tasks, namely tariff setting and the enforcement of performance requirements and service standards to be achieved by the service provider. In this regard, regulators need to establish sanctions for defaulters of performance requirements as service providers may gain by finding a way to reduce costs, which in most cases is by way of reducing the levels of service.

Subject to legal and regulatory environment in the respective country, sanitation regulators in the region, may employ either of the three common types of sanctions, as follows:

- (a) Penalties: the service provider may pay a specified sum of money to the sanitation regulator for each instance of non-compliance with the performance requirements. However, penalties are imposed only to sanitation utilities which have achieved full cost recovery through tariffs for the regulated services. In other words, a penalty shall be imposed on the sanitation business profit/surplus. Where the licensed sanitation service provider is penalised for non-compliance of a delegated service, such a penalty shall be passed through to the contracted party (Private Operator/CBO);
- (b) Compensation to customers: the payments for certain kinds of non-compliance are made by the service provider directly to the affected customers. Where the licensed sanitation service provider is subjected to compensation, for non-compliance of a delegated service, such a penalty shall be passed through to the contracted party (Private Operator/CBO). However, for non-compliance which are caused by an individual or a group of individual staff of the licensed service provider, such a compensation payment shall be made from the budgeted personnel emolument; and
- (c) An adjustment is made to the revenue requirement for the next control period to reflect divergences of performance from specified target values.



## 4 TYPES OF TARIFF APPLICATIONS

The following are the types of tariff applications and circumstances in which they may be applicable.

### 4.1 Multi Year Tariff Application

A Multi Year Tariff is one that is applicable over a period of time normally three years and its determination is based on and in line with a Business Plan period. Under this type, tariffs for each year of a Multi-year period are determined in advance. The multiyear tariff has advantages, including allowing the Consumer to have a fair idea of what to expect in the next three years and the service provider to be able to plan its business.

### 4.2 Provisional Tariff Application

Provisional tariffs refer to those tariffs that are urgently approved without undergoing a comprehensive tariff review process. This may happen when a sanitation service provider cannot submit historical financial and operational data, for instance if it is a newly established utility. Provisional tariffs may be provided for a period of not more than one year.

### 4.3 Extra-Ordinary Tariff Application

The Extra-Ordinary tariff comes before the approved end of the existing tariff period because of unforeseen events that may result in big operational losses.

### 4.4 Automatic Tariff Adjustment

The Automatic Tariff is one that occurs when an extra-ordinary event can be predetermined in percentage terms and thereby be measured against the existing approved revenue requirement and the related costs, such as fuel cost, cost of power, inflation, currency fluctuation which can easily be passed through to the existing customer tariff. Determination of extra ordinary tariff, therefore, does not require a full prudence test to the total revenue requirement. However, automatic tariff adjustment is recommended to be applicable when the effect of the changes exceed 5% of the total revenue requirement.

### 4.5 Tariff Charged by Sanitation Operators

The tariff by operator applies to Sanitation Operators (Private Operators, CBOs) operating in the service area of a Service Provider/ Sanitation Utility. Sanitation Operators shall present their case for tariff review to the Service Provider/ Sanitation Utility and the latter shall submit a formal tariff application to the Regulator on behalf of the Operators. The Sanitation Utility shall be accountable to justify the proposed tariff.

## 5 THE PROCESS: TARIFF REVIEW

### 5.1 Information Requirement

- (a) A detailed multiyear tariff application shall contain the following minimum information requirement:
- (i) Background of an applicant showing the license of the applicant, legal mandate, ownership structure of the applicant and the other entities in which the applicant has an ownership interest; and service area.
  - (ii) The requested regulatory action and the rationale for such action including a statement explaining how the proposed adjustment of the current tariff will benefit the customers.
  - (iii) A summary table of current and proposed tariff.
  - (iv) Assumptions used to project various costs and implementation status of key performance indicators.
  - (v) Information regarding operating and maintenance costs for the past three years and the projected costs for the next three years.
  - (vi) Depreciation for the past three years and an analysis of projected depreciation charge for the next three years.
  - (vii) An analysis of the applicant's proposed rate of return or Weighted Average Cost of Capital (WACC) on its own invested capital.
  - (viii) Information regarding Regulatory Asset Base of an applicant covering the past three financial years prior to the date of the application and the projections for the next three years.
  - (ix) An analysis of the proposed new investment, rehabilitation and replacement costs.
  - (x) Annual subsidies and grants received within the past three financial years prior to the date of the application as well as forecast of the same during the rate or charge period.
  - (xi) Detailed explanatory statement with subordinate schedules that clearly indicate how the proposed rates and charges for each individual customer class were calculated.
  - (xii) Options other than a tariff change considered by the applicant and why each option was not selected.
  - (xiii) The financial implications to the applicant if the requested changes in tariffs are not approved.

- (b) Supporting Documents
  - (i) The implementation status of conditions imposed on the previous tariff Order of the applicant.
  - (ii) Proposed Business Plan
  - (iii) Audited financial statements including the opinion of the auditor, covering the past three financial years and the most recent interim financial statements prior to the date of the application.
  - (iv) Recent report on the valuation of assets (if any).
  - (v) A Cost of Service Study (if any).
  - (vi) Affordability to Pay Study (if any/or as required by Regulator)
  - (vii) Annual report covering the past one financial year and the most recent quarterly reports prior to the date of the application.
  - (viii) Client Service Charter approved by the regulator.

## 5.2 Acceptance of an Application

- (a) Required time from the date of submission until the date of decision on the tariff should be at least 90 days to provide ample time for the regulator to conduct a thorough review and decision on the application.
- (b) Once the application for tariff review is received, the regulator shall acknowledge receipt of such an application.
- (c) The regulator shall conduct a preliminary review to identify any gaps, then the regulator shall communicate to the applicant accepting, referring back or rejecting the application.
- (d) Where the application has been accepted, the date of acceptance shall be considered as the beginning date for processing the application.

## 5.3 Stakeholders' Consultation

- (a) For Tariff regulation to be complete, it involves three elements, namely:
  - i. Regulation of Costs;
  - ii. Tariff Setting Process; and
  - iii. Final Tariff Decision.
- (b) The Tariff Setting Process- depending on legal and regulatory frameworks of a particular country- requires involvement of key stakeholders such as government, consumers, and consumer associations/groups.
- (c) The regulator shall require the service provider to consult its customers on the intention to seek tariff adjustment.

- (d) The regulator shall seek stakeholders' views and comments and consider them in the determination of tariffs for sanitation services.

#### 5.4 Evaluation of the Application

The regulator shall undertake a detailed evaluation of the application.

- (a) Evaluation of the tariff application shall consider:
  - (i) the views of stakeholders during the Public Inquiry process (if any);
  - (ii) tariff setting methodology; and
  - (iii) any other information deemed appropriate.
- (b) Approval or disapproval of an application shall be based upon the regulator's evaluation of the application, which shall be conducted in a fair and transparent manner.
- (c) The sanitation regulator may conduct an exit meeting with the Applicant to review the Draft Decision.
- (d) The sanitation regulator, after consultation with policy makers, shall incorporate the level of subsidy (if any) in the tariff for respective customer categories.

#### 5.5 Tariff Decision

- (a) The regulator shall make a decision on an application within a period as specified in the regulatory instruments, from the date of acceptance of the application.
- (b) A decision of the regulator may be appealed to a dedicated appellate body or a court of law pursuant to and under applicable law of a specific country.
- (c) The approved tariff decision shall remain in effect from the effective date provided until it is superseded by a new regulatory decision.

#### 5.6 Notification to Stakeholders of the Approved Decision

- (a) The decision of the regulator shall be published and posted in public places for public review.
- (b) Copies of the decision of the regulator will be availed to the applicant, consumer group, government and all interveners free of charge.
- (c) The applicant shall notify its customers of the regulator's decision, in a form and manner as prescribed by the regulator.
- (d) The Applicant shall post the notice of Regulator's decision at various strategic locations within its service area showing therein the original tariff and the newly approved tariff.

## 5.7 Tariff Decision Communication Strategy

Sanitation service providers have a duty to communicate the tariffs decisions to the customers they serve and the public in general. The tariff communication strategy has to contain the following elements:

- (a) Provide a description of the levels of service provided by the sanitation service provider so that the consumer understands what they receive in exchange for tariff payments.
- (b) The cost of service provision is provided as a reference against which tariffs have been evaluated. The communication has to elaborate in simple and non-technical language the changes in costs from the previous tariff period or a year.
- (c) Describe the types of consumers served as referred to in the tariff schedules.
- (d) A brief description of how the 'consumption' of services is defined for each service that is the tariff structure and its implications, particularly important for rising block.
- (e) The tariffs charged in current year and previous year are stated.
- (f) Reasons for changes in tariffs are noted. If tariffs are adjusted by more or less than the adjustment in costs, then the reasons for this should be commented on.
- (g) Expected benefits and implication of the tariff decisions.
- (h) Provide real life examples of the calculations of actual bills to help consumers to understand how the tariffs translate into actual bills.

## 6 APPROACHES FOR TARIFF REGULATION

There are three primary approaches for regulating the overall price/tariff level, namely rate of return (or cost of service) regulation, price cap regulation and revenue cap regulation.

### 6.1 Cost of Service or Rate of Return Regulation

The prices/ revenues are based on operating costs plus “fair” rate of return on capital (cost recovery principles). In most cases, the regulator reviews the operator’s overall price level in response to a claim by the operator that the rate of return that it is receiving is less than its cost of capital, or in response to a suspicion of the regulator or claim by a consumer group that the actual rate of return is greater than the cost of capital. However, regulators in some countries practice rate of return regulation by scheduling price reviews in advance, such as conducting an annual price review.

### 6.2 Incentive Regulation - Price Cap Regulation

Price cap regulation, which is sometimes called RPI-X regulation, allows the operator to change its price level according to an index that is typically comprised of an inflation measure,  $I$ , and a “productivity offset,” which is more commonly called the X-factor. It is applied for a longer regulatory period - regulatory lag (3 to 5 years) and it allows retention of efficiency gains. The regulator addresses the quality of service. Typically, with price cap regulation, the regulator groups services into price or service baskets and establishes an  $I - X$  index, called a price cap index, for each basket. Establishing price baskets allows the operator to change prices within the basket as the operator sees fit as long as the average percentage change in prices for the services in the basket does not exceed the price cap index for the basket.

### 6.3 Incentive Regulation – Revenue Cap Regulation

Revenue cap regulation is similar to the price cap regulation in that the regulator establishes  $I - X$  index, which in this case is called a revenue cap index, for services baskets and allows the operator to change prices within the basket so long as the percentage change in revenue does not exceed the revenue cap index. Revenue cap regulation is more appropriate than the price cap regulation when costs do not vary appreciably with units of sales.

### 6.4 Recommended Approach for Tariff Regulation

Incentive regulation using price cap or revenue cap regulation is recommended for utilities which have already attained cost recovery. Since most of utilities in the ESAWAS region have not yet achieved cost recovery levels, it is recommended to use a Rate of Return (Cost of Service) approach for setting sanitation tariffs. However, currently, even for utilities which have attained cost recovery, the regulator can opt for hybrid structures such as a combination of a rate of return and price cap.

## **7 DETERMINATION OF ALLOWED REVENUE**

### **7.1 Cost Components along the Sanitation Chain**

The Guidelines provide a breakdown of cost components along the sanitation chain, that enable unbundling of tariffs for sanitation businesses into capture and containment, conveyance, treatment, emptying and transportation services. For each component, the costs covered are O&M, Depreciation and Return on Investment and the costs may be used in the determination of revenue requirement of each unbundled sanitation segment.

S/N	SANITATION CHAIN	COST ELEMENT	BREAKDOWN OF COST ELEMENTS
A	CAPTURE AND CONTAINMENT	<b>General remarks</b>	Due to the nature of this sanitation chain, the customer is responsible for investment (construction of capture and containment facilities), service provision and is also a consumer. Customers are, therefore, responsible for service provision including operation and Maintenance and Repair of capture and containment facilities.
		<b>(a) O&amp;M Costs</b>	<p><b>Operational and Maintenance cost</b> to be borne by customers shall comprise of:</p> <ul style="list-style-type: none"> <li>• Water</li> <li>• Interior cleaning materials</li> <li>• Maintaining sub and super structure of latrines</li> <li>• Maintaining the pedestal</li> <li>• Cleaning vent pipe</li> <li>• Emptying the pit</li> <li>• Removing of sludge from the septic tank</li> <li>• Repairs</li> <li>• Labour</li> </ul>
			<p><b>Operational and Maintenance cost</b> to be borne by utility shall comprise of Customer Based Costs:</p> <ul style="list-style-type: none"> <li>• promotion of construction of emptiable toilets through awareness creation</li> <li>• design of emptiable toilet technologies to be adopted by municipalities</li> <li>• provision of assistance/subsidy of emptiable toilet units to low income communities i.e. provision of toilet slabs.</li> <li>• data collection and monitoring of non-sewered sanitation services.</li> </ul>
		<b>(b) Investment Cost</b>	<p><b>Investment cost</b> to be borne by customers shall comprise of construction and/or rehabilitation of:</p> <ul style="list-style-type: none"> <li>• latrine or toilet facilities</li> <li>• septic tank and soak away facilities</li> </ul>



S/N	SANITATION CHAIN	COST ELEMENT	BREAKDOWN OF COST ELEMENTS
B	EMPTYING AND TRANSPORT OF FAECAL SLUDGE	(a) O&M Costs	<p>a) <b>Operational cost</b> shall comprise of:</p> <p>(i) Volume Related Costs:</p> <ul style="list-style-type: none"> <li>• Operations of transfer stations</li> <li>• Fuel and lubricants</li> <li>• FS discharge fees</li> </ul> <p>(ii) Customer Related Costs:</p> <ul style="list-style-type: none"> <li>• Labour</li> <li>• Subcontracting</li> <li>• Monitoring operations of emptying and transport of FS</li> </ul> <p>(iii) Fixed Costs:</p> <ul style="list-style-type: none"> <li>• Cost for operator/driver,</li> <li>• Cost of exhauster pipes and fittings</li> <li>• Safety protective gears</li> <li>• Administration costs</li> <li>• Financial Charges</li> <li>• Municipal license fees</li> <li>• Environmental/regulatory and fees</li> </ul>
			<p>a) <b>Maintenance and Repair Costs</b> may include:</p> <p>(i) Volume Related Costs:</p> <ul style="list-style-type: none"> <li>• Repair and maintenance of manual and mechanical emptying equipment</li> <li>• Repair and maintenance of transfer stations</li> <li>• Spare parts</li> </ul> <p>(ii) Customer Related Costs:</p> <ul style="list-style-type: none"> <li>• Repair and maintenance of exhauster trucks.</li> </ul>

S/N	SANITATION CHAIN	COST ELEMENT	BREAKDOWN OF COST ELEMENTS
		<b>(b) Depreciation</b>	<p>The Depreciation cost may be determined from the following assets:</p> <p>(i) Volume Related Costs:</p> <ul style="list-style-type: none"> <li>• Cost of exhauster trucks,</li> <li>• Cost of transfer stations</li> <li>• Cost of manual and mechanical emptying equipment</li> </ul>
		<b>(c) Return on Investment</b>	<p>The Regulatory Asset Base (RAB) which may be included in calculating ROI shall be derived from the following assets:</p> <p>(i) Volume Related Costs:</p> <ul style="list-style-type: none"> <li>• Cost of exhauster trucks,</li> <li>• Cost of manual and mechanical emptying equipment</li> <li>• Cost of transfer stations</li> </ul>
C	SEWAGE CONVEYANCE	<b>(a) O&amp;M Costs</b>	<p>O&amp;M costs shall comprise of, among others, the following cost elements:</p> <p>a) Cost of Operations</p> <p>(i) Volume Related Costs:</p> <ul style="list-style-type: none"> <li>• Electricity for sewage pumps</li> <li>• Operating Costs for Cannon Jets</li> <li>• Wastewater quality testing</li> <li>• Wastewater booster pumps (including electricity costs, labour)</li> </ul> <p>(ii) Customer Related Costs</p> <ul style="list-style-type: none"> <li>• Personnel Costs for Sewer Network Operations</li> <li>• Cost of transport for operations</li> <li>• Billing costs</li> <li>• Revenue collection follow-up costs</li> <li>• Subcontracting</li> <li>• Monitor operations of the sewerage system i.e. using visual inspection or CCTV Cameras</li> </ul> <p>(iii) Fixed Costs</p> <ul style="list-style-type: none"> <li>• Cost for safety protective gear,</li> <li>• Customer survey costs,</li> </ul>

S/N	SANITATION CHAIN	COST ELEMENT	BREAKDOWN OF COST ELEMENTS
			<ul style="list-style-type: none"> <li>• General administration and staff costs</li> <li>• Financial Charges</li> <li>• Board expenses</li> <li>• Licenses, permits and fees</li> <li>• Customer survey costs</li> </ul>
			<p>b) Cost of Maintenance and Repairs of the Sewer Network</p> <p>(i) Customer Based Costs:</p> <ul style="list-style-type: none"> <li>• Repair of pipes and fittings,</li> <li>• De-blocking sewer pipes,</li> <li>• Repair of collapsed sewer lines,</li> <li>• Sewer manholes maintenance,</li> <li>• Cost of vehicle use for maintenance + equipment's (i.e. jetting machines),</li> <li>• Maintenance and Repairs of Cannon Jets.</li> <li>• Spare parts</li> </ul> <p>(ii) Fixed Costs:</p> <ul style="list-style-type: none"> <li>• Wastewater booster pumping buildings, pumps, switch gears,</li> <li>• Maintenance of the management information system (for billing, finance GIS system etc.).</li> </ul>
		<b>(b) Depreciation</b>	<p>The Depreciation cost may be determined from the following assets:</p> <p>(i) Volume Based Costs</p> <ul style="list-style-type: none"> <li>• Pumps and switch gears</li> </ul> <p>(ii) Customer Based Costs</p> <ul style="list-style-type: none"> <li>• Major Repairs for Sewer Network</li> <li>• Sewer networks</li> <li>• Sewer manholes</li> <li>• Water Cannon Jet Trucks</li> </ul> <p>(iii) Fixed Costs</p> <ul style="list-style-type: none"> <li>• Pumping Stations</li> <li>• Civil Works</li> </ul>

S/N	SANITATION CHAIN	COST ELEMENT	BREAKDOWN OF COST ELEMENTS
		(c) <b>Return on Investment</b>	<p>The Regulatory Asset Base (RAB) which may be included in calculating ROI shall be derived from the following assets:</p> <ul style="list-style-type: none"> <li>(i) Volume Based Costs <ul style="list-style-type: none"> <li>• Pumps and switch gears</li> </ul> </li> <li>(ii) Customer Based Costs <ul style="list-style-type: none"> <li>• Major Repairs for Sewer Network</li> <li>• Sewer networks</li> <li>• Sewer manholes</li> <li>• Water Cannon Jet Trucks</li> </ul> </li> <li>(iii) Fixed Costs <ul style="list-style-type: none"> <li>• Pumping Stations</li> <li>• Civil Works</li> </ul> </li> </ul>
D	SEWAGE/FAECAL SLUDGE TREATMENT	(a) <b>O&amp;M Costs</b>	<p>a) Operational Costs shall include:</p> <ul style="list-style-type: none"> <li>(i) Volume Based Costs <ul style="list-style-type: none"> <li>• Electricity costs for use within the treatment plant</li> <li>• Operation of plant equipment</li> <li>• Chemical costs for advanced waste treatment technologies</li> <li>• Wastewater laboratory costs</li> <li>• Waste/sludge disposal fees</li> <li>• Fuel and lubricants</li> </ul> </li> <li>(ii) Fixed Costs <ul style="list-style-type: none"> <li>• Personnel Costs for Operations</li> <li>• Safety protective gear</li> <li>• Vehicle used for operations</li> <li>• General administration costs</li> <li>• Financial Charges</li> <li>• Board expenses</li> <li>• License, environmental permits, and regulatory fees.</li> </ul> </li> </ul>

S/N	SANITATION CHAIN	COST ELEMENT	BREAKDOWN OF COST ELEMENTS
			<p>b) Maintenance and Repair Costs may include:</p> <p>(i) Volume Based Costs</p> <ul style="list-style-type: none"> <li>• Maintenance and repair of treatment plant equipment</li> <li>• Maintenance and repair of ponds</li> </ul> <p>(ii) Fixed Costs</p> <ul style="list-style-type: none"> <li>• Cost of vehicle use for maintenance</li> <li>• Civil works within the plant,</li> <li>• Maintenance of the management information system (for billing, finance etc.)</li> <li>• Access roads to the treatment plant.</li> </ul>
		<b>(b) Depreciation</b>	<p>The Depreciation cost may be determined from the following assets:</p> <p>(i) Volume Based Costs</p> <ul style="list-style-type: none"> <li>• Major Repairs for the Treatment Plant</li> </ul> <p>(ii) Fixed Costs</p> <ul style="list-style-type: none"> <li>• Land</li> <li>• Treatment plant and equipment</li> <li>• Civil works within the plant</li> <li>• Vehicles used for treatment services</li> </ul>
		<b>(c) Return on Investment</b>	<p>The Regulatory Asset Base (RAB) which may be included in calculating ROI shall be derived from the following assets:</p> <p>(i) Volume Based Costs</p> <ul style="list-style-type: none"> <li>• Major Repairs for the Treatment Plant</li> </ul> <p>(ii) Fixed Costs</p> <ul style="list-style-type: none"> <li>• Land</li> <li>• Treatment plant and equipment</li> <li>• Civil works within the plant</li> <li>• Vehicles used for treatment services</li> </ul>

S/N	SANITATION CHAIN	COST ELEMENT	BREAKDOWN OF COST ELEMENTS
E	DISPOSAL & RE-USE OF EFFLUENT/ SLUDGE	<b>General Remark</b>	A Sanitation Utility is responsible for disposal of effluent and sludge into the environment and water bodies or may sell the same to beneficial use such as agricultural fertilizers or biomass for energy generation.
		<b>O&amp;M Costs</b>	a) Operational Costs include: <ul style="list-style-type: none"> <li>(i) Volume Based Costs               <ul style="list-style-type: none"> <li>• Effluent and treated sludge disposal fees;</li> <li>• Treated sludge transport costs to disposal sites</li> </ul> </li> <li>(ii) Fixed Costs               <ul style="list-style-type: none"> <li>• Electricity</li> <li>• Labour</li> <li>• Marketing and awareness creation costs for re-use of effluent and treated sludge</li> </ul> </li> </ul> b) Maintenance and Repair Costs include: <ul style="list-style-type: none"> <li>(i) Volume Based Costs               <ul style="list-style-type: none"> <li>• Maintenance of treated sludge storage facilities</li> </ul> </li> </ul>
		<b>Depreciation</b>	The Depreciation cost may be determined from the following assets: <ul style="list-style-type: none"> <li>(i) Volume Based Costs               <ul style="list-style-type: none"> <li>• Treated sludge storage facility</li> <li>• Treated sludge transport facilities</li> </ul> </li> <li>(ii) Fixed Costs               <ul style="list-style-type: none"> <li>• Land</li> </ul> </li> </ul>
		<b>Return on Investment</b>	The Regulatory Asset Base (RAB) which may be included in calculating ROI shall be derived from the following assets: <ul style="list-style-type: none"> <li>(i) Volume Based Costs               <ul style="list-style-type: none"> <li>• Treated sludge storage facility</li> <li>• Treated sludge transport facilities</li> </ul> </li> <li>(ii) Fixed Costs               <ul style="list-style-type: none"> <li>• Land</li> </ul> </li> </ul>

## 7.2 Revenue Requirement

- (a) One of the basic methods for setting Revenue Requirement is Rate of Return (RoR) methodology, also known as cost-plus (or cost of service) regulation. The methodology allows the regulated service provider to cover their operating expenses, taxes and depreciation, and to ensure a fair rate of return (profit) on assets utilised for service provision.
- (b) Cost components that qualify to be allowed to form part of a Service Providers' revenue requirement shall satisfy three general principles.
  - (i) **Prudence Principle** – requires use of reasonable judgment, in light of the current facts known at the time the tariff decision was made to accomplish the desired result at the lowest reasonable cost and in a reliable, safe, and timely manner. The burden of proof to show that an operating or investment decision is prudent is on the service provider making the request for a change in the revenue requirement.
  - (ii) **Known and Measurable Principle** - requires that the service provider shall justify with documentation, facts, and rationale those costs it wishes its customers to reimburse. The service provider shall prove that all the costs it is requesting to recover are measurable (or can be estimated), legitimate and necessary for its operations
  - (iii) **Used and Useful Principle** - requires that an **asset** shall be used and useful in the provision of a product or service in order for that asset to earn a return that will be included in the revenue requirement.
- (c) The Sanitation Regulator shall approve revenue requirement to the extent that the regulator finds the rationale supporting them to be reasonable. The burden of proof is upon the applicant to demonstrate to the regulator's satisfaction the reasonableness of any proposed revenue requirement.
- (d) The sanitation regulator may classify costs incurred by the service provider as controllable and non-controllable and they will be treated as follows:
  - (i) Controllable costs, the regulator may set the targets for each year under review and certain controllable costs may be indexed to appropriate indices such as Consumer Price Index (CPI).
  - (ii) Non-controllable costs as checked and verified by the regulator with due diligence and prudence shall be treated as pass-through when they exceed a set tolerance threshold.
- (e) In determining the revenue requirement, regulated Utilities shall build the revenue requirement for each year of the multiyear period in accordance with the following formula.

$$RR_t = OM_t + D_t + T_t + WACC \times RAB_t (+/-) \text{ Adjustment}$$

RR <sub>t</sub>	=	Revenue Requirement for year t;
OM <sub>t</sub>	=	Operation and Maintenance expenses in year t;
D <sub>t</sub>	=	Depreciation charge in year t;
T <sub>t</sub>	=	Taxes (if any) in year t;
WACC	=	Weighted Average Cost of Capital; and
RAB <sub>t</sub>	=	Regulatory Asset Base in year t.

- (f) The determination of a revenue requirement for a multi-year tariff period (control period) is achieved by the following basic steps:
- (i) Build the revenue requirement for each year of the forthcoming multi-year tariff period. This is done by taking the sum of the following items for each year, based on targets or forecasts developed in accordance with the following chapters of the Guidelines:
    - Operation and maintenance costs
    - Taxes and fees;
    - capital maintenance charge; return on investment, which is equal to (RAB including working capital) x allowed rate of return;
    - any corrections to be applied from previous control periods.
  - (ii) Determination of revenue requirement projections in the tariff period, the sanitation service provider shall submit a test year revenue requirement. The Test Year shall reflect financial and operating conditions under a normal year. The starting point of establishing the test year revenue requirement shall be audited financial statements which shall then be normalized (that is, to make the costs reflect a normal year). Things to consider when carrying out normalization include, among others, whether in the year of audited accounts there have been disconnection of services due to pump breakdown or pipe breaks, under-dosage of chemicals, or other non-compliances to guidelines, and any other underspending due to financial constraints.
  - (iii) The revenue requirement for future years shall be estimated by adjusting the test year based on “known and measurable” criteria to reflect typical or expected future financial and operating conditions of the utility. Things to consider when making adjustment include, among others, projected price increases or inflation, projected increase in facilities and customers, increase in personnel, targeted key performance indicators, and general increase in scale or change of scope of the business.



- (iv) The projected expenditure for sanitation determines the revenue requirements whereas tariffs, volumes and customer numbers determine actual revenue. Once the revenue requirement is determined it can be compared to the revenue from tariffs. These tariffs are made up of fixed charges, unit (per m<sup>3</sup>) charges and other charges.
- (v) The gross revenue requirement is adjusted for other revenues such as new connection revenue and trade effluent revenue. These are subtracted from the revenue requirement leaving a net revenue requirement to be satisfied from the tariffs.
- (vi) The net revenue requirement is then divided by the projected billing volume, the result of which is the “average tariff”.
- (vii) All monetary values (tariffs, costs, revenues) are set in constant prices of the current year (the base year) with the exception of data relating to the ‘previous year’ which is set in terms of the prices of that year (i.e. in nominal prices).

### 7.3 Operation and Maintenance (O&M) Expenses

The allowed O&M costs for the tariff period shall be based on information provided in the service provider’s business plan. Estimates shall be made using some combination of past costs, benchmarking with similar service providers in the country, and regional or international benchmarks.

### 7.4 Depreciation Charge

- (a) The determination of depreciation charge shall be on all assets in service, irrespective of the source of financing. The total projected depreciation expense shall be the aggregate of depreciation for three groups of assets: existing assets, assets turned over from current work in progress balance and assets turned over from work in progress projected for the tariff period.
- (b) Funds allowed for depreciation shall be used for replacement and/or renewal and or rehabilitation of assets and may also be used for new investment asset renewal, rehabilitation upon serviceability and risk criteria, within the context of asset management planning.
- (c) Depreciation charge shall be calculated by using the straight line depreciation method based upon the remaining useful life of the asset as indicated in the formula below.

$$D = \frac{C - RV}{EL}$$

where

- D = Depreciation Charge
- C = Cost or Revalued Asset Value
- RV = Estimated Residual Value, and
- EL = Estimated Economic Life

- (d) Regulators shall issue a guiding schedule of useful life for various regulatory assets used in the provision of sanitation services.

## 7.5 Taxes

- (a) Where the sanitation service provider is subjected to levies, corporate taxes and similar taxes, that amount shall be included in its revenue requirement.
- (b) VAT and any other indirect taxes shall be assumed as being part of the proposed Operation and Maintenance (O&M) and investment costs.

## 7.6 Regulatory Asset Base

- (a) The Regulatory Asset Base (RAB) represents the value of the investment made in productive and financial assets necessary for provision of sanitation services. The RAB includes the working capital necessary for the service provider's regulated activities. However, it excludes financial and other investments (e.g., land and buildings) not essential to the provision of the sanitation services; it also excludes financial assets beyond the requirements for working capital. Some assets of the service provider such as management information system and headquarters office may be shared between different regulated activities (e.g. sanitation services) and will need to be allocated between these activities.
- (b) The sanitation service provider may be required to provide evidence that all assets constituting the Regulatory Asset Base were prudently designed, competitively procured and/or constructed, and whether good industry practice was followed, demand projections were reasonable and timing of construction was appropriate.
- (c) The source of data for determination of the starting RAB and projected RAB shall be the audited Statement of Financial Position and projected statement in the Business Plans of the service provider.

- (d) All assets that were funded by government grants and customer funds are excluded from the RAB because they do not form part of the service provider’s investment and are not supposed to earn a return.
- (e) Only Used and Useful assets shall be considered in arriving at a justifiable level of RAB. That is, assets that are used and useful in the provision of sanitation services in order for that asset to earn a return, will be included in revenue requirement and tariff.
- (f) RAB shall be determined using the following formula:
  - (i) RAB shall be computed as follows:

$$RAB = NCA + Grant + AWC$$

Where

- NCA = Non-current assets
- Grants = Grants or any third party contribution
- AWC = Allowable working capital

- (ii) Noncurrent assets shall include Property, Plant and Equipment (PPE) and intangible assets.
- (iii) Working Capital Working Capital shall be computed as follows:

$$WC = CA - CL$$

Where:

- WC = Working Capital
- CA = Current Assets
- CL = Current Liabilities

- (iv) The service provider shall include in its RAB up to the maximum 45 days of working capital which is equivalent to the annual Operation and Maintenance Expenses divided by eight, i.e.:

$$Allowable\ Working\ Capital \leq \frac{Annual\ O\&M\ Expenses}{8}$$

### 7.7 Weighted Average Cost of Capital (WACC)

- (a) The existing assets that are employed in the provision of sanitation services needs to be remunerated through the allowed reasonable return of investment for the service provider. The projected level of return on investment (profit) depends on two elements: the RAB and the allowed rate of return (WACC).
- (b) Weighted Average Cost of Capital (WACC) for sanitation service providers shall be set such that the service provider is capable of paying the annual cost of debt and

provides a fair return for the total equity employed to finance facilities used in provision of sanitation services.

- (c) WACC shall be determined as described in the following formula:

$$WACC = r_D \times (1 - t) \times \left(\frac{D}{V}\right) + r_E \times \left(\frac{E}{V}\right)$$

Where:

- r<sub>D</sub> = cost of debt
- 1-t = tax adjustment for interest expenses
- D = total value of debt
- V = total value of capital
- r<sub>E</sub> = cost of equity
- E = total value of equity

- (d) During determination of WACC, the following main elements shall be established.

- (i) **Capital Structure (Gearing):** indicates the share of equity and debt and shall be determined by using Statement of Financial Position.
- (ii) **Equity:** constitutes own generated funds.
- (iii) **Debt:** constitutes long term debt from commercial banks or government (sub-loan).
- (iv) **Return on Equity (Cost of Equity)** in the **absence** of mature financial market may be computed as the average of 10-year Central Bank monthly bank rates (discount rates) provided by Central Banks.
- (v) **Return on Debt (Cost of Debt)** shall be computed as the weighted average of the nominal interest rates quoted in the loan instruments. The Return on Debt shall be computed using the following formula:

$$r_d = \sum^n w_i r_i$$

Where:

- r<sub>d</sub> = Return on Debt
- r<sub>i</sub> = Nominal interest rate on loan
- w<sub>i</sub> = Weights of the constituent loan

## 7.8 Determination of Replacement, Rehabilitation and Investment Costs

The Sanitation Service Provider shall be allowed to undertake replacement, rehabilitation and implementation of new investment, which costs shall be limited by the estimated value of the sum of return on investment (ROI) and depreciation charge.

## 7.9 Treatment of Government and Donor Grants and Customer Contributions

As noted earlier, it is straightforward to address new government grants and customer contributions but more problematic for existing ones. This is primarily because poor accounting systems lead to a lack of knowledge about which assets a utility has, let alone how they were funded. Of course, if good accounting information exists then this should not be a problem and the appropriate asset values should be subtracted from the RAB.

Generally speaking, assets funded by government grants and customer contributions (outside tariffs) are excluded from the RAB because they do not form part of the utility's investment.

## 7.10 Cost Allocation between Water and Sanitation Businesses

Generally, each of the sanitation business model explained in section 2 may have a revenue requirement and ultimately a tariff determined. For a business model which combines water and sanitation services, it is possible to determine revenue requirement for each component by booking water and sanitation costs in their respective cost centers while cost allocation will be done for common expenditure items between water and sanitation. The cost allocation is applicable for all common costs namely operation and maintenance costs, depreciation and a return on investments.

- (a) The objective of allocating costs between water supply and sanitation services is to ensure that total sanitation charges should match total sanitation required revenue, and total water charges should match total water supply required revenue. This means that, in an ideal situation, there should not be cross subsidy between the two activities. It is therefore necessary to unbundle the cost centers water supply and sanitation (as two separate units), as well as to record separate (indirect) costs of common administrative services such as accounting service, commercial service, and legal services. The basis for cost allocation should be agreed upon by the sanitation service provider's management and as a guide the following criteria may be considered:
  - (i) Vehicles and their associated costs may be separated by the principal use of each vehicle as indicated in the vehicle logbooks;
  - (ii) Direct identification of service costs from invoices, e.g. electricity bills for pumping (identified by pumping station and purpose of pumping (water or wastewater), wastewater quality testing bill;
  - (iii) Number of connections for water or sanitation services, e.g. for allocation of meter reading, billing costs and maintenance;
  - (iv) Depreciation of fixed assets (according to the function of asset, which of the services provided by the utility it assures- examples of sanitation assets include wastewater collection systems (sewers), wastewater treatment and disposal systems, sludge management and treatment equipment.

- (v) Staff numbers and their responsibilities for water or sanitation, e.g. for allocation of total salary bill; and
- (vi) Shared asset related costs may be separated based on the split of assets between water and sanitation, for instance head office buildings, IT systems, vehicles for maintenance, workshops/depots and warehouses.

### 7.11 Smoothing of Revenue Requirement

Based on demand forecasts, determine a smoothed tariff profile over the control period that yields the same present value of revenue. This is done to help avoid fluctuations of the tariff over the control period, which might occur if the annual revenue requirements were translated directly into annual allowed revenue.

The smoothing must be done, however, in an NPV-neutral manner (i.e., the NPV of the allowed revenue remains the same even if the time pattern changes). The annual revenue figures that emerge from this step constitute the *allowed annual revenue*. However, the allowed revenue in any year must at least equal the estimated O&M costs for that year and that allowed revenue must permit the sanitation service provider to meet lender’s obligations.

### 7.12 Revenue Projections

Service Providers can distribute the allowed annual revenue requirement as per Table 3 (minus Other Revenue) in the determination of the tariff/price/charge to be applied:

**Table 3: Revenue Projections – quantity x price**

	Quantity	Price
<b>Capture and Containment</b>	Number of individual household toilets	Construction Charge
	Number of shared household toilets	Construction Charge
	Number of community/public toilets Number of people served	user fee per visit
<b>Emptying and transport</b>	Number of containment units (individual/shared septic tanks, individual/ shared pit latrines, transfer stations etc)	Emptying fee per storage unit / m <sup>3</sup> by type of emptying method (manual, motorised)
		Emptying fee per trip
<b>Conveyance</b>	Number of connections	Price per m <sup>3</sup>
	Volume of wastewater	
<b>Treatment</b>	Volume discharges	Discharge fee per m <sup>3</sup>
	Number of discharges in a given period	Discharge fee per day/month
<b>Other Revenue</b>	Sales biogas	Per unit
	Sales soil cond./humus/compost	Per kg
	Sales reclaimed water	Per m <sup>3</sup>
	Subcontracted out services not collected via water bill	Percentage of turnover
Leasing fee		

## 8 TARIFF DESIGN

### 8.1 Characteristics of a Good Tariff

- (a) An ideal tariff should be simple and easy to understand. Consumers should be able to look at the tariff and easily calculate the size of the bill that they will receive based on this tariff.
- (b) The tariff should provide revenue stability. This basically means that when use of the service changes, revenues and costs change by approximately equal amounts. If this does not happen, service providers can encounter cash flow problems.
- (c) The tariff should be easy to implement. A good tariff should preferably not require complex billing procedures or administration.

### 8.2 General Guidance for Designing Tariff Structure

Designing an efficient tariff structure can be done through the following three stages:

(a) Stage One: Submission of Tariff Application and Information Collection

The first step for review of the tariff structure, involves the sanitation service provider and the sanitation regulator to gather information about the current activity of the service provider (present and projected operating costs, assets, and investment plans), the demand forecasts (trend analysis, statistical analysis) and feedback from consumers on the actual service and price through consultation.

(b) Stage Two: Evaluate Adequacy of Existing and Proposed Tariff Structure

The second step is for the sanitation regulator to conduct an assessment of the submitted revenue requirement which are expected to cover operating and maintenance costs, depreciation and a return on investment. In this stage the regulator evaluates whether current tariffs are sufficient to cover costs or whether there needs to be an overall tariff increase or decrease in order to achieve cost-covering tariffs.

(c) Stage Three: Regulatory Tariff Decision

Where revenues from tariffs do not cover the full cost of service, then cross subsidization among the customer categories may be considered and where the Government Policy require provision of subsidy then subsidies have to cover the difference.

The third stage involves presentation of the regulatory tariff decision through publication and share the decision with key stakeholders as well as the general public. Depending on the regulatory framework of a particular country, the regulatory decision

may be subjected to appeals if the operator or any other stakeholder disagrees with the tariff decision by the sanitation regulator.

### 8.3 Cost Recovery and Cost Reflective Tariff in Sanitation Services

Cost recovery and cost reflectivity are two different terms as detailed below.

**(a) Cost Recovery** may be defined as a revenue stream sufficient for a water/wastewater service provider to finance its activities in accordance with its statutory obligations. This means that the service provider should be able to secure sufficient income to meet its operating costs, capital maintenance commitments and generate a return on capital sufficient to attract the necessary loan or investment finance to ensure that the level of service satisfies agreed standards and expectations. Cost recovery should reflect reasonably efficient costs and should not finance inefficient costs. The goals of cost recovery in sanitation services are:

- (i) to ensure sufficient revenue to deliver services over the long term;
- (ii) to ensure sufficient revenue to support improved quality of services;
- (iii) to ensure sufficient revenue to support extending service coverage, particularly to serve low-income and unserved consumers;
- (iv) to ensure better use of scarce water resources and management of waste water disposal to conserve the natural environment by signalling to consumers the cost to the economy of the resources used by the services.

The recommended roadmap towards progressive attainment of full cost recovery tariffs<sup>4</sup> are as follows:

- (i) Tariffs to cover total O&M Costs (minimum target);
- (ii) Tariffs to cover O&M Costs plus Depreciation; and
- (iii) Tariffs to cover O&M Costs, Depreciation and Return on Investments.

The cost recovery roadmap should be vividly outlined in service provider's Business Plans taking into considerations of the goals mentioned above.

**(b) Cost Reflectivity** is a charging system which requires that each consumer (or consumer group) should incur charges that reflect the costs that they impose on the system. In other words, under cost reflectivity practical terms consumers are generally grouped into similar types and their charges are set to reflect the costs that they as a group impose.

---

<sup>4</sup> Table 3.1, Guidelines for User Fees and Cost Recovery for Urban, Networked Water and Sanitation Delivery, African Development Bank, October 2010 and Consultants' Interpretation.



Regulators should aim at ensuring that utilities attain cost recovery while implementing tariffs which are cost reflective by taking into consideration equity issues through cross subsidization. For example separating water and sewerage tariffs is a move towards cost reflectivity.

## 8.4 Sewage Conveyance Tariff Design

### (a) Customer Categories

The sewage conveyance business model should be combined with water supply services. The customer categories for sewage conveyance business should be similar to customers of the water supply services (for easy monitoring and billing), and number of customer categories for wastewater disposal shall not exceed four (4). The recommended customer categories are as follows:

- (i) **Domestic Customers** are customers in premises built for or adapted to be used for human residential habitation.
- (ii) **Commercial Customers** are customers providing service to the public in any property that is used primarily for the conduct of a trade or business for profit.
- (iii) **Institutional Customers** are entities occupying properties for governmental purposes, non-profit making organizations such as hospitals, schools, day care centers, religious institutions and any other statutorily created body.
- (iv) **Industrial Customers** are entities operating in premises in which the principal activity carried out involves the making, altering, blending, ornamenting, finishing, or otherwise treating or adapting any article or substance with the intent to sell, transport, or deliver such articles elsewhere.

### (b) Determination of Sewage Conveyance Tariff

The sewage conveyance tariff is determined by the following steps:

#### (i) *Determination of Revenue Requirement for Conveyance (RRc)*

The revenue requirement for conveyance services is determined by using the formula outlined in Section 7 and cost components (O&M, D, & RoI) as detailed in section 7.1 (C).

#### (ii) *Determination of Volume of Sewage (VS)*

Since the water consumption for individual customers is known either through metered consumption or estimated water consumption, it is appropriate to apportion the revenue requirement for sewage conveyed to the treatment, relative to metered water consumption, though possibly with an allowance for non-returned (to sewer) water of approximately 20%. The total revenue collected remains the same but it is charged on 80% of the water consumed in order to help the customer understand that the charges are fair. Customers who

are not connected to the water supply system but have private water sources (private) and are disposing/intending to dispose their sewage in the central sewage system, should be compelled to install water meters (under inspection of the water utility) at an appropriate point (i.e. at the pumping main from the borehole). The water meter should be read by the utility similar to other meter readings and should only be booked for computation of sewage charges.

(iii) *Computation of Cost Recovery Tariff (CRT)*

The cost recovery tariff is computed by dividing total revenue requirement for sewage services by the total quantity of conveyed sewage (RRc/VS).

(iv) *Apportioning of Costs and Tariff Design*

The apportioning of the obtained revenue requirement (costs) among categories with aim of progressively moving towards cost recovery while ensuring affordable tariff for domestic wastewater customers. Table 4 shows a proposal for apportioning of costs among customer categories which can be considered for adoption.

**Table 4: Proposal of Apportioning of Cost of Conveyance Customer**

No	Customer Category	Apportioning of Costs & Tariff Design
1	Domestic Customers	Shall cover costs related to conveyance of sewage limited to its affordability. Tariff = $RRc/VS(1-X\%)$ , where X = level of subsidy from industrial customers based on affordability study.
2	Commercial Customers	Shall cover all costs related to conveyance of sewage. Tariff = $RRc/VS$
3	Institutional Customers	Shall cover all costs related to conveyance of sewage. Tariff = $RRc/VS$
4	Industrial Customers	Shall cover all costs related to conveyance of sewage and subsidy to domestic customers. Tariff = $RRc/VS(1+X\%)$ , where X = level of subsidy to domestic customers based on affordability study

The tariff design for sewage conveyance services for each customer category shall be similar to the tariff design for provision of water supply services. The recommended tariff design is the two-part tariff, which contains fixed tariff and variable tariff. The recommended variable component of the tariff is a uniform tariff. Fixed costs may cover customer service costs such as meter reading, revenue collection and billing.

## 8.5 Determination of Sewage & Faecal Sludge Treatment and Disposal Tariff

The revenue requirement for sewage and/or faecal sludge treatment and disposal are computed together. The sewage and/or faecal sludge treatment and disposal tariff is determined by the following steps:

(a) *Determination of Revenue Requirement for Sewage and/or Faecal Sludge Treatment and Disposal (RRtd):*

The revenue requirement (RRtd) for sewage and faecal sludge treatment services is determined by using the formula outlined in Section 7 and cost components (O&M, D, & Rol) as detailed in section 7.1 (D) by subtracting revenues from re-use services.

(b) *Determination of Volume of Sewage and/or Faecal Sludge*

If the operator of the wastewater treatment plant is the same operator for water supply and sewage conveyance system (Sewage conveyance and treatment model), the volume of sewage to be treated will be determined as in 8.4(b)(ii).

If the sewage treatment is separately operated (sewage/faecal sludge treatment model), sewage delivered by sewer pipes may be measured by either a Venturi tube, Parshall flume or Kennison Nozzle after screening at the treatment inlet works. By estimation, the volume of faecal sludge brought by exhaust trucks will be equal to the volume of exhauster truck or any delivery container.

(c) *Computation of Cost Recovery Tariff (CRT)*

The cost recovery tariff for sewage and/or faecal sludge treatment and disposal service is computed by dividing total revenue requirement for sewage and/or faecal sludge treatment services by the total quantity of sewage and/or faecal sludge brought in for treatment (RRtd/VS).

(d) *Customer Categories*

Customers for wastewater treatment are categorized similar to wastewater conveyance and water customers. However, in wastewater treatment, they may be further re-categorized according to the nature of wastewater to be treated as follows:

- (i) Larger (industrial) consumers: These are individual industrial consumers whose charges will be site specific/based because the quality of effluent might be materially different from average wastewater quality (design wastewater quality).
- (ii) Industrial customers: These are the remaining industrial customers who do not fall in a group of large industrial customers with the quality effluent which is not likely to be materially different from the average wastewater quality. This group includes customers who deliver waste from latrines and septic tanks by cesspit emptiers/ or other containers to the waste water treatment facility.

- (iii) Domestic customers: this category constitute of domestic customers, commercial customers and institutional customers whose wastewater quality is almost similar to the quality of domestic wastewater quality.

(e) *Apportioning of Costs among Customers*

The proposed apportioning of cost between different customer categories is as shown in Table 5.

**Table 5: Proposal of Apportioning of Costs Wastewater Treatment Customer**

No	Customer Category	Apportioning of Costs and Tariff Design
1	Domestic Customers	Shall cover costs related to sewage and/or faecal sludge treatment limited to its affordability. Tariff = $RRt/VS(1-X\%)$ , where X = level of subsidy from large industrial customers based on affordability study.
2	Industrial Customers	Shall cover all costs related wastewater treatment. Tariff = $RRt/VS$
3	Large Industrial Customers	Shall cover all costs related to wastewater treatment and subsidy to domestic customers. Tariff = $RRt/VS(1-X\%)$ , where X = level of subsidy from large industrial customers based on affordability study.

The apportioning of costs among Domestic and Industrial wastewater customers categories will aim at progressively moving towards cost recovery while ensuring affordable tariff for domestic wastewater customers. The recommended tariff design is the two-part tariff, which contains fixed tariff and variable tariff. The recommended variable component of the tariff is a uniform tariff. Fixed costs may cover customer service costs such as quality tests for wastewater.

For utilities which are not in position to use Mogden Formula (see (f)), the fixed tariff for large industrial customers should be higher than the remaining customers in order to take into consideration extra costs which will be incurred by the utility due to increased monitoring of their wastewater to ensure that it does not go beyond the allowable limit for the respective treatment plant.

(f) *Surcharge for Heavy Polluting Customers*

Wastewater from non-domestic customers (especially industrial customers) tend to be heavily polluted than wastewater from domestic customers thus requiring more effort in its treatment. This means that tariffs for non-domestic customers should reflect the costs of treatment, which will depend upon the volume and strength of the wastewater that is taken away and/or treated. One approach for computation of surcharge on

customers discharging varying strength effluents is through a formula (often referred to as the Mogden Formula). The sewage treatment surcharge serves as a deterrent (polluter pays principle) and not to be treated as regular revenue for the utility. The ideal is that the industries put up pre-treatment facilities. Utilities will have to establish a maximum limit of BoD and SS that it can take in beyond which the industry will be disconnected from the sewerage system.

(g) Use of Mogden Formula

Utilities should aim to use Mogden Formula<sup>5</sup> or other similar formula for computation of sewerage surcharge on top of sewerage charge which is dependent on volume and quality of sludge produced.

## 8.6 Non-Sewered Sanitation Tariff Design

### 8.6.1 Capture and Containment Services

One of the obligations of the regulator's role is to ensure the achievement of SDG 6.2. Among the reasons for low sanitation coverage and poor quality of sanitation service include non-availability of technically sound options of capture and containment facilities and high construction costs. Furthermore, it is evident that the quality of faecal sludge which is ultimately fed into the wastewater treatment plants (which are mostly operated by utilities) depends, partially on the quality of capture and containment facilities.

(a) **Tariff Design for Capture and Containment Services**

The revenue requirement methodology, hence tariff design for capture and containment services may not be applicable in the case of capture and containment services due to the nature of the business where the investor (construction of capture and containment facilities), service provider and customer are the same.

It makes no sense to think of controlling the price of self-dug pit latrines or regulating the quality of service provided to householders by their own septic tanks.

(b) **Creating Competition to Regulate Construction Costs and Quality**

The regulator, in this case, may intervene by promoting competition through implementation of the following strategies:

- (i) Prepare and publish technical options for capture and containment technologies and require that service providers sensitize and promote the technologies to consumers in their service areas;

---

<sup>5</sup> <https://www.ofwat.gov.uk/nonhouseholds/yourwaterbill/hownonhousehold/#trade>

- (ii) Require service providers to maintain, update and publicise a register of qualified artisans for constructing capture and containment facilities for the public to negotiate and choose from; and
- (iii) Require service providers to assign a toll-free help line for sanitation customers so as to assist customers during negotiation/ choosing of service providers when requested.

### 8.6.2 Emptying and Transportation Services

#### (a) Tariff Design for Manual/ Mechanical Emptying and Primary Sludge Transport Services

The revenue requirement methodology and tariff determination may not be applicable in the case of manual/mechanical emptying and primary sludge transport services because of varying conditions of business implementation within the same area i.e. accessibility, condition of the toilets, nature of the sludge (it is at times mixed with solid waste) etc. An attempt to employ a common tariff or pricing methodology for charging or costing manual/mechanical emptying and primary sludge transport services is difficult due to non-homogeneity and nature of the business, specifically:

- (i) Significant variation of composition of contents to be emptied;
- (ii) Variation of quality of capture and containment facilities;
- (iii) Different conditions and quality of access to the capture and containment facilities;
- (iv) Methods used in emptying faecal sludge; and
- (v) Difficulty in measuring quantity of emptiable contents.

However, through experience and depending on the extent of the above-mentioned factors in a particular area, a charge per bucket of emptied sludge may be determined. The customer should be prepared for potential extra charges due to (i) unexpectedly high volume of pit; (ii) high solid waste content; (iii) unanticipated difficulties in emptying the pit<sup>6</sup>.

---

<sup>6</sup> Standard Operating Procedures for Improved Faecal Sludge Management In Kisumu County, County Government of Kisumu, May 2017

**(b) Creating Competition for Manual/ Mechanical Emptying and Primary Sludge Transport Services**

In order to facilitate and promote competition, the sanitation service provider may design and/or create service area zones and assign to the emptiers through a bidding process. In this case, a tariff can be set as ceiling (cap tariff) to allow for competition among the emptiers hence protecting customer interest.

The regulator in this case may intervene by promoting competition through implementation of the following strategies:

- (i) Require sanitation service providers to create service area zones, prepare performance contracts and assign emptiers through a competitive process;
- (ii) Require service providers to maintain, update and publicize a register of qualified operators for emptying and primary transport for the public to negotiate and choose from;
- (iii) Require service providers to prepare and publish technical options for emptying and primary transport technologies and that service providers sensitise and promote the technologies to consumers in their service areas;
- (iv) Require service providers to facilitate emptying, primary and secondary transport area wise so as to promote economies of scale; and
- (v) Require service providers to assign a toll-free help line for sanitation customers so as to assist customers during negotiation/ choosing of operators when requested.

**(c) Motorised Emptying and Transport Services**

The motorised emptying and transport tariff is determined by the following steps:

- Determination of Revenue Requirement for Motorised Emptying and Transport Services (RR<sub>met</sub>)

The revenue requirement for motorized emptying and transport services is determined by using the formula outlined in Section 7 and cost components (O&M, D, & RoI) as detailed in section 7.1 (B). Revenue requirement is determined for each size of the motorised emptying and transport equipment (e.g. 3, 8 10 m<sup>3</sup>).

- Determination of Volume of Faecal Sludge/ Septage (V<sub>met</sub>)

The volume of faecal sludge transported by exhauster trucks will be equal to the volume of exhauster of the respective truck.



- Computation of Cost Recovery Tariff (CRT)

The cost recovery tariff for faecal sludge emptied and transported is computed by dividing total revenue requirement for faecal sludge motorised emptying and transportation services to the capacity (volume) of the respective exhaustor truck ( $RR_{met}/V_{met}$ ).

- (i) **Tariff Design**

The tariff design depends much on the type of business model which is applied for emptying, transport and discharge of sludge. There are two types of Business Models which may be applicable on this part of the FSM which are the “Demand Based Model” and the “Regularised Model”. The computed cost recovery tariff will be applicable for both demand based and regularised models.

- *Demand-Based Model*

Under demand-based model, faecal sludge (FS) emptying at households, institutions and public toilets are carried out as per demand from the public. Charges are paid as per volume of FS emptied and collected at individual households and institutions. With the demand-based model, the regulator may promote competition among service providers by setting the cost recovery tariff as a cap tariff and customers may be given an opportunity to bargain the charge downwards without compromising the quality of service. The regulator, in this case, should ensure that the quality of service is maintained and may promote competition through implementation of the following strategies:

- Require utilities to maintain, update and publicize a register of service providers for sludge emptying, transport and discharge for the public to negotiate and choose; and
- Require utilities to assign a toll-free help line for sanitation customers and to assist customers during negotiation/ choosing of service providers when requested.

- *Regularized- based model*

This model refers to a service where FS from onsite sanitation systems are emptied at regular pre-determined intervals. The key feature of this model is the emptying of septic tanks at fixed intervals of time irrespective of the filling of the tanks. The cost recovery tariff for septic tank emptying and transportation as computed above, may be inbuilt in the water tariff



for ease of collection. Operators are paid by utilities based on sludge quantities discharged at the treatment plant. Payment to operators excludes sludge disposal fees.

## 8.7 Implementation of Universal Access Charge for Sanitation

Due to the prominent risk of water supply and sanitation service providers to downplay sanitation activities, it is recommended to establish a sanitation universal access charge as a percentage of water bill for all water supply customers. The charge shall be used for financing sanitation activities which are within the roles of the Sanitation Service Providers, with special attention to pro-poor and promotion of equity in sanitation service provision, subject to approval by the sanitation regulator.

### (a) Determination of the Access Charge

It is recommended that the regulator should establish a method for determination of the universal access charge, preferably by benchmarking with other fees and charges which are imposed on customer water/electricity bills (e.g. regulatory levy, within the country, Rural Electrification Levy, Municipal Levy).

### (b) Management of Universal Access Fund<sup>7</sup>

For transparency and easy of monitoring, it is recommended that the management of such funds should be as follows:

- (i) Create a separate sanitation universal access charge within the water bill;
- (ii) Sanitation fund should be ring-fenced in special account;
- (iii) Activities that will be implemented and financed from the special account to be approved by the regulator; and
- (iv) In order to ensure equity and access to sanitation and hygiene services by all, universal sanitation access charge is recommended to be imposed to all water supply users.

### (c) Subsidy for Pro-Poor<sup>8</sup> NSS

Apart from the above activities, sanitation service providers may design and implement subsidy mechanism as a pro-poor intervention targeting (a) capture and containment services by provision of toilet slabs, for example; and (b) manual and mechanical emptying services by provision of transfer stations and transportation services to the treatment plant.

---

<sup>7</sup> Water and Sanitation for the Urban Poor (WSUP), Discussion Paper No. 004: Sanitation Surcharges Collected through water Bills – A Way Forward Financing for Pro-poor Sanitation, October 2012 & Consultants' Views

## **8.8 Disposal and/or Re-Use**

The cost for disposal should be computed as part of treatment costs for the purpose of tariff setting. However, as for re-use if there are additional costs required and revenue gained, they should be ring-fenced and not built into the tariff. This is to ensure that the re-use can be independently financially sustainable.

## 9 MONITORING AND EVALUATION

### 9.1 Monitoring

- a) The regulator shall monitor implementation and compliance to the approved tariff by way of conducting periodic inspections on:
  - (i) invoices sent to customers.
  - (ii) water meter reading or estimated water meter reading.
  - (iii) water consumed for the period.
  
- b) Monitoring of tariff conditions/instructions shall focus on key areas including protection of the customer interests and environmental sustainability.
  - (i) The regulator shall require a sanitation service provider to provide an action plan for implementation of each condition of the order.
  - (ii) The regulator shall require a sanitation service provider to submit reports of the implementation of each of the Tariff condition and each cost item of the revenue requirement.
  - (iii) The regulator may conduct inspections and performance audits to validate submitted reports.

### 9.2 Evaluation

- a) The regulator shall evaluate the implementation of tariff order conditions directly in terms of achieving the set targets and the timeframe provided in the order.
- b) For the purpose of evaluation, tariff order conditions shall be grouped in terms of conditions related to:
  - (i) Key performance indicators
  - (ii) achievement of approved investment costs; and
  - (iii) submission of reports
- c) For conditions related to key performance indicators, implementation shall be evaluated based on the following:
  - (i) Minimum score (that is, 0%) which is equivalent to the status of the respective indicator at the time when the order is issued;
  - (ii) Maximum score (that is, 100%) which is equivalent to the targeted performance on the specified date; and
  - (iii) Intermediate performances are allocated pro rata by interpolating between the minimum and maximum scores.

- d) For conditions related to investment, points shall be deducted based on the comparison of actual investment and the amount allocated for a specific investment on an annual basis.
- e) For conditions related to submission of reports within the deadline, will get a score of 100%, and 0% otherwise.
- f) The percentage performance achievements for all the tariff order conditions shall be averaged to determine the overall performance of the regulated water and sanitation service provider in terms of the implementation of tariff order conditions within a reporting period.
- g) The implementation of tariff order conditions shall be interpreted in accordance with the performance benchmarking guidelines for sanitation service providers as follows:
  - (i) “excellent performance” shall be achievement of between 85% and 100% of the target.
  - (ii) “very good performance” shall be achievement of between 70% and 84% of the target;
  - (iii) “good performance” shall be achievement of between 55 to 69%;
  - (iv) “fair performance” shall be achievement of between 40 to 54%; and
  - (v) “unsatisfactory performance” shall be achievement of below 40%.
- h) It is recommended that regulators make the results of the achievements and non-compliances regarding implementation of tariff order conditions, public preferably once a year by way of annual sector performance review report.

### 9.3 Sanctions Related to Performance Requirements

Failure to implement the tariff order may lead to regulatory sanctions as stipulated in guiding legislation. Specifically, where it is proved that there is no justification for failure to implement the order after the end of multiyear tariff period, the following sanctions may apply:

- a) Rejection of the new application;
- b) Deduction of revenue requirement from the newly proposed revenue requirement in order to compensate customers for the denied services;
- c) Where the sanitation service provider fails to attain any of the performance targets, the regulator may decide to impose special performance monitoring which includes enhanced performance reporting; and
- d) Penalties for non-performance may also apply.

## 10 REFERENCES

1. *NWASCO, Guidelines on Tariff Adjustment (+Tariff Model), March 2014.*
2. *NWASCO, Recommendations for a Pricing Strategy for Sanitation Services, March 2018;*
3. *NWASCO, Guidelines for Separation of Costs of Commercial Utilities between Water and Sanitation Services & Cost Separation Worksheet, March 2018; and*
4. *NWASCO, Tariff Model and Manual for Use of the Tariff Model; March 2018.*
5. *WASREB, Tariff Guidelines*
6. *LEWA, Tariff Filing and Review Procedure for Electricity and Water Tariff Applications; Feb. 2012.*
7. *EWURA, Tariff Setting Guidelines for Regulated Water and Sanitation Utilities, 2017.*
8. *EWURA, Tariff Application Guidelines for Electricity and Natural Gas Subsectors; 2017.*
9. *World Bank, Tariff Setting Guidelines A Reduced Discretion Approach for Regulators of Water and Sanitation Services, 2009.*
10. *UNDP, Tariff Setting Methodology for Water Supply and Sewerage Services in Bosnia and Herzegovina, 2015.*
11. *Castalia, Defining Economic Regulation of the Water Sector - Explanatory Notes in the Regulation of Water and Sanitation Services, 2005.*
12. *African Development Bank, Guidelines for User Fees and Cost Recovery for Urban, Networked Water and Sanitation Delivery.*