# Policy Note on Performance Reporting and Design of Performance Reports

## Municipal Finance and Management Component
## Bhutan Second Urban Development Project (BUDP-2)

**Policy Note on Performance Reporting and Design of Performance Reports**

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| Acronyms | Description |
|---|---|
| BUDP II | Bhutan Urban Development Project II |
| CAO | Chief Administrative Officer |
| CKB | Constitution of Kingdom of Bhutan |
| KPI | Key Performance Indicators |
| LGA | Local Government Act 2009 |
| LGI | Local Government Institution |
| MIS | Management Information System |
| MoF | Ministry of Finance |
| MoUD | Ministry of Urban Development |
| MoWHS | Ministry of Works and Human Settlement |
| NRW | Non-Revenue Water |
| PAD | Project Appraisal Document |
| PM | Performance Management |
| PPD | Policy and Planning Division |
| PT | Phuentsholing Thromde |
| QPR | Quarterly Performance Report |
| RGoB | Royal Government of Bhutan |
| SLB | Service Level Benchmarking |
| STM | Sewerage Treatment Plant |
| SWM | Solid Waste Management |
| TT | Thimphu Thromde |
| ULB | Urban Local Body |

# POLICY NOTE ON PERFORMANCE REPORTING AND DESIGN OF PERFORMANCE REPORTS

## 1. Background

The Royal Government of Bhutan's Vision 2020 for Peace, Prosperity and Happiness provides a strategy for the country's distinct path of development over the next 15 years. It recognizes the challenges as it undergoes a profound and rapid demographic transition from a largely subsistence rural economy to an urban society.

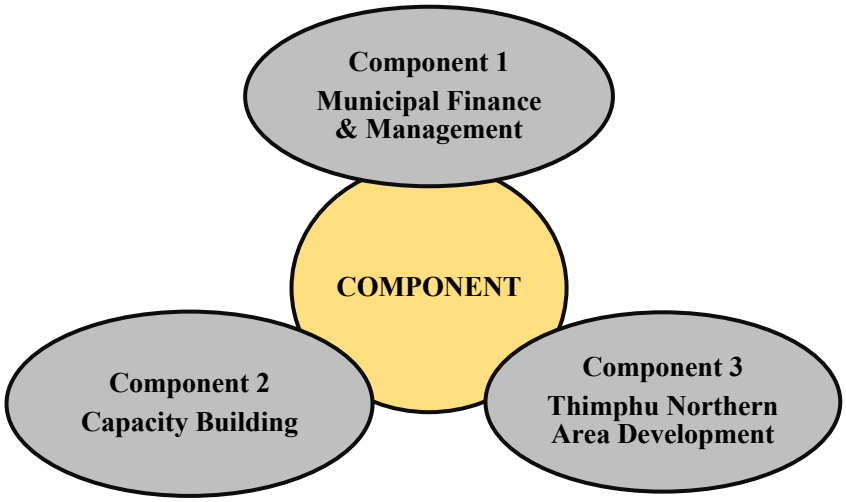
The urban sector is being increasingly recognized as a critical growth driver for the country's economy. The share of population residing in urban areas is also witnessing rapid growth, and it is expected to increase four times over the next 20 years and reach at the level of 50 percent of the total population by the year 2020.

This is setting a new trend and requires provision of increased level of basic infrastructure services such as potable water supply, sewerage, drainage, solid waste management etc. It is in this context, Thromdes (urban local bodies) have been instituted as provided in the Constitution of the Kingdom of Bhutan (CKB) and Local Government Act (LGA) 2009 to provide the basic civic services to their citizens to improve the productivity of urban centers.

The LGA, 2009 defines the roles, responsibilities, functions, financial and administrative powers of the local government institutions (LGI). To address the urban challenges, the Royal Government of Bhutan (RGoB) has undertaken Bhutan Urban Development Project II (BUDP II), and has secured an IDA credit of US$12 million to:

a. Strengthen municipal management systems starting in Thimphu and Phuentsholing; and
b. Improve infrastructure services in northern Thimphu.

BUDP II has the following three project components:




All the above components are being implemented by the Policy and Planning Division (PPD) of the MoWHS in close consultation with Thimphu and Phuentsholing Thromdes and the Ministry of Finance (MoF).

Our project scope covers Component #1 (Municipal Finance and Management) which aims to strengthen the institutional systems and processes of the two Thromdes (city governments) in Bhutan, viz. Thimphu and Phuentsholing Thromdes to enable them to function effectively as efficient, transparent and accountable urban local governments.

As per Project Appraisal Document (PAD) of BUDP II, "The project will support the strengthening of the general management capacities of the two Thromdes with regard to service delivery. As part of this, the project will strengthen the offices of the Thrompon/Executive Secretary and the Chief Administrative Officer (CAO) by introducing modern information technology for the administrative and monitoring systems. Support will be provided for the design and implementation of a Management Information System (MIS) for enabling the city management to ensure robust monitoring of service delivery. The systems and procedures for service delivery will be made systematic through the streamlining of business procedures and training of staff in the provision of efficient and citizen-friendly services." A properly designed performance measurement system (PMS) in conjunction with a supporting MIS can go a long way in improving the efficiency and effectiveness of ULBs. Local governments at the forefront of the performance management movement rely on their performance measures not only for purposes of accountability and performance reporting but also as catalysts for performance improvement. These governments do not rest their aspirations on eloquent mission statements and broad goals alone. Instead, they proceed from articulating their mission and goals to developing more specific and immediate objectives and associated measures that will mark progress toward achievement of these objectives.

Under BUDP-II, Ministry of Works and Human Settlement (MoWHS), the RGoB has prepared a draft policy note on performance reporting and design of performance reports in May 2012 which has been reviewed with a view to finalize and implement performance measurement system in both the Thromdes in reference. This note/report will cover performance indicators for the selected services, performance reporting formats, and guidelines for performance reporting. It may be mentioned that the draft policy note has identified 28 service level performance indicators focusing four basic services, viz., water supply, sewerage, solid waste management and storm water drainage. Accordingly, the draft policy note has suggested two aspects: (a) collation of performance data using the indicators and methodologies for preparation of quarterly progress report and (b) implementation of appropriate MIS at municipality level to support provision of such data on an on-going basis.

## 2. What is Performance Measurement?

Performance Measurement (PM) is a practice that many organizations use with a view to achieve desired levels of effectiveness and efficiency in their functions/operations. It can also be served as a tool for strategic decision-making and long-term planning process. It is a technique for regular monitoring and reporting of the performance of various schemes and programmes, departments, or divisions of the organizations. PM is concerned with not only how much is being done, but also how efficiently, of what quality, and to what effect. With reference to urban local bodies or Thromdes, PM could be defined as a process of determining how efficiently and effectively the concerned departments or divisions are delivering services. It provides an assessment of the quality of work the local body is doing and how successful it has been in satisfying beneficiaries' needs and expectations.

In order to measure the performance of local bodies, number of performance indicators need to be developed, each indicator reflecting a specific attribute, which assess various dimensions of the

service providers' (Departments/Divisions) performance. Service quality, service levels, and cost of service are some important parameters of performance.

It is in this background; the present policy note has been prepared, reviewed and finalized in consultation with key stakeholders of Thimphu Thromde (TT) and Phuentsholing Thromde (PT).

## 3. Objectives of Performance Management

**Performance Management** (PM) includes activities that ensure that goals are consistently being met in an effective and efficient manner. Introduction of Performance reporting in relation to service delivery at Thimphu Thromde (TT) and Phuentsholing Thromde (PT) aims to ensure that each Thromde is able to introduce a standard periodic monitoring mechanism to assess if their respective actual performance is in consonance with the vision, mission and objectives/benchmarks established by each Department/Division of Thromdes. Its benefits include an availability of framework for evaluation of performance of each service; Thromdes are mandated to deliver effectively and efficiently.

Performance measures in local government gauge the quantity, quality, efficiency, and impact of the work of a city government. These measures usually focus on the work of crews, programs, or entire departments rather than the work of individual employees.

## 4. The uses and need of performance measurement

Measuring the performance of a service or ULB is a complex exercise, but can be worthwhile. In recent years, many cities in different countries have adopted performance measurement (PM) and benchmarking to improve service levels, service quality, and responsiveness to community needs. The International City Management Association (ICMA) in the United States has established the centre for performance measurement, which compile performance data on annual basis from more than 120 jurisdictions. The Swedish Association of Local Authorities (SALA) has a program for annual benchmarking of the finances of various local government institutions. The results are being published annually by the SALA in the form of a report called '*How Costly is Your Local Government*?' Similarly, in the England and Wales, the Audit Commission undertakes annual benchmarking of the performance of local authorities. There have been series of initiatives in India in recent years for introducing PM in ULBs. Govt. of Andhra Pradesh has issued guidelines prescribing 12 performance indicators for ULBs of the state with a view to: foster competitive spirit and thereby enhance the levels of municipal performance; assess the efficiency of ULBs and provide rational ways for sanction of grants-in-aid; reward the best performing ULBs; and improve the overall performance of ULBs of the state.

One of the measurement tools of PM is service level benchmarking, which is now well-recognized important mechanism for introducing accountability in service delivery. It involves measuring and monitoring of service provider performance on a systematic and continuous basis. Sustained benchmarking can help utilities to identify performance gaps and introduce improvements through the sharing of information and best practices, ultimately resulting in better services to people.

Recognizing its importance, the Ministry of Urban Development (MoUD), Government of India has launched the Service Level Benchmarking (SLB) initiative covering water, sanitation, solid waste management and storm water drainage. A Handbook on Service Level Benchmarking has been developed and released by the MoUD, Govt. of India in 2006 which seeks to (i) identify a minimum set of standard performance parameters for the water and sanitation sector that are commonly understood and used by all stakeholders across the country; (ii) define a common

minimum framework for monitoring and reporting on these indicators and (iii) set out guidelines on how to operationalize this framework in a phased manner.

The framework encompasses 28 performance indicators as follows:

| **Water Supply:** |
|---|
| 1. Coverage of water supply connections |
| 2. Per capita supply of water |
| 3. Extent of metering of water connections |
| 4. Extent of Non-Revenue (Unaccounted) Water |
| 5. Continuity of water supply |
| 6. Efficiency in redressal of customer complaints |
| 7. Quality of water supplied |
| 8. Cost recovery in water supply services |
| 9. Efficiency in collection of water supply related charges |

| **Waste water management:** |
|---|
| 1. Coverage of Public / Community Toilets |
| 2. Coverage of waste water network services |
| 3. Collection efficiency of waste water network |
| 4. Adequacy of waste water treatment capacity |
| 5. Quality of waste water treatment |
| 6. Extent of reuse and recycling of waste water |
| 7. Extent of cost recovery in waste water management |
| 8. Efficiency in redressal of customer complaints |
| 9. Efficiency in collection of sewerage related charges |

| **Solid Waste Management:** |
|---|
| 1. Household level coverage of Solid Waste Management services |
| 2. Efficiency of collection of municipal solid waste |
| 3. Extent of segregation of municipal solid waste |
| 4. Extent (%) of solid waste recovered |
| 5. Extent of scientific disposal of municipal solid waste |
| 6. Extent of cost recovery in Solid Waste Management services |
| 7. Efficiency in redressal of customer complaints |
| 8. Efficiency in collection of SWM related user related |

| **Storm water Drainage:** |
|---|
| 1. Coverage of Storm water drainage network |
| 2. Incidence of water logging/flooding |

For each of the above indicators, the Handbook provides details on the guidelines, a service goal (to be achieved over a period), and data reliability grading scale.

The logic of performance measurement is simple and compelling:

a. ***Performance measurement provides vital information for management and oversight***

Those who manage a program and those who have oversight responsibility for it should know what

is being done and how well it is being done.

b. ***Performance measurement focuses attention on priorities and results***

The identification of key objectives for a department or program and the measurement of progress toward these objectives focus the attention of program officials and employees, and, where needed, prompt the development of new strategies to achieve the program's objectives.

c. ***Performance measurement identifies successful strategies***

Evidence of performance progress will reveal strategies that are working. In contrast, evidence of performance decline or performance gaps will challenge the status quo, leading managers to revise their strategies or test new approaches and, perhaps in especially severe cases, prompt decision makers to consider service delivery alternatives or even program discontinuation.

d. ***Performance measurement enhances accountability***

Those who pay for public programs deserve an accounting that reassures them that funds are being spent properly, that programs are being managed efficiently, and that expectations for service quantity, quality, and results are being met.

More specific applications include:

a. ***Performance reporting****,* both internal and external to the local government, as a method of accountability for performance
b. ***Directing operations****,* making adjustments where measures indicate areas or patterns of deficiency
c. ***Deciding Priorities,*** performance indicators can measure the contribution of each activity towards achieving the agency's objectives and help in deciding priorities as the available resources are limited against numerous competing demands.
d. ***Testing new procedures or equipment****,* comparing new measures with prior results or comparing pilot project results to measures elsewhere
e. ***Contract monitoring*** to ensure that promises regarding service quantity and quality are being kept
f. ***Supporting planning and budgeting systems*** by providing objective information on the condition of programs and services
g. ***Program evaluation,*** which often begins with routinely collected performance measures and proceeds with the compiling of new measures specific to the needs of more detailed analysis
h. ***Assigning responsibilities:*** performance indicators enables to identify the areas where the performance is not up to the mark, and then assign specific responsibilities to the concerned staff and hold them accountable for improving performance.
i. ***Benchmarking****,* usually by comparing the performance measures of one's own organization to professional standards or to the results achieved by respected counterparts, often as a catalyst for improving local operations.

Most local governments that are among the leaders in performance measurement use their measures for more than one purpose. For virtually all of them, some form of accountability—the first of the uses listed above—is one of those purposes. Rarely, however, do the leaders stop with simply reporting their performance. Most apply measures in other ways that more directly influence improvements in services and programs, ways such as those that make up the balance of the list.

## 5. Approach and Methodology

The present report on performance reporting and design of performance reports for TT and PT has been developed on the basis of available literature, documents and reports in the field, followed by the discussions with the heads of various departments and divisions of both the Thromdes in reference. According to the Policy Note of 2012, the Municipal Finance Consultant, who drafted this report, had detailed discussions and meetings with the key officers and Heads of Divisions of both the Thromdes to ascertain the existing level of service reporting, if any in these Thromdes and also to assess their requirements in this regard.

With a view to finalize the draft policy note/report, this note was circulated to the heads of concerned departments to take their views/comments on the note that was followed by the personal visits and meetings with the departmental heads/key persons of TT& PT. The list of key persons/departments in this regard is annexed as Annex V.

The following documents/reports have been reviewed/consulted while preparing this policy note:

### 5.1. 10th Five Year Plan 2008-2013

Under the 10th Five Year Plan Gross National Happiness Commission has set out various goals towards improving the quality of life of the urban population through sustainable development of urban infrastructure facilities and services in existing as well as new urban centres/township.

### 5.2. Annual Report of Ministry of Works & Human Settlement, Thimphu, 2011

With the onset of development and the ensuring result of rapid urbanization process, urban planning has also been accorded equally high priorities to ensure safe, clean and well-organized cities to cater to the needs of the urban population. According to the Vision Document 2020 and the 10th Five Year Plan of RGoB there should be no urban settlement in the country beyond half a day's walk from motorized road and provision of potable drinking water supply to its residents.

The Annual Progress Report also is a Performance report for each major Program/Activities and covers activities of TT and PT in respect of establishment of Water Supply System, Improved sanitation through sewerage network, Urban Roads, construction of footpath, parking and drainage and several activities grouped under "Environmentally sound urbanization" etc. The Progressive Actual Achievement in terms of Physical as well as Financial at the end of Fiscal Year is compared against corresponding Tenth Plan and End of Fiscal Year Targets & Outlays. The inputs for the Annual Report of MoWHS are received from each of two Thromdes.

The Annual report, however, covers only Capital Expenditure/Works and does not report on progress in respect of mandated service delivery against specific benchmarks and/or yearly target levels of services.

### 5.3. Annual Information Bulletin 2010 Report of PPD, Ministry of Works & Human Settlement, Thimphu

Chapter VII and VIII of the Annual Information Bulletin 2010 Report talks about the existing Infrastructure services such as the Sewerage system, Sewerage Treatment Plant, Public Toilets, Water Treatment Plants, Water Reservoirs, Solid Waste Management, Street Lights, Parks, Parking etc.in TT and PT. For example, in water supply, besides information on production, consumption

and unaccounted water, it also has the data on the number of connections and complaints registered and attended.

### 5.4. MoWHS Newsletter

MoWHS Newsletter which is prepared monthly also covers progress made under various projects.

### 5.5. Yearly Audit Report of TT and PT from Royal Audit Authority

The audit reports contain vision and goals of various departments.

### 5.6. Service Guide: Thimphu City Corporation (TT), 2010

This Guide was found to be relevant in the perspective of TT's obligations to provide various services. The objective of this Guide is to facilitate better understanding of the services delivered by TT and avail them with ease.

### 5.7. Survey Report of February 2012 on Sanitation of Phuentsholing and Recommendations and Public Opinion

### 5.8. Thromde Report for the MoWHS of Royal Govt. of Bhutan, 2012 and 2013

The main objectives of this report are to provide planned growth of Thimphu City and provide efficient and effective services to the residents; ensure that the development and other activities within the boundaries of a Municipal Corporation occur in a planned and harmonious manner; undertake any activity, consistent with the other relevant laws and policies of the Royal Government, which may preserve and promote the environment within the limits of a Municipal corporation; and perform any other functions that the Royal Government may assign

## 6. The principal types of performance measures

To usefully serve the various purposes of performance measurement, a set of measures must be multidimensional. It must focus not just on the quantity of services provided by a department or program but also on the quality of services, the efficiency with which services are provided, and the extent to which objectives are being achieved. An especially good set of measures may even assess the overall productivity of a program—often by means of an index that taps both efficiency and effectiveness—and the impact that the program or service is having on service recipients or the community as a whole.

Local governments can develop sets of performance measures that will gauge quantity, efficiency, quality, effectiveness, impact, and productivity by concentrating their attention on four categories of performance measures: Output (also known as workload), Efficiency, Outcome (also known as effectiveness), and Productivity. Concentrating only on output measures, like many other local governments, will yield information of limited value. It will not produce the multidimensional measures needed to manage performance. The various types of principal measures are as under:

### 6.1. Output (workload) Measures

Output or workload measures are the simplest of all measures. They report raw counts of activities or services—for example, calls received, work orders completed, city council minutes prepared,

zoning applications processed, or tons of asphalt laid. They tell us nothing about quality or efficiency but only about the workload of the department or program concerned.

Calling output measurement bean counting might be a little harsh but only a little for raw output measures alone have very little of the managerial or policy value associated with higher-order measures. This is not to suggest that local governments should discontinue output measurement. Output measures remain important for at least three reasons:

a. **First**, tracking outputs over time will show whether demand for a given service is going up, going down, or holding steady.
b. **Second**, output measures reveal the scale of an operation and, when viewed alongside measures of efficiency and outcome, show whether an efficient and effective program is also a high-volume operation.
c. **Third**, and most important, workload measures often are necessary for calculating the higher-order measures of efficiency and effectiveness. So even bean counting can have value.

Unfortunately, many city governments begin and end their performance measurement with output measures—raw counts of workload. It is impossible to tell from output measures alone whether a given program performs well, poorly, gets results, or does not. Workload measures alone rarely prompt program officials to reconsider service delivery strategies. They are easy and safe. They rarely challenge the status quo, as shifts in efficiency and outcome measures do from time to time. In most instances, raw output measures have relatively little managerial or policy value.

### 6.2. Efficiency measures

Managerial and policy value ramps up considerably with measures of efficiency as good efficiency measures relate outputs to the resources consumed to produce them. Local government officials can consider whether the current level of efficiency in a given program meets expectations, whether steps should be taken to improve efficiency, or, more fundamentally, whether a given allocation of resources produces a sufficient return in services or other benefits to warrant continued funding.

### 6.3. Outcome (effectiveness) measures

Outcome measures (also known as effectiveness measures) have considerable managerial and policy value. This category includes measures that gauge service quality, those that reflect service or program impact, and those that depict the extent to which program objectives are being met. If trained observers at the city parks rate the condition of the turf to be in compliance with highest standards, this would be an effectiveness measure as would a measure reporting the satisfaction of residents withThromdes' recreation programs. Also belonging in the effectiveness or outcome category would be program statistics showing the impact of public health programs designed to combat childhood obesity, teen pregnancy, or teen smoking. If police objectives emphasize responsiveness to emergencies and prescribe response times of five minutes or less to emergency calls, then a measure reflecting 92 percent compliance with that target would be an effectiveness measure and would belong in this category.

### 6.4. Productivity measures

Although relatively rare, productivity measures occasionally are found in local government budgets and performance reports. One such measure, for instance, can be found in the set reported by the Office of the City Internal Auditor, namely, “ratio of estimated audit benefits to audit costs”.

Consider the distinctive feature that makes this benefit-to-cost ratio a productivity measure. Instead of this measure, the city could have inserted separate measures—one reporting the average benefits of an audit and the other reporting average cost. A measure focusing exclusively on the average benefit of an audit performed by this office would address effectiveness. A measure focusing strictly on the average cost of an audit would address efficiency. This measure, "ratio of estimated audit benefits to audit costs," combines efficiency and effectiveness in a single measure and thereby more fully addresses the dual dimensions of productivity.

### 6.5. Alignment with mission, goals, and objectives

To be meaningful, measures must address facets of performance that are important to an organization. In an organization that is serious about strategic planning and performance management, the measures will be aligned with its long-range mission and goals, and even more specifically with its shorter-term objectives. These objectives express the more im*mediate intentions of the organization and thereby set its course toward fulfilling its aspira*tions, as reflected in the organization's mission and goals. Properly aligned with the mission and goals, objectives bring action that moves the organization toward its aspirations.

While mission statements and goals tend to be broad and imprecise, objectives are much narrower and more precise. Well-written objectives are said to be SMART, an acronym for specific, measurable, aggressive but attainable, results-oriented, and time-bound. For instance, a Sanitation department might have a mission or goal of "ensuring the health and well-being of the citizens of the community" and a much more specific and measurable objective of "reducing the rate of infant mortality by three percentage points during the next two fiscal years." The objective *operationalizes* the goal and, by doing so, focuses the attention of the program staff on the problem of infant mortality and challenges it to strengthen projects already in place and, if needed, to devise new strategies. Performance measures aligned with objectives gauge progress toward achieving these objectives.

## 7. Development of Key Performance Indicators

The challenges of the urban sector are growing rapidly, and government agencies at various levels are taking steps to address the gaps in service delivery. One of the important steps towards this is introduction of appropriate systems for information management, performance monitoring, benchmarking.

Benchmarking is now well recognized as an important mechanism for introducing accountability in service delivery. Sustained benchmarking can help Thromdes and utilities in identifying performance gaps and effecting improvements through the sharing of information and best practices, ultimately resulting in better services to people. Under this Policy Note, benchmarking is aimed to develop - First, a detailed framework for core or basic municipal services viz; water supply, wastewater management, storm water drainage, solid waste management; and secondly, to suggest a set of Performance Indicators for other equally important services and amenities which affects the quality of life of urban residents in every settlement.

Accordingly, the initiative encompassed two aspects (1) Collation of performance data using the indicators and methodologies as per Quarterly Progress Report and (2) Implementation of appropriate management information systems at the Thromde level to support provision of this data on an on-going basis. It is suggested, likewise, the initiative taken by the Ministry of Urban Development, Govt. of India, Ministry of Works and Human Settlement, RGoB in coordination with the other concerned agencies including Thromdes, may also make an attempt to develop the SLBs for various services and also identify a minimum set of standards for key urban services and amenities which are commonly understood and used by all stakeholders across the country.

**Core Services PI's:**

There are 28 service level performance indicators are identified covering four core/basic urban services, viz., Water Supply, Sewerage Management, Solid Waste Management and Storm Water Drainage. These are as follows:

### 7.1. Water Supply

As water supply is a basic need, emphasis has been laid on performance related to reach and access to quality service and prevalence and effectiveness of the systems to manage the water supply networks. As financial sustainability is critical for continued effectiveness in service delivery, performance is measured on this aspect too. Indicators selected are:

a. Coverage of water supply connections
b. Continuity of water supply
c. Quality of water supplied
d. Per capita supply of water
e. Extent of metering of water connections
f. Extent of Non-Revenue (Unaccounted for) Water
g. Efficiency in redressal of customer complaints
h. Cost recovery in water supply services
i. Efficiency in collection of water supply related charges

### 7.2. Waste water management (Sewerage and Sanitation)

For waste water management, performance related to reach and access of the service, effectiveness of the network and environmental sustainability have been emphasized, apart from financial sustainability of operations. Indicators selected are:

a. Coverage of toilets
b. Coverage of waste water network services
c. Collection efficiency of waste water network
d. Adequacy of waste water treatment capacity
e. Quality of waste water treatment
f. Extent of reuse and recycling of waste water
g. Extent of cost recovery in waste water management
h. Efficiency in redressal of customer complaints
i. Efficiency in collection of sewerage related charges

### 7.3. Solid Waste Management

Performance related to reach and access, effectiveness of network operations and environmental sustainability has been considered, apart from financial sustainability of operations. Indicators selected are:

a. Household level coverage of Solid Waste Management (SWM) services
b. Efficiency of collection of Thromde solid waste
c. Extent of segregation of Thromde solid waste
d. Extent of (%) solid waste recovered
e. Extent of scientific disposal of Thromde solid waste
f. Extent of cost recovery in Solid Waste Management services
g. Efficiency in redressal of customer complaints
h. Efficiency in collection of SWM related user related charges

### 7.4. Storm Water Drainage

Extent of the network and effectiveness of the network are emphasized to assess storm water drainage systems performance. As this service does not yield any direct revenues, financial sustainability is not considered. Indicators selected are:

a. Coverage of Storm water drainage network
b. Incidence of water logging

**Other Services/Amenities Performance Indicators (PIs):**

The stakeholders consultation meeting held on 10-11 September 2014 at Thimphu, followed by the discussion with the key officers of Thimphu Thromde, it has been decided to incorporate the following additional performance indicators for the other important social, cultural and physical infrastructure services: such as urban roads, pedestrian path/footpath, open spaces, street lights in the report as a part of performance reporting system. Suggested service wise indictors are as follows:

### 7.5. Urban Roads:

Urban roads could be classified as follows:

**Urban Expressway:** Expressways are divided highways for through traffic with full or partial control of access and generally with grade separations at major crossroads

**Arterial roads:** They are the primary roads for ensuring mobility function. They carry the largest volumes of traffic and longest trips in a city. These roads are characterized by mobility and cater to through traffic with restricted access from carriageway to the side. In such cases, special provisions should be introduced to reduce conflict with the through traffic.

**Sub Arterial Road:** This category of road follows all the functions of an Arterial Urban road and is characterized by mobility, and caters to through traffic with restricted access from carriageway to the side. It carries same traffic volumes as the arterial roads. Due to its overlapping nature, Sub arterial roads can act as arterials. This is context specific and is based on the function and the land use development it passes through.

**Distributor/Collector Roads:** As the name suggests, these are connector roads which distribute the traffic from access streets to arterial and sub arterial roads. They are characterized by mobility and access equally. It carries moderate traffic volumes compared to the arterial roads. Due to its overlapping nature, distributor roads can act as sub arterial and as access streets, depending upon the function and the land use of the surroundings.

**Local Streets:** These are intended for neighbourhood (or local) use on which through traffic is to be discouraged. These roads should be made pedestrian and bicycle friendly by using modern traffic calming designs to keep the speeds within limits as per design.

**Access Street:** These are used for access functions to adjoining properties and areas. A majority of trips in urban areas usually originate or terminate on these streets.

To measure the performance of Thromdes in provision of various categories of roads, the suggested indicators are:

a. Coverage by different types of roads (% area) within the jurisdiction of Thromde
b. Road density (Km/Sq. Km area)
c. Quality of roads-Coverage by surfaced/all-weather roads
d. Length of different types of surfaced roads per 1000 population (in running kilometres-RKM)
e. Operational Cost per kilometre of road length (Operations and maintenance cost per month in Nu.)

### 7.6. Footpaths:

Footpath should normally design for a pedestrian Level of Service (LoS), thereby providing wide pedestrian facilities for pleasant and comfortable walking. The width of footpaths depends upon the expected pedestrian traffic and may be fixed as per the land use adjacent to roads which significantly influences generation of pedestrian traffic on the footpaths. Various land uses could be defined as follows:

a. Residential/mixed use areas
b. Commercial
c. Shopping Frontages
d. Institutional areas
e. Bus Stops

Suggested indicators to measure the performance of Footpaths are as follows:

a. Coverage (% area) by the footpaths according to uses
b. Footpaths density (Km/Sq. Km area)
c. Length of footpaths per 1000 population (RKM)
d. Operational cost per kilometre length of walkways/footpaths (operations and maintenance cost per month in Nu)

### 7.7. Street Lights:

To provide an effective safety to the citizens of the Thromde especially after sunset/dark and venerable places, provision of adequate street lights is essential which could be used as an indicator to assess the performance of the Thromde/department concerned. Suggested indicators are:

a. Coverage by lamp posts/street/lights (No of lamp posts/Km) for all road categories in the Thromde
b. Spacing between street lights/polls in different roads/streets. To be determined keeping in view the types of lights installed and influence area of such lights
c. Cost of maintenance (per month in Nu)

### 7.8. Open Spaces:

The open spaces can include the following three broad categories, namely:

a. Organized Green
b. Recreational purpose
c. Other common open spaces (such as vacant lands/open spaces including flood plains, forest cover etc. in plain areas.

In hilly areas such as in Bhutan, the protected zones and ecological conservation areas shall be considered to be over and above this open space requirement.

Organized Green refer to parks, play fields and other open spaces like specified park, amusement park, play grounds, a multipurpose open space, botanical garden and zoological parks, traffic parks, etc. It is suggested that:

a. In each residential complex there should be 2-3 parks and playgrounds
b. In a housing cluster, there should be community level park and open space
c. At zonal level, there should be a district level park and sports center; and
d. At a city level, there should be a city level park, sports complex, botanical/zoological garden, exhibition ground, cultural gathering ground etc. depending upon design and space availability.
e. The community open space shall be reserved for recreational purposes which shall as far as possible be provided in one place.

It is suggested that the open spaces are to be developed with other socio cultural and commercial facilities so that they can serve multiple purposes. The size, design etc. of open spaces should be govern as per the rules and regulations in force in this regard. The performance of Thromde in terms of provision of open spaces in a city could be reviewed on the basis of following indicators:

a. Number of parks and playgrounds in a city per 10,000 populations
b. Coverage (% area) under open spaces
c. Cost of maintenance (per month in Nu)

### 7.9. Fire Station/Sub-Fire Station/Fire Hydrants:

It is one of the most important components of disaster management. Ideally fire stations should be located in such a way that fire tenders are able to reach any disaster site within 3-5 minutes. Fire stations should be located on corner plots as far as possible and on main roads with minimum of two entries. Necessary provisions for laying underground/surface firefighting measures, water lines, hydrants etc. may be kept wherever provision of fire station is not possible.

Suggested indicators are:

a. No of fire stations per sq. km area
b. No of fire hydrants per sq. km area
c. No of fire hydrants per km road length.

### 7.10. Parking Facilities:

Provision of adequate parking spaces to park various types of vehicles including cars, taxi, two wheelers, truck, buses, emergency vehicles, cycles, etc. is one of the important functions of Thromdes. Provision of parking areas both surfaced and multi-level parking facility in any settlement depends on number of factors including topography, settlement typology, land use, population growth, socio-economic characteristics of the city/town, traffic congestion level during peak hours and otherwise, number registered vehicles of different types and average annual growth in them, tourist inflow and such other parameters. Therefore, there is a need to have an updated, preferably computerized intelligent vehicle management information system to design, operate and maintain parking system in different locations in a city in an efficient manner. Proper coordination with different line departments such as road transport department, traffic police etc. is required to implement and maintain effective parking management system.

Suggested basic indicators to assess the performance of Thromdes in terms of availability of parking facilities in a city/town are as follows:

a. No of registered vehicles of different types in a city at different points of time.
b. No of existing parking slots for different types of vehicles
c. Adequacy – no of vehicles (for each type such as cars/two wheelers etc.) per parking slot
d. Total vehicle parking slots per 1000 population
e. Coverage by dedicated parking facilities (total % area covered to total municipal area)
f. Extent of cost recovery
g. No of traffic challans per month for unauthorized parking.

### 7.11. Bus Stops/Stand:

The bus stops used for intra city travel by the passengers both by local residents and floating population and tourists. Its function therefore, is different from the bus terminals which are primarily utilized for inter-city travel and require various kinds of facilities for the smooth flow of vehicular movement. The bus terminal serves as a point and unit where necessary information to

user is made available for processing and it broadly needs to perform the functions to meet the requirements of the passengers, vehicles, crew and management. Usually every city has one inter-sate bus terminal having the facilities of passengers' platforms, waiting lounges, maintenance depot, rest house/rooms, baggage storage facilities, utilities and amenities, communication and information system, shelter from different weather conditions, eating facilities etc.

In case of intra-city bus stops, however, the scale and level of facilities are different and depends largely on the passengers' traffic and their locations. The basic facilities which every stop should have are: platform to stop buses with electronic display mentioning timing of departure and arrival of different route buses with watch, covered space with all-weather material, proper lighting arrangements for security and safety specially women, children, senior citizens and disabled people and good quality benches for waiting passengers.

Bus stops shall be on walkable distance and preferably on the main roads. The basic measurable indicators to assess the performance of Thromdes in provision of bus stops are as follows:

a. No of bus stops per km of road length
b. Quality of bus stops % no of covered and well illuminated bust stops
c. No of bus stops per 1000 population

## 8. Design of Performance Reports

The Indicators in the Quarterly reports are based on the Performance Indicators as discussed in this report as also the comments received from the stakeholder's workshop held on 10-11 September 2014 at Thimphu, Bhutan. Format of Quarterly Performance Report has been annexed as Annex I for core services and Annex II for other services/amenities.

The Guidelines for compilation of various Performance Indicators are provided in the Annex III and IV and is predicated on availability of relevant information. In the Guidelines, the data requirements along with Reliability Measurement for each Indicator are described.

The Reliability Scale is under following 4 categories:

a. Lowest Level of Reliability: D
b. Intermediate Level: B & C
c. Highest/Preferred Level of Reliability: A

## 9. Current Status and Way Forward

Based on our discussions with the key officers and heads of departments/divisions of selected Thromdes, it has been observed that presently there is no formal performance reporting system available which otherwise should have been initiated in the FY 2012-13 as recommended in the draft policy note. Concerned departments/officers of Thromdes are yet to familiarize themselves on the proposed performance reporting system and therefore, capacity has to be developed to understand and implement the system. Moreover, in the absence of an appropriate Management Information System (MIS), it is almost impossible to implement a performance measurement system (PMS) in the Thromdes.

Up to date records on level of various services focusing PM indicators are not readily available in the Thromdes which could be used to prepare quarterly performance reports (QPR) by the concerned officers/departments. MIS ensures that important information pertaining to each activity

is properly recorded and reported so that a supervisor officer can inspect it, as and when he/she required. For the purpose of QPR, it is important that all the information as required in the formats and guidelines should be measured and recorded on a regular basis. The absence of MIS or inadequate MIS in the Thromdes will have an adverse effect on the managerial efficiency of the departments/divisions concerned. Setting up proper MIS is therefore, a prerequisite for implementing an effective PMS.

MIS should try to ensure that right information reaches the relevant persons with appropriate frequency, so that it can be used for improving efficiency and for better planning and decision making. It is equally important that the information be properly recorded, compiled and reported. Formats should be simple and user-friendly, and contents of the reports should be relevant to the manager's need. Although both PMS and MIS is a complex exercise for the Thromdes (ULBs), but these tools could be very useful to address the problems relating to both real and perceived performance in a local body. Further, as most urban local bodies are moving towards greater participation of private sector for providing municipal services, these management techniques will be important to monitor PPP projects to safe guard the interest of both, service providers as well as beneficiaries of such services.

## 10. Prioritization of Key Performance Indicators (KPIs)

The policy note has suggested a number of performance indicators for each of the services in reference. The proposed indicators have been selected on the basis of their validity, measurement and ease of implementation. However, it would be unrealistic to assume that the departments responsible for providing these services would be in a position to implement all of these indicators in one go. Therefore, the following phased implementation strategy is suggested:

a. Departments concerned may operationalize selected indicators with the existing information or by retrieving desired information from readily and easily available records
b. Operationalization of some indicators can be made relatively easy by gathering some more information and by making some minor modifications to the existing record management system
c. There are some indicators that require massive efforts for data collection, compilation and implementation of an efficient MIS prior to operationalization of such indicators.

Considering the above following priority list of key performance indicators has been prepared which is divided into two parts, Whereas Part A deals with the KPIs for core municipal services; Part B attempted for other important services and amenities. All the priority KPIs suggested for core services to be implemented in **the First Phase of introduction of quarterly performance reporting system** in both the Thromdes i.e. Thimphu and **Phuentsholing**. With regard to other services/amenities indicators mentioned in the table below, it is suggested that concerned departments/divisions of Thromdes in consultation with concerned Executive Secretary/Chief Administrative Officer shall take the decision on his matter keeping in view the existing capacity of department concerned and availability of information to work out such indicators to be reported in the quarterly performance reporting system

All the indicators both for core municipal services and other services, as proposed in the Section 7 of the report can be implemented in these local bodies as and when those become practically possible keeping in view the data requirements and capacity of Thromdes to implement them. In addition to proposed 56 indicators for the selected services, more and more indicators along with

increased functional activities/services/amenities could be added in the list of PMS keeping in view improvement in MIS based application system and capacity of Thromdes.

Till the implementation of MIS based data collection, compilation and reporting system in different departments of Thromdes, it is suggested that concerned departments/divisions of Thromdes shall prepare the performance reports on the priority KPIs on an excel file format and submit these reports on the quarterly basis to their Executive Secretary (ES)/Chief Administrative Officer (CAO) through the respective department/divisional heads. ES/CAO will review the progress of various departments/divisions on regular basis, based on their performance reports to be submitted quarterly. He/she shall fix the targets for each financial year for every parameter/performance indicator for various services keeping in view the capacity of the staff and resources available. It is suggested that Thromde administration incentivize the better performing departments/divisions every year to create the healthy competition among them.

As a long term goal, as suggested earlier in the report that Ministry of Works and Human Settlement, RGoB in coordination with the other agencies concerned including Thromdes, shall make an attempt to develop the SLBs for various services and also identify a minimum set of standards of key urban services and amenities which should be achieved by each Thromde of the country within the time frame to be fixed by the MoWHS/Thromdes concerned

Table: Prioritization of Key Performance Indicators (KPIs) to Implement Performance Reporting System in the Thromdes:

| **Service / Priority Indicators** |
|---|
| **PART A: Core/Basic Services:**<br>I. Water supply:<br><br>1. Coverage of water supply connections<br>2. Continuity of water supply by the Thromde<br>3. Quality of water supply<br>4. Per capita supply of water<br>5. Cost recovery in water supply services<br><br>II. Waste water management:<br><br>1. Coverage of private toilets<br>2. Coverage of public/ community toilets<br>3. Coverage of waste water network services<br>4. Adequacy of waste water treatment capacity<br>5. Extent of cost recovery in waste water management<br><br>III. Solid waste Management:<br><br>1. Household level coverage of solid waste management services<br>2. Extent (%) of solid waste recovered/recycled<br>3. Extent of cost recovery in solid waste management services<br><br>IV. Storm water drainage:<br><br>1. Coverage of storm water drainage network |

| **Service / Priority Indicators** |
|---|
| **PART B: Other Services/Amenities**:<br><br>V. Urban Roads:<br><br>1. Total Coverage by different types of roads (% area) within the jurisdiction of Thromde<br>2. Road density (Km/Sq. Km area)<br>3. Quality of roads-Coverage by surfaced/all-weather roads<br><br>VI. Footpaths/Walkways:<br><br>1. Coverage (% area) by the footpaths<br>2. Length of footpaths per 1000 population (RKm)<br><br>VII. Street Lights:<br><br>1. Coverage by lamp posts/street/lights (No. of lamp posts/Km of road length) for all road categories in the Thromde<br><br>VIII. Open Spaces:<br><br>1. Number of parks and playgrounds in a city per 1,000 population<br>2. Coverage (% area) under open spaces<br><br>IX. Fire Stations/Fire Posts/Fire Hydrants:<br><br>1. No of fire stations per sq. km area<br>2. No of fire hydrants per sq. km area<br>3. No of fire hydrants per km road length.<br><br>X. Parking spaces:<br><br>1. Adequacy – no of vehicles (for each type such as cars/two wheelers etc.) per parking slot<br>2. Total vehicle parking slots per 1000 population<br>3. Coverage by dedicated/authorized parking facilities (total % area covered to total municipal area)<br>4. No of traffic challans per month for unauthorized parking.<br><br>XI. Bus Stop/Stand:<br><br>1. No of bus stops per km of road length<br>2. Quality of bus stops % no of covered and well illuminated bust stops<br>3. No of bus stops per 1000 population |

**ANNEX I: PERFORMANCE REPORT for Core Services AS OF …** **THROMDE: …**

## 1.1. Water Supply

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 1.1.1 | Coverage of Water Supply Connections | | | | | |
| 1.1.2 | Per Capita Supply of Water | | | | | |
| 1.1.3 | Extent of Metering of Water Connections | | | | | |
| 1.1.4 | Extent of Non-Revenue Unaccounted for Water | | | | | |
| 1.1.5 | Continuity of Water Supply by the Thromde (availability of water in the distribution lines):<br>• Less than 2 hrs./ day<br>• 2-4 hrs./day<br>• 4-6 hrs./day<br>• 6-8 hrs./day<br>• 8-12 hrs./day<br>• 12-18 hrs./day<br>• 18-24 hrs./day<br>• 24x7 | | | | | |
| 1.1.6 | Efficiency in Water Redressal of customer complaints | | | | | |
| 1.1.7 | Quality of Water Supplied | | | | | |
| 1.1.8 | Cost Recovery in Water Supply Services | | | | | |
| 1.1.9 | Efficiency in collection of Water Supply related charges | | | | | |

## 1.2. Water Waste Management (Sewerage and Sanitation)

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 1.2.1 | Coverage of public / community toilets | | | | | |
| 1.2.2 | Coverage of Waste Water Network Services | | | | | |
| 1.2.3 | Collection Efficiency of Waste Water Network | | | | | |
| 1.2.4 | Adequacy of Waste Water Treatment Capacity | | | | | |
| 1.2.5 | Quality of Waste Water Treatment | | | | | |
| 1.2.6 | Extent of Reuse and Recycling of Waste Water | | | | | |
| 1.2.7 | Extent of Cost Recovery in waste Water Management | | | | | |
| 1.2.8 | Efficiency in redressal of Customer Complaints | | | | | |
| 1.2.9 | Efficiency in Collection of Sewerage Related Charges | | | | | |

### 1.3. Solid Waste Management

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 1.3.1 | Household Level Coverage of SWM Services | | | | | |
| 1.3.2 | Efficiency of Collection of waste water network | | | | | |
| 1.3.3 | Extent of Segregation of Thromde Solid Waste | | | | | |
| 1.3.4 | Extent (%) of Thromde Solid Waste Recovered / Recycled | | | | | |
| 1.3.5 | Extent of Scientific Disposal of Thromde Sold Waste | | | | | |
| 1.3.6 | Extent of Cost Recovery in SWM Services | | | | | |
| 1.3.7 | Efficiency in redressal of Customer Complaints | | | | | |
| 1.3.8 | Efficiency in Collection of SWM Related User Charges | | | | | |

### 1.4. Storm Water Drainage

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 1.4.1 | Coverage of Storm Water Drainage Network | | | | | |
| 1.4.2 | Incidence of Water Logging /Flooding | | | | | |

**ANNEX II: PERFORMANCE REPORT for Other Services/Amenities AS OF…**

## 2.1. Urban Roads:

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 2.1.1 | Total Coverage by different types of roads (% area covered) within the jurisdiction of Thromde | | | | | |
| 2.1.2 | Road density (Km/ Sq. Km area) | | | | | |
| 2.1.3 | Quality of roads-Coverage by surfaced/all-weather roads to total roads network | | | | | |
| 2.1.4 | Length of different types of surfaced roads per 1000 population (in running kilometers-RKM) | | | | | |
| 2.1.5 | Operational Cost per kilometer of road length | | | | | |

**2.2. Footpaths/Walkways:**

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 2.2.1 | Coverage (% area) by the footpaths | | | | | |
| 2.2.2 | Footpaths density (Km/ Sq. Km area) | | | | | |
| 2.2.3 | Length of footpaths per 1000 population (RKM) | | | | | |
| 2.2.4 | Operational cost per kilometer length of walkways/footpaths | | | | | |

**2.3. Street Lights:**

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 2.3.1 | Coverage by lamp posts/street/lights (No of lamp posts/Km) for all road categories in the Thromde | | | | | |
| 2.3.2 | Spacing between street lights/polls in different roads/streets for different types of light | | | | | |
| 2.3.3 | Cost of maintenance (per month in Nu) | | | | | |

**2.4. Open Spaces:**

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 2.4.1 | Number of parks and playgrounds in a city per 1,000 population | | | | | |
| 2.4.2 | Coverage (% area) under open spaces | | | | | |
| 2.4.3 | Cost of maintenance (per month in Nu) | | | | | |

**2.5. Fire Stations/Fire Hydrants:**

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 2.5.1 | No of fire stations per sq km area | | | | | |
| 2.5.2 | No of fire hydrants per sq km area | | | | | |
| 2.5.3 | No of fire hydrants per km road length. | | | | | |

**2.6. Parking Facilities:**

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 2.6.1 | Adequacy – no of vehicles (for each type such as cars/ two wheelers etc.) per parking slot | | | | | |
| 2.6.2 | Coverage by dedicated parking facilities (total % area covered to total municipal area) | | | | | |
| 2.6.3 | No of traffic challans per month for unauthorized parking | | | | | |

**2.7. Bus Stops/Stands:**

**Vision: …**
**Mission: …**
**Objective for FY: …**

| Sl. No. | Indicators of Performance | Target for FY | As of 30th Sept, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st Dec, (Unit in % or Number with Reliability Scale A to D within bracket) | As of 31st March (Unit in % or Number with Reliability Scale A to D within bracket) | As of 30th June (Unit in % or Number with Reliability Scale A to D within bracket) |
|---|---|---|---|---|---|---|
| 2.7.1 | 1.No of bus stops per km of road length | | | | | |
| 2.7.2 | Quality of bus stops (% no of covered and well illuminated bus stops) | | | | | |
| 2.7.3 | No of bus stops per 1000 population | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

## Annex III: Guidelines for Computation of Performance Indicators in Quarterly Reports – For Core/Basic Services

### 3.1. Water Supply Services

#### 3.2.1. Coverage of Water Supply Connections

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Household level coverage of direct water supply connections | % | Total number of households in the service area that are connected to the water supply network with a direct service connection, as percentage of Total number of households in that service area. The service area may be either a Tshogpa Demkhong, or the Thromde as a whole. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of households in the service area | Number | The total number of households (not properties) in the service area should be calculated. Service area refers to either the Tshogpa Demkhong or the Thromde limits. Cadaster maps supplemented through actual ground level surveys (carried out once in 4-5 years) should provide this data. Exclusive surveys need not be carried out, and data can be collected during other surveys carried out for property tax, or other such purposes. |
| b) Total number of households with direct water supply connection | Number | This will include households which receive municipal water supply at one common point, from where it is stored and distributed for all households (for e.g. as in apartment complexes). Households supplied water through public stand posts or tankers should be excluded. Households completely dependent on other water sources such as bore wells, open wells, etc. should not be included. |
| Household Coverage for water supply connections | % | Coverage = [(b/a) * 100] |

**Rationale for the Indicator**

The minimum level acceptable standard for water supply service should be a household level water supply connection, i.e. a direct piped connection for water supply within the household. Water provision to households (urban poor or otherwise), at common public stand posts cannot be considered as an acceptable/long-term permanent service provision standard. The social costs of not having access to pipe water connection at household level are significant. Innovative service delivery options may be adopted for delivery of piped water connections to properties with inappropriate tenure rights (as in many urban slums).

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of households covered on basis of geographical area of the city covered with pipeline network, as a surrogate indicator for water supply coverage. |
| Intermediate level (C) | Estimation of households covered on basis of road length in the city covered by pipeline network, as a surrogate indicator for water supply coverage. |
| Intermediate level (B) | Estimation of households covered computed as total number of connections (for which data is maintained) as a percentage of estimated number of households on basis of population (total population divided by average household size) |
| Highest/preferred level of reliability (A) | Calculation based on actual number of households with direct service connections (for which data is maintained); and total number of households as revealed in ground level surveys. Data is periodically updated on basis of building units approved, and new household level water connections provided. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong Level |

### 3.2.2. Per Capita Supply of Water

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Per capita quantum of water supplied | Liters Per Capita Per Day (LPCD) | Total water supplied into the distribution system (ex-treatment plant and including purchased water, if any) expressed by population served per day. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Water supplied to the distribution system | Liters Per Month | Daily quantities to be measured through metering, and records should be maintained. Total supply for the month should be based on aggregate of daily quantum. Only treated water input into the distribution system should be measured. If water is distributed from multiple points, aggregate of that quantity should be considered. The quantum should exclude bulk water transmission losses, as measured through water audit tests. This quantum should include water purchased directly from any other sources and put into the distribution system, if any. Water may have been purchased from neighboring Thromdes, Cantonment Boards, etc. Water supplied in bulk to large water intensive industries/industrial estates should be excluded. |
| b) Population served | Number | Number of people in the service area served by the utility. While typically number of residents are considered, if the city has a significant floating population of tourists who temporarily reside in the city, such population should be included. Tourist population estimates can be reasonably computed on basis of bed capacity of hotels, and occupancy rates. |
| c) Number of days in the month | Number | Number of days in the specific month |
| d) Additional information in respect of areas where water is supplied at a rate less than 70 LPCD | LPCD | Number of people in these service areas served by the utility. The quantity of water supplied to these areas measured through bulk meters or by scientific calculation using flow velocity and head. |
| Water Produced | LPCD | Per capita water produced = [(a/c) / b] |

**Rationale for the Indicator**

This frequently used performance indicator provides an overall indication of the adequacy of the water supply to meet the needs of the citizens in the city. Per capita water supplied, expressed in LPCD, and indicates the adequacy of the municipal water supply system in being

able to source, treat water to potable standards and supply the same into the distribution system. Therefore, this indicator should be periodically measured and monitored. Monitoring this on a monthly basis will reveal seasonal variations. The key limitation of this indicator is that it provides information on a city-wide basis, and does not reveal intra-city variations.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Quantity of water produced is estimated on basis of assumed pump capacity and efficiencies and number of hours of operation. Population served is on basis of past census figures, extrapolated to current levels. Reliable estimates of floating population are not available. |
| Intermediate level (C) | Quantity of water produced is estimated on basis of measurement of periodic sample surveys of production flows at all bulk production points. Reliable estimates of transmission losses and industrial water consumption are available. Population served is on basis of past census figures, extrapolated to current levels. Reliable estimates of floating population are not available. |
| Intermediate level (B) | Not applicable |
| Highest/preferred level of reliability (A) | Quantity of water produced is computed on basis of measurement by bulk flow meters at the outlet of treatment plant and/or at all bulk production points. Quantum of losses and bulk industrial consumption is periodically monitored. Population served is known with reasonable accuracy. Any expansion of municipal limits and other significant factors are measured and factored into the current population computation. Floating population is estimated with reasonable accuracy. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Thromde Level |

### 3.2.3. Extent of Metering of Water Connections

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Extent of metering of water connections | % | Total number of functional metered water connections expressed as a percentage of total number of water supply connections. Public stand post connections should also be included. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of direct service connections | Number | This will include households and establishments which receive municipal water supply at one common point, from where it may be stored and distributed for all households (for e.g. as in apartment complexes). Households supplied water through public stand posts or tankers should be excluded. Households completely dependent on other water sources such as bore wells, open wells, etc. should not be included. |
| b) Total number of public stand posts | Number | The total number of public stand post connections, which are currently in use should be considered. |
| c) Number of metered direct service connections | Number | Out of the total number of direct service connections (to all categories of consumers), the number of connections which have functional meters, and metered quantities is the basis for billing of water charges. |
| d) Number of metered public stand posts | Number | Typically, public stand posts are not metered. However, if some of them are metered, they should be included. |
| Extent of metering of water connections | % | Extent of metered connections = [(c + d) / (a + b)] * 100 |

**Rationale for the Indicator**

While water is a basic need, supply of potable water to citizens at their doorstep involves significant costs in building, operating and maintaining a system to do so. In a water supply system, quantum of service provided to citizens is directly measurable, and therefore it is necessary that all the water supplied to all categories of consumers should be metered. Metering will also induce efficiency in use of water, reveal physical and administrative leakages in the system, and enable high-end consumers to be charged for consuming more. Therefore, for introduction of volumetric based tariff structure for water charges, metering all connections is essential.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Few meters have been installed. All installed meters assumed to be functional and are assumed used as basis for billing water charges. |

| | |
|---|---|
| Intermediate level (C) | Meters installed for only certain category of consumers. It is assumed all consumers of these categories have meters installed which are functional and used as basis for billing. Records do not reveal exact number of connections which are metered. Water charged on basis of average reading for consumer category or on basis of past trends in most cases. |
| Intermediate level (B) | Database/records reveal list of consumers that have meters installed in their water connections. However, no clear data on functioning of meters, and no linkage with the billing system that may or may not use metered quantity as basis for billing. |
| Highest/preferred level of reliability (A) | Billing records and databases clearly identify consumers with meters (against specific meter serial no.). Billing processes reveal regular reading of meters and, meter readings are the basis for charging consumers. Records of stand posts are available. Database of water connections and meters are complete, and spatially referenced with a GIS database. Mechanism in place to repair meters if found faulty. Processes for installation of new water connections, installation of meters and generation of water bills based on the same are interlinked, and the data systems enable such continuity of data flow regarding these. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong Level |

### 3.2.4. Extent of Non-Revenue Water

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Extent of Non-Revenue Water | % | This indicator highlights the extent of water produced which does not earn the utility any revenue. This is computed as - Difference between total water produced (ex-treatment plant) and total water sold expressed as a percentage of total water produced. NRW comprises:<br>a) Consumption which is authorized but not billed, such as public stand posts;<br>b) Apparent losses such as illegal water connections, water theft and metering inaccuracies; and<br>c) Real losses which are leakages in the transmission and distribution networks. |

**Data Requirement**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total water produced and put into the transmission and distribution system | Million Liters Per Day or Month | Daily quantities to be measured through metering, and records should be maintained. Total supply for the month should be based on aggregate of daily quantum. Only treated water input into the distribution system should be measured. If water is distributed from multiple points, aggregate of that quantity should be considered. This quantum should include water purchased directly from any other sources and put into the distribution system, if any. Water may have been purchased from neighboring Thromdes, Cantonment Boards, etc. |
| b) Total water sold | Million Liters Per Day or Month | Actual volume of water supplied to customers who are billed for the water provided. Ideally, this should be the aggregate volume of water consumed as per which consumers have been billed. However, in the absence of a complete and functionally effective metering regimen, alternate methods of measurement need to be evolved, with lower but acceptable levels of reliability. |
| Non-Revenue Water | % | Non-Revenue Water = [((a - b) / a) * 100] |

**Rationale for the Indicator**

Reduction in NRW to acceptable levels is vital for the financial sustainability of the water utility. NRW can be reduced through appropriate technical and managerial actions, and therefore monitoring NRW can trigger such corrective measures. Reduction of real losses can be used to meet currently unsatisfied demand or to defer future capital expenditures to provide additional supply capacity. Reduction of NRW is desirable not just from a financial stand point, but also from economic and environmental benefits point of view.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Quantity of water produced is estimated on basis of assumed pump capacity and efficiencies and number of hours of operation. Few meters have been installed, in the distribution system and at the consumer end. Quantity of water sold to the category of consumers to whom bills are raised, is estimated on basis of assumed average consumption in that category and number of consumers in that category. |
| Intermediate level (C) | Quantity of water produced is estimated on basis of measurement of periodic sample surveys of production flows at all bulk production points. Meters are installed for select category of consumers, such as commercial and bulk consumers. For other category of consumers, such as domestic consumers, average consumption per consumer is considered and number of such consumers is considered, to arrive at quantum of water sold. |
| Intermediate level (B) | Quantity of water produced is computed on basis of measurement at bulk flow meters at the outlet of treatment plant and/or at all bulk production points. Quantum of water sold is based on metered quantity for bulk and commercial consumers. For households, ferrule size (size of distribution pipe outlet at consumer end) of each consumer connection is known, and hours of supply are known to compute the quantum of water sold. |
| Highest/preferred level of reliability (A) | Quantity of water produced is computed on basis of measurement at bulk flow meters at the outlet of treatment plant and/or at all bulk production points. Metering is undertaken at all key distribution nodes (entry to District Metering Areas - MOW&HSs) and at consumer's end for all category of consumers. Billing records and databases clearly reveal regular reading of meters and, therefore total quantum of water billed to consumers in the given time period (month/bi-monthly). |

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|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | Thromde Level |

### 3.2.5. Continuity of Water Supply

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Continuity of water supply | Hours Per Day | Continuity of supply is measured as - Average number of hours of pressurized water supply per day. Water pressure should be equal to or more than a head of 7 meters at the ferrule point / meter point for the connection. [7 m head corresponds to ability to supply to a single-storey building] |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| Average hours of pressurized supply per day | Hours | The number of hours of supply in each of the operational zones should be measured, continuously for a period of 7 days. The average of the seven days should be considered for that month. Measurement should exclude hours of supply where the pressure is less than the minimum standards for piped water supply mentioned above. The zone-wise figures should be averaged out to get city-wise data. |

**Rationale for the Indicator**

24x7 water supply system is the norm in most cities in the developed world. From a citizens' perspective, it is desirable to have round the clock water supply daily, as it eliminates the need to provide and manage household/establishment level storage, and other resultant inconveniences. The water utilities in most cities provide intermittent and limited number of hours of supply, as a means to manage inadequate supply. A number of studies have demonstrated the negative fallouts of designing and operating a system for intermittent water supply. A number of cities are undertaking substantial investments to improve this service level. It is therefore critical to monitor this indicator on a city-wide basis.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of number of hours based on feedback from field level engineers. Zone wise data is not available. |
| Intermediate level (C) | Not applicable |
| Intermediate level (B) | Calculation based on detailed operational records at each of the valve operating points. Pressure availability at the consumers' end is assumed to be adequate and meeting the stated norms. |
| Highest/preferred level of reliability (A) | Calculation based on detailed operational records at each of the valve operating points. Pressure adequacy and number of hours of supply at consumers' end is assessed on basis of statistically valid sample survey, |

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| | across all zones in the city. |

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| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Zone |

### 3.2.6. Efficiency in Redressal of Customer Complaints

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Efficiency in redressal of customer complaints | % | Total number of water supply related complaints redressed within 24 hours of receipt of complaint, as a percentage of the total number of water supply related complaints received in the given time period. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of water supply related complaints received per month | Number Per Month | Total number of all supply related complaints from consumers received during the month. Systems for receiving and logging in complaints should be effective and easily accessible to the citizens. Point of customer contact will include Common phone numbers, Written complaint at Tshogpa Demkhong offices, Collection centers, Drop boxes, Online complaints on web-site, etc. |
| b) Total number of complaints redressed within the month | Number Per Month | Total number of water supply related complaints that are satisfactorily redressed within 24 hours or the next working day, within that particular month. Satisfactory resolution of the complaint should be endorsed by the person making the complaint in writing, as part of any format / Proforma that is used to track complaints. |
| Efficiency in redressal of complaints | % | Efficiency in redressal of complaints = [(b/a) * 100] |

**Rationale for the Indicator**

It is important that in essential services such as water supply, the Thromde/water utility has an effective system to capture customer complaints/grievances, escalate them internally for remedial action and resolve them. While many Thromdes/utilities have put in place systems to capture complaints, much more work needs to be done to put in place back-end systems for satisfactorily resolving those complaints in a timely manner. As water supply is an essential service, the benchmark time for redressal is 24 hours or the next working day. It is therefore important to monitor this indicator.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Complaints data not maintained either at Tshogpa Demkhong level or Thromde level. |
| Intermediate level (C) | Multiple mechanisms/ means by which consumers can register their complaints such as by telephone, in person or by writing or by email. All complaints received are assumed to be resolved quickly. |
| Intermediate level (B) | Multiple mechanisms/ means by which consumers can |

| | |
|---|---|
| | register their complaints such as by telephone, in person or by writing or by email. However, systems do not exist for aggregating, sorting and tracking the complaints. Data available for some months has been used as a trend to report the figures for some other months. |
| Highest/preferred level of reliability (A) | Multiple mechanisms by which consumers can register their complaints such as by telephone, in person or by writing or by email. Complaints segregated into different categories. Complaints are collated through computer network or other systems, and tracked on a daily basis. The status of redressal of complaints is maintained. Consumers endorse complaint being addressed on the municipal Proforma. |

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|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Each water distribution Zone |

### 3.2.7. Quality of Water Supplied

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Quality of supply supplied | % | Percentage of water samples that meet or exceed the specified potable water standards, as defined by the concerned agency/ ministry of health. Sampling regimen should be as per standards and norms laid down for the same. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of water samples in a month | Number Per Month | Actual number of water samples that are taken for testing in the month. Samples should be drawn at both points - outlet of treatment plant and at consumer end. Sampling regimen should be as per laid down standards and norms. |
| b) Number of samples that meet the specified potable water standards in that month | Number Per Month | Of the total number of samples drawn in the month, the number of samples that have met or exceeded the specified potable water standards. All parameters of the quality standards should be met. Even if one standard is not met, the sample cannot be assumed to have met the standards. |
| Quality of water supply | % | Quality of water supply = [(b/a) * 100] |

**Rationale for the Indicator**

The quality of water supplied is as important a performance indicator as other service delivery indicator. Poor water quality can pose serious public health hazards. Water borne diseases are quite common in Indian cities, particularly amongst the urban poor. Although in most cases the sources of water that causes such diseases / epidemics are not municipal piped water supply, it is very important that this performance indicator is monitored regularly.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Sampling done only at treatment plant outlets. Absence of sampling regimen. Absence of required laboratory equipment, and only very basic tests are carried out. |
| Intermediate level (C) | Sampling done at production and intermediate points along distribution network, but only for residual chlorine. Absence of sampling regimen. Absence of required laboratory equipment, and tests are intermittently carried out through third party. |
| Intermediate level (B) | Regular sampling done at treatment plant outlet and consumption points. Consumption points are spatially spread across the city. Sampling regimen well documented and practiced. Tests include residual chlorine as well as bacteriological tests. Own laboratory equipment (or) easy and regular access to accredited |

| | |
|---|---|
| | testing centers. |
| Highest/preferred level of reliability (A) | Regular sampling done at treatment plant outlet and consumption points. Sampling regimen well documented and practiced. Tests include residual chlorine as well as bacteriological tests. Own laboratory equipment (or) easy and regular access to accredited testing centers. Periodic independent audit of water quality is carried out. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Thromde level |

### 3.2.8. Cost Recovery in Water Supply Services

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Cost recovery in water supply services | % | Total operating revenues expressed as percentage of total operating expenses incurred in the corresponding time period. Only income and expenditure of the revenue account must be considered, and income and expenditure from the capital account should be excluded. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total annual operating expenses | Nu. Million Per Quarter | Should include all operating expenses (for the year) such as electricity, chemicals, staff, outsourced operations/staff related to water supply, bulk water purchase costs and other Operations and Maintenance expenses. Should exclude interest payments, principal repayments and other capital expenses. |
| b) Total annual operating revenues | Nu. Million Per Quarter | Should include all water supply related revenues (billed) during the corresponding time period. Revenues may be in the form of taxes / Cess / surcharges, user charges, connection charges, sale of bulk water, etc. This should exclude capital income such as grants, loans, etc. |
| Cost recovery in water supply services | % | Cost recovery = [ (b / a) * 100] |

**Rationale for the Indicator**

Financial sustainability is a critical for all basic urban services. In services such as water supply services, benefits received by the consumers are more direct and can be quantified. Through a combination of user charges, fees and taxes, it is possible for all operating costs to be recovered. Cost recovery objectives provide a basis for tariff fixation, enables setting targets for revenue mobilization and cost control in delivery of water supply services. Therefore, it is critical to monitor this indicator.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | No segregation of budget heads related to water supply services and sanitation from the rest of the functions of the agency. Cash based accounting system is practiced. No clear systems for reporting unpaid expenditure, or revenues that is due. Disclosures and reporting are not timely. Audits have a time lag and are not regular. |
| Intermediate level (C) | Not applicable |
| Intermediate level (B) | Budget heads related to water and sanitation is segregated. Key costs related to water and sanitation are |

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|---|---|
| | identifiable, although complete segregation is not practiced (for e.g. electricity costs for water supply services is not segregated from overall electricity costs of the Thromde). Key income and expenditure are recognized based on accrual principles. Disclosures are complete and are timely. |
| Highest/preferred level of reliability (A) | In case of multi-function agencies like municipal corporations, the budget heads related to water and sanitation are clearly separated. Cost allocation standards for common costs are in place. Accrual based double entry accounting system is practiced. Accounting standards are comparable to commercial accounting standards with clear guidelines for recognition of income and expenditure. Accounting and budgeting manuals are in place and are adhered to. Financial statements have full disclosure and are audited regularly and in a timely manner. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | City level |

### 3.2.9. Efficiency in Collection of Water Related Charges

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Efficiency in collection of water related charges | % | Efficiency in collection is defined as - Current year revenues collected, expressed as a percentage of the Total operating revenues, for the corresponding time period. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Current revenues collected in the given year | Nu. Million Per Annum | Revenues collected for bills raised during the year. This should exclude collection of arrears. Inclusion of arrears will skew the performance reflected. Collection efficiency is in fact an indicator of how much arrears are being built up, and therefore only Current Revenues should be considered. |
| b) Total operating revenues billed during the given year | Nu. Million Per Annum | Total quantum of revenues related to water supply services that are billed during the year. This should include revenues from all sources related to water such as taxes, charges, Cess, surcharges, sale of bulk water, etc. |
| Collection efficiency | % | Collection Efficiency = [(a / b) * 100] |

**Rationale for the indicator**

For a water utility, it is not just enough to have an appropriate tariff structure that enables cost recovery objectives, but also efficient collection of revenues that are due to the utility. It is also important that the revenues are collected in the same financial year, without allowing for dues to get accumulated as arrears. It is therefore critical to monitor this indicator.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | No segregation of arrears Vs current year revenue collection. Cash basis of accounting is followed. Accounting code structure does not enable clear segregation of water revenues. |
| Intermediate level (C) | Not applicable |
| Intermediate level (B) | Clear segregation of Current year revenues collection Versus Arrears collection. However, revenue collection not matched against the specific bill issued. Overall accrual principles of accounting are followed, and therefore deposits and advances are not included in income and expenditure respectively. |
| Highest/preferred level of reliability (A) | Collection records maintained for each billing cycle. Collections are clearly identified against the specific bill which has been issued. Overall accrual principles of accounting are followed, and therefore deposits and |

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|---|---|
| | advances are not included in income and expenditure respectively. Accounting code structure also enables monitoring of billing and collections for each Tshogpa Demkhong within the Thromde. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Annual |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong Level |

## 3.2. Waste Water Management (Sewerage and Sanitation)

### 3.2.1. Coverage of Toilets

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Coverage of public/community toilets (Number/ seats) | % | This indicator denotes the extent to which citizens have private toilets in a service area. The toilets would include those in the category of residential, commercial, industrial and institutional properties. Service area implies a specific jurisdiction in which the service is required to be provided i.e. either a Tshogpa Demkhong or a Thromde as a whole.<br><br>This indicator denotes the extent to which citizens have access to public/community toilets in a service area. Service area implies a specific jurisdiction in which the service is required to be provided i.e. either a Tshogpa Demkhong or a Thromde as a whole. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of properties having access to individual toilets or community toilet within walking distance in the service area | Number | The total number of toilets (as against households) should be assessed. A property may have multiple tenants. A property is considered unique, if it is recorded as a unique property in the municipal records. Municipal records should be up-to-date, and preferably backed up by a cadaster map. |
| b) Total number of properties without individual toilet or community toilet within walking distance. | Number | Only total number of properties without access to an individual or community toilet should be assessed. |
| Coverage of toilets | % | Coverage of toilets = [b/a + b] * 100 |

**Rationale for the Indicator**

Last mile access to toilets is a key to improvement in service levels of sanitation facilities. In many cities, there is inadequate access to toilet facilities Therefore, it is important to measure this parameter.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (C) | Estimation based on geographical area of the Thromde covered with and without toilets facilities as a % of total Thromde area, as an indicator of service coverage. |

| | |
|---|---|
| Intermediate level (B) | Estimation based on total number of properties having individual toilets in the premises or access to a public/ community toilet at walking distance and without such facilities as a percentage of estimated number of properties, to arrive at indicator of service coverage. |
| Highest/preferred level of reliability (A) | Calculation based on actual number of properties and count of properties with or without toilet facilities, measured through a field survey. This data should be periodically updated on the basis of data regarding provision of toilet facilities and new properties being developed (from building plan approval department). Field surveys throughout the city carried out at least once in 5 years. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong Level |

### 3.2.2. Coverage of Waste Water Network Services

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Coverage of waste water network services | % | This indicator denotes the extent to which the underground sewerage (or waste water collection) network has reached out to individual properties across the service area. Properties include those in the category of residential, commercial, industrial and institutional. Service area implies a specific jurisdiction in which service is required to be provided, either a Tshogpa Demkhong or the Thromde as a whole. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of properties in the service area | Number | The total number of properties (as against households) should be assessed. A property may have multiple tenants. A property is considered unique, if it is recorded as a unique property in the municipal records. Municipal records should be up-to-date, and preferably backed up by a cadaster map. |
| b) Total number of properties with direct connection to the sewerage network | Number | Only properties with access connection to underground sewerage network should be included. Properties that connect their waste water outlet to storm water drains or open drainage systems should not be considered. However, this may include one or more properties with access to decentralized/stand-alone underground sewerage networks, which have treatment and safe effluent disposal facilities, which has been setup and operated as per laid down environmental standards. |
| Coverage of waste water network | % | Coverage of waste water network services = [b/a] * 100 |

**Rationale for the Indicator**

Last mile access to waste water networks is key to improvement in service levels of waste water management. In many Indian cities, waste water also flows through open drains / storm water drains, posing serious public health hazards. Also, coverage of sewerage network services is very low across most Indian cities. With substantial investments in this area being taken up programs, it would be important to monitor this indicator to observe the impact being made on the ground. Therefore, it is important to measure this parameter.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation based on geographical area of the Thromde |

| | |
|---|---|
| | covered with sewerage pipeline network, as a % of total Thromde area, as an indicator of service coverage. |
| Intermediate level (C) | Estimation based on road length in the city covered by pipeline network, as % of total road length, as an indicator of service coverage. |
| Intermediate level (B) | Estimation based on total number of connections as a percentage of estimated number of properties, to arrive at indicator of service coverage. |
| Highest/preferred level of reliability (A) | Calculation based on actual number of properties and count of properties with direct connection, measured through a field survey. This data should be periodically updated on basis of new sewerage connections taken (from sewerage department), and new properties being developed (from building plan approval department). Field surveys throughout the city carried out at least once in 5 years. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong Level |

### 3.2.3. Collection Efficiency of Waste Water Network

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Efficiency in collection of waste water | % | This indicator is measured as - Quantum of wastewater collected as a % of normative waste water generation in the Thromde. Water generation is linked to quantum of water supplied through piped systems, and other sources such as bore-wells, when they are very extensively used.<br><br>Data should be collected daily for an entire month, so as to measure the quantities per month. While daily variations may be normalized out, monthly variations may exist on account of seasonal variations. Data should be aggregated from multiple points across the Thromde. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total water produced | Million Liters Per Day or Month | Total quantum of water supplied to consumers. This data should be based on the water supplied to the distribution system (ex-treatment plant and including purchased water, if any), less physical losses of water in transmission and distribution system through leakages. In case municipal water is supplied through decentralized distribution networks, sourcing water from deep bore wells, the same should be included. |
| b) Estimated water use from other sources | Million Liters Per Day or Month | An estimate of water drawn from other sources such as private bore wells. Data that will drive this estimate include - number of properties with access to bore wells or other sources of water, spatially spread across the city; quantity of water supplied in those areas. Alternately, data may also be collected from sample surveys. |
| c) Wastewater collected | Million Liters Per Day or Month | Quantum of wastewater measured at the inlet of treatment plants. Quantum of waste water at outfalls of untreated sewerage, leading into rivers, lakes or other water bodies should not be included in the quantum of waste water collected. |
| Wastewater collection efficiency | % | Collection efficiency of waste water networks = [c / ((a+b) * 0.8)] |

**Rationale for the Indicator**

While the performance indicator for coverage provides an idea of infrastructure available for access to sewerage networks, the effectiveness of the system in capturing the waste water may

not be adequate. Therefore, the performance indicator related to collection efficiency signifies the effectiveness of the network in capturing and conveying it to the treatment plants. Thus, it is not just adequate to have an effective network that collects waste water, but also one that treats the waste water at the end of the network.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Water production is based on "D" category systems for measuring Non-Revenue Water (NRW). No meters at sewerage treatment plants, intake estimated on basis of flow or treatment plant capacity. No estimates for water consumed from other sources. |
| Intermediate level (C) | Water production is based on "C" category systems for measuring NRW. No meters at sewerage treatment plants, intake estimated on basis of flow or treatment plant capacity. No estimates for water consumed from other sources. |
| Intermediate level (B) | Water production is based on "B" category systems for measuring NRW. Periodic measurement of wastewater collection based on storage capacities of ponds / batches that are run for treatment at the Sewerage Treatment Plant (STP). No estimates for water consumed from other sources. |
| Highest/preferred level of reliability (A) | Water production is based on "A" category measurement systems for measuring NRW. Estimates available for water consumed from other sources. Measurement of wastewater collection at all inlets of sewerage treatment plants by flow meters. Process control automation provides accurate data, for both water production and distribution and for sewerage intake and treatment. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Thromde Level |

### 3.2.4. Adequacy of Waste Water Treatment Capacity

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Adequacy of capacity for treatment of waste water | % | Adequacy is expressed as - Secondary treatment (i.e. removing oxygen demand as well as solids, normally biological) capacity available as a percentage of normative wastewater generation, for the same time period |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total water consumed | Million Liters Per Day or Month | Total quantum of water supplied to consumers. This data should be based on the water supplied to the distribution system (ex-treatment plant and including purchased water, if any), less physical losses of water in transmission and distribution system through leakages. In case municipal water is supplied through decentralized distribution networks, sourcing water from deep bore wells, the same should be included. |
| b) Estimated water use from other sources | Million Liters Per Day or Month | An estimate of water drawn from other sources such as private bore wells. Data that will drive this estimate include - number of properties with access to bore wells or other sources of water, spatially spread across the city; quantity of water supplied in those areas. Alternately, data may also be collected from sample surveys. |
| c) Treatment plant capacity | Million Liters Per Day or Month | Total functional capacity of all wastewater treatment plants that can meet secondary treatment standards. |
| d) Capacity utilization | Million Liters Per Day or Month | c-b |
| Wastewater Treatment capacity | % | Adequacy of treatment capacity = [c/ ((a+b) * 0.8)] |

**Rationale for the Indicator**

Most cities have inadequate capacity for treatment of waste water that is generated in their cities. This indicator will highlight the adequacy of available and operational waste water treatment capacity.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|

| | |
|---|---|
| Lowest level of reliability (D) | Water consumption is based on "D" category systems for measuring Non-Revenue Water (NRW). No estimate of wastewater treatment capacity that is actually functional and in operation. No estimates for water consumed from other sources. |
| Intermediate level (C) | Water consumption is based on "C" category systems for NRW. No estimate of wastewater treatment capacity that is actually functional and in operation. No estimates for water consumed from other sources. |
| Intermediate level (B) | Water consumption is based on "B" category systems for NRW. Sound engineering estimates of functional wastewater treatment capacity is available, on basis of reliable operational data that is maintained. No estimates for water consumed from other sources. |
| Highest/preferred level of reliability (A) | Water consumption is based on "A" category measurement systems for NRW. Reliable estimates are available for quantity of water consumed from non-municipal sources. Water treatment plant system capacity assessed through rigorous testing and commissioning procedures (after which there have been no modifications to the plant). In case any modifications to the treatment plant have been carried out, system capacity is reassessed through measuring peak throughput. |

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|---|---|
| Minimum frequency of measurement of performance indicator | Annually |
| Smallest geographical jurisdiction for measurement of performance | Thromde Level |

### 3.2.5. Quality of Waste Water Treatment

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Quality of treatment | % | Quality of treatment is measured as - Percentage of wastewater samples that pass the specified secondary treatment standards. i.e. Treated water samples from outlet of waste water treatment plants are equal to or better than the standards laid down by Govt. of Bhutan agencies for secondary treatment of waste water. While the samples are collected at the waste water treatment plant outlet and results should be computed per treatment plant, this indicator should be reported at city/ Thromde level. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of wastewater samples in a month | Number Per Month | Sampling (quantity, periodicity, point of sample collection, etc.) should be taken as per good industry practices and laid down norms by environmental agencies, such as Pollution Control Boards, etc. |
| b) Number of samples that pass the specified secondary treatment standards | Number Per Month | Within the total valid samples, the number of samples that pass the specified secondary treatment standards, along all key parameters. |
| Quality of treatment | % | Quality of treatment = [(b/a) * 100] |

**Rationale for the Indicator**

For sustainable waste water management, it is not just enough to have the infrastructure to collect and convey the waste water, or the installed capacity to treat the same. It is important that the treated water that is discharged back into water bodies, or used for other purposes such as irrigation, meets the laid down environmental standards. It is therefore important to monitor this indicator.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Absence of sampling regimen. Absence of required laboratory equipment. Irregular tests carried out. Not all parameters are tested. |
| Intermediate level (C) | Not applicable |
| Intermediate level (B) | Sampling regimen well documented and practiced on most occasions. Own laboratory equipment (or) easy and regular access to accredited testing centers. Only a few key parameters are assessed. |
| Highest/preferred level of reliability (A) | Sampling regimen well documented and practiced completely. Own laboratory equipment (or) easy and |

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| | regular access to accredited testing centers. Periodic independent audit of wastewater quality. All parameters are assessed. |

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| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Thromde Level |

### 3.2.6. Extent of Reuse and Recycling of Waste Water

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Extent of recycling or reuse of waste water | % | Percentage of wastewater received at the treatment plant that is recycled or reused for various purposes. This should only consider water that is directly conveyed for recycling or reuse, such as use in gardens and parks, use for irrigation, etc. Water that is discharged into water bodies, which is subsequently used for variety of purposes should not be included in this quantum.<br><br>While measurements are done at treatment plants inlets and outlets, the indicator should be reported at the city/Thromde level as a whole. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Wastewater received at the treatment plants | Million Liters Per Day or Month | This should be based on actual flow measurement by functional flow meters, the quantum for which should be measured daily. Daily quantities should be aggregated to arrive at monthly quantum. |
| b) Wastewater recycled or reused | Million Liters Per Day or Month | This should be based on actual flow measurement by functional flow meters, the quantum for which should be measured daily. Daily quantities should be aggregated to arrive at monthly quantum. |
| Wastewater recycled or reused | % | Extent of waste water recycled or reused = [(b/a) * 100] |

**Rationale for the Indicator**

For sustainable water management, it is desirable that waste water is recycled or reused after appropriate treatment. Water can be directly reused in a number of areas such as - used in parks and gardens, supplied for irrigation purposes for farmland on city periphery, etc. To maximize the same, it is important that this indicator is measured and monitored.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | No meters at treatment plant inlet or points of supply of recycled water. Estimates based on observation and treatment plant capacity. |
| Intermediate level (C) | Not applicable |
| Intermediate level (B) | Not applicable |
| Highest/preferred level of reliability (A) | Based on data from flow meters at treatment plant inlets and outlets (i.e. points of supply of recycled water). Data should be measured daily, and aggregated for monthly |

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| | totals. |

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| Minimum frequency of measurement of performance indicator | Annually |
| Smallest geographical jurisdiction for measurement of performance | Thromde level |

### 3.2.7. Extent of Cost Recovery in Waste Water Management

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Extent of Cost recovery in waste water management | % | Extent of cost recovery is expressed as - Wastewater revenues as a percentage of wastewater expenses, for the corresponding time period. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total annual operating expenses | Nu. Millions | Should include all operating expenses (for the year) such as electricity, chemicals, staff and other establishment costs, outsourced operations/staff related to wastewater collection and treatment, and O &M expenses. Should exclude interest payments and principal repayments. |
| b) Total annual operating revenues | Nu. Millions | Should include all wastewater related revenues billed for the year. Revenues may be in the form of taxes/Cess/surcharges, user charges, connection charges, sale of sludge, sale of recycled water, etc. |
| Cost recovery in waste water management | % | Cost recovery = [(b/a) * 100] |

**Rationale for the Indicator**

Financial sustainability is a critical factor for all basic urban services. In services such as waste water management, some benefits are received directly by the consumers, and some benefits accrue indirectly through sustainable environment and public health benefits. Therefore, through a combination of user charges, fees and taxes all operating costs may be recovered. Therefore, it is critical for measuring overall cost recovery.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | No segregation of budget heads related to wastewater from the rest of the functions of the agency. Cash based accounting system is practiced. No clear systems for reporting unpaid expenditure. Disclosures and reporting are not timely. Audits have a time lag and are not regular. |
| Intermediate level (C) | Not applicable |
| Intermediate level (B) | Budget heads related to wastewater are segregated. Key costs related to wastewater are identifiable, although complete segregation is not practiced. Key income and expenditure are recognized based on accrual principles. Disclosures are complete and are timely. |
| Highest/preferred level of reliability (A) | In case of multi-function agencies like municipal corporations, the budget heads related to wastewater are clearly separated. Cost allocation standards for common |

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| | costs are in place. Accrual based double entry accounting system is practiced. Accounting standards comparable to commercial accounting standards with clear guidelines for recognition of income and expenditure. Accounting and budgeting manuals are in place and are adhered to. Financial statements have full disclosure and are audited regularly and in a timely manner. |

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| Minimum frequency of measurement of performance indicator | Yearly |
| Smallest geographical jurisdiction for measurement of performance | Thromde level |

### 3.2.8. Efficiency in Redressal of Customer Complaints

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Efficiency in redressal of customer complaints | % | Total number of sewerage related complaints redressed within 24 hours of receipt of complaint, as a percentage of the total number of sewerage related complaints received in the given time period |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of sewerage related complaints received per month | Number Per Month | Total number of all sewerage related complaints from consumers received during the month. Systems for receiving and logging in complaints should be effective and easily accessible to the citizens. Point of customer contact will include Common phone numbers, Written complaint at Tshogpa Demkhong offices, Collection centers, Drop boxes, Online complaints on web-site, etc. |
| b) Total number of complaints redressed within the month | Number Per Month | Total number of sewerage related complaints that are satisfactorily redressed within 24 hours or the next working day, within that particular month. Satisfactory resolution of the complaint should be endorsed by the person making the complaint in writing, as part of any format/Proforma that is used to track complaints. |
| Efficiency in redressal of complaints | % | Efficiency in redressal of complaints = [(b / a) * 100] |

**Rationale for the Indicator**

It is important that in essential services such as sewerage, the utility has effective systems to capture customer complaints/grievances, escalate them internally for remedial action and resolve them. While many Thromdes/utilities have put in place systems to capture complaints, much more work needs to be done to put in place back-end systems for satisfactorily resolving those complaints in a timely manner. As sewerage is an essential service, the benchmark time for redressal is 24 hours or the next working day. It is therefore important to monitor this indicator.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Complaints data not maintained either at Tshogpa Demkhong level or Thromde level. |
| Intermediate level (C) | Multiple mechanisms/ means by which consumers can register their complaints such as by telephone, in person or by writing or by email. All complaints received are assumed to be resolved quickly. |
| Intermediate level (B) | Multiple mechanisms/ means by which consumers can |

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|---|---|
| | register their complaints such as by telephone, in person or by writing or by email. However, systems do not exist for aggregating, sorting and tracking the complaints. Data available for some months has been used as a trend to report the figures for some other months. |
| Highest/preferred level of reliability (A) | Multiple mechanisms by which consumers can register their complaints such as by telephone, in person or by writing or by email. Complaints segregated into different categories. Complaints are collated through computer network or other systems, and tracked on a daily basis. The status of redressal of complaints is maintained. Consumers endorse complaint being addressed on the municipal Proforma. |

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|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Each water distribution zone/MoWHS level |

### 3.2.9. Efficiency in Collection of Sewerage Charges

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Efficiency in collection of sewerage charges | % | Efficiency in collection is defined as - Current year revenues collected, expressed as a percentage of the Total operating revenues, for the corresponding time period. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Current revenues collected in the given year | Nu. Million Per Annum | Revenues collected for bills raised during the year. This should exclude collection of arrears. Inclusion of arrears will skew the performance reflected. Collection efficiency is in fact an indicator of how much arrears are being built up, and therefore only Current Revenues should be considered. |
| b) Total operating revenues billed during the given year | Nu. Million Per Annum | Total quantum of revenues related to sewerage services that are billed during the year. This should include revenues from all sources related to sewerage such as taxes, charges, Cess, surcharges, etc. |
| Collection efficiency | % | Collection Efficiency = [(a / b) * 100] |

**Rationale for the Indicator**

For a utility, it is not just enough to have an appropriate tariff structure that enables cost recovery objectives, but also efficient collection of revenues that are due to the utility. It is also important that the revenues are collected in the same financial year, without allowing for dues to get accumulated as arrears. It is therefore critical to monitor this indicator.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Complaints data not maintained either at Tshogpa Demkhong level or Thromde level. |
| Intermediate level (C) | Multiple mechanisms/means by which consumers can register their complaints such as by telephone, in person or by writing or by email. All complaints received are assumed to be resolved quickly. |
| Intermediate level (B) | Multiple mechanisms/ means by which consumers can register their complaints such as by telephone, in person or by writing or by email. However, systems do not exist for aggregating, sorting and tracking the complaints. Data available for some months has been used as a trend to report the figures for some other months. |
| Highest/preferred level of reliability (A) | Multiple mechanisms by which consumers can register their complaints such as by telephone, in person or by writing or by email. Complaints segregated into different |

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|---|---|
| | categories. Complaints are collated through computer network or other systems, and tracked on a daily basis. The status of redressal of complaints is maintained. Consumers endorse complaint being addressed on the municipal Proforma. |

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|---|---|
| Minimum frequency of measurement of performance indicator | Annual |
| Smallest geographical jurisdiction for measurement of performance | Measurement at Tshogpa Demkhong level |

## 3.4. Solid Waste Management

### 3.4.1. Household Level Coverage of Solid Waste Management Services

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Household level coverage of SWM services through door-to-door collection of waste | % | Percentage of households and establishments that are covered by daily door-step collection system. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of households and establishments in the service area | Number | The total number of households and establishments (not properties) in the service area should be calculated. Service area refers to either the Tshogpa Demkhong or the Thromde limits. |
| b) Total number of households and establishments with daily doorstep collection | Number | Include doorstep collection through Thromde itself or Thromde approved service providers. This can even include door-to-door collection systems operated by Resident Welfare Associations, etc. |
| Coverage | % | Coverage = [(b/a) * 100] |

**Rationale for the Indicator**

This indicator provides the coverage of door-to-door solid waste collection services. Door-step level collection is an essential and critical starting point in the entire chain of scientific solid waste management services. Having waste free clean roads and drains, scientific treatment of waste so as to maximise treatment, recycling, and disposal, can all be achieved in a sustainable manner only if door-to-door collection of waste is sustained.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Coverage numbers based on aggregate city level estimate by service provider |
| Intermediate level (C) | Coverage is estimated on the basis of number of Tshogpa Demkhongs serviced by doorstep collection, as percentage of total number of Tshogpa Demkhongs in the Thromde. |
| Intermediate level (B) | Estimation of coverage based on average daily waste collected by Thromde (in tons) from areas serviced by door-step waste collection; divided by estimated daily waste generation (in tons) by entire city. Daily averages based on actual weighment of waste collected on designated weighbridges, measured daily for consecutive seven days in a month. |
| Highest/preferred level of reliability (A) | Calculation based on actual number of households and establishments with doorstep collection as stated by agency involved in doorstep collection. This may be |

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|---|---|
| | verified from records of any user charges collected for the doorstep collection services. Total number of households/establishments should be measured from updated GIS spatial data of the city. |

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|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong level |

### 3.4.2. Efficiency in Collection of Municipal Solid Waste

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Collection Efficiency | % | Total waste collected by Thromde and authorized service providers versus the total waste generated within the Thromde excluding recycling or processing at the generation point. Typically, some amount of waste generated is either recycled or reused by the citizen itself. This quantity is excluded from the total quantity generated, as reliable estimates will not be available for these. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total waste that is generated and which needs to be collected | Tons Per Month | Total waste generated excluding waste processed or recycled at the generation point. This would depend on the population of the city, and the composition of economic activities. |
| b) Total quantum of waste that is collected by the Thromde or authorized service providers | Tons Per Month | Total waste collected from households, establishments and common collection points. This should be based on actual weighment of the collected waste. Daily generation should be aggregated to calculate the total monthly quantum. This should exclude any special drives for waste collection, and waste generated from one-off activities such as demolitions, desilting canals, etc. |
| Coverage | % | Coverage = [(b/a) * 100] |

**Rationale for the Indicator**

This indicator is relatively easy to measure, and has been used for a long time as an indicator of efficiency in collection of waste. While the indicator is well understood, the reliability varies significantly on account of different methods used for measurement. Collection efficiency should measure waste collected in normal course by the SWM systems. Typically, the uncollected waste tends to gradually find its way into recycling, or is strewn along the roads, clogs the drains or in case of bio-degradable waste, it putrefies and degrades. Therefore, collection efficiency is a key performance indicator.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Waste generation estimates based on empirical standards of per capita waste generation based on size of the city. Inadequate data on waste collection, the same is estimated based on number of trips made by waste collection vehicles to the disposal site. |
| Intermediate level (C) | Nil |
| Intermediate level (B) | Waste generation estimates based on empirical standards |

| | |
|---|---|
| | of per capita waste generation based on size of the city. Data on waste collection, based on waste weighed by weighbridge at the disposal site. |
| Highest/preferred level of reliability (A) | Waste generation estimates based on quarterly survey/sample of statistically significant and representative number of households and establishments. Seasonal variation in waste quantity generation is captured in these estimates. Waste collection is based on actual weighment of waste on a weighbridge at the disposal site (which is aggregate of waste measured at composting yard, sanitary land fill site, and waste taken out for recycling/reuse after it has been collected.) |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong level |

### 3.4.3. Extent (%) of Segregation of Municipal Solid Waste

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Extent (%) of Segregation of waste | % | % of households and establishments that segregate their waste. Segregation should be at least separation of wet and dry waste at the source, i.e. at household or establishment level. Ideally, the separation should be in following categories: bio-degradable waste, waste that is non-biodegradable, and hazardous domestic waste such as batteries, etc. In line with this description, the Thromde may further refine the criteria for classifying waste as being "segregated".<br><br>It is important that waste segregated at source, is not again mixed, but transported through the entire chain in a segregated manner. It is therefore important that this indicator is based on measurement of waste arriving in segregated manner at the treatment/disposal site, rather than measuring the same at collection point. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Quantum of waste that is segregated | Tons Per Month | Total quantum of waste that arrives in segregated manner at the treatment and / or disposal site (viz. composting yards, waste treatment plants, landfill sites, etc.). Waste that arrives at these locations in an un-segregated manner should not be considered. |
| b) Total quantum of waste that is collected by the Thromde or authorised service providers | Tons Per Month | Total waste collected from households, establishments and common collection points. This should be based on actual weighment of the collected waste. This should exclude any special drives for waste collection, and waste generated from one-off activities such as demolitions, desilting canals, etc. [This corresponds to the quantity of (b), as measured for the indicator on Collection Efficiency.] |
| Extent of Segregation | % | Extent of segregation = [(a/b) * 100] |

**Rationale for the Indicator**

Segregation of waste is a critical requirement for sustainable solid waste management systems. Segregations enables recycling, reuse, treatment and scientific disposal of the different components of waste. Segregation of waste should ideally be at source, and should then also be transported in a segregated manner up to the point of treatment and/or disposal. If waste is received at these points in a segregated manner, it can be safely assumed, that it has

been segregated at source and transported so; while the converse may not be true. Therefore, segregation is being measured at this point of receipt, rather than at point of collection.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Segregation estimated by service provider without any documentation of measurement methods adopted. |
| Intermediate level (C) | All households and establishments provided two separate waste containers assumed to be "segregating" waste. Then % of households provided with two bins, used as basis for estimating extent of segregation. |
| Intermediate level (B) | Estimates of segregation based on input from agencies engaged in doorstep collection. The aggregates of estimates across all areas should be added up for the Thromde-wide estimate. |
| Highest/preferred level of reliability (A) | The daily total of waste arriving in segregated manner at disposal/treatment sites should be measured, on basis of weighment of individual trips. Waste taken away by recyclers from intermediate points, should be added to this quantum. Waste taken away by recyclers can be assessed from wholesale waste recycling traders.<br><br>Alternately, the quantum of unsegregated waste received at the disposal point, viz. the composting yard, land-fill site, or dump site should be measured through regular weighment on a weighbridge. The daily totals should be arrived at by adding the weighment of all trips. The difference between the quantum collected and this quantum (unsegregated waste) should be equal to the quantity that is segregated.<br><br>Daily log of waste intake at processing facilities is maintained, which is aggregated for monthly data. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Thromde level |

### 3.4.4. Extent of Municipal Solid Waste Recovered

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Extent of recovery of waste collected | % | This is an indication of the quantum of waste collected, which is either recycled or processed. This is expressed in terms of % of waste collected. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Amount of waste that is processed or recycled | Tons Per Month | Total quantum of waste intake by waste processing/recycling facilities operated by the Thromde or operator at a Thromde/Tshogpa Demkhong/locality level. Inert matter, and other material refused by the processing/recycling facilities, which will go back to the dumping sites/landfills should be deducted from the intake quantities. |
| b) Total quantum of waste that is collected by the Thromde or authorized service providers | Tons Per Month | Waste collected at intermediate points by informal mechanisms (rag pickers, etc.) and fed back into the recycling chain should be included in this quantity. This can be assessed through data from whole sale traders of such waste at the city level. Typically, there would be few wholesalers at the city level, from whom data can be collected. |
| Recovery | % | Extent of recovery = [a / b] * 100 |

**Rationale for the Indicator**

Environmental sustainability demands that maximum extent of waste should be recycled, reused or processed. While the processing, recycling and reuse should be carried out without creating any health and environmental hazards, the total quantum of waste recovered is in itself a key performance parameter. Therefore, measurement of this indicator is critical. The benchmark value for this indicator will depend on the amount of inert matter comprised in the waste collected by the Thromde. Waste composition is typically unique for each city, while being in a broad range of values for similar cities.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Recovery estimates are based on installed capacity of waste processing facilities. |
| Intermediate level (C) | Estimation of waste recovery is based on an aggregate mass balance. From the total estimated waste collection, the following are reduced to arrive at the extent of recovery viz. moisture loss and amount disposed at landfill/dump sites are deducted from the amount of waste collected. |
| Intermediate level (B) | Recovery estimates is based on measured consumption/inputs at the organized large waste |

| | |
|---|---|
| | processing facilities, such as composting yards and waste-to-energy facilities. |
| Highest/preferred level of reliability (A) | Recovery estimates is based on measured consumption/inputs at the organized large waste processing facilities, such as composting yards and waste-to-energy facilities. To this quantum, unorganized sector waste intake for processing is added. This will typically include - community/colony level composting facilities, waste collected for recycling and reuse through the chain of waste recyclers (aggregates measured at the wholesale level). Daily log of waste intake at processing facilities is maintained, which is aggregated for monthly data. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Thromde level |

### 3.4.5. Extent of Scientific Disposal of Municipal Solid Waste

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Extent of scientific disposal of waste in landfill sites | % | Amount of waste that is disposed in landfills that have been designed, built, operated and maintained as per standards lay down by Central agencies. This extent of compliance should be expressed as percentage of total quantum of waste disposed at landfill sites, including open dump sites. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total waste disposed in "compliant" landfills every month | Tons Per Month | Daily log of waste being disposed at such "compliant" land fill sites should be maintained, based on actual measurement at weighbridges that are preferably located at the entrance to such sites. Monthly total should be sum of daily totals in the month. |
| b) Total waste disposed in all landfills every month | Tons Per Month | Total waste disposed after collection and recovery (if any) at landfills (including compliant landfills and open dumpsites). This quantity should be based on actual measurement at weighbridges that are preferably located at the entrance to such sites. Monthly total should be sum of daily totals in the month. |
| Extent of scientific disposal | % | Extent of scientific disposal = [a/b] * 100 |

**Rationale for the Indicator**

Inert waste should finally be disposed at landfill sites, which are designed, built, operated and maintained as standards laid down in prevailing laws and manuals of nodal agencies. This includes collection and treatment of leachate at the landfill site. Extent of compliance should be seen against total quantum of waste that is disposed in landfills. This is a critical performance parameter from an environmental sustainability perspective.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Poor data and records at landfill sites. No documentation of operations. Estimates provided on basis of estimate number of trips of trucks to landfill site. |
| Intermediate level (C) | Quantity of waste being disposed at landfill site is estimated on basis of mass balance. i.e. total waste collected less (moisture loss and waste recovered through recycling or processing). Actual measurements are not available. |
| Intermediate level (B) | Records are maintained and good quality data is available on quantity of waste being disposed at the landfill / open dumping sites. However, there are no clear records on |

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|---|---|
| | operations and maintenance of landfill operations. |
| Highest/preferred level of reliability (A) | Accurate and detailed records on amount of waste being landfilled are regular collected, and also records are maintained on operating practices and routines carried out at all landfill sites. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Thromde level |

### 3.4.6. Extent of Cost Recovery in SWM Services

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Extent of Cost Recovery for the Thromde in SWM services | % | This indicator denotes the extent to which the Thromde is able to recover all operating expenses relating to SWM services from operating revenues of sources related exclusively to SWM.<br><br>This indicator is defined as --> Total annual operating revenues from solid waste management/Total annual operating expenses on solid waste management, expressed in % terms. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total annual operating expenses | Nu. Million | Should include all operating expenses incurred by the Thromde towards SWM services. This should include costs related to - operations and maintenance expenses, all directly attributable administrative and establishment expenditure (including salaries, wages, contract labour hire charges, etc.). Operating expenses should also include payments to contractors for activities outsourced by the Thromde. Should exclude interest payments and principal repayments. |
| b) Total annual operating revenues | Nu. Million | Should include all taxes and charges for SWM, plus proceeds from processing or recycling that accrue to the account of the Thromde. This should exclude income earned by contractors, or the informal sector that is not passed on to the Thromde. |
| Cost Recovery | % | Cost recovery = [b/a] * 100 |

**Rationale for the Indicator**

Financial sustainability is a critical factor for all basic urban services. In services such as SWM, some benefits are received directly by the consumers, while some other benefits accrue indirectly through a cleaner and sustainable environment, apart from public health benefits. Therefore, costs related to SWM may be recovered through a combination of taxes and user charges. In case of SWM, there is potential to supplement user charges with revenues that can be gained from recycling, reuse and conversion of waste to either compost or fuel or directly to energy. Therefore, it is critical for measuring overall cost recovery.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | No segregation of budget heads related to solid waste from other functions such as street sweeping and drainage. Cash based accounting system is practiced. |

| | |
|---|---|
| | Account codes are not function-wise, and difficult to estimate SWM related establishment, administrative and O& M costs. Disclosures and reporting are not timely. |
| Intermediate level (C) | Not applicable |
| Intermediate level (B) | Budget heads related to solid waste management are segregated. Key costs related to solid waste management are identifiable, although complete segregation is not practiced. Key income and expenditure are recognised based on accrual principles. Disclosures are complete and are timely. Accounts are finalized and closed, although audit may be pending. |
| Highest/preferred level of reliability (A) | Budget heads related to SWM are clearly separated and cost allocation standards for common costs are in place. Accrual based double entry accounting system is practiced. Accounting standards comparable to commercial accounting standards with clear guidelines for recognition of income and expenditure. Accounting and budgeting manuals are in place and are adhered to. Financial statements have full disclosure and are audited regularly and in a timely manner. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Annually |
| Smallest geographical jurisdiction for measurement of performance | Thromde level |

### 3.4.7. Efficiency in Redressal of Customer Complaints

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Efficiency in redressal of customer complaints | % | Total number of SWM related complaints redressed within 24 hours of receipt of complaint, as a percentage of the total number of SWM related complaints received in the given time period |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of SWM related complaints received per month | Number Per Month | Total number of all SWM related complaints from consumers received during the month. Systems for receiving and logging in complaints should be effective and easily accessible to the citizens. Point of customer contact will include Common phone numbers, Written complaint at Tshogpa Demkhong offices, Collection centers, Drop boxes, Online complaints on web-site, etc. |
| b) Total number of complaints redressed within the month | Number Per Month | Total number of SWM related complaints that are satisfactorily redressed within 24 hours or the next working day, within that particular month. Satisfactory resolution of the complaint should be endorsed by the person making the complaint in writing, as part of any format/Proforma that is used to track complaints. |
| Efficiency in redressal of complaints | % | Efficiency in redressal of complaints = [(b / a) * 100] |

**Rationale for the Indicator**

It is important that in essential services such as SWM, the utility has effective systems to capture customer complaints/grievances, escalate them internally for remedial action and resolve them. While many Thromdes/utilities have put in place systems to capture complaints, much more work needs to be done to put in place back-end systems for satisfactorily resolving those complaints in a timely manner. As SWM is an essential service, the benchmark time for redressal is 24 hours or the next working day. It is therefore important to monitor this indicator.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Complaints data not maintained either at Tshogpa Demkhong level or Thromde level. |
| Intermediate level (C) | Multiple mechanisms/means by which consumers can register their complaints such as by telephone, in person or by writing or by email. All complaints received are assumed to be resolved quickly. |
| Intermediate level (B) | Multiple mechanisms/means by which consumers can |

| | |
|---|---|
| | register their complaints such as by telephone, in person or by writing or by email. However, systems do not exist for aggregating, sorting and tracking the complaints. Data available for some months has been used as a trend to report the figures for some other months. |
| Highest/preferred level of reliability (A) | Multiple mechanisms by which consumers can register their complaints such as by telephone, in person or by writing or by email. Complaints segregated into different categories. Complaints are collated through computer network or other systems, and tracked on a daily basis. The status of redressal of complaints is maintained. Consumers endorse complaint being addressed on the municipal Proforma. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | Each water distribution zone/MoWHS level |

### 3.4.8. Efficiency in Collection of SWM Charges

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Efficiency in collection of SWM charges | % | Efficiency in collection is defined as - Current year revenues collected, expressed as a percentage of the Total operating revenues, for the corresponding time period. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Current revenues collected in the given year | Nu. Million Per Annum | Revenues collected for bills raised during the year. This should exclude collection of arrears. Inclusion of arrears will skew the performance reflected. Collection efficiency is in fact an indicator of how much arrears are being built up, and therefore only Current Revenues should be considered. |
| b) Total operating revenues billed during the given year | Nu. Million Per Annum | Total quantum of revenues related to SWM services that are billed during the year. This should include revenues from all sources related to SWM such as taxes, charges, cess, surcharges, etc. |
| Collection efficiency | % | Collection Efficiency = [(a / b) * 100] |

**Rationale for the Indicator**

For a utility, it is not just enough to have an appropriate tariff structure that enables cost recovery objectives, but also efficient collection of revenues that are due to the utility. It is also important that the revenues are collected in the same financial year, without allowing for dues to get accumulated as arrears. It is therefore critical to monitor this indicator.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | No segregation of arrears Vs current year revenue collection. Cash basis of accounting is followed. Accounting code structure does not enable clear segregation of water revenues. |
| Intermediate level (C) | Not applicable |
| Intermediate level (B) | Clear segregation of Current year revenues collection Versus Arrears collection. However, revenue collection not matched against the specific bill issued. Overall accrual principles of accounting are followed, and therefore deposits and advances are not included in income and expenditure respectively. |
| Highest/preferred level of reliability (A) | Collection records maintained for each billing cycle. Collections are clearly identified against the specific bill which has been issued. Overall accrual principles of accounting are followed, and therefore deposits and |

| | |
|---|---|
| | advances are not included in income and expenditure respectively. Accounting code structure also enables monitoring of billing and collections for each Tshogpa Demkhong within the Thromde. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Annually |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong Level |

## 3.4. Storm Water Drainage

### 3.4.1. Coverage of Storm Water Drainage Network

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Coverage of storm water drainage network | % | Coverage is defined in terms of - % of road length covered by storm water drainage network |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total length of road network in the Thromde | Kms | Only consider roads that are more than 3.5 m wide carriageway |
| b) Total length of primary, secondary and tertiary drains | Kms | Only consider drains that are trained, made of Cemented construction and are covered. |
| Coverage of storm water drainage networks | % | Coverage = [(b / a) * 100] |

**Rationale for the Indicator**

This indicator provides an estimation of the extent of coverage of the storm water drainage network in the city.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Not applicable |
| Intermediate level (C) | Estimated from city road maps, not updated in past 5 years |
| Intermediate level (B) | Estimated from city road maps (that are detailed and to scale), which have been updated in past 5 years |
| Highest/preferred level of reliability (A) | Actual ground levels surveys carried out to measure drain and road length. Surveys to verify that drains are of pucca construction and covered. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Annually |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong Level |

### 3.4.2. Incidence of Water Logging/Flooding

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Aggregate number of incidents of water logging reported in a year | Number Per Year | Number of times water logging is reported in a year, at flood prone points within the city |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Identification of flood prone points within the Thromde limits. The points may be named as A1, A2, A3, …. An. | Number | Flood prone points within the city should be identified as locations that experience water logging - at key road intersections, or along road length of 50 meters or more, or in a locality affecting 50 households or more. |
| b) Number of occasions of flooding/water logging in a year | Number Per Year | Occasion or an incident of flooding/water logging should be considered if the same affects transportation and normal life. Typically, stagnant water for more than 4 hours of depth more than 6 inches. |
| The aggregate number of instances or occasions of water logging/flooding reported across the city in a year | Number Per Year | Aggregate Incidence = (b at A1) + (b at A2) + … (b at An) |

**Rationale for the Indicator**

This indicator provides a picture of the extent to which water logging and flooding is reported in the Thromde within a year, which has impacted significant number of persons impacting normal life and mobility. This indicator provides an assessment of the impact or outcome of storm water drainage systems.

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Not applicable |
| Intermediate level (C) | Not applicable |
| Intermediate level (B) | Based on reports/complaints filed by citizens |
| Highest/preferred level of reliability (A) | Flood prone points should be first identified based on reports/complaints filed by citizens, or by direct observations, and reported into a Central Control Room. Monitoring stations (in charge of specific jurisdictions) should regularly monitor in respective Tshogpa Demkhongs, instances of flooding as mentioned above. Data should be captured by time, date, location and extent of flooding. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |

| | |
|---|---|
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong Level |

## Annex IV: Guidelines for Computation of Performance Indicators in Quarterly Reports – For Other Services/Amenities

### 4.1. Urban Roads:

Urban roads could be classified as Urban Expressway, Arterial roads, Sub Arterial Roads, Distributor/Collector Roads, Local Streets and Access Streets.

To measure the performance of Thromdes in provision of roads network, the basic indicators used are:

#### 4.1.1. Coverage of Urban Roads

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Coverage by all types of roads in the municipal jurisdiction | % | Coverage is defined - % of total roads network including principal roads, streets and lanes to the total area under the Thromde jurisdiction. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| Length and width of different types of roads in the Thromde. It includes both surfaced and unsurfaced roads) | Kilometer (Km) | Total roads length worked out by multiplying width and length of each category of roads. Total of such computation with be total roads length in the Thromde |
| Total area of the Thromde | (Km) | As in the road length, it also refers to the total area of the Thromde (length X width= total area) |
| Coverage of roads (%) | % | % coverage = (b/a) x100 |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of area coverage by different categories of roads, streets etc. without proper records and surveys as a surrogate indicator for urban roads coverage. |
| Intermediate level (C) | Estimation of roads network coverage on the basis of roads length alone (without data on widths) as a surrogate indicator for urban roads coverage |
| Intermediate level (B) | - |
| Highest/preferred level of reliability (A) | Calculation based on actual data with regard to length and width of different types of roads in the Thromde as also the area under the jurisdiction of Thromde. Data need to be periodically updated on the basis of new area added in the Thromdes limit and up gradation of roads network. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |

| | |
|---|---|
| Smallest geographical jurisdiction for measurement of performance | Thromde Level |

### 4.1.2. Road Density

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Roads density | Km/Sq. Km Area) | It indicates the extent of road network in a Thromde in terms of its geographical area and refers to the accessibility. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total length of all types of roads | Running Kilometer (RKm) | Total roads length (RKM) divided by the total area of Thromde (in Sq. Kms). |
| b) Total Area under the Thromde jurisdiction | Sq. Km | |
| Roads density | Km/Sq. Km Area | Density = a/b |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of area covered by different categories of roads, streets etc. without proper records and surveys as a surrogate indicator for urban roads coverage. |
| Intermediate level (C) | Density worked out without actual data of all types of roads in different land uses |
| Intermediate level (B) | - |
| Highest/preferred level of reliability (A) | Calculation based on actual data with regard to length of different types of roads in various land uses in the Thromde. And actual data on the area under the jurisdiction of Thromde. Data need to be periodically updated on the basis of new area added in the Thromdes limits and up gradation of roads network. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | City Level |

### 4.1.3. Quality of roads

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Coverage by surfaced/ all-weather roads | % | It indicates the quality of roads in terms of areas covered by surfaced or all-weather roads. These are pucca roads suitable for smooth flow of traffic and vehicular movement. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total area of surfaced roads | Sq. Km | Data both on width and length of different types of surfaced/pucca/metaled roads, streets and lanes is needed to compute the total area under surfaced roads network in a Thromde. |
| b) Total area of all roads both surfaced and un surfaced | Sq. Km | As in the case of surfaced roads, data both in terms of width and length of various types of roads required to work out total area of roads in the Thromde. |
| Coverage by surfaced roads | % | Coverage = [(a/b) * 100] |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of data on surfaced roads, as a surrogate indicator for quality of urban roads. |
| Intermediate level (C) | |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | Calculation based on actual data with updated records. MIS will help to generate such kind of record management system |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | City Level |

### 4.2. Footpaths/Walkways

Footpath should normally design for a pedestrian Level of Service (LOS), thereby providing wide pedestrian facilities for pleasant and comfortable walking. The width of footpaths depends upon the expected pedestrian traffic and may be fixed as per the land use adjacent to roads which significantly influences generation of pedestrian traffic on the footpaths. Various land uses could be defined as residential/mixed use areas, Commercial, Shopping Frontages, Institutional areas. Bus stops etc. For measuring the status in providing footpaths, a set of indicators have been developed and discussed here:

#### 4.2.1. Coverage of Footpaths

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Coverage by footpaths and walkways | % | Total area covered by the footpaths (length X width) in different land uses such as residential, commercial, institutional, mixed land use etc. It will help to assess the adequacy of footpaths in a Thromde for the easy safe and comfortable movement of pedestrian population. It will be worked out with the total area under the Thromde jurisdiction. Ideally pedestrian walkways or footpaths should be on both sides of principle and main roads of the city mainly connecting different commercial and mixed land use areas. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total area of footpaths/walkways under the Thromde jurisdiction. | Km | Data both in terms of length and width of different footpaths constructed alongside of different categories of roads in the city need to be compiled for this purpose with its regular updating. Formula: width X length= total area in running kilometers (RKM) |
| b) Total area under Thromde jurisdiction | Km | Data both in terms of width and length of the city need to be calculated with a view to work out percentage of area covered by the footpaths. It needs to be updated regularly to have the real-life situation assessment. Formula: width X length= total area in running kilometers (RKM) |
| Coverage by footpaths | % | Coverage = [a/b) * 100] |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of coverage by footpaths on the basis of just observation without proper data on the width and length of footpaths. |
| Intermediate level (C) | Calculation on the basis of length of roads of various |

| | |
|---|---|
| | types without considering the actual length of footpaths in different land uses. |
| Intermediate level (B) | Calculation on the basis of only length of footpaths. |
| Highest/preferred level of reliability (A) | Calculation based on actual length and width of footpaths in different land uses based on factual surveys and MIS. Data updated periodically on the basis of construction of new footpaths along road side in the new settlements, commercial centers, etc. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with at the city level, gradually to be compiled and reported on the basis of land use in the city. |

### 4.2.2. Footpath Density

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Density | Km/Sq. Km Area | Density refers to the intensity of service concerned in relation to total area of the settlement/urban center/Thromde. It calculated in terms of total length of footpaths in RKM in the context of per square kilometer area of Thromde |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total length of all types of footpaths/walkways under the Thromde jurisdiction. | RKm | Data in terms of length of different footpaths constructed alongside of different categories of roads in the city need to be compiled for this purpose with its regular updating. |
| b) Total area under Thromde jurisdiction | Sq. Km | Total area under Thromde jurisdiction |
| Density: Footpaths length/Sq. Km of municipal area | Km/Sq. Km Area | Total length of all footpaths (RKM)/Area of Thromde (Sq. Kms) |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of coverage by footpaths on the basis of just observation without proper data on the actual length of footpaths. |
| Intermediate level (C) | Calculation on the basis of length of roads of various types without considering the actual length of footpaths in different land uses. |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | Calculation based on actual length of footpaths in different land uses based on factual surveys and MIS. Data updated periodically on the basis of construction of new footpaths along roadside in the new settlements, commercial centres etc. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with at the city level, gradually to be compiled and reported on the basis of land use in the city. |

### 4.2.3. Accessibility to Footpaths Per 1000 Population

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Accessibility to Footpaths per 1000 population | RKm | To assess the availability of footpaths in the context of urban population in a Thromde. It should be linked with the growth of population to provide better services to the citizens. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total length of all types of footpaths in the city | RKm | Length need to be measured of all footpaths in the city/Thromde. Record to be updated regularly to capture the actual status of the service in reference. |
| b) Total population of the Thromde/City | Number | Projections for population need to be done to assess the service level. |
| Length of footpaths per 1000 population | RKm | (a/b) x 1000 |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Without updated information on length of footpaths and population. |
| Intermediate level (C) | Calculation on the basis of length of roads of various types without considering the actual length of footpaths in different land uses. |
| Intermediate level (B) | - |
| Highest/preferred level of reliability (A) | Calculation based on actual length of footpaths in different land uses based on factual surveys and MIS. Data updated periodically on the basis of construction of new footpaths along road side in the new settlements, commercial centers etc. Similarly, population is being projected on the basis of trend analysis and such other indicators. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with at the city level, gradually to be compiled and reported on the basis of land use in the city. |

## 4.3. Street Lights

To provide an effective safety to the citizens of the Thromde especially after sunset/dark and venerable places, provision of adequate street lights is essential which could be used as an indicator to assess the performance of the Thromde/department concerned. Suggested indicators are:

### 4.3.1. Coverage by Lamp Posts/Street Lights

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Number of lamp posts per kilometer road length | Number | It will provide the level of street lights and its coverage in terms of area served by them. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total number of lamp post/ street lights in the city | Number | It includes all kind of lights such as LED, tube lights, halogen etc. The intensity of street lights usually depend on the height of poles, type of lamp/light installed, its power (watts) width of roads etc. Here only basic indicator has been used to assess the general performance of street lights being the part of public safety function of Thromdes. |
| b) Total road length within the jurisdiction of Thromde | RKm | It includes all types of roads and streets in the city. |
| No of lamp posts/km road length | Number | =(b/a) |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | All the street poles with or without functioning lights covered under the indicator. |
| Intermediate level (C) | |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | Regular census of street lights poles with updated information on the functioning lights. Breakup of different kind of lights with their influence area needs to be provided. Updated data on the roads length of various types also need to be furnished as per the frequency of performance reporting system in the Thromdes concerned. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | City/settlement level |

### 4.4. Open Spaces:

The open spaces broadly include:

a. Organized Green
b. Recreational purpose
c. Other common open spaces (such as vacant lands/open spaces including flood plains, forest cover etc. in plain areas.

In hilly areas such as in Bhutan, the protected zones and ecological conservation areas shall be considered to be over and above this open space requirement.

Organized Green refer to parks, play fields and other open spaces like specified park, amusement park, play grounds, a multipurpose open space, botanical garden and zoological parks, traffic parks, etc. It is suggested that:

a. in each residential complex there should be 2-3 parks and playgrounds;
b. In a housing cluster, there should be community level park and open space;
c. At zonal level, there should be a district level park and sports Centre; and
d. At a city level, there should be a city level park, sports complex, botanical/zoological garden, exhibition ground, cultural gathering ground etc. depending upon design and space availability.

The community open space shall be reserved for recreational purposes which shall as far as possible be provided in one place.

It is suggested that the open spaces are to be developed with other socio cultural and commercial facilities so that they can serve multiple purposes. The size, design etc. of open spaces should be govern as per the rules and regulations in force in this regard. The performance of Thromde in terms of provision of open spaces in a city could be reviewed on the basis of following indicators:

#### 4.4.1. No of Parks/Playgrounds Per 1000 Population

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| No of perks/ playgrounds per 1000 population | Number | To assess the provision of open spaces in the context of population served. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| Total number of parks and playgrounds in the Thromde | Number | Data on Total no of open spaces in different land uses and settlement/ clusters shall be collected and complied. System need to maintain the area of each of open spaces along with facilities provided in it. These open spaces should be well equipped with all kind of facilities such as lighting arrangements, security, wash rooms, drinking water facilities, |

| | | |
|---|---|---|
| | | small eating places, etc. |
| Total population of Thromde | Number | Projected population |
| No of parks/playgrounds per 1000 population | Number | (a/b) x 1000 |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Based on estimations only, both with respect of no of parks and playgrounds and population. |
| Intermediate level (C) | Without updated information on open spaces and population projections. |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | Calculation based on actual data collected and compiled, Tshogpa Demkhong-wise Data updated periodically on the basis of development of new open spaces in the new settlements, Similarly, population is being projected on the basis of trend analysis and such other indicators. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | Tshogpa Demkhong Level |

### 4.4.2. Coverage Under Open Spaces

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Area Covered under open spaces | % | How much area is covered under open spaces to the total area of the Thromde. This is one of the parameters to assess the quality of life in a city. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) total area under open spaces | Sq. Km | To be calculated by measuring the covered area of different parks and playgrounds maintained in different part of the city. |
| b) total area under Thromde jurisdiction | Sq. Km | It requires regular updating to include the urban extensions for which Thromdes are responsible for provision of various services and amenities. Zone wise data may be compiled for better monitoring system. |
| % area covered under open spaces | % | (a/b) x 100 |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of area of open spaces without proper measurement system. |
| Intermediate level (C) | Not availability of area maintained by the private sector under open spaces as parks/playgrounds/recreational or entertainment places. It includes residential complexes and institutional areas. |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | MIS system with complete information on all kind of open spaces with their measurement. Current area of the Thromde to assess the actual open space coverage at different points of time. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with city level and gradually shall be measured at Tshogpa Demkhong level. |

## 4.5. Fire Stations/Fire Hydrants:

It is one of the most important components of disaster management. Ideally fire stations should be located in such a way that fire tenders are able to reach any disaster site within 3-5 minutes. Fire stations should be located on corner plots as far as possible and on main roads with minimum of two entries. Necessary provisions for laying underground/surface firefighting measures, water lines, hydrants, etc. may be kept wherever provision of fire station is not possible. In measuring the performance of fire stations/fire hydrants, the basic indicators used are:

### 4.5.1. Coverage by Fire stations

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| No of fire stations per sq. km of area under Thromde jurisdiction | Number | The purpose of this indicator is to measure the accessibility of fire stations in the event of fire or other kind of disasters in the city. It will suggest the average influence area of each fire station in a city/town. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) total number of fire stations in a Thromde | Number | Data need to be maintained, Tshogpa Demkhong-wise or at least zone wise on the availability of fire stations. |
| b) total area under Thromde jurisdiction | Sq. Km | This should include the extended municipal limits also. |
| No of fire stations per sq. km area | Number | (a/b) |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | |
| Intermediate level (C) | |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | Total number of fire stations and area of the Thromde is required to work out this indicator. This shall be available with the Thromde concerned. However, it requires updating as per the new fire stations added in the extended urban limits. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with city level and gradually shall be measured at Tshogpa Demkhong level |

### 4.5.2. Coverage of Fire Hydrants

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| No of fire hydrants per sq. km municipal area | Number | How many fire hydrants Thromde have to cover one sq. km area in order to reach the site in time in emergency situations. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total no of fire hydrants covering all fire stations in the city/town | Number | Functional fire hydrants need to be recorded in this indicator. |
| b) total area under Thromde jurisdiction | Sq. Km | Including extended urban limits. |
| No of fire hydrants per sq. km area | Number | (a/b) |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | |
| Intermediate level (C) | |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | Data on all fire hydrants should be maintained on regular basis with their status, how many are in working conditions. Only working fire hydrants data should be used to assess the performance here. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with Thromde level and gradually shall be measured at Tshogpa Demkhong level. |

### 4.5.3. Coverage of Fire Hydrants

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| No of fire hydrants per km of road length | Number | Provision of fire safety services under this indicator has been assessed in the context of road coverage. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) total no of fire hydrants covering all fire stations and locations in the city/ town | Number | |
| b) total length of roads | RKm | |
| No of fire hydrants per km road length | No/Km Road Length | (b/a) |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of roads length without measurement along with data for all fire hydrants both working and nonworking. |
| Intermediate level (C) | Measured road length with data of all fire hydrants both functioning and non-functioning. |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | Up to date information is needed both on number of functioning fire hydrants and total roads length in the jurisdiction of Thromde concerned. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | At city level |

### 4.6. Parking Facilities:

Provision of adequate parking spaces to park various types of vehicles including cars, taxi, two wheelers, truck, buses, emergency vehicles, cycles etc. is one of the important functions of Thromdes. Provision of parking areas both surfaced and multi-level parking facility in any settlement depends on number of factors including topography, settlement typology, land use, population growth, socio-economic characteristics of the city/town, traffic congestion level during peak hours and otherwise, number registered vehicles of different types and average annual growth in them, tourist inflow and such other parameters. Therefore, there is a need to have an updated, preferably computerized vehicle management information system to design, operate and maintain parking system in different locations in a city in an efficient manner. Proper coordination with different line departments such as road transport department, traffic police, etc. is required to implement and maintain effective parking management system. Basic indicators to assess the performance of Thromdes in terms of availability of parking facilities in a city/town are as follows:

#### 4.6.1. Adequacy of Parking Facilities

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| No of vehicles per parking slot | Number | How many vehicles of different types such as cars, two-wheelers, cycles, etc. are registered with the transport department in the city/Thromde and availability of existing parking slots in the city (total) to accommodate these vehicles. This will help to assess the estimated no of parking slots required to accommodate different types of vehicles in the city. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) total number of vehicles of different types registered in the city | Number | Require regular updating of information in coordination with the transport department. Average growth of varying nature of vehicles need to be worked out to plan the requirement of parking facilities. Further periodical vehicle survey at household level need to be carried out to assess the parking requirements for different locations and use. Data on average no of vehicles per day entering in the city also need to be collected from the traffic department to plan better parking facilities in the city concerned. |
| b) existing no of parking slots to park different types of vehicles | Number | Data to be complied at the city level. Calculation shall be made on the basis of total parking slots available in different part of the city. Data need to be collected both for privately managed parking spaces and parking facilities provided by the Thromde and other institutions. |
| Average no of vehicles per | Number | (a/b) |

| | | |
|---|---|---|
| parking slot | Per Parking Slot | |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimated no of parking slots and estimated no of vehicles in the city. |
| Intermediate level (C) | Estimated number of vehicles registered of various types in the city and parking slots/spaces provided by the Thromde. |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | Actual no of vehicles of different types registered in the city will have the periodical update of the information. Actual data on the number of parking slots/spaces available in the city to accommodate different types of vehicles. Data need to be collected and updated regularly. Survey has to be undertaken to assess the peak hours and lean hour's requirements of parking places for different category of vehicles. Survey should also identify the traffic intensity on different roads and areas. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with city level and gradually shall be measured for different locations and use. |

### 4.6.2. Coverage by Authorized Parking Facilities

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| Coverage by authorized parking facilities | Sq. Km | Area coverage by the parking facilities in the city in different land use to work out the proportionate area covered under parking to the total area of the city/town. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) Total authorized parking area in the city/ Thromde | Sq. Km | This should include all types of parking viz; surfaced parking, underground parking multi-level parking etc. |
| b) total area under Thromde jurisdiction | Sq. Km | |
| % area covered under parking spaces | % | (a/b) x 100 |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of area of parking spaces without proper measurement system. |
| Intermediate level (C) | Not availability of area maintained by the private sector as parking spaces. It includes essentially residential complexes and institutional areas. |
| Intermediate level (B) | |
| Highest/preferred level of reliability (A) | MIS system with complete information on all kind of parking spaces with their measurements. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with city level and gradually shall be measured for different locations and use. |

### 4.6.3. Unauthorized Parking

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| No of traffic challans per month for unauthorized parking | Number/ Month | This suggest the adequacy or otherwise of parking spaces on different locations. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) average number of challans in a month for unauthorized parking | Number/ Month | To be collected from traffic police/ transport department for various locations. This suggests the most visited area and least visited area as far as vehicle parking is concerned. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Monthly |
| Smallest geographical jurisdiction for measurement of performance | For different locations in the city |

## 4.7. Bus Stops/Bus Stands:

The bus stops used for intra city travel by the passengers both by local residents and floating population and tourists. Its function therefore, is different from the bus terminals which are primarily utilized for inter-city travel and require various kinds of facilities for the smooth flow of vehicular movement. The bus terminal serves as a point and unit where necessary information to user is made available for processing and it broadly needs to perform the functions to meet the requirements of the passengers, vehicles, crew and management. Usually every city has one inter-sate bus terminal having the facilities of passengers' platforms, waiting lounges, maintenance depot, rest house/rooms, baggage storage facilities, utilities and amenities, communication and information system, shelter from different weather conditions, eating facilities etc.

In case of intra-city bus stops, however, the scale and level of facilities are different and depends largely on the passengers' traffic and their location. The basic facilities which every stop should have are: platform to stop buses with electronic display mentioning timing of departure and arrival of different route buses with watch, covered space with all-weather material, proper lighting arrangements for security and safety specially women, children, senior citizens and disabled people and good quality benches for waiting passengers.

Bus stops shall be on walkable distance and preferably on the main roads. The basic measurable indicators to assess the performance of Thromdes in provision of bus stops are as follows:

### 4.7.1. Coverage by Bus Stops

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| No of bus stops per km road length | Number | It suggests the distribution of bus stops in the context of total road length in the Thromde. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) total no of bus stops in the city limits | Number | All bus stops both covered and without shelter should be recorded to work out the coverage. It requires periodical updating of records. |
| b) total length of roads in the jurisdiction of Thromde | RKm | Regular updating is required to add the up gradation of road network in the extended urban limits. All motorized roads shall be covered to measure the length of roads in RKMs. |
| No of Bus stops per Km of road length | No/Km Roads | (b/a) |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of roads length without proper measurement system and updated records. |
| Intermediate level (C) | |
| Intermediate level (B) | |

| | |
|---|---|
| Highest/preferred level of reliability (A) | MIS system with complete information on all kind of roads with their measurement. Actual number of functional bus stops in different part of the city. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with Thromde level and gradually shall be measured at Tshogpa Demkhong level. |

### 4.7.2. Quality of Bus Stops

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| % of bus stops covered and well illuminated | % | How many bus stops to the total number of bus stops have puck shed with railing for security of commuters and lighting arrangements for dark hours/evenings or vulnerable locations in the city? This is one of the parameters to assess the quality of bus stops in a city. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| Total no of bus stops in the city | Number | It includes all types of bus stops provided in different parts of the city for the intra city transport purpose. |
| No of bus stops having pucca sheds, railing and lights in different part of the city | Number | Only those bus stops which have proper shed, lighting for dark hours and security chain/ railing shall be recorded for this quality indicator. Regular updating is required to accommodate upgraded stops with the above facilities. Similarly degraded due to nonfunctioning of some of the suggested facilities. |
| % of quality bus stops | % | (b/a) x 100 |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of quality bus stops without proper and updated records. |
| Intermediate level (C) | Out of three parameters identified for the definition of quality bus stops, only one is satisfying the conditions of quality bus stops. |
| Intermediate level (B) | Out of three parameters identified for the definition of quality bus stops, two are satisfying the conditions of quality bus stops. |
| Highest/preferred level of reliability (A) | periodically updated information consisting all the three parameters of quality bus stops along with data on all types of bus stops in the city. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with Thromde level and gradually shall be measured at Tshogpa Demkhong level. |

### 4.7.3. Coverage in Terms of Population

**Performance Indicator**

| Indicator | Unit | Definition |
|---|---|---|
| No of Bus stops per 1000 population | Number | How much population is being served by one bus stop to cater the need of intra city commuters? This is one of the important indicators to assess the performance of Thromdes in then provision of bus stops for intra city travel. Usually the distance of one bus stop from another should not be more than 500 meters. |

**Data Requirements**

| Data Required for Calculating the Indicator | Unit | Remarks |
|---|---|---|
| a) total no of bus stops within the city limits | Number | It should include all types and location of bus stops meant for intra-city travel. Need to be updated periodically to capture the data on functioning and non-functioning stops. |
| b) Total projected population of the city | Number | Projections should include the floating population, tourist inflow etc. Population should be projected on annual basis. |
| No of bus stops per 1000 persons | No of Stops/1000 Persons | (b/a) x 1000 |

**Reliability of Measurement**

| Reliability Scale | Description of Method |
|---|---|
| Lowest level of reliability (D) | Estimation of bus stops without proper records Similarly, projected population is taken into account while calculating the indicator in reference. |
| Intermediate level (C) | |
| Intermediate level (B) | Actual data on the number of bus stops is available, but population projections not made on year to year basis to assess the requirements of bus stops keeping in view growth of population in the city. |
| Highest/preferred level of reliability (A) | Periodically updated information system on the number and quality of bus stops along with availability of data on annual population projections. Survey need to be undertaken to assess the requirement of bus stops on various location keeping in view the demand profile of commuters. |

| | |
|---|---|
| Minimum frequency of measurement of performance indicator | Quarterly |
| Smallest geographical jurisdiction for measurement of performance | To begin with city level and gradually shall be measured at Tshogpa Demkhong level. |