

ミャンマー連邦共和国
ヤンゴン市開発委員会

ミャンマー国
ヤンゴン市開発委員会
水道事業運営改善プロジェクト
【有償勘定技術支援】

プロジェクト業務完了報告書
(付属資料編)

2021年6月

独立行政法人
国際協力機構 (JICA)

株式会社 TEC インターナショナル
東京水道株式会社

環境
JR
21-019

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備考：本資料は付属のCD内に格納されている。

付属資料 1：業務指標（PIs）による水道事業モニタリングマニュアル

Annex-1: Manual for Monitoring Performance Indicators (PIs)

Manual for Monitoring Performance Indicators (PIs)

Benchmarking and
Monitoring

Planning Section, EDWS, YCDC
JICA Expert Team: Atsuo Ohno

Manual for Monitoring Performance Indicators (PIs)

Benchmarking and Monitoring

Sep. 2016

Planning Section, EDWS, YCDC

JICA Expert Team: Atsuo Ohno

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1. Benchmarking and Performance Indicators (PIs)

1.1. Concept of Benchmarking

Benchmarking is a significant management tool to assess the water utility performance in the worldwide. It is normally operated by Performance Indicators (PIs).

Benchmarking enables quantitative comparison of the periodical performance of the single utility. Also, it can be compared to the performance of other utilities. Furthermore, benchmarking supports for the decision-making to improve the performance and set up the target level of future performance.

1.2. Composition of PIs data sheet

1.2.1. PIs datasheet

The composition of PIs datasheet for Engineering Department of Water and Sanitation (EDWS) YCDC is shown as below.

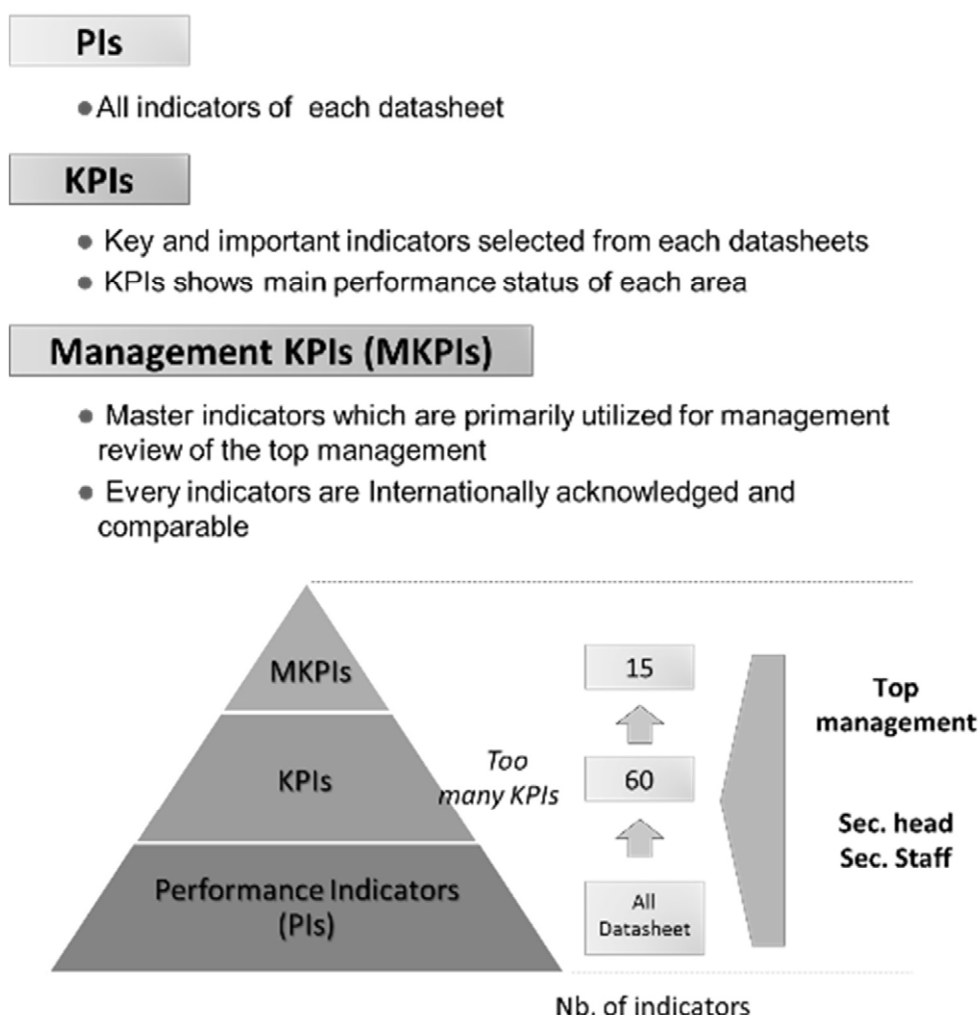
Table 1 Composition of PIs datasheet

Category	Sheet composition
1. Water supply service	• Water Supply Service
2. Production and Transmission	• Production (Reservoir, WTP, Underground)) • Water Flow Measurement • Transmission System
3. Distribution and NRW	• Distribution and NRW
4. Water Quality	• Water Quality Summary • Water Quality (Quarterly) • Water Quality (Monthly) • Water Quality (Weekly) • Water Quality (Nyaughnapin)
5. Sales	• Sales and Collection (Summary) • Sales and Collection (Data) ➤ Sub-format (billing and collection, outstanding) ➤ Sub-format (meter connection & consumption)

6. Finance	<ul style="list-style-type: none"> • Finance (Summary) • Finance
7. Admi. and HRD	<ul style="list-style-type: none"> • Administration and Human Resource • Human Resource Development (Sub-sheet)

1.2.2. Structure of PIs

There is a hierarchical structure in the PIs applied to EDWS. Out of all PIs, Key PIs (KPIs) and Management KPIs (MKPIs) are selected. Top management shall always focus on all MKPIs and some KPIs. Sec. head and staffs in charge shall carefully monitor the relevant KPIs and PIs.



2. Management KPIs (MKPIs)

Fifteen (15) Management KPIs (MKPIs) was selected from overall indicators and set up. MKPIs are shown as follows.

Table 2 Management KPIs

Sq/N	Symbol	Indicators	Unit
1. Water Supply Service			
1	S1	Service population	'000 inhabitants
2	S2	Total connections	Nb.
3	S28	Service coverage rate	%
		Service coverage rate	%
2. Production & Transmission			
4	PT4-4	Daily average total production	m ³ /day
3. Distribution & NRW			
5	D17	NRW ratio	%
6	D23	The number of repaired pipe breaks per pipe length	Repaired Nb./km/year
4. Water Quality			
7	Q7-1-1	Compliance ratio of monthly water test in water facilities -treated water- (turbidity)	%
8	Q7-5-2	Compliance ratio of monthly water test at tap water in TS (Residual chlorine)	%
5. Sales & Collection			
9	C15-3	Operating metering ratio (by total connection)	%
10	C20-2	Collection ratio in amount	%
6. Finance			
11	F5	Operating ratio (Operating cost coverage)	%
12	F9	Average revenue per m ³ sold	Kyat/m ³ water sold
13	F12	Unit operational cost for water sold	Kyat/m ³ water sold
7. Administration & Human Resource			
14	H8	Training period*number of trainee/Total staff	Person*day
15	H11	Total staffs number/1000 connections	person/ 000 conn.

The definition, formula, explanation on MKPIs are shown as follows.

MKPI 1: Service Population

S1	Service population	1000 inhabitants	-
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Service pop in the responsible area was not available, so that this indicator value is estimated as follows.

Definition:	Residential population with access to water services in the area of YCDC's responsibility
Estimation:	Number of Household with water services X Average number of persons per household

MKPI 2: Total Connection

S2	Total connection	connections	-
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Definition:	Total number of connection which includes all kind of customer type such as domestic, commercial, departmental, FOC etc.
Data source:	From "Connection and Consumption Sub-sheet" as a part of "Sales sheet"

MKPI 3: Service Coverage Ratio

D14	Service coverage ratio (population)	%	IBNET 2.1
D15	Service coverage ratio (household)		

Definition:	Residential population with access to water services as a percentage of total residential population (household) in the area of YCDC's responsibility
Description:	This indicator represents how many residential population (household) of the service area actually receives water supply by the utility.

D 14	Service population (D1-2)
	Total population (D1-1)
D15	Nb. of household connected (D1-4)
	Nb. of household (D1-3)

MKPI 4: Daily average total production

PT4-4	Daily average total production	m ³ /day	-
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Definition:	Daily average total production of water
Description:	<p>This indicator represents total daily average total production of water.</p> <p>(untreated)</p> <ul style="list-style-type: none"> - Gyobyu reservoir - Phugyi reservoir (aqueduct) - Hlawga No.1 (pump station) - Hlawga No.2 (gravity) - Underground <p>(treated)</p> <ul style="list-style-type: none"> - Nyaughnapin WTP Phase 1 - Nyaughnapin WTP Phase 2 <p>Better to use Transmission and Distribution flow volume</p>

MKPI 5: NRW ratio

D17	NRW ratio	%	IBNTE 6.1
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- Formula will be entered after getting the relevant data

Definition:	<p>Non-revenue water (NRW) represents the difference between the volume of water delivered into a network and billed authorized consumption.</p> <p>NRW sec. will calculate the ratio every month</p>
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MKPI 6: Nb. of Repaired Pipe Break – Pipe Length

D23	The number of repaired pipe breaks on network per pipe length	Nb./ km	IBNET 9.1
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Definition:	Repaired pipe breaks on pipeline network expressed per km of the total pipeline network
Description:	This indicator represents how many pipe breaks are repaired in the networks per km.
	$\frac{\text{Number of pipe break identified (distribution) (D3-4)}}{\text{Length of distribution pipeline (end of month)(D2-2)}}$

MKPI 7&8: Compliance ratio of monthly water test

Q7	Compliance ratio of monthly water test	%	IBNET 15.4 (chlorine)
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Definition:	The percentage of monthly samples tested for each parameter that pass the relevant standards
Description:	This indicator represents how much percentage of monthly samples actually pass the water quality standards in each parameter
	<p>[4.Water Quality 3 (Monthly)] Sheet</p> $\frac{\text{Number of tests of treated water that passed the relevant standard (QM3)}}{\text{Total sampling numbers tested (QM2)}}$

Formula:	(e.g.) in January	
1	Turbidity - Total	=H118/H112
1.	Water facilities (Reservoir, WTP, SR and PS)	=H115/H109
2.	Tap water in TS	=H116/H110
3.	Tube well	H117/H111
2.	E.coli	=H119/H110
3.	Total coliform	=H120/H110
4.	Electrical conductivity	=H121/H112
5.	Total dissolved solids	=H122/H112
6.	Residual chlorine	=H123/H112

MKPI 9: Operating Metering Ratio

C15-3	Operating metering ratio (by total connection)	%	IBNET 7.1
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Definition:	Number of connection with operational meter as a percentage of number of total metered connections
Description:	This indicator represents how much percentage of total connection has functional and accurately operational water meters.
Formula:	$\frac{\text{Number of water meter operated (D4-2)}}{\text{Number of total meter(Metered+Flat+Others) (end of the month) (D4-1)}}$

MKPI 10: Collection Ratio - amount

C17-2	Collection ratio in amount	%	IBNET 23.2
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Definition:	Collection amount from customer as a percentage of billed amount
Description:	This indicator represents how much water charge is actually collected in the percentage of total billed amount.
Formula:	$\frac{\text{Amount of bills collected (Metered+Flat+Others) (C8-4)}}{\text{Amount of bills delivered (Metered+Flat+Others) (C6-4)}}$

MKPI 11: Operating ratio

F6	Operating ratio (Operating cost coverage)	%	IBNET 24.1
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Definition:	Daily average production of treated water
Description:	This indicator represents how much operating revenue for water service covers operating expenses for water service. It evaluates the profitability of water service. If the ratio exceeds 1.0, it means that operating costs are covered by operating revenue. Thus, the profits are generated.
	$\frac{\text{Total operating revenues for water (F1)}}{\text{Total operating expenses for water (F2)}}$

MKPI 12: Average revenue per m³ sold

F9	Average revenue per m ³ sold	Kyat/m ³ water sold	IBNET 18.3
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Definition:	Average annual operating revenue expressed by annual amount of water sold per m ³
Description:	This indicator represents how much operating revenue is generated per sold water as m ³ .
	$\frac{\text{Total operating revenues for water (F1-9)}}{[\text{5. Sales \& Collection (Data)] Sheet Metered consumption (C11)}}$

MKPI 13: Unit operational cost for water sold

F12	Unit operational cost for water sold	Kyat/m ³ water sold	IBNET 11.3
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Definition:	Average annual operating expenses expressed by water sold volume as m ³
Description:	This indicator represents how much operating expenses are costed per m ³ of water sold volume.

Total operating expenses for water (F2-9)
[5. Sales & Collection (Data)] Sheet
Metered consumption (C11-9)+

MKPI 14: Training period*number of trainee/Total staff

H8	Training period*number of trainee/Total staff	Person-day	-
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Description:	This indicator represents to how much training opportunities are given to per 1 staff
	$\frac{\text{Training period} \times \text{No. trainees (WSD) (H7)}}{\text{No. of staff of WSD (H2)}}$

MKPI 15: Total staffs number/1000 connections

H11	Total staff number/1000 connections	Person /conn./ '000	IBNET 12.1
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Description:	This indicator represents how much percentage is shared by practical sessions in the total sessions
	$\frac{\text{No. of staff of WSD (H2)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month) (C4-5-8)}} \times 1000$

3. Other KPIs (MKPIs)

Some important KPIs are picked up and explained as follows.

3.1. Reservoir

Daily average total production (untreated)

PT4-1	Daily average total production (untreated)	m ³ /day
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Definition:	Daily average production of untreated water
Description:	<p>This indicator represents total daily average production of untreated water. Untreated water can be recognized as: (As of Mar. 2020)</p> <ul style="list-style-type: none"> - Gyobyu reservoir - Phugyi reservoir (aqueduct) - Hlawga No.1 (pump station) - Hlawga No.2 (gravity) - Underground

Daily average total production (treated)

PT4-2	Daily average total production (treated)	m ³ /day
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Definition:	Daily average production of treated water
Description:	<p>This indicator represents total daily average production of treated water. Treated water can be recognized as: (As of Mar. 2020)</p> <p>Nyaughnapin WTP Phase 1</p> <p>Nyaughnapin WTP Phase 2</p>

Percentage of actual production (surface water)

PT4-5	Percentage of actual production (surface water)	%
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Definition:	Total production of surface water as a percentage of total water production
Description:	This indicator represents how much percentage of total water production is shared by surface water production
Formula:	$\frac{\text{Surface production volume (Gyobyu reservoir, Phugyi reservoir, Hlawga No.1 (pump station), Hlawga No.2 (gravity), Nyaughnapin WTP Phase 1, Phase 2)(PT2-1\sim 2-2, PT2-5\sim 2-8)}}{\text{Actual Production Volume total (PT2-1\sim 2-2, PT2-5\sim 2-9)}}$

Achievement ratio of water production of the planned production

PT4-6	Achievement ratio of water production of the planned production	%
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Definition:	Total production of surface water as a percentage of total water production
Description:	This indicator represents how much percentage of designed production is achieved by actual water production.
Formula:	$\frac{\text{Actual water production total (PT2-1\sim 2-2, PT2-5\sim 2-9)}}{\text{Design production capacity (PT1-7)}}$

Nyaughnapin WTP - Achievement ratio of WTP water production of the planned production

P4-1	Achievement ratio of WTP water production of the planned production	%
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Definition:	Actual production volume of water as a percentage of design water production
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Description:	This indicator represents how much percentage of designed production is achieved by actual water production.
Formula:	$\frac{\text{Daily average water production volume (estimated) (P2-1-9)}}{\text{Design production capacity (P2-1-1)}}$

Nyaughnapin WTP – Production efficiency (produced water / raw water)

P4-2	Production efficiency (produced water / raw water)	%
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Definition:	Outflow production volume of water as a percentage of inflow water volume of raw water
Description:	This indicator represents how efficiently water is produced from raw water
Formula:	$\frac{\text{Monthly water production volume (estimated) (P2-1-8)}}{\text{Monthly raw water volume (estimated) (P2-1-6)}}$

Nyaughnapin WTP – Transmission efficiency (transmitted water / produced water)

P4-3	Transmission efficiency (transmitted water / produced water)	%
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Definition:	Outflow transmitted water volume as a percentage of inflow water volume of raw water
Description:	This indicator represents how efficiently production water is transmitted from production water
Formula:	<p>[2. Transmission System] Sheet</p> $\frac{\text{Monthly flow volume (Outlet total)(T1-1-8) + (Monthly flow volume (Outlet total)(T1-2-8))}}{\text{Monthly water production volume (metered/estimated)}}$

(P2-1-8)

Nyaughnapin WTP – Overall production-transmission efficiency (transmitted water / raw water volume)

P4-4	Overall production-transmission efficiency (transmitted water / raw water volume)	%
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Definition:	Actual transmitted volume of water as a percentage of raw water volume per month
Description:	This indicator represents how efficiently water is produced and transmitted between inflow volume and outlet volume
Formula:	$\frac{\text{Monthly flow volume (Outlet total)(T1-1-8) + (Monthly flow volume (Outlet total)(T1-2-8))}{\text{Monthly raw water volume (metered/estimated) (P2-1-6)}}$ <p style="text-align: center;">[2. Transmission System]</p>

Nyaughnapin WTP – Power consumption for production

P4-5	Power consumption for production	Kwh/m ³
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Definition:	Power consumption volume for producing water per m ³
Description:	This indicator represents how much volume of electricity power is consumed in the production of water expressed as per m ³
Formula:	$\frac{\text{Power consumption for production (P2-1-13)}}{\text{Monthly water production volume (estimated) (P2-1-8)}}$

Nyaughnapin WTP –Chlorine consumption per unit treated water volume (m³)

P4-7	Chlorine consumption per unit treated water volume (m ³)	g/m ³
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Definition:	Chlorine consumption volume for producing water per m ³
Description:	This indicator represents how much volume of Chlorine is consumed in the production of water expressed as per m ³
$\frac{\text{Chlorine consumption (P2-1-16)} \times 1000}{\text{Monthly water production volume (estimated) (P2-1-8)}}$	

3.2. Distribution and NRW

Old pipe ratio

D7	Percentage of old pipe in distribution network	%
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Definition:	Old pipe length more than 40 years in distribution network as a percentage of total distribution network length
Description:	This indicator represents how much percentage of total distribution networks is shared by old pipe of more than 40 years.
$\frac{\text{Length of old distribution network (D2-4)}}{\text{Length of distribution network (end of month)(D2-2)}}$	

Pipe breaks ratio

D11	Pipe breaks on network per pipe length	breaks/km/month
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Definition:	Total number of pipe breaks expressed per km of the water network in the month
Description:	This indicator represents how many pipe breaks are happened on the networks per km.
$\text{Number of pipe breaks reported (total network)(D3-6)}$	

Length of total pipeline (end of month)(D2-3)
Formula: =H27/H14

Nb. of Repaired Pipe Break – Connection

D14	The number of repaired pipe breaks per 1,000 connections	Nb./ 1,000 conn.
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Definition:	Repaired pipe breaks on pipeline network expressed per 1000 connections
Description:	This indicator represents how many pipe breaks are happened on the network per 1000 connection.
Formula	$\frac{\text{Number of pipe break repaired (D3-5)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month)(C4-5-8)}}$

Ratio of pipe breaks repaired

D15	Ratio of pipe breaks repaired	%
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Definition:	Repaired pipe breaks on pipeline network as a percentage of total pipe breaks reported
Description:	This indicator represents how much percentage of the reported pipe breaks in the pipeline network is actually repaired.
Formula:	$\frac{\text{Number of pipe break repaired (D3-5)}}{\text{Number of pipe break reported (D3-6)}}$

Continuous Supply

D16	Customers with continuous supply	%
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Definition:	Customers with continuous water supply of 24hx7 as a percentage of total connections
Description:	This indicator represents how much percentage of total customers receive continuous water supply from the utility. Continuous water supply means water supply for 24 hours everyday.
$\frac{\text{Customers with continuous supply (D5-2)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month) (C4-5-8)}}$	

3.3. Water Quality Monitoring

Percentage of parameters analyzed on the standard

Q4	% of parameters analyzed on the standard	%
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Definition:	The percentage of parameters tested against number of parameter required by MDWQ standards
Description:	This indicator represents how much percentage of total parameters required by MDWQ standards are actually tested in Laboratory
Formula;	$\frac{\text{Number of parameters actually tested in lab (Q1-2)}}{\text{Number of parameters required by the MDWQ standard (Q1-1)}}$

Implementation ratio of monthly water analysis by type of sampling

Q5-3	% of actual samplings of required sample numbers (monthly)	%
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Definition:	The percentage of monthly samples collected against required sample numbers
Description:	This indicator represents how much percentage actually the utility collect monthly samples against required monthly sample numbers
$\frac{\text{Total number of actual samples (Q3-1-4)}}{\text{Total number of samples required (locations) (Q3-1-3)}}$	

Implementation ratio of monthly water analysis by type of sampling

Q5-4	% of actual tests of sampling numbers (monthly)	%
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Definition:	The percentage of monthly samples tested against collected monthly sample numbers by sampling types
Description:	This indicator represents how much percentage actually the utility test monthly samples out of total monthly sample numbers by sampling types
$\frac{\text{Monthly numbers of actual monthly test (per month) (Q3-2-4)}}{\text{Total number of actual samples (Q3-1-4)}}$	

Compliance ratio on water quality standard in clear water

QW8	Compliance ratio on WTP target value	%
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Definition:	The percentage of samples tested for each parameter that pass the WTP target value
Description:	This indicator represents how much percentage of total samples actually pass the WTP target value in each parameter
$\frac{\text{Number of tests of treated water that comply with the standards (QW3-2-5, 3-3-5, 3-4-5)}}{\text{Total number of samples tested for each parameter}}$	

Number of tests of treated water
 (QW3-2-1, 3-3-1, 3-4-1)

3.4. Sales and Collection

Metering Ratio – by Connection

C-15-1	Metering ratio (by total connection)	%
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Definition: Number of metered connection as a percentage of number of total metered connections

Description: This indicator represents how much percentage of total connection is metered connection.

$$\frac{\text{Number of connections -Metered (end of the month) (C4-1-X)}}{\text{Number of total connections (Metered+Flat+other) (end of the month) (C4-5-X)}}$$

Input the relevant cell number of sub-items in "X"

Billing Ratio - number

C16	Billing ratio in number	%
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Definition: Connections with bill delivered as a percentage of total connections

Description: This indicator represents how much percentage of the total connections the utility actually deliver water bills to customers.

$$\frac{\text{Number of total bills delivered (Metered+Flat+Others) (C5-4-X)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month) (C4-5-X)}}$$

Collection Ratio - number

C17-1	Collection ratio in number	%
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Definition:	Connections with water charge collection as a percentage of total connections of bill delivered
Description:	This indicator represents how much percentage of total connections the utility actually collect water charges from customers.
	$\frac{\text{Number of bills collected (Metered+Flat+Others) (C7-4-X)}}{\text{Number of bills delivered (Metered+Flat+Others) (C5-4-X)}}$

Outstanding Ratio - number

C18-1	Outstanding ratio in number	%
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Definition:	Connections with bill outstanding as a percentage of total connections of bill delivered
Description:	This indicator represents how much percentage of total connections does not pay water charges.
Formula:	$\frac{\text{Number of bills outstanding (Metered+Flat+Others)(C9-4-X)}}{\text{Number of bills delivered (Metered+Flat)(C5-4-X)}}$

Outstanding Ratio - amount

C18-2	Outstanding ratio in amount	%
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Definition:	Amount of bill outstanding as a percentage of total amount of bill delivered
Description:	This indicator represents how much amount becomes actual outstanding in the percentage of total billed amount.

Formula:	$\frac{\text{Amount of bills outstanding (Metered+Flat+Others) (C10-4-X)}}{\text{Amount of bills delivered (Metered+Flat+Others) (C6-4-X)}}$
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Monthly Consumption Ratio

C19-1	Monthly water consumption (metered)	m ³ /month
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Definition:	Monthly water consumption of metered customers
Description:	This indicator represents how much volume of water is consumed by metered customers. = Metered consumption (C11-X)

Daily Consumption Ratio – m³

C19-2	Daily average water consumption (metered)	m ³ /d (MGD)
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Definition:	Daily water consumption of metered customer expressed per m ³
Description:	This indicator represents the daily average volume of water consumption per m ³ by metered customers. $\frac{\text{Metered consumption (C11-X)}}{\text{Number of assessment days of month}^{*1}}$

*1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	29	31	30	31	30	31	31	30	31	30	31

Daily Consumption Ratio - litter

C20	Daily water consumption per connection	L/conn/d
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Definition:	Daily water consumption expressed per litter per connection
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Description:	This indicator represents the daily average volume of water consumption per litter per connection by metered customers.
Formula:	$\frac{\text{Metered consumption (C11-X)} \times 1000}{\text{Number of connections -Metered (end of the month) (C4-1-X)} \times \text{(assessment days)}}$

Tariff Revenue Ratio – total connection

C21-1	Average tariff revenue per connection (total connection)	Kyat/conn
-------	--	-----------

Definition:	Amount of tariff revenue collected as a percentage of total number of connections
Description:	This indicator represents the average tariff revenue amount per connection.
Formula:	$\frac{\text{Amount of bills collected (Metered+Flat+Others) (C8-4-X)}}{\text{Number of total connections (Metered+Flat+Others) (end of the month) (C4-5-X)}}$

Collection Period

C23	Collection period of account receivable (Outstanding bill amount)	days
-----	---	------

Definition:	Amount of bills outstanding as a percentage of total amount of bill delivered during the assessment days, to check collection efficiency
Description:	<p>This indicator represents the average number of days between the date billed is made and the date payment is received from.</p> <p>It shows the effectiveness of the collection process by the amount of outstanding revenue.</p>
Formula:	$\frac{\text{Amount of bills outstanding (Metered+Flat)(C10-4-9)}}{\text{x Assessment days}}$

Amount of bills delivered (Metered+Flat+others)(C6-4-7)	
--	--

3.5. Finance

Financial balance

F5	Financial balance	Kyat/month
-----------	-------------------	------------

Definition:	Total financial balance between operating revenue of water and operating expenses of water
Description:	This indicator represents how much amount of benefits (or deficits) is generated between operating revenue and operating expenses. This indicator could be evaluated at the end of the fiscal year.
Formula:	$\frac{\text{Total operating revenues for water (F1-9)} - \text{Total operational expenses for water (F2-9)}}{\text{Total operational expenses for water (F2-9)}}$

Composition of operating revenue

F7	Composition of operating revenue	%
-----------	----------------------------------	---

Definition:	Composition of current operating revenue of water
Description:	This indicator represents how much percentage each revenue item shares in the total operating revenue respectively.
Formula:	(e.g.) in January Departmental Water Charges: =H9/H17 Public Water Charges: =H10/H17 Water Connection: =H11/H17 Sales of Water meters: =H12/H17 Rental of Shops and Sites: =H13/H17

Plumber Licenses Fees: =H14/H17 Road Crossing Charges: =H15/H17 Other Revenue: =H16/H17

Composition of operating expenses

F8	Composition of operating expenses	%
----	-----------------------------------	---

Definition:	Composition of current operating expenses of water
Description:	This indicator represents how much percentage each cost item shares in the total operating expenses respectively.
Formula:	(e.g.) in January Salary: =H19/H27 Labour Charges: =H20/H27 Electricity: =H21/H27 Petrol&Lunricant: =H22/H27 Operating Material: =H23/H27 Printing & Publishing : =H24/H27 Materials, repair, maintenance and spare prt: =H25/H27 Other expenses: =H26/H27

Average revenue per m3 produced

F9	Average revenue per m3 produced	Kyat/m3 water produced
----	---------------------------------	------------------------------

Definition:	Average annual operating revenue expressed by annual amount of water produced per m3
Description:	This indicator represents how much operating revenue is generated per produced water volume as m3.
	$\frac{\text{Total operating revenues for water (F1-9)}}{\text{[2. Transmission Flow Measurement] sheet}}$

Actual production volume (PT2) – 1, 2, 5, 6, 7, 8, 9

Unit operational cost for water produced

F12	Unit operational cost for water produced	Kyat/m3 water produced
------------	--	------------------------------

Definition:	Average annual operating expenses expressed by water production volume as m3
Description:	This indicator represents how much operating expenses are costed per m3 of water production volume.
Formula:	$\frac{\text{Total operating expenses for water (F2-9)}}{\text{Actual production volume (PT2) – 1, 2, 5, 6, 7, 8, 9}}$

[2. Transmission Flow Measurement] sheet

3.6. Administration and HRD

Training courses (by Admin Dep)

Training opportunities	Person-day
------------------------	------------

Description:	This indicator represents how much training opportunities are actually given to the staff members. This indicator is expressed as person-day.
Formula:	=Training duration (day) x No. of trainees (WSD)

Training courses (by WSD)

Training opportunities	Person-day
------------------------	------------

Description:	This indicator represents how much training opportunities are given to the staff members. This indicator is expressed as person-day.
--------------	--

Formula	=Training duration (day) x No. of trainees (WSD)
---------	--

Ratio of trained staff in a year

H5	Ratio of Trained staff in a year	%
-----------	----------------------------------	---

Description:	This indicator represents to how much percentage of total staff of WSD is trained in a year.
--------------	--

	No. of trained staff by WSD in a year (H3)
--	--

	No. of staff of WSD (H2)
--	--------------------------

Ratio of trained technicians in a year

H6	Ratio of Trained staff in a year	%
-----------	----------------------------------	---

Description:	This indicator represents to how much percentage of total technicians of WSD is trained in a year.
--------------	--

Formula:	No. of trained technicians in a year (H3-4)
----------	---

	No. of technicians (H2-2)
--	---------------------------

Ratio of trainers to trainees

H9	Ratio of trainers to trainees	Person
-----------	-------------------------------	--------

Description:	This indicator represents how many trainers exist per 1 trainee
--------------	---

Formula:	Number of trainers
----------	--------------------

	Number of trainees
--	--------------------

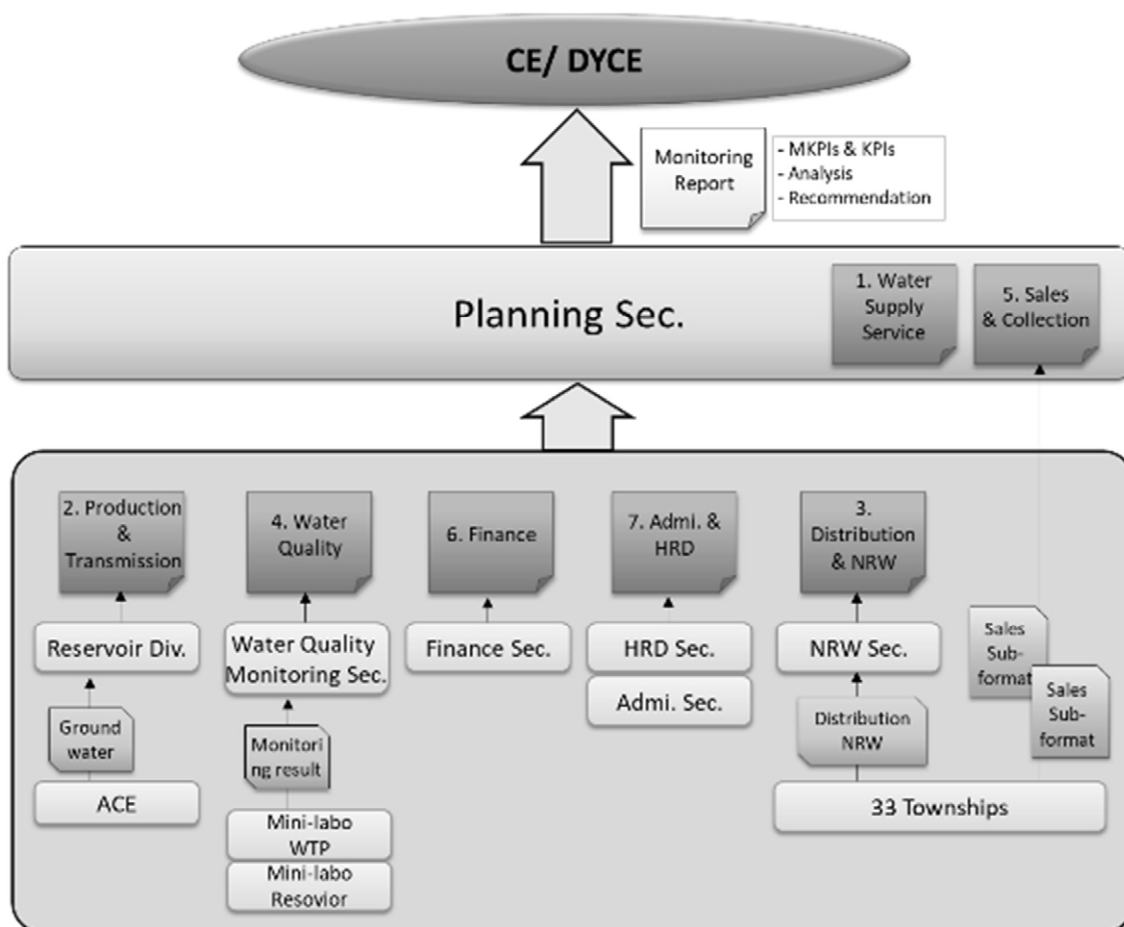
4. Monitoring System of PIs Data

4.1. PIs Data Collection Flow

Current PIs data collection flow is shown as follows. This flow should be revised as necessary and flexibly changed according to the institutional structure of EDWS.

Category of Datasheet	Responsible Section for Preparation of Datasheet		Submission to	Symbol
	Original Section Responsible	Intermediate Section		
1. Water Supply Service	(Proposed Planning & Monitoring Section) (Proposed Commercial Section)	None	Planning	S
2. Production & Transmission	Reservoir Division (Proposed Water Distribution Management Section)	None	Planning	P T
Groundwater	ACE (Ms. Aye Pa Pa Nyo)	None	Planning	
3. Distribution & NRW	T/S	NRW Sec.	Planning	D
4. Water Quality	Water Quality Monitoring Section Nyaghnapi WTP, Reservoirs	Water Quality Monitoring Sec.	Planning	Q
5. Sales & Collection			Planning	C
Sub-format	T/S	None	Planning	
Meter conn. & Consumption	T/S	None	Planning	
6. Finance	Finance Section	None	Planning	F
7. Administration & Human Resource	Administration Section	None	Planning	H

Data collection flow is shown in the following figure.



4.2. Reporting

After collection of PIs datasheet, it is arranged and compiled by the planning section. Planning section prepare a monitoring report including analysis and suggestion by summarizing the performance indicated PIs. The report shall be monthly or quarterly submitted to the top management such as CE/ DYCE/ ACE. In addition, Planning section prepare an annual report by compiling monthly or quarterly reports.

5. Analysis of PIs Data

5.1. Key Points for Analysis

To make an analysis of the collect PIs data, the followings could be the starting steps.

Key point

- 👉 Comparing periodical performance
- 👉 Comparing regional performance (by township, by district)
- 👉 Checking outstanding trends (positive, negative)
- 👉 Identifying its main reasons/causes related to outstanding trends
- 👉 Finding the challenge and the necessity of improvement

5.2. Findings from the Performance in FY2018/19

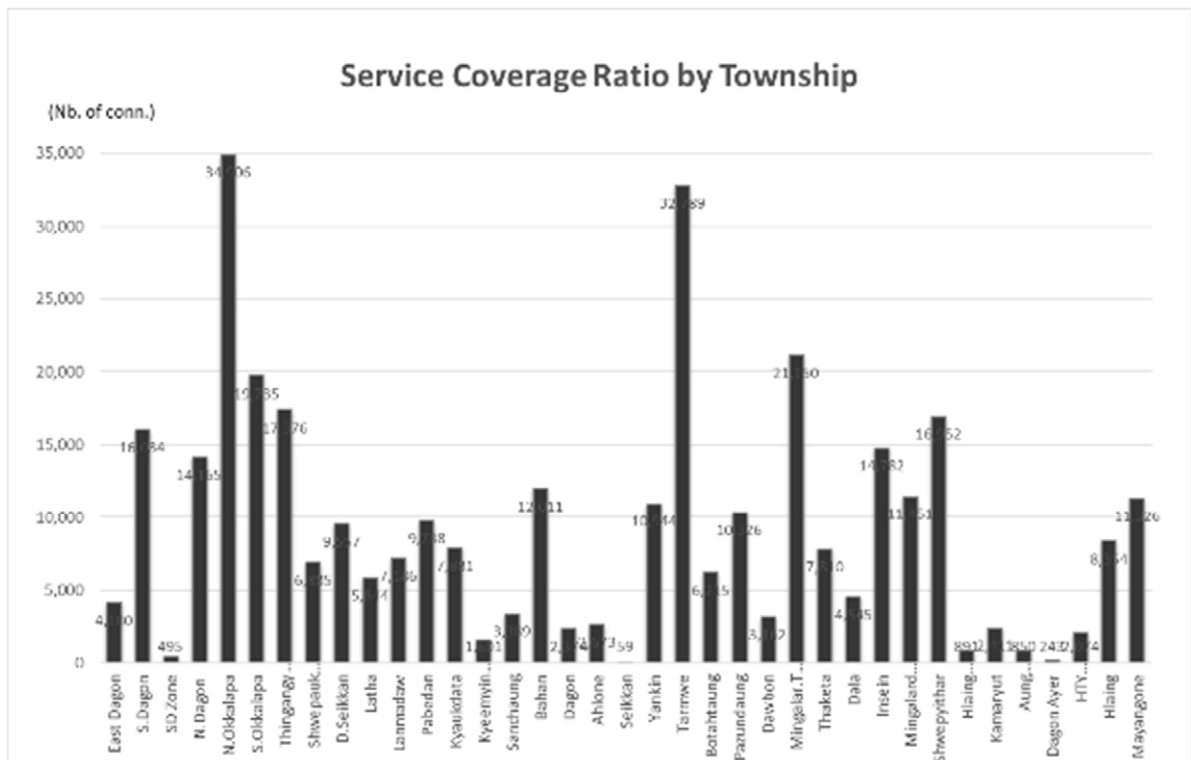
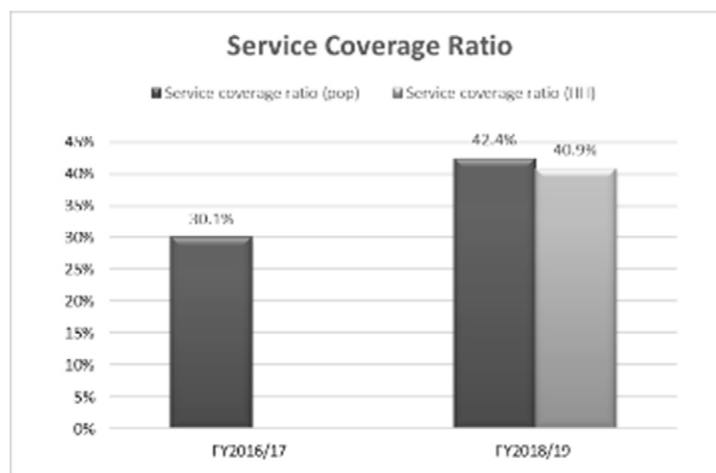
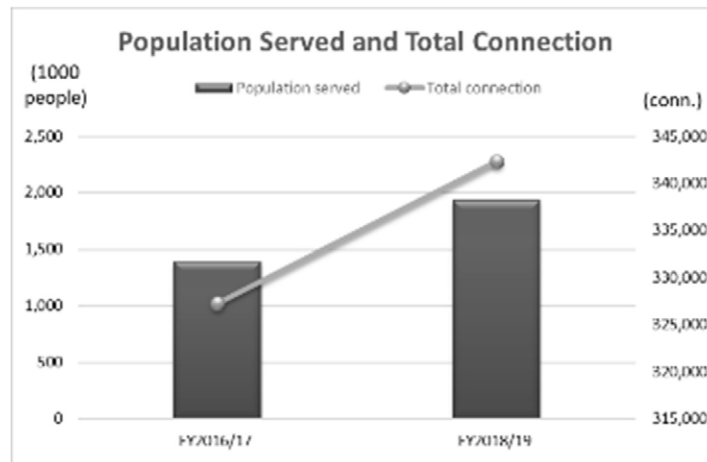
5.2.1. Management KPIs

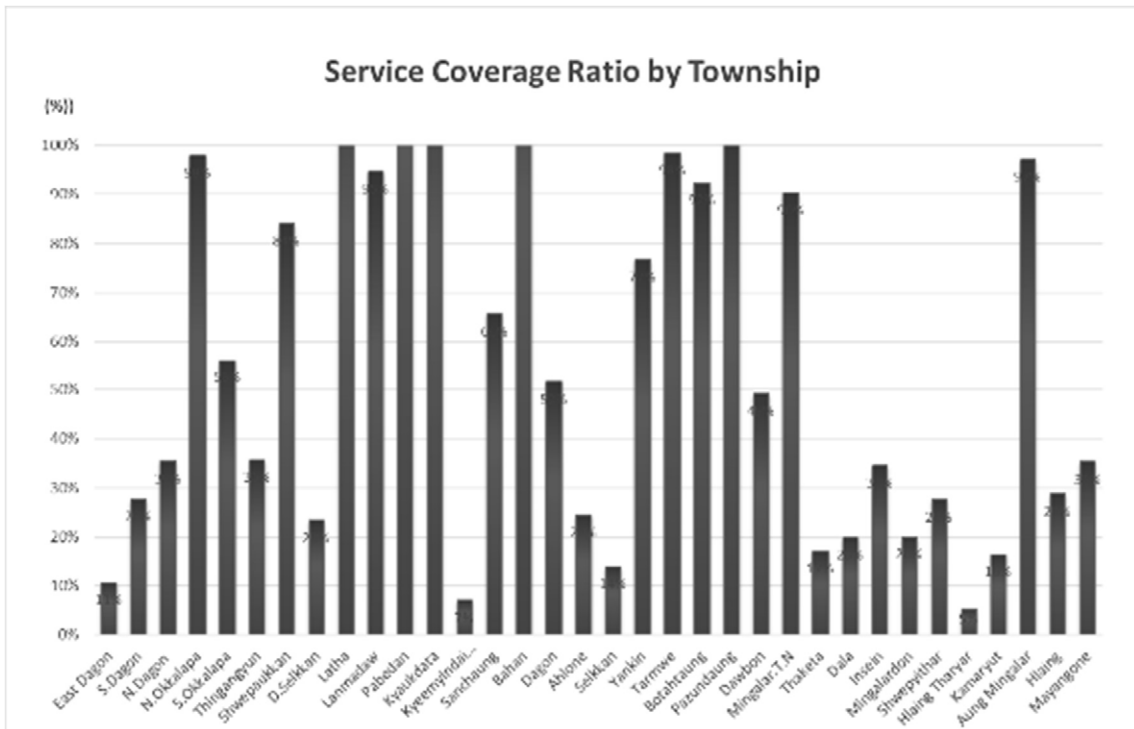
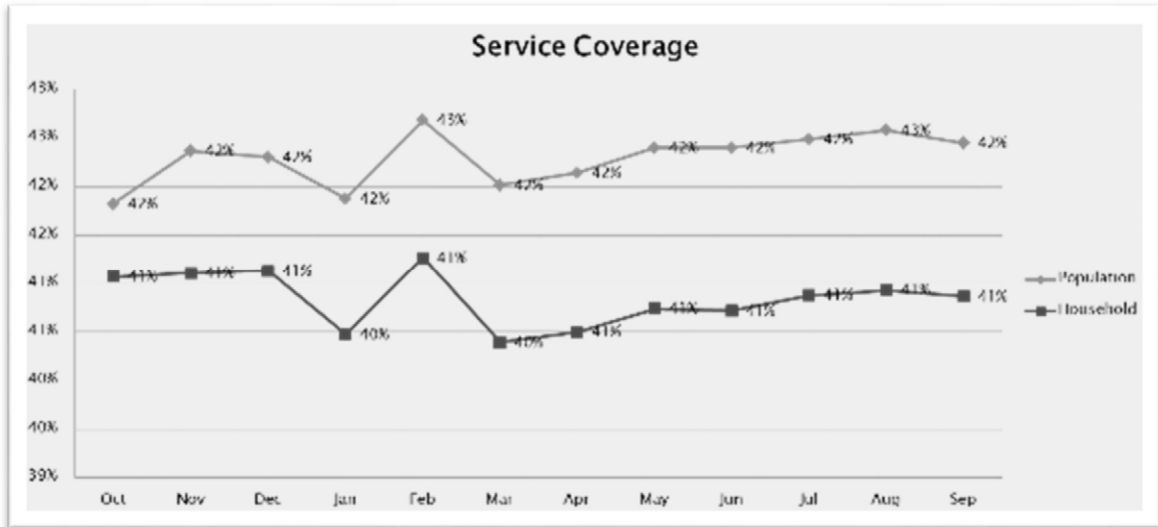
(1) Number of Connection and Service Coverage

The number of connection shows an increase trend during three years from 327,285 connections in FY2016/17 to 342,364 connections in FY2018/19. Served population also increased from 1,391,626 to 1,928,093. Approximately 536,000 connection has been connected to the water system of EDWS.

As the results, water service coverage of EDWS increase from 30% in FY2016/17 to 42% in FY2018/19.

It needs an attention on the estimation method has been changed in FY2018/19. Served population is estimated by multiplying number of households (HH) by average number of persons per HH. In the estimation of FY2016/17, we utilized a uniform average value of 5 persons/HH for all township as a simple method. In FY2018/19, the average number of persons/HH was calculated in all township and it was applied for the estimation of served population, since the average was varied township to township.



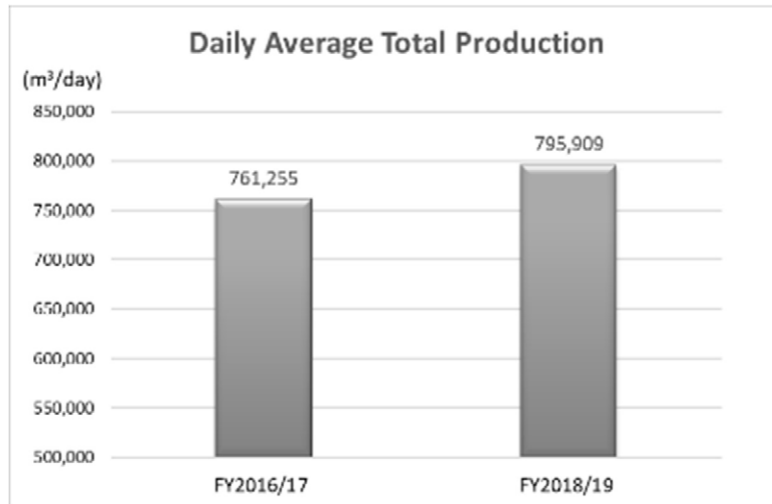


(2) Daily Average Total Production

Daily average total production increased from 761,255 m³/day in FY2016/17 to 795,909 m³/day in FY2018/19, by adding the production volume with 3,500 m³/day. The production volume is expected to be increased after commencement of Lagyunpin WTP operation.

In FY2016/17, this volume was estimated by using pump capacity and operation hours.

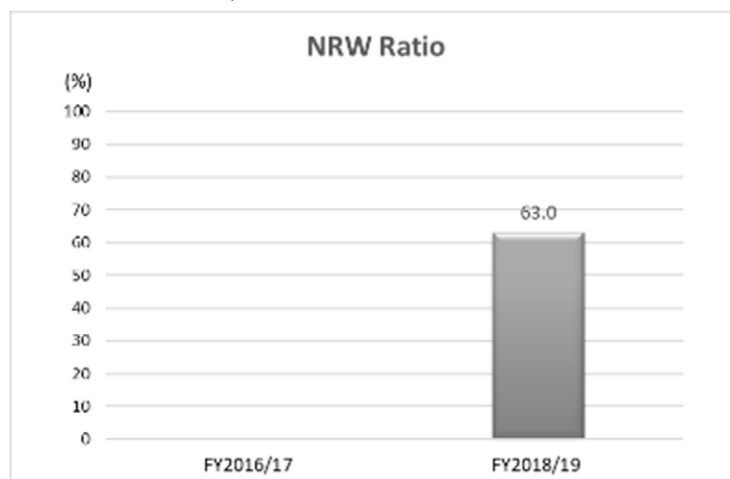
In FY2018/19, since flow meters were installed in 21 main points which enable to estimate water flow volume more accurately, the production volume was estimated based on the available flow data of only one month. In the next year, an annual production data will be available, so that more reliable data will be obtained.



(3) NRW Ratio

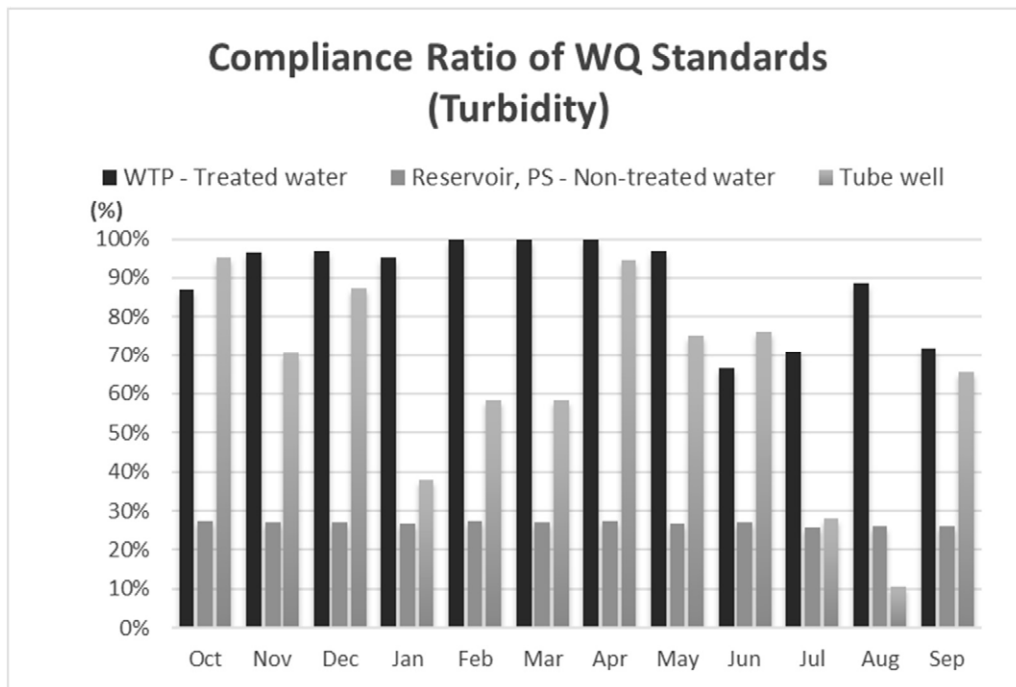
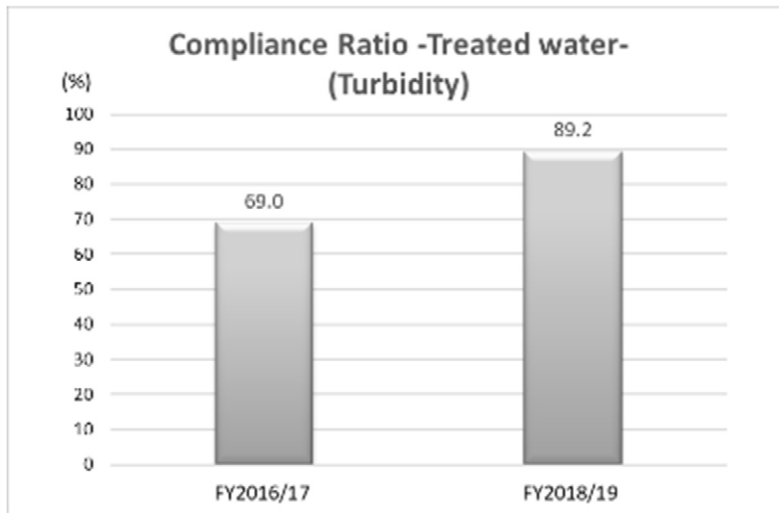
NRW ratio was estimated as 63% in FY2018/19, while the ratio was not indicated in FY2016/17 due to limitation of the information on water flow volume. Master Plan indicated NRW ratio as 66% in FY2011/12.

NRW ratio in FY2018/19 was estimated also based on the available flow data of one month, same as daily average production volume. Hence, In the next year, an annual production data will be available, so that more reliable data will be obtained.



(4) Compliance Ratio of Monthly Water Test in Water Facilities -Treated Water- (Turbidity)

Compliance ratio of turbidity for treated water with the required standard increased from 69.0% in FY2016/17 to 89.2% in FY 2018/19. It could be said that water quality of treated water has been getting improved. This could be attributed to improvement of operation practice of WTP, enrichment of water quality monitoring system and quality management. In the next year, compliance ratio of residual chlorine will be possible to be estimated after starting the operation of chlorine dosing facilities.

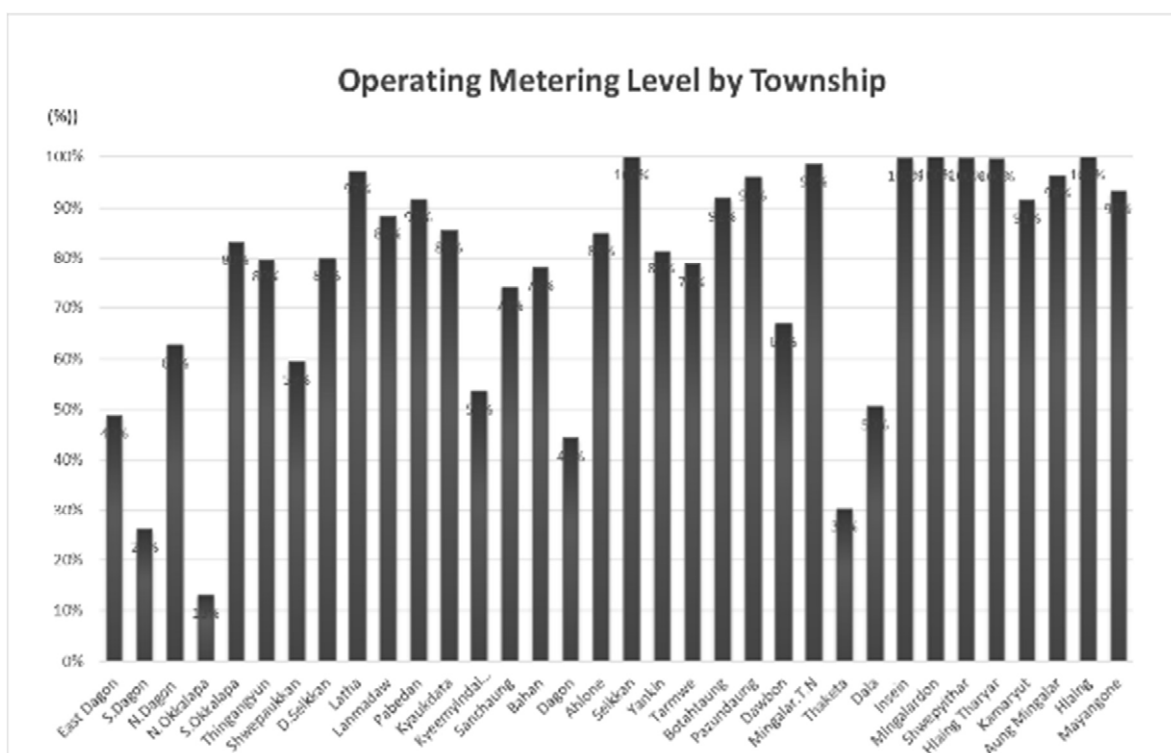
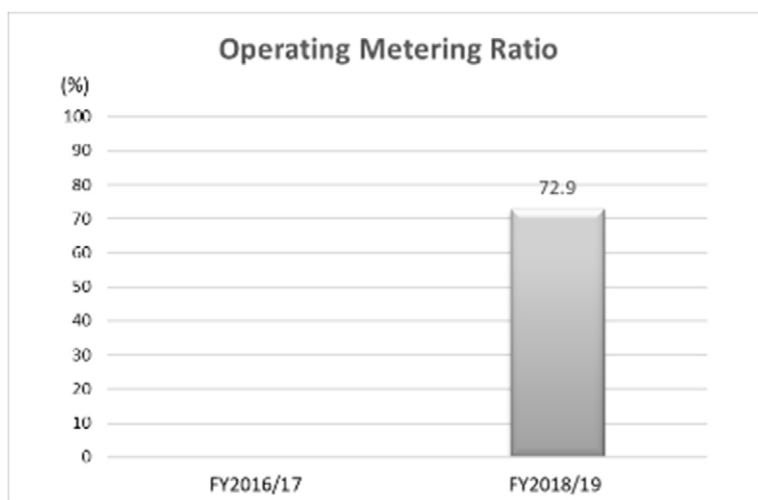


(5) Operating Metering Ratio

Operating metering level in FY2018/19 is indicated as 72.9%. Since the ratio in

FY2016/17 was not available, it is not comparable to the past performance. The judgement and counting for the number of operating meters depends on the assessment of township staffs by an instruction of Planning section. The challenge could be more standardize the assessment criteria comprehensively.

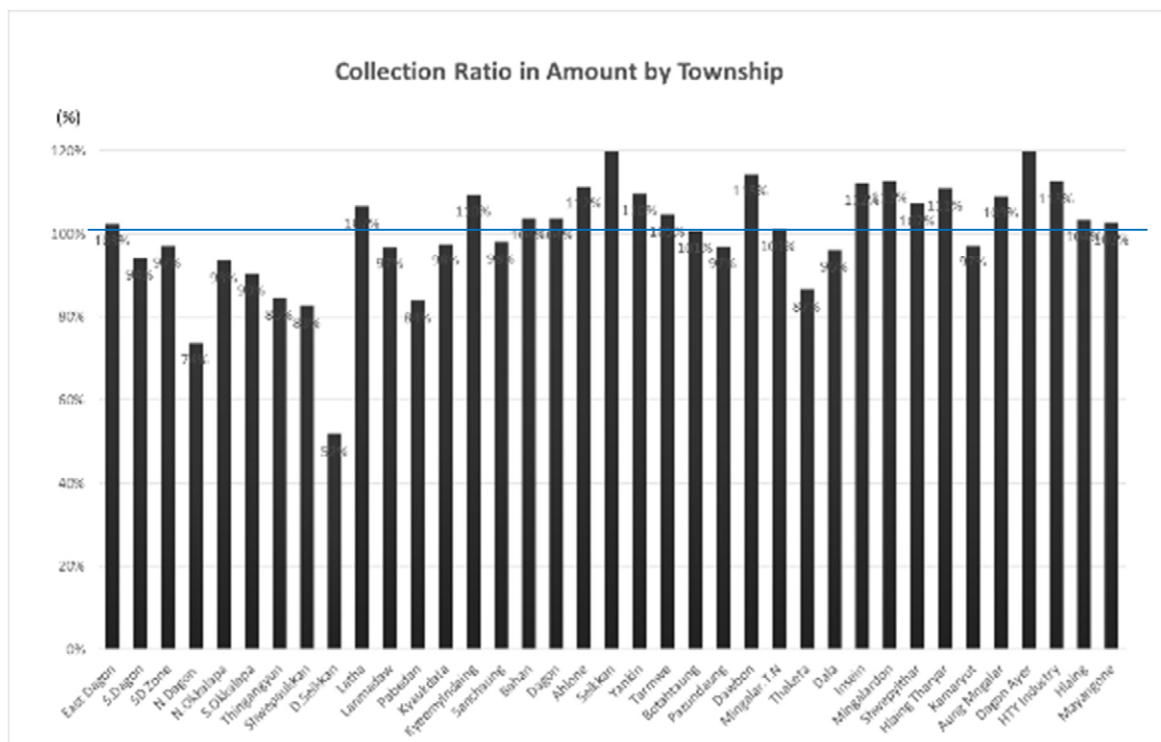
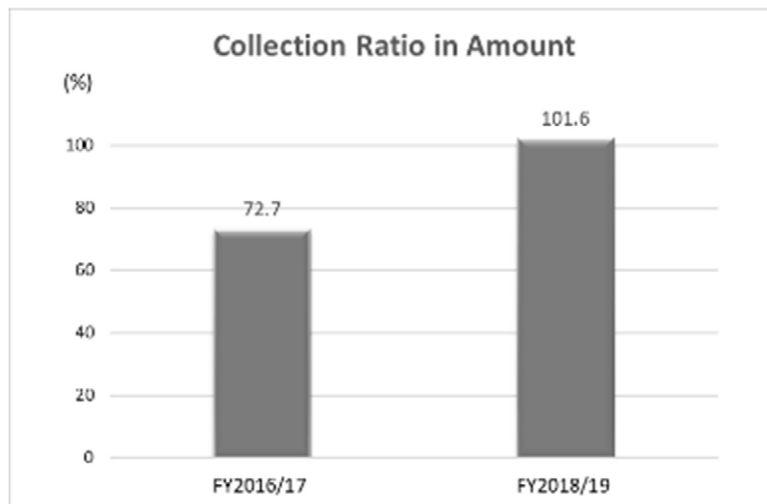
Looking at operating metering level by township base, the ratio of North District shows relatively high ratio, nearly 100%. While, the ratio of North Okkalapa, South Dagon, Thaketa and Dagon townships are low at less than 50%.



(6) Collection Ratio in Amount

Collection ratio in amount meets a dramatic increase from 72.7% in FY2016/17 to 101.6% in FY 2018/19. This is obvious improvement of the operation practice of township and district offices at the forefront and it is also attributed to the top management efforts. Even if outstanding is occurred, the amounts tends to be usually collected during three or four months.

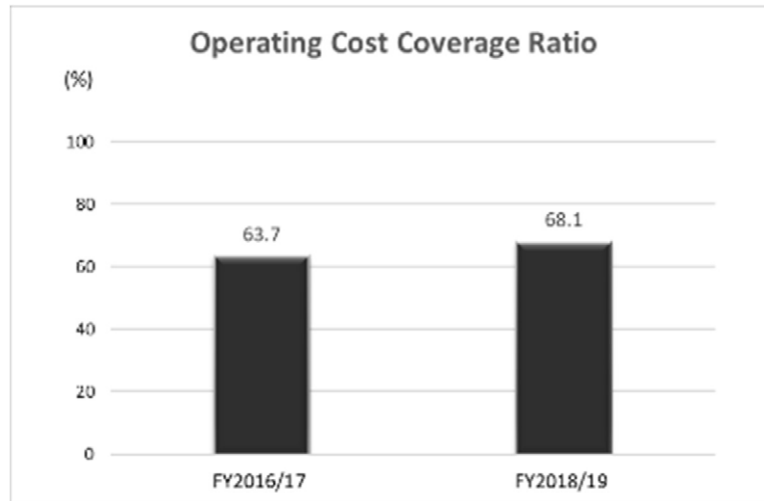
Looking at the ratio by township-base, the ratio of Dagon Seikkan, North Dagon, North Dagon townships are relatively low at less than 80%.



(7) Operating Cost Coverage Ratio

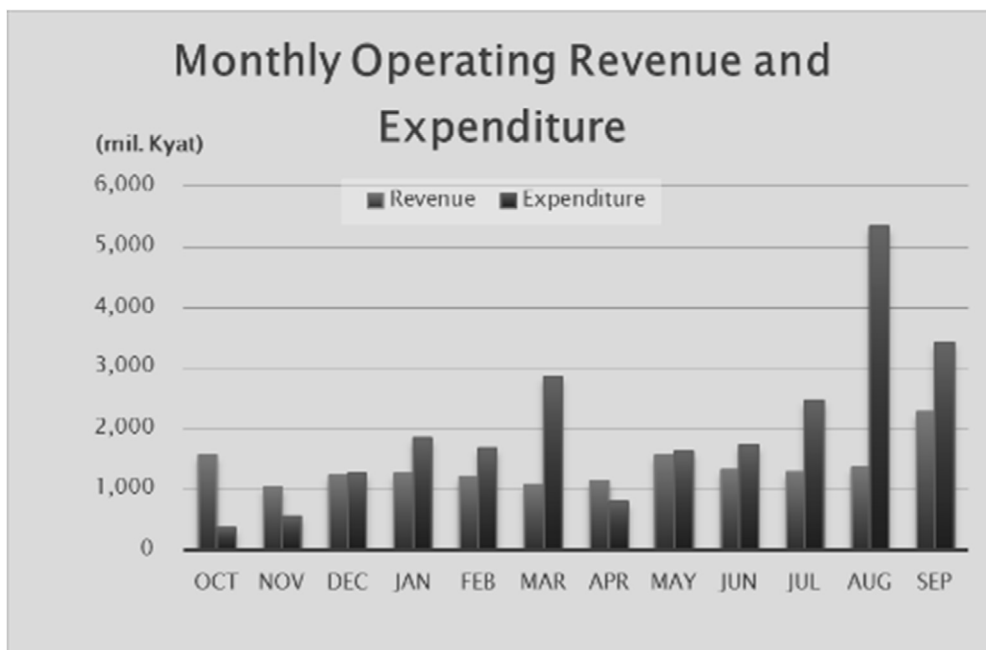
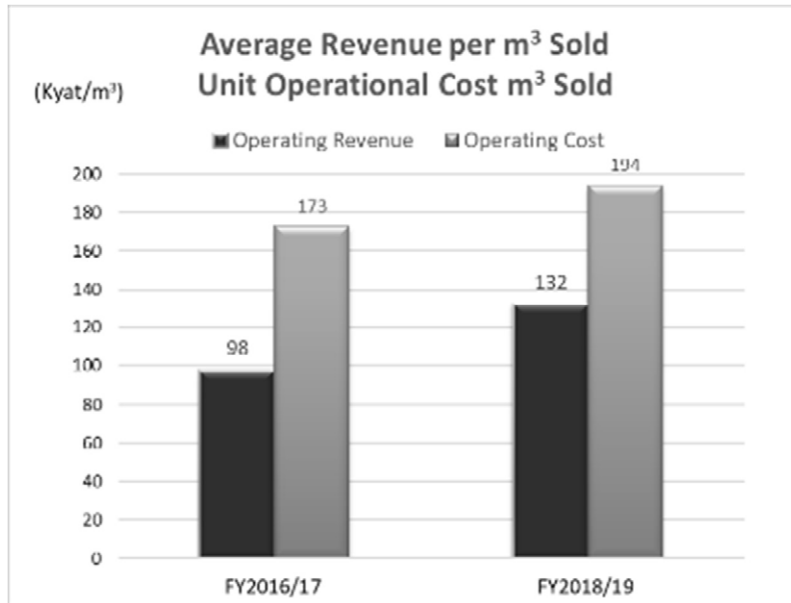
This ratio was calculated by annual operating revenue divided by annual operating costs. The indicator value less than 100% means that operating costs exceed operating revenue, hence the operating cost recovery should be a present target of EDWS.

The ratio shows an improvement of const coverage from 63.7% in FY 2016/17 to 68.1% in FY 2018/19.



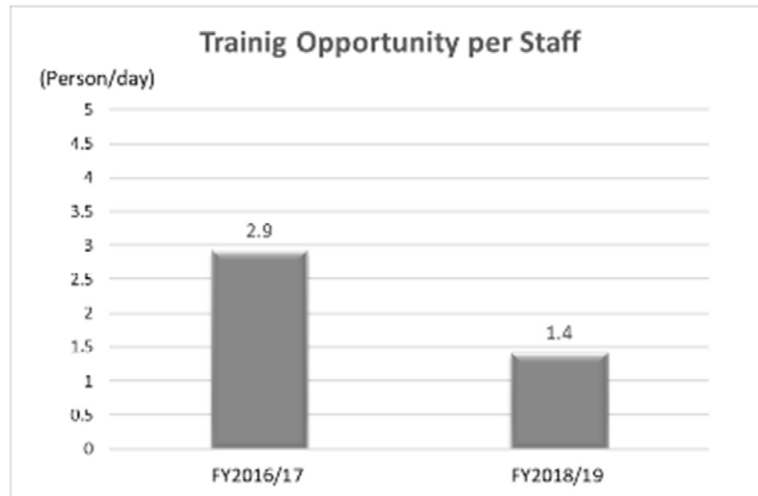
(8) Average Revenue per m³ and Sold and Unit Operational Cost per m³ Sold

Both of unit operating cost and average revenue per m³ shows its increase trend from FY2016/17 to FY2018/19. Unit operating cost per m³ still exceeds average revenue per m³, however the ratio of gap between costs and revenue is getting small. The cost usually tends to be increased year by year, so that continuous efforts to take measure on revenue increase needs to be carried out.



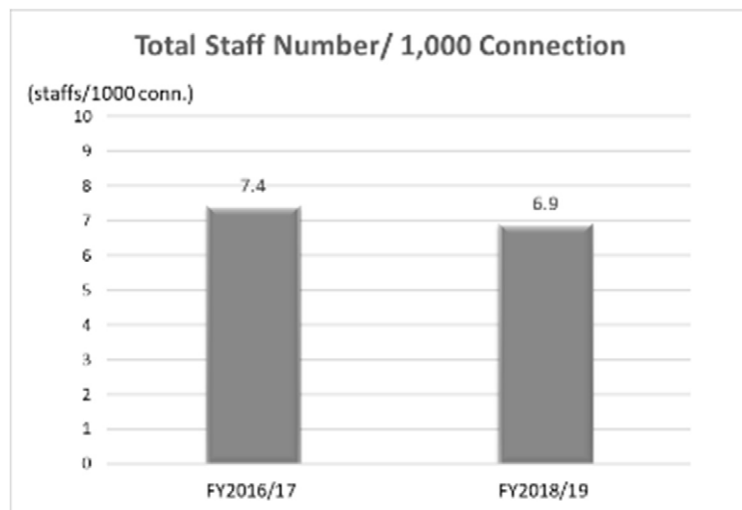
(9) Training Opportunity per Staff

The ratio of training opportunity per staff decreased from 2.9 in FY 2016/17 to 1.4 FY 2018/19. It is assumed that the reason of relatively high ratio in FY2016/17 was attributed to increase of training opportunity associated with JICA technical assistant project, since the period in FY 2016/17 was the beginning stage of the project.



(10) Total Staff Number per 1,000 Connection

Total staff number per 1,000 connection decreased from 7.4 in FY 2016/17 to 6.9 in FY 2018/19. It indicates a slight improvement of management efficiency of EDWS. Institutional reform of YCDC has been carried out, therefore the trend of this ratio should be carefully monitored after the reform.



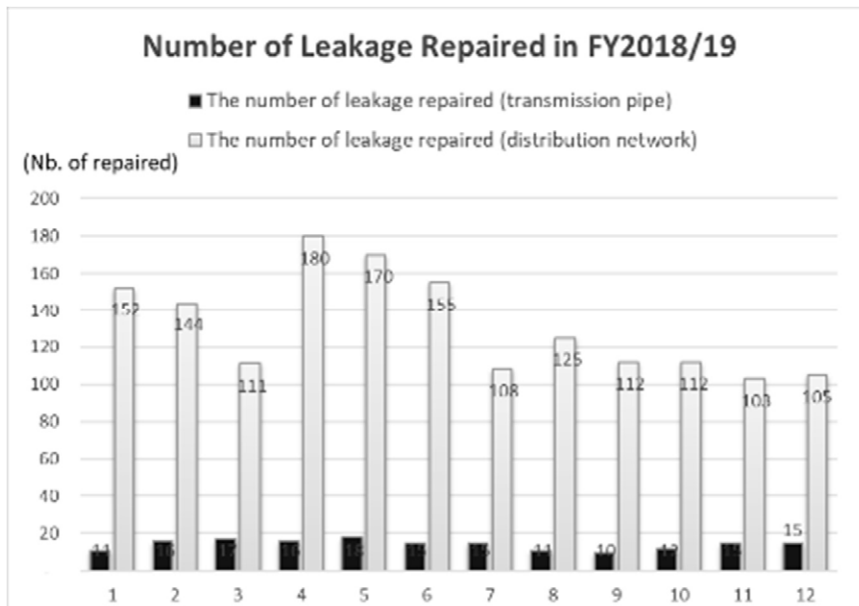
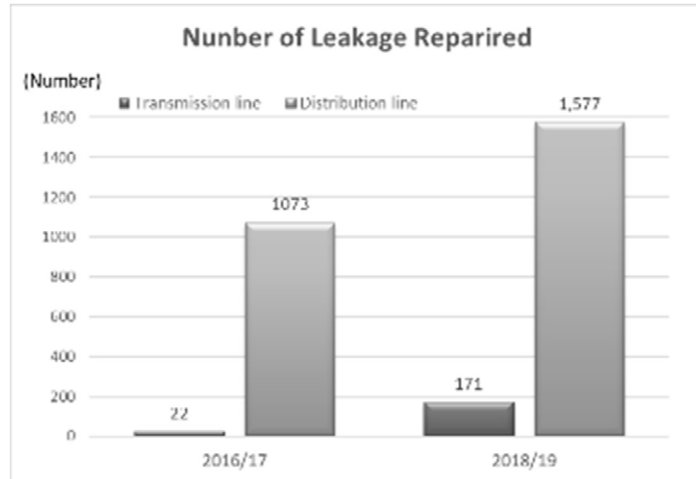
5.2.2. Other KPIs

(1) Number of Leakage Repaired

Number of leakage repaired both in transmission line and distribution line indicates the increased trend as 1.6 times from 1,095 in FY 2016/17 to 1,748 in FY 2018/19. Particularly number of leakage repaired in transmission pipe is assumed to be attributed to the aged pipe such as concrete pipe. The clear reason of this trend

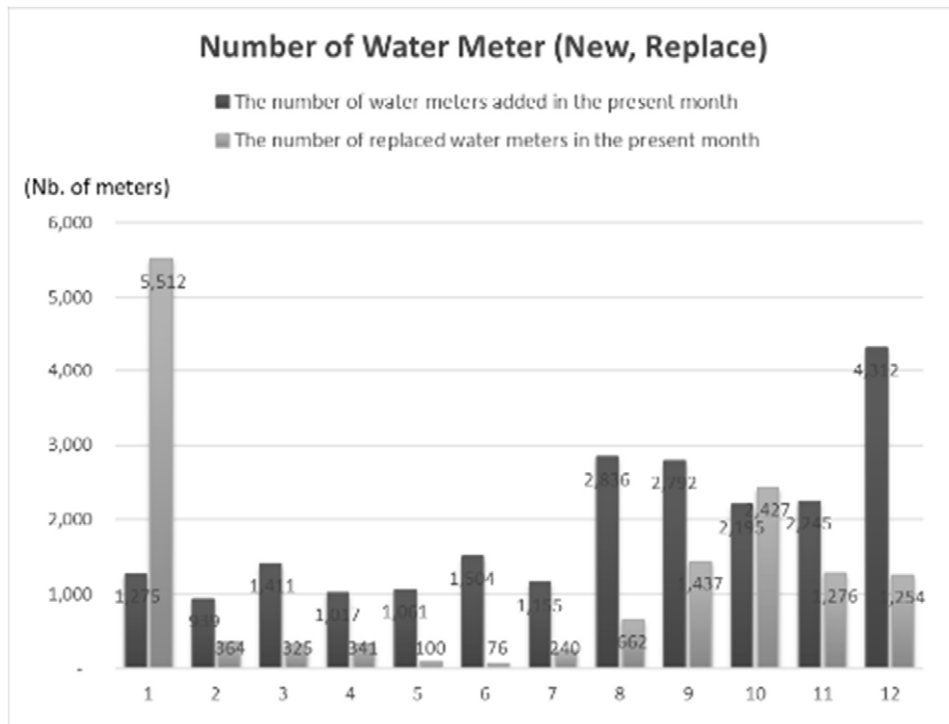
carefully needs to be identified in the monitoring report.

The number of leakage repaired for transmission and distribution seems to be constantly occurred every month.



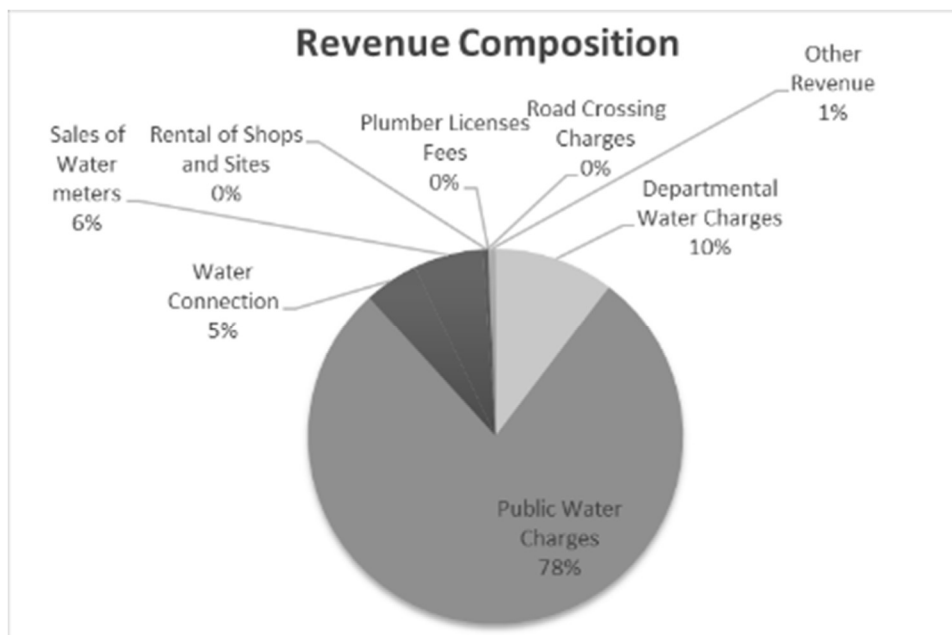
(2) Number of Water Meter (New, Replace)

Number of water meter newly installed in FY2018/19 was 22,742 and number of water meter replaced in FY2018/19 was 14,014. The monthly average of new meter installation and meter replacement were 1,895 and 1,168 respectively.



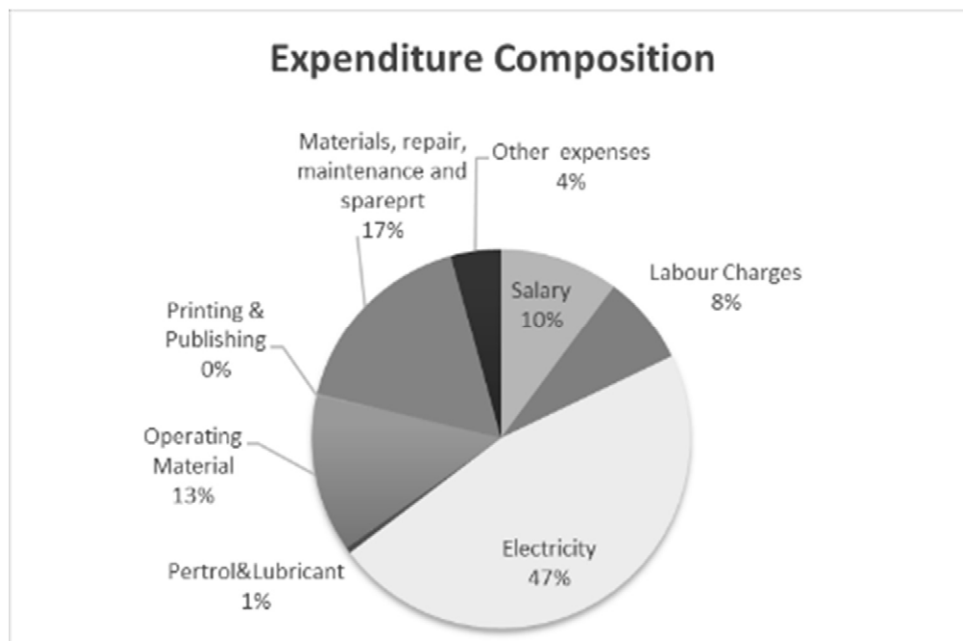
(3) Composition of Revenue and Expenditure

In FY2018/19, The major part of revenue was Public Water Charge with 78% of the total, and followed by Departmental Water Charge with 10%. Hence, 88% of revenue depends on water charge for the supplied water.



In 2018./19, the largest cost was electricity costs which remarkably shares 47% of the total expenditure. The following larger costs were material, repair and maintenance costs with 17% and operating materials including chemicals with 13%.

The trend of electricity expenditure including electricity tariff revision may have large impact on the operating balance of EDWS, it should be carefully monitored in the succeeding years.



5.3. Comparison to Other Water Utility

5.3.1. International Benchmarking Network

The International Benchmarking Network for Water and Sanitation Utilities (IBNET) funded by the World Bank group is an initiative to encourage water and sanitation utilities to compile and share the information of Performance Indicators (PIs). Hence, we are able to access comparative information that will help to promote best practice among water supply and sanitation providers worldwide.

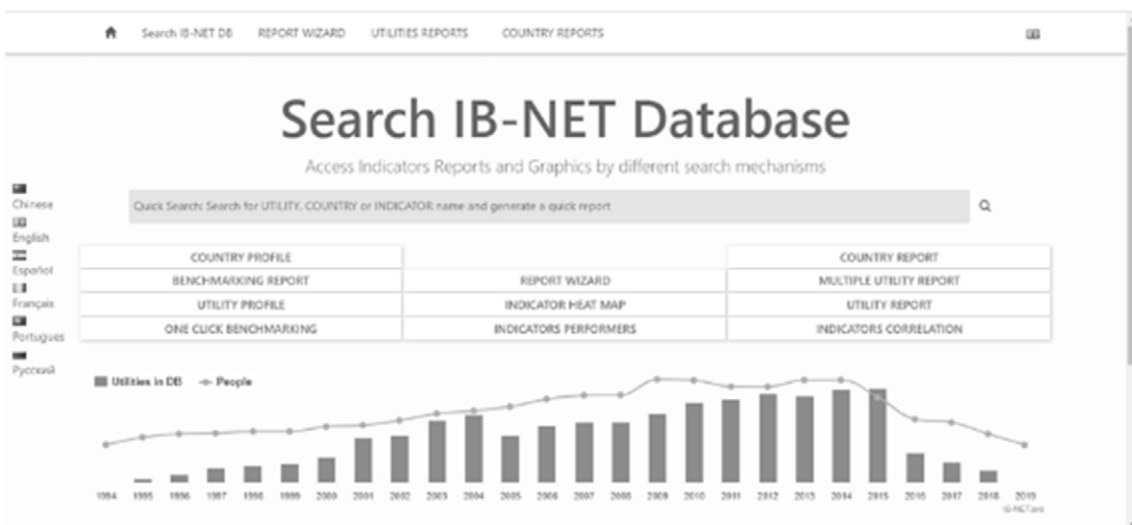
<https://www.ib-net.org/>



5.3.2. Checking Performance of Other Utilities

IB-NET Database provides us key information of other water utilities if the data is registered and is available. The users can extract information from the following database menu according to your needs.

- Country Profile
- Benchmarking Report
- Multiple Utility Report
- Indicator Heat Map
- One Click Benchmarking
- Indicators Correlation
- Country Report
- Report Wizard
- Utility Profile
- Utility Report
- Indicator Performers



(1) Utility Profile

This function provides information on water service status by indicating key PIs, such as “population and coverage”, “consumption and production”, “consumption breakdown”, “non-revenue water”, “network performance”, “revenue, costs and operational cost coverage”, “cost breakdown”, “number of complaints”, and “billing and collection”.

1. Click “Utility Profile”.
2. Select ① one country and ② one utility, from the list.

The screenshot shows a web application interface for selecting a utility. At the top, there are navigation tabs: 'Search IS-NET DB', 'REPORT WIZARD', 'UTILITIES REPORTS', and 'COUNTRY REPORTS'. Below the navigation is a breadcrumb trail 'Home / Select a Utility'. The main heading is 'Select a Utility' with a sub-heading 'Search for Utility's name or choose first a Country and then a Utility from the list'. There is a search input field with the placeholder text 'Quick Search Search for a UTILITY name'. Below the search field, a dark grey bar contains the instruction 'To continue to the report, please select an item from the list'. Underneath, there are two dropdown menus: the first is labeled '1' and 'Country' with the text '---Select One Country---'; the second is labeled '2' and 'Utility Utility' with the text '---Select One Utility---'.

3. Quick outlook of the utility profile will be appeared.



(2) Utility Report

This function provides information on water service status by all PIs registered in the database. The database indicates all periodical data of the registered year.

1. Click “Utility Report”.

၁။ ‘Utility Report’ ကို ဝှံ့ဝှံ့ဝှံ့ဝှံ့

2. Select ① one country and ② one utility, from the list.

Home / Select a Utility

Select a Utility

Search for Utility's name or choose first a Country and then a Utility from the list

Quick Search Search for a UTILITY name

To continue to the report, please select an item from the list

1 Country ---Select One Country---

2 Utility Utility Select One Utility

3. The information can be customized by selecting target “Year”, “Report type” and “Currency”.

Home / Utility Profile / Standard Utility Report

Standard Utility Report

Most common indicators

Year: 1996, 2001, 2003, 2004, ... **Choose Report** Standard **+ Add Utility** **Currency** USD - Dollar

Phnom Penh Water Supply Authority	1996	2001	2004	2005	2006	2007	2013
1.1 - Water Coverage (%)			75.00%	75.05%	74.22%	82.00%	91.29%
2.1 - Sewerage Coverage (%)							
4.1 - Total Water Consumption (liters/person/day)			10423	10041	7887	11712	11154
4.2 - Residential Consumption (liters/person/day)			11766	11305	10437	10128	0.0
12.0 - Staff Water/1000 Water pop served (M/1000 W pop served)			0.77	0.63	0.52	0.53	0.25
6.1 - Non-Revenue Water (%)			18.10%	23.2%	13.8%	3.74%	6.4%
6.2 - Non-Revenue Water (m ³ /km ² /day)			18.68	11.21	10.4	6.7	11.67
6.3 - Water sold that is metered (%)			100.00%	100.00%	100.00%	100.00%	100.00%
16.1 - Average Revenue WaterW (USD/m ³ water sold)			0.24	0.24	0.25	0.3	0.3
11.1 - Unit Operations: Com water and wastewater (M ³ /M ³ WW)			0.06	0.09	0.1	0.12	0.12
23.1 - Customer Satisfaction			87.7%	88.97	84.7%	82.3%	82.1

(3) Multiple Utility Report

This function provides information on water service status of the selected utilities. You can compare the performance of the selected utilities periodically.

1. Click “Multiple Utility Report”.

၁။ ‘Multiple Utility Report’ ကို ခွဲဝိပွဲပါ။

2. Select multiple utilities that you want to compare by using “Filter Search” or “Name Search”.

Home / Multiple Utility Report

Multiple Utility Report

This report allows you to generate PRE-SET or CUSTOM REPORTS for MULTIPLE UTILITIES

Select as many utilities as you want and choose one option from the buttons on the right to display PRE-SET or Customized reports for the selected utilities. You can also change the options of the filters to search for more utilities.

Selected UTILITIES (select as many utilities you want using the NAME SEARCH or the FILTERS)

- Utility: Cambodia - ...
- NPNL
- SAWACD, Ho Chi Minh ...
- SYABAS
- Ptsm Kota Dk, Yogyakarta...

PRE-SET Multiple Report

Comparison

Filter Search | **Name Search**

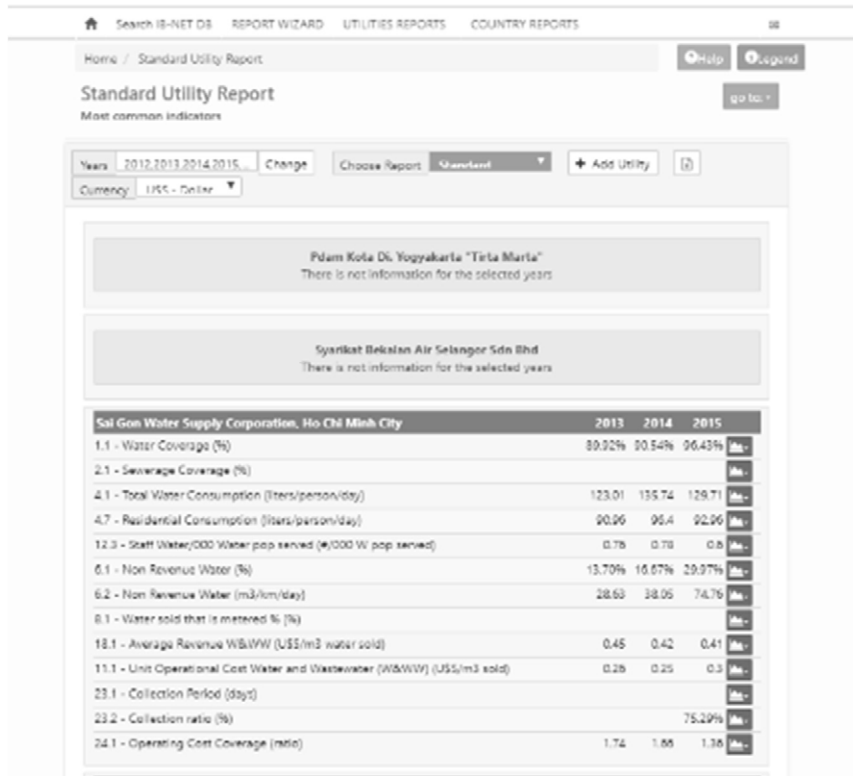
Region: East Asia and Pacific | Country: Indonesia | Population: ---Filter By Population

Utilities found: 14 | Select All

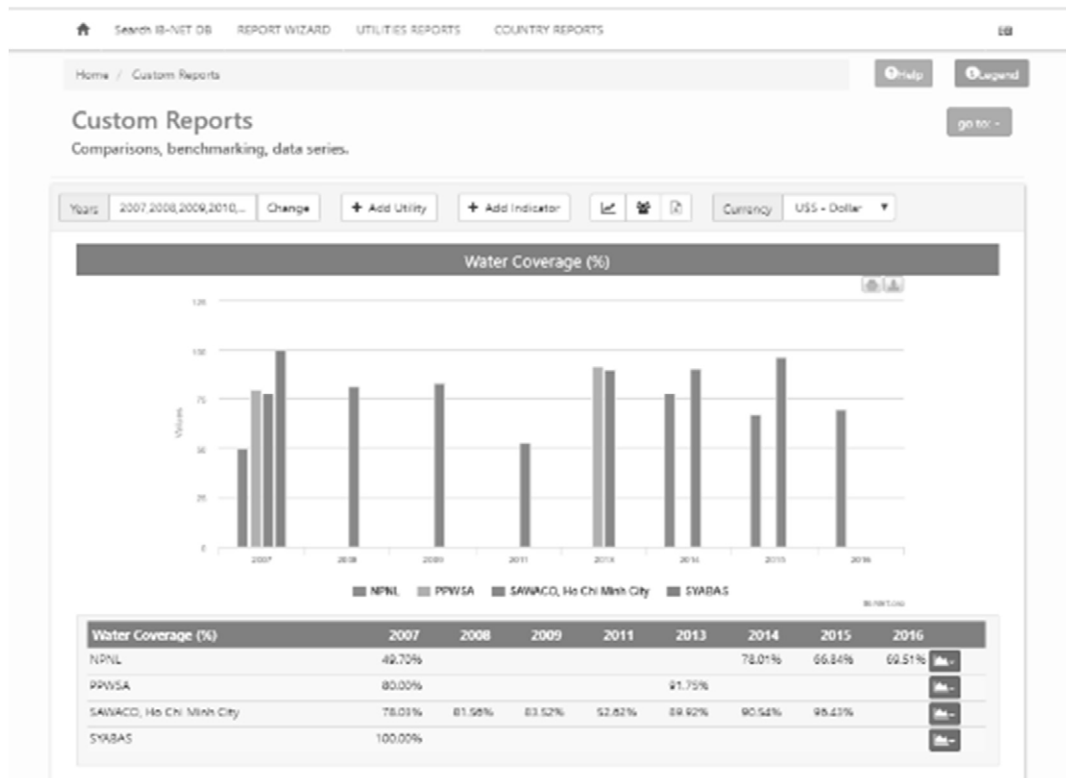
Utility	Years with data	Country	City	Population	Select
Ream Gab. Banyumas	2004-2007	Indonesia	Banyumas District	278,000	+
Ream Gab. Kerinci Tirta Sakti	2003-2003	Indonesia	Kerinci District	108,000	+
Ream Gab. Pandeglang	2003-2003	Indonesia	Pandeglang District	24,000	+
Ream Gab. Purwokerto	2004-2002	Indonesia	Purwokerto District	110,000	+

3. Then, you can choose one option from the buttons on the right display, “PRE-SET” or “Comparison”.

Option: PRE-SET



Option: Comparison



The above sample figure is made by selecting 5 utilities in South-east Asia; (1)

SAWACO, Ho Chi Minh, Vietnam, (2) PPWSA, Cambodia, (3) Pdam Kota Di. Yogyakarta "Tirta Marta", Indonesia, (4) NPNL, Vientiane, Lao PDR (5) SYABAS, Kuala Lumpur, Malasy

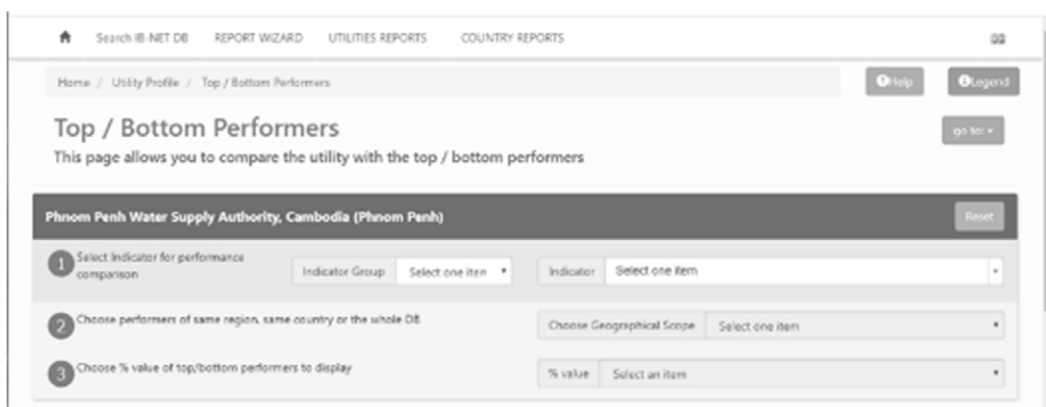
(4) Top/ Bottom performers

This function provides comparative performance information on water service status of top/bottom performers within the country/ region/ whole world. It enable to compare the selected utility's performance with the top/bottom performance in the country/ region/ whole world.

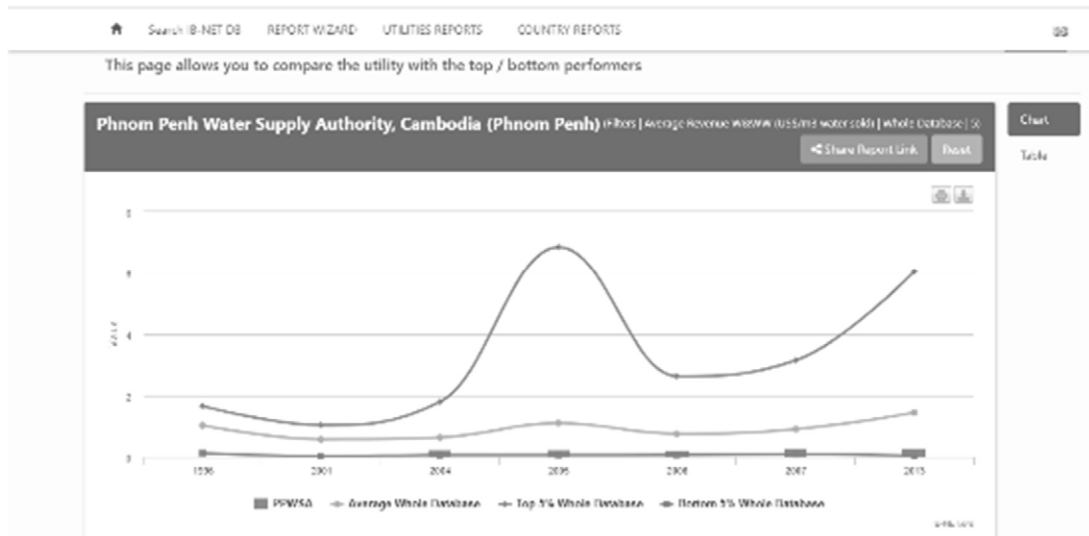
1. Click "Top/ Bottom performers".
2. Select ① one country and ② one utility, from the list.



3. Select ① one PI for comparison, ② utilities of same region/or country/or whole database.
4. Then, choose ③ % value of top/bottom performers to display.



5. The comparison chart will be automatically appeared. The chart shows the % value of top and bottom performance, and the performance of the selected utility periodically.



(5) Indicators Correlation

This function provides an analytical tool to check correlation between the selected PIs. Also, you can check other closest performance of the registered utilities in the selected PIs. This function gives us the comparative performance position of the utility within country/ region/ whole world.

1. Click “Indicators Correlation”.
2. Select ① one country and ② one utility, from the list.

Home / Select a Utility

Select a Utility

Search for Utility's name or choose first a Country and then a Utility from the list

Quick Search: Search for a UTILITY name

To continue to the report, please select an item from the list

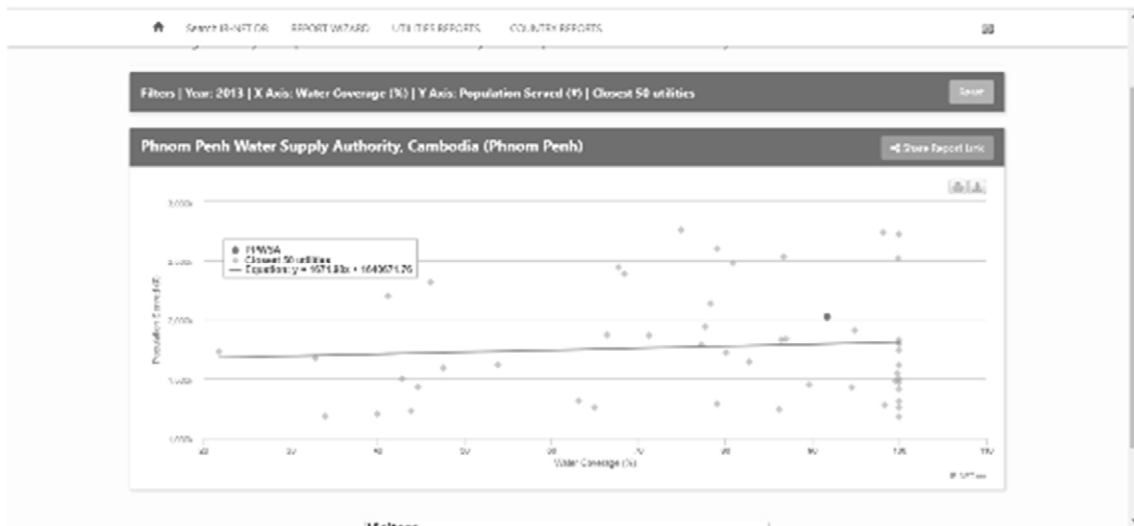
① Country: --Select One Country--

② Utility: Select One Utility

3. Select the target “Year”, “Indicators” both for the X axis and for Y axis. Also choose “Geographical scope” and “Closest utilities – Number”.
4. A correlation figure of 2 indicators will be appeared. If you bring your cursor on the utility dot that you want to check, the other utility information will be

shown.

The following sample figure is made by setting the conditions; Country: Cambodia, Utility: PPWSA, Year:2013, X-axis: Water Coverage, Y-axis: Population Served, Geographical scope: Whole database, Closest utilities -Number: 50.



International Benchmarking Network homepage, <https://www.ib-net.org/>

付属資料 2 : 水道事業にかかわる規定、基準、ガイドライン

- 2.A : 水道条例 (案)
- 2.B : 水道料金設定ガイドブック
- 2.C : 固定資産の管理及び経理
- 2.D : 顧客管理マニュアル (案)
- 2.E : 全部署標準手順書 (SOP) (目録のみ)

Annex-2: Regulations, Standards and Guidelines for Water Utility Management

Annex-2.A: Water Resources and Water Supply Regulation (Draft)

Annex-2.B: Guidebook for Water Tariff Setting

Annex-2.C: Maintenance of Fixed Assets Lists

Annex-2.D: Customer Management Manual (Draft)

Annex-2.E: Standard Operating Procedures (SOP) of All Sections of WRAWSA (List only)

2.A : 水道条例 (案)

Annex-2.A: Water Resources and Water Supply Regulation (Draft)

Draft: Water Resources and Water Supply Regulation

2020.01.31

	Chapter 1 Terms and Definition
Title	1. This regulation shall be called YCDC water supply regulation.
Terms and definition	2. The terms in this regulation shall mean the same as in YCDC law. Moreover, the terms below shall mean as follow;
	(a) Law means 2018 YCDC Law.
	(b) Water Supply means the distribution of water for the public within the city boundary, by the committee, by transmitting water from reservoir, stream, creek, lake and river, and underground water through open channel, transmission pipe, various distribution and service pipes and other water supply facilities.
	(c) Water Supply System means the distribution system of water from Committee-owned water supply utility through transmission pipe or other ways.
	(d) Illegal connection means direct or indirect connecting of water from utility's water supply system into the building, compound or any place, or installation of electric or fuel pump and hand pump without Committee's permission.
	(e) Performing beyond the permission means performing beyond the specified connection permit.
	(f) Transmission pipe means the water pipe that transports water from lake, reservoir and treatment plants to storage reservoir or distribution pipe under the water supply system of Committee.
	(g) Distribution pipe means the water pipe network that conveys water from storage reservoir or transmission pipe under the water supply system of Committee to service pipe in order to distribute water to each township.
	(h) Service pipe means the water pipe connecting to collective residence or individual residence to access water from Committee's water supply network. That term will include all related materials installed on the pipe.
	(i) Water Charges means the charges for consumption of Committee water collected from customers by meter rate, or flat rate according to customer category.
	(j) Pipeline Boundary means the alongside area of 25 feet from transmission pipeline of water supply system.
	(k) Water Connection Permit means the permit, issued by the committee, which allows the access of water from the Committee's water supply system .
	(l) Non-revenue Water means the water wasting/loosing from Committee's water supply system due to various reasons.
	(m) Owner means the person who gets granted the water connection permit to access the water from the Committee's water supply system and who pays all related cost of water meter, service pipe, other related materials and installation fee by his or her own. Owner

	<p>can be the owner of building or room accessing the Committee’s water.</p> <p>(n) Customer means the person who gets the water access and consume the water from water supply system of the Committee, and who is responsible to pay for its consumption. That customer can be the owner of building or room, or can be the tenant resident living in some other way.</p>
	<p>Chapter 2 Water Resources</p>
Committee’s power and duty to develop new resources	3. The Committee shall manage and perform the exploration of new water resources, by applying modern technologies, within the city territory or outside in order to supply clean and adequate water to the citizens residing inside the municipal area.
Water shed	4. The Committee shall preserve the stipulated catchment area of reservoir for its sustainability in collaboration with relevant departments.
Water pollution measures	5. The Committee shall adopt the measures to ensure the quality of water in reservoirs and the plan to prevent the contamination of water in reservoirs.
Conservation of forests	6. The Committee shall manage to take action, in line with the law, on any activity that harms or threads the forest within the stipulated area of reservoirs owned by the Committee.
Prohibition of reservoir sanctions	7. The Committee can prohibit and penalize the followings: jungle clearance, cultivating and gardening, quarrying, making brick, constructing shops or buildings within the premises of pipeline area, or compound or on the bank of lake and reservoir, and removing, relocating or destroying the materials related to water pipes, reservoir compound and reservoir bank without Committee’s permission.
Prohibition on lakes	8. The Committee can prohibit and penalize the followings activities within Inya Lake, Kandawgyi Lake and other lakes of the Committee without the Committee’s permission: accessing water, rowing, swimming, fishing, washing clothes, bathing, digging, backfilling, car washing, Drainage Bridge, building construction, garbage disposal and waste disposal.
Boundary restrictions on lakes	9. The committee can prohibit and penalize the construction works within 30-feet distance from the stipulated area of Kandawgyi and Inya Lake.
Ecological plans	10. The Committee can negotiate with the relevant Departments and organizations to promulgate the orders as needed in order to prevent destruction of Eco-environment during the implementation of water resources and water supply works.
Committee’s power and duty on rainwater harvesting	11. The Committee can coordinate with relevant departments, organizations and individuals to store rain water every raining season.
Groundwater plans	12. The Committee can coordinate with relevant departments, organizations and individuals to manage ground water extraction within city territory.
	<p>Chapter 3 Water Supply Works</p>

Committee's duty to supply water	13. The Committee can negotiate with the relevant departments, organizations and individuals to supply clean and adequate water to all citizens residing within City Municipal Area.
Water supply	14. The Committee has the right to pass through any land or to place the machineries and equipment on any land in order to construct, inspect and repair the water supply facilities inside or outside the City Municipal Area. In that regard, the destruction can be compensated as to current value with negotiation.
Authority What can be done Crossing water pipes in the road and bridge area Relevant pre-negotiation emergency	15. The Committee can perform the following works: (a) Laying the pipeline for water supply either passing through the road or any place which is intended to construct the road, or over/under/alongside the channel, creek, pond and lake. (b) Laying the pipeline either passing through any land or building, or under/over any land or building. (c) Informing the respective owner or tenant of the house/building in advance before performing the works in Article (a) and (b) above, and negotiating with the respective Department or Organization for department or organization owned buildings. (d) Implementing the works without negotiation mentioned in Article (c) above, in case of emergency.
Coordination on pipelines; Negotiation for construction	16. The governmental department or an organization or a person, which/who wants to extend, repair or construct a building or bridge or road or railway over distribution pipe within the city or on transmission pipe within or outside of municipal area, shall negotiate with the Committee in advance.
Construction authority on water pipes	17. The Committee has the right to manage and prevent constructing, repairing or extending of road, railways, bridge or building over the main transmission pipes or distribution pipes within municipal area.
Prohibition within the boundaries of the pipeline	18. The Committee has the right to stop and take action on cultivation, quarrying, making bricks, and constructing buildings and bridge, material piling up and ground digging within the pipeline boundary without Committee's permission.
Water Loss	19. The Committee can make arrangements to prevent water loss.
Water quality standard Standard for water supply facilities	20. (i) The Committee shall manage the water quality to be in line with WHO standards and the National Drinking Water Standards. (ii) The Committee shall prescribe the standards of pipelines, reservoirs, tube wells and pumps and water supply facilities, and comply the standards.
Prohibition if found unhealthy	21. The Committee can manage and coordinate with relevant departments and authorities for the prohibition of the public and private water supplies that do not comply or meet health standards with the negotiation
	Chapter 4 House Connection

Water supply system	22. The Committee can permit the connection to access committee's water in line with the stipulations. In that regard, water meter system or other appropriate system can be applied.
Requirements for approval Direct water connection Secondary pipe Working to get more water	23. Anyone who want to perform the followings, shall apply the permission at the Committee – a. To get direct water access by punching the Committee's water pipe b. To install secondary pipe diverged from service connection permitted by the Committee c. To apply or use electric or other fuel/energy, hand pump in order to extract or access more water from the permitted connection.
Application for water connection	24. The Committee may, in principle, approve or reject the application for water contract. If approved, the applicant must pay the specified service fee.
Rules and regulations Fees and permits Costs Supervision by staff Damage to water pipe	25. The Committee can instruct the following rules to be obeyed for new connection installation: a. The permitted customer (applicant) shall pay the specified service charge (including water meter costs) and follow the prescribed installation standards. b. The permitted customer (applicant) shall pay all related costs to install the house connection from the distribution pipe owned by the Committee. c. The permitted customer (applicant) shall carry out the plumbing works in standard format with the supervision of the Committee Staff in-charged. d. The customer shall be responsible to protect service connection pipelines from damages. If any damage occurred due to lack of customer's care, customer shall obey the decision of the Committee.
Owner responsibility Secondary connection Home water supply pipe Tenant	26. The responsibilities of connection owner regarding the house connection are as follows: a. not installing secondary connection without permission of the Committee b. not replacing or removing the house connection without Committee's permission
To store backup water	27. If the house owner whose house gets water from YCDC water supply denies or is absent to allow the temporary or rent residents to consume water, or if the house owner whose house gets water from YCDC water supply doesn't contribute water to temporary or rent residents enough, those tenant or residents can apply the separated house connection at the committee and the Committee can allow the house connection permit or appropriate use with the stipulated service charges payment.

	To store water for 36 hours consumption besides daily consumption per capita and to configure a reserved reservoir with the storage capacity stipulated by Fire Department for firefighting purpose.
Standard of material	28. The Committee can stipulate the standards of the size, material type, quality and structure of materials to be installed in service connection of a building or a place, that will access water from Committee's water supply system.
Inspection	29. The Committee, regarding water supply works, has the right to inspect any building or any land with accompany of relevant ward or village tract administrator, village tract in-charged or head of 100-household group or head of 10-household group together with two witness at least.
Withdrawal of water connection permit	30. If the owner or resident is found out to have engaged in illegal water connection, or absence to pay the water charges, or failure to comply with the rules and instruction of water consuming, or lack of care to prevent damage to the water connection, or cause of water loss, the Committee has the right to cut the connection off or provoke the connection permit.
	Chapter 5 Water Meter
YCDC and customer's responsibility for water meter	31. Concerning with the Water meter installation – <ul style="list-style-type: none"> a. The Committee has the right to manage the meter installed. b. The Committee shall grant hiring meter with specified rate. c. The specified Meter maintenance fee or leasing fee shall be charged on the meter leased by the Committee. d. The customer shall not perform the follows: damaging meter, repairing meter, changing or replacing meter, removing the parts of meter, connecting secondary pipe behind the meter. e. The customer shall be responsible to protect the water meter and responsible to compensate if the meter is lost or stolen. f. The customer shall be responsible to pay the cost for replacement of meter damaged due to lack of customer's care. g. The Committee shall determine whether the water meter should be validated and what should be done if it expires.
How to install Meter	32. The customer shall follow to perform the followings – <ul style="list-style-type: none"> a. The meter shall be located in the place, within the premises of customer, where the responsible staff can easily access meter reading and inspection. b. The meter shall be installed by following the installation standards of the Committee.
Meter test	33. The Committee : <ul style="list-style-type: none"> a. Can specify the period of meter testing for maintenance properly.

	b. Can take out the meter any time with repair or function test purpose.
	Chapter 6 Water Tariff and Billing
YCDC right to sell water and charge	34. The Committee can perform the followings with regard to the consumption of Committee's water: a. Charging for water consumption b. Selling water by setting proper tariff c. Charging water tariff for its consumption if the construction and other activities consume the water from the water supply system.
Foreign Currency	35. The Committee shall charge the water charges and service fee in line with the specified rate from the followings: a. Housings, apartments and buildings leasing in foreign currency b. Hotels, motels, and guest houses charged in foreign currency c. Businesses with foreign investments
Consumer & owner 's responsibility to pay	36. For bill payment, a. The customer shall be responsible to pay the bill for the consumption of water from Committee's water supply system. b. If the consumer is absent to pay the water bill, the house owner shall be responsible to pay it.
Customer change	37. To amend the customer name or to change the connection category shall be applied at the Committee by filling the application.
YCDC's right to draft rate	38. If necessary to amend or revise the water tariff, the proposal shall be submitted to relevant authority for approval.
YCDC's power for disconnection Allow reconnection	39. The Committee; a. has the right to cut the connection off if the customer is absent to pay the bill or fail to comply with the instructions stipulated by the Committee. b. The Customer whose connection is cut off according to Section 43-a, can apply the reconnection after debt payment or obeying the instructions. In that regard, the Committee can approve the reconnection application after the customer had paid fine, debt and service charges.
	Chapter 7 Prohibition
Illegal connection	40. No one can connect water illegally.
Water meter prohibition	41. No one can damages water meter, can make the meter functioning delay and can prevent easy meter reading.
Limit water use	42. No one can do the following activities to use the Committee owned water supply system: car washing with tap water, watering streets.

Comply with rule, etc.	43. No one can fail to comply with the instructions, rules and orders issued, according to this regulation, by the Committee.
Take action	44. Anyone who violates any prohibition in this regulation shall be taken action according to Yangon City Development Committee Law.
	Chapter 8 General
YCDC's right to delegate task	45. The Committee can delegate and assign the tasks or activities to be implemented to relevant department/authority, organization or person under the Committee in line with this regulation.

2.B： 水道料金設定ガイドブック

Annex-2.B: Guidebook for Water Tariff Setting

Guidebook for Water Tariff Setting in YCDC

JANUARY 2021

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Exercise I

Exercise II

I. Background

1. Introduction

1.1 Yangon City Development Committee; The Department of Engineering (Water and Sanitation) (EDWS) has been carrying out financial matters under the Union Fund since 1.10.2011. EDWS uses the Government Accounting System, which maintains single entry system and compiles accounts based on the Cash Basic system. Using the Government Accounting System Based on the Cash Basic system, there is a lack of inventory for fixed assets, incomplete depreciation rates, lack of depreciation accounts. There are no accounting results such as Profit & Loss Account and Balance Sheet. There is a need to establish specific guidelines and guidelines for accounting policy, as well as specific policies and procedures for setting water tariffs.

1.2 EDWS water tariffs are very low compared to other countries and meter maintenance rates are not in line with modern prices. The current water tariff has been increased from the 2012-2013 financial year as it was allowed to be collected from the 2012-2013 financial year in accordance with Article 151 of the Resolution No. (4/2012) of the Yangon Region Government. There is also a need for a specific authority for EDWS to set tariffs. Some religious buildings; There is a need to list specific water consumption units for FOCs, such as schools, and make effective management. Increased FOCs; Rising raw water prices; Electricity bills and chemicals used in water purification; Factors such as rising prices for other accessories have widened the gap between EDWS revenue and expenditure.

1.3 Regarding foreign loans, MY-P5 loan agreement was signed on 5-9-2014 between the Treasury Department of the Ministry of Planning and Finance and the Japan International Cooperation Agency (JICA) on behalf of the Government of Myanmar and a loan of 23.683 billion yen from the Government of Japan for the Yangon City Development Project. A supplementary loan agreement was signed between the Ministry of Planning and Finance and the Yangon City Development Committee (YCDC) on 10.7.2015 to implement the project. For this MY-P5 loan, we have been borrowing since the 2015-2016 financial year, and we have been paying interest on the loan with interest rate of 0.01% from the 2015-2016 financial year. The loan has a fixed term of 10 years and must be repaid at the rate of two annually within 30 years after the end of the term. Thus, the loan under Contract No. MY-P5 will be repaid within 30 years from the fiscal year 2026-2027 starting from the loan of 23.683 billion yen.

1.4 The Japan International Cooperation Agency (JICA) signed a loan of 25 billion yen with the loan agreement MY-P19 on March 1, 2017 to implement the Phase II of Yangon City Water Supply Development Project

1.5 EDWS has to repay its loans and invest heavily in future water supply projects, and the need for large sums of money to increase existing expenditures to sustain existing water supply projects has led to an increase in the cost of water, which is EDWS 'core revenue. Guidelines need to be drawn up for a systematic increase in EDWS tariffs. Therefore, I will present this guideline under the following headings:

- (a) Water Tariff in Yangon
- (b) Comparison of Water Tariff
- (c) Guideline for Water Tariff Setting in EDWS

2. Water Tariff in Yangon

2.1 According to the Municipal Law of 1874 and the Yangon Municipality Act of 1992, Cleaning tax; Light tax Water tax and water tax were collected by the Assessors Department and later by the EDWS as property tax. Table 1 shows the gradual changes in water tariffs collected by EDWS from 2001 to 2015.

Table (1) EDWS tariff changes from 2001 to 2015

Type	Customer	2001	2002	2005	2006	2012	2013	2014	2015	Unit	
Metered	Household	6.6 (Kyat)	88 (Kyat)			88 (Kyat)			88 (Kyat)	Kyat / m ³	
	General	Commercial	29.7 (Kyat)	77 (Kyat)		110 (Kyat)			110 (Kyat)	Kyat / m ³	
		Construction	29.7 (Kyat)	77 (Kyat)		110 (Kyat)			110 (Kyat)	Kyat / m ³	
	Department	Building	4.4 (Kyat)	55 (Kyat)			88 (Kyat)		88 (Kyat)	Kyat / m ³	
		Factory	4.4 (Kyat)	77 (Kyat)					110 (Kyat)	110 (Kyat)	Kyat / m ³
	FE	Household	0.44 (US\$)				440 (Kyat)		440 (Kyat)	440 (Kyat)	Kyat / m ³
Commercial		0.88 (US\$)				880 (Kyat)		880 (Kyat)	880 (Kyat)	Kyat / m ³	
Hotel, Motel, inn, etc											
Flat	General	Household Ordinary	120 (Kyat)	1125 (Kyat)		1800 (Kyat)		1800 (Kyat)	1800 (Kyat)	Kyat / month	
		High class		1875 (Kyat)		3000 (Kyat)		3000 (Kyat)	3000 (Kyat)	Kyat / month	
	Commercial	135 (Kyat)		1575 ~ 57068 (Kyat)		2250 ~ 81525 (Kyat)				Kyat / month	
	FE	Household	25 (US\$)								US\$ / month
		Commercial	35 ~ 1440 (US\$)						27000 (Kyat)	27000 (Kyat)	Kyat / month
		Hotel, Motel, inn, etc	0.5 (US\$)								US\$ / guest / day
	Construction	83.6 (Kyat)		155 (Kyat)		217 (Kyat)		309.6 (Kyat)		Kyat / sq-m	

2.2 EDWS is currently collecting water tariffs from the 2012-2013 financial year. Customers who have not yet installed a water meter will be charged a fixed rate of 1,800 Kyats per month for home use. For commercial use and large plots of land at the rate of 3,000 Kyats / month; Water bills are collected with quarterly consolidated invoices. The current water tariff is shown in Table 2:

Table 2 Water rates charged by EDWS in 2018-2019 fiscal year

No.	Category	Kyat (1 Unit - m ³)
1	Meter (Domestic) House, YCDC Staff, Department	88
2	Meter (Commercial) Business, Department	110
3	Meter (FE) House Commercial	440 880

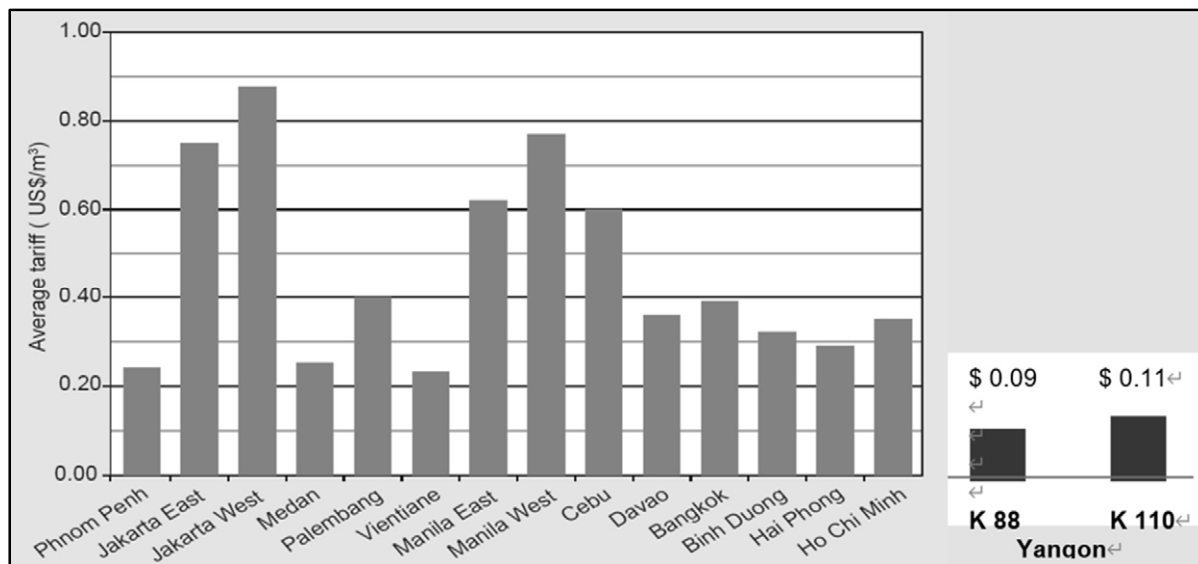
4	Flat House (Normal) Large House, Commercial Garden	1800 3000 270000 / Month
No.	Category	Kyat (1 Unit - m³)
1	Meter (Domestic) House, YCDC Staff, Department	88
2	Meter (Commercial) Business, Department	110
3	Meter (FE) House Commercial	440 880
4	Flat House (Normal) Large House, Commercial Garden	1800 3000 270000 / Month

Meter Manintaince fees (House,Commercial) 100 ks / month

Meter Manintaince fees (FE) 1000 ks / month

2.3 Statistics at the end of 2011 show that EDWS tariffs are very low compared to some ASEAN countries:

Average Tariff ASEAN Cities (End of 2011)



2.4 In April 2018, EDWS reported that the total number of connections used in the water supply network was 34,0122, with 48,783 flat connections and 230,279 metered bills. A total of 2,300 FOC connections and a total of 58,760 suspended connections were found. The following table (3) shows the water consumption situation from 2012 to 2018:

Table 3 List of water consumption (up to 2012-2018)

No	Year	Flat connection ပုံစံ သဘော :		Metered connection မီတာရှိသော ဓာတ်ကြိုးပေးမှု		FOC	Total connections in End of April(source; ACE office) ဓာတ်ကြိုးပေးမှု ဓာတ်ကြိုးပေးမှု ရရှိပေးပါခြင်း (ACE ရုံးချုပ်)
		Flat Bill (ပုံစံ ထ)	Flat Suspend (ပုံစံ ထ ဆိုင်းထိုင်)	Metered Bill (မီတာ ဝေးပုံစံ)	Metered Suspend (မီတာ ဆိုင်းထိုင်)		
1	2012	55,131	7,557	155,961	34,843	2,530	256,022
2	2013	54,049	10,402	163,677	48,326	2,452	278,906
3	2014	54,998	19,893	176,279	50,083	2,415	303,668
4	2015	49,292	17,277	192,516	46,794	2,481	308,360
5	2016	55,902	10,578	214,779	43,778	2,248	327,285
6	2017	45,028	9,315	228,388	49,902	2,382	335,015
7	2018	48,783	12,828	230,279	45,932	2,300	340,122

3. Comparison of Water Tariff

3.1. MCDC Water Tariffs

The following is a comparison of YCDC (EDWS) water rates with MCDC water rates:

3.1.1 MCDC has been collecting water bills since 1989. Water meter collection with water meter will start from 4/2017. The water tariff has been increased from 7/2017 for water supply. If the water bill is not paid by the due date, overdue fines will be charged as arrears. Overdue fines are charged at the rate of 1,000 Kyats per month and up to a maximum of 3 months. The meter maintenance fee is 100 Kyats per bill. The steps of MCDC's water tariff changes and the water tariffs collected in the current 2018-2019 fiscal year are as follows:

Water Tariff in Mandalay

No.	Period	Cost per 1 unit (Kyats)	Cost per 1 unit (USD)	Comment
1	1989-1996	5	0.004	
2	6/1996-11/1997	10	.007	Above 90 units
3	12/1997-8/1999	11	.008	
4	9/1999-11/2005	10	.007	
		15	.011	Above 90 units
5	12/2005-2/2006	25	.018	
		30	.022	Above 90 units
6	3/2007-11/2010	55	.04	
7	12/2010-3/2015	55	.04	Domestic
		77	.057	Commercial
8	4/2015-3/2017	85	.063	Domestic
		110	.081	Commercial
9	4/2017-Today	200	.147	Domestic
		260	.191	Commercial

from Ms Khin May Htay on 1st August 2017 at JICA Yokohama Forum

Mandalay Water Tariff Revision

• Domestic	55 → 85 → 200 /m ³	2.35
• Commercial (Medium)	77 → 110 → 260	2.36
• Commercial (Industry/Factory)	440 → 660	1.5
• FE (Commercial)	490 → 880 → 1,100	1.25

• Moat Water (fixed according to pipe sizes)		
• 1/2 inch	1,500 → 4,000	2.7
• 3/4 inch	2,500 → 5,000	2.0
• 1 inch	3,000 → 6,000	2.0
• 1 1/4 inch	5,000 → 9,000	1.8
• 1 1/2 inch	7,500 → 12,000	1.6
• 2 inch	15,000 → 20,000	1.3
• 8 inch	50,000 → 70,000	1.4

• FY 2016-2017		
- Expenditure	5,236 million Kyat	3.4
- Revenue	1,527 million Kyat	
- Deficit	3,708 million Kyat	

3.1.2 The MCDC has increased the water tariff from the fiscal year 2017-2018, increasing the domestic water tariff by 2.35 times and the Commercial (Medium) by 2.36 times. The FE (Commercial) rate was increased only 1.25 times. Moat Water was doubled for 1" and 3/4" pipes.

3.1.3 A comparison of water tariffs between YCDC (EDWS) and MCDC is presented as follows:

YCDC Water Tariff Structure		Mandalay Water Tariff Revision	
No.	Category	1 Unit	Kyats
1	Domestic (Meter)	88	55 → 85 → 200 /m ³ 2.35
2	Commercial (Meter)	110	77 → 110 → 260 2.36
3	FE(House) (Meter)	440	440 → 660 1.5
4	FE(Commercial)(Meter)	880	490 → 880 → 1,100 1.25
5	Y.C.D.C Staff (Meter)	88	
6	Department (Domestic) (Meter)	88	
7	Department (Commercial) (Meter)	110	
8	Domestic (Flat)	1800	
9	Domestic/Commercial (Large House)	3000	
10	FE (Flat)	270,000(for 1 month)	

3.2. YESC Electricity Rates

3.2.1 YESC Electricity Rates

It also compared with the Yangon Electric Power Corporation, which has the same nature of operation as the Water Supply and Water Supply Authority. YESC's electricity bill in Yangon is free of charge for all consumers, regardless of nationality. The meter maintenance fee is 500 kyats per month for a three-meter house. Industrial Home Power Meter 3 Phase 2000 / - Kyats; Industrial Power Meter 3 Phase (Transformer) 5,000 / - Kyats. YESC charges a two-part tariff system, block rate, and YESC's tariff and bill form are presented below:

Electricity tariff

Residential settlements, temples and churches including the surrounding areas to such settlement pay electricity tariff according to the below table.

Electricity Consumption	Price per unit (kyat/kWh)
The first 100 kWh (1-100 kWh)	35
The next 100 kWh (101-200 kWh)	40
Unit above 200 kWh	50
Meter service fee	500 kyat per month

Commercial sector and foreigners have the different tariff rates.

Commercial sector	Minimum	75 kyat/kWh
	Maximum	150 kyat/kWh.
Foreigners		12 cent/kWh (about 140 kyat)

YESC Electricity Bill Form

Electricity Form (243) Yangon City Electricity Supply Board
Electricity Bill

Town ship Dec, 2014

Name of Resident Last date for payment
17-Jan-15

Address of resident Power will be cut after the date

Account No.	18/09/20	Meter No. (F-69638)	Rate	Amt (Kyat)
Rate	1	1 unit to 100 unit	(35 Kyat)	3,500
Meter reading date	1/1/2015	101 unit to 200 unit	(40 Kyat)	4,000
Last month reading	61875	201 unit and above	(50 Kyat)	19,500
Current month reading	62465			
Unit different	590			
Multiplier				
Adding		Total electricity bill		27,000
Unit used	590	Meter service charges		500
Horse power		Horse power charges		
Invoice no. 1022		Total amount		27,500

Township office Phones for complaint - 095503190, 095412538, 01578420

Signature of
Township Administrator

လွှဲပေးရန် (၂၄၃) ရန်ကင်းမြို့နယ်လျှပ်စစ်ဓာတ်အားပေးရေးကော်ပိုရေးရှင်း

ရန်ကင်းမြို့နယ်လျှပ်စစ်ဓာတ်အားပေးရေးကော်ပိုရေးရှင်း

Dec, 2014 17 Jan 2015

SH,R-103, Thabae Housing

စာရင်းအမှတ်	18/09/20	မီတာအမှတ် (F-69638)	နှုန်းထား	သက်သေခံ
နှုန်း	1	၀ မှ ၁၀၀ ယူနစ်အထိ	(၃၅ ကျပ်)	3,500
မီတာဖတ်ရက်စွဲ	01/01/2015	၁၀၁ ယူနစ် မှ ၂၀၀ ယူနစ်အထိ	(၄၀ ကျပ်)	4,000
မီတာဖတ်ရက်စွဲ	01/01/15	၂၀၁ ယူနစ် မှ ၃၀၀ ယူနစ်အထိ	(၅၀ ကျပ်)	19,500
လျှပ်စစ်အသုံး	590			
ပေါင်းစု		လျှပ်စစ်အသုံးစရိတ်		27,000
ယူနစ်အသုံး	590	မီတာစီမံခန့်ခွဲမှုခွန်		500
မာ့စွမ်းစွမ်းအား		မာ့စွမ်းစွမ်းအားခွန်		
စာရင်းအမှတ် - 1022		စာရင်းအမှတ်စဉ်		27,500

ရန်ကင်းမြို့နယ်လျှပ်စစ်ဓာတ်အားပေးရေးကော်ပိုရေးရှင်း
095503190, 095412538, 01578420

ရန်ကင်းမြို့နယ်လျှပ်စစ်ဓာတ်အားပေးရေးကော်ပိုရေးရှင်း

3.2.2. YESC collects meter maintenance fee according to customer class, such as 3-meter, 3-phase, 3-phase (Transformer). Even if there is no meter unit, the meter bill is issued monthly and only the meter maintenance fee is included, and a fine will be imposed if the meter maintenance fee is not paid within the due date. Regular monthly meter maintenance fees and precise penalties have been found to support YESC's financial growth in one way or another.

3.2.3. At EDWS, the meter maintenance fee is not charged according to the customer class, but only 100 Kyats / - and if it is considered as a suspension bill for various reasons, the bill can be lost due to the suspension of the bill. EDWS meter maintenance fee

3.2.4 Public announcement to increase electricity tariff

Adjusting electricity tariffs

1. Ministry of Electricity and Energy To continue to provide electricity to the areas that have not yet received electricity from the grid system, and to continuously improve the power generation capacity. In order to make more efforts, we have met with representatives and organizations from various fields representing consumers to get suggestions on how to adjust the tariffs.

2. Ministry of Electricity and Energy In accordance with Section 41 of the Electricity Law, the matter of adjusting the electricity tariff was submitted to the Union Government in accordance with the agreement of the Union Government Meeting No. (7/2019) held on 11 April 2019. Starting from 1 July, the electricity tariffs will be adjusted as follows:

Type of Consumers	New Rates (July 2019)		Former Rates		raise ratio
	Unit	Rate	Unit	Rate	
Domestic	1-30	35	1-100	35	----
	31-50	50			43%
	51-75	70			100%
	76-100	90			157%
	101-150	110	101-200	40	175%
	151-200	120			200%
	Over 201	125	Over 201	50	150%
Non-Domestic	1-500	125	1-5,000	75	67%
	501-5,000	135			80%
	5,001-10,000	145	5,001-10,000	100	45%

	10,001-20,000	155	10,001-50,000	125	24%
	20,001-50,000	165			32%
	50,001-100,000	175	50,001-200,000	150	17%
	Over 100,001	180	200,001-300,000	125	44%
			Over 300,001	100	80%

The below rationale for electricity hike, which are compiled from the articles at GNLM (Global New Light of Myanmar) on 14th, 15th, 17th and 20th July 2019, shall be learned in order to review the water tariff rate of YCDC.

- Financial “losses” that have been long incurred by the Electricity Supply Enterprises.
- Electricity supply has been heavily “subsidized” by the State Budget.
- High subsidies is a “legacy” from the Socialist era.
- In a democratic country with a free market economy, a more “market-oriented” outlook is needed.
- In Myanmar need for electricity has been increasing rapidly. To provide adequate electricity is a top priority.
- Electricity generation, transmission and distribution over large areas need huge amounts of investment.
- Union government does not have the funds to undertake such investments.
- Need to invite private sector electricity companies.
- Commercially viable electricity rate shall be introduced as “incentive” for private providers.
- Hikes could be justified if the results improve service of supplying more stable electricity to the present users and at the same time enable to expand supplying to over half of the population who do not yet access to electricity.
- We cannot hear the voices of the people who have no electricity. They cannot accept the benefits of subsidies for electricity costs.
- Electricity rate hike enable more fellow citizens to get access to electricity in the future.
- Increasing rate system: the bigger the users, the more they should pay. “Big users”, “guzzlers” of electricity may save electricity consumption by using other sources.
- As for “industry” sufficient and stable electricity supply will be able to put aside standby-

generators and voltage-regulators in the future.

3.2.5. Electricity tariffs specified in electricity laws and regulations

Rules and standards for determination

The Ministry of Electric Power enacts the regulation with the approval of the Union Government under Section 72 (a) of the Electricity Law. (1377 October 27, 2015 Warning No. 1998/2015 for Electricity Rates

With regard to water supply, this policy is in line with water tariffs.

The principles set electricity rates

87. Electricity tariffs should be based on the following:

(A) Covering all the costs incurred by the permit holders by paying attention to the needs of the electricity consumers.

(B) The rate of return on capital investment in the electricity sector is as high as similar ventures.

(C) Short run and long run marginal costs; Accurate pricing information; Transparency of electricity demand and supply conditions

(D) Electricity tariffs are commensurate with the quality of electricity supplied to each type of consumer and the provision of other electrical services.

(E) according to the various times such as the maximum load time, the time of normal use, etc. Providing services according to the amount of electricity consumption.

(F) The government needs to support the acceleration of rural electricity supply in accordance with the policies set by the Union Government.

4. Study of Water Prices in other countries

A study of water prices in other countries

In studying the water price structure of other countries, Thailand, The Bangkok Metropolitan Waterworks Authority (MWA), the Phnom Penh Water Supply Authority (PPWSA) in Phnom Penh, Cambodia and the Tokyo Metropolitan Water Work Authority in Tokyo, Japan.

4.1. Water Tariff of Metropolitan Waterworks Authority (Bangkok, Thailand)

4.1.1. Bangkok is located in the Gulf and is prone to seawater intrusion due to high groundwater consumption. Bangkok's land level is dropping by 5mm a year, which poses a risk. MWA urges control of groundwater consumption and urges water conversion. Businesses are no longer allowed in Bangkok, but in other parts of Thailand. As a result, the cost of water was raised in 1999 due to the growing need for capital to expand pipelines and meet future water needs. From 1958 to 1999, MWA's water tariff was increased five times, and the current rate is the same as in 1999. At this rate, MWA is still a very profitable and successful water supply organization.

4.1.2. MWA's water tariff is called Type 1 for Residence. Commerce, Government Agency, State Enterprise and Industry are divided into Type-2 and there are Minimum Charges by Block Rate System. Raw Water Charges are collected from the customer and paid to the Royal Irrigation Department. Bulk sale is 10.50 Bath / Cubic Meter for Type 1 and 13.00 Bath / Cubic Meter for Type 2. The water price rate of MWA is shown in Table (4). The meter maintenance fee is also stated in (5):

Schedule (4) WATER TARIFFS OF MWA (EFFECTIVE DECEMBER 1999)

Type 1 Residence		Type 2 Commerce, Government Agency, State Enterprise and Industry	
Volume (cu.m.)	Baht/ cu.m.	Volume (cu.m.)	Baht/ cu.m.
1-30	8.50 Not less than 45.00 Baht	0-10	9.50 Not less than 90.00 Baht
31-40	10.03	11-20	10.70
41-50	10.35	21-30	10.95
51-60	10.68	31-40	13.21
61-70	11.00	41-50	13.54
71-80	11.33	51-60	13.86

81-90	12.50	61-80	14.19
91-100	12.82	81-100	14.51
101-120	13.15	101-120	14.84
121-160	13.47	121-160	15.16
161-200	13.80	161-200	15.49
Over 200	14.45	Over 200	15.81

MWA has been charged the untreated water at the rate of 0.15 baht or 15 satang/cubic meter to the Royal Irrigation Department.

Note:

1. Value added tax is not included.

2. Bulk sale:

Type 1 = 10.50 Baht/cubic meter;

Type 2 = 13.00 Baht/cubic meter

Table (5) MWA meter maintenance fee

Diameter	Baht
½	25
¾	40
1	50
1 ½	80
2	300
3	400
4	500
6	900
8	1100
12	3500
16	5000

4.1.3. MWA rates are set for the new water connection as shown in Table 6 below:

Table 6 The cost of the new water connection of MWA


Meter Size (inch)	Type R2		Service Fee	Cost Collect 7%vat not Included	Guarantee Deposit		
	Volume (cu.m.)	Baht(cu.m)			Perma- nent	Contempo- rary R1	Contempo- rary R2
0-1/2"	0-10	90	25	5000	400	2000	5000
1-3/4"	0-10	90	40	6000	600	3000	7000
2-1"	Less than 50	579	50	8000	1500	5000	12500
4-1½"	Less than 120	1588.40	80	12000	3000	-	30000
5-2"	Less than 200	2814.40	300	36000	4000	-	50000
7-3"	Less than 450	6766.90	400	71000	10000	-	50000
8-4"	Less than 800	12300.40	500	92000	15000	-	50000
A-6"	Less than 1800	28110.40	900	150000	20000	-	50000
B-8"	Less than 3200	50244.40	1100	210000	30000	-	50000
D-12"	Less than 54000	85026.40	3500	430000	-	-	-
H-16"	Less than 12800	202020.40	5000	680000	-	-	-

4.1.4. For MWA, the cleaning fee is set according to the following table (7):

Table 7 Tank cleaning service fee

Capacity of tank (cu.m.)	Service rate(Baht)
3	1500
10	3200
20	4800
30	6100
40	7300
50	8300
70	10200
90	11800
110	13300
140	15400
170	17300
200	19100
250	21800
300	24400
500	33100
600	36900

4.1.5. MWA collects Service Fee, Guarantee Deposit and Value Added Tax 7% per meter for water connection. It was found that 7% Value Added Tax was collected from customers and charged 0.15 Bath per unit of Raw Water Charges. MWA's water bill is as follows:


การประปานครหลวง ใบแจ้งค่าน้ำประปา
<http://www.mwa.co.th> E-mail : mwa1125@mwa.co.th
 สาขาบางบัวทอง 02-5713982-7 ประจำเดือน 11/59

สาขา-เขต	ทะเบียนผู้ใช้น้ำ	เส้นทาง-ลำดับ	เลขที่แจ้งค่าน้ำ	วันที่แจ้งค่าน้ำ
54-02	47347315	532-040	582457-8	15/11/59 07:11
วันที่อ่านครั้งนี้	เลขในมาตร	วันที่อ่านครั้งก่อน	เลขในมาตร	จำนวนน้ำใช้
15/11/59	810	15/10/59	803	7

ค่าน้ำดิบ (ลูกบาศก์เมตรละ.....0.15.....บาท)	1.05	<i>Raw Water Unit Ch</i> <i>Service C</i> <i>Total.</i> <i>Tax 7%.</i> <i>Total</i>
ค่าน้ำประปา R1(00)	59.50	
ส่วนลด	0.00	
ค่าบริการรายเดือน	40.00	
ยอดเงินก่อนคิดภาษี	100.55	
ภาษีมูลค่าเพิ่ม 7%	7.04	
รวมเงิน	107.59	
ค่าน้ำเดือนก่อน.....0.....เดือน	0.00	
รวมเงินที่ต้องชำระทั้งสิ้น	*****107.59	
โปรด.....ชำระเงินภายใน.....วันที่	22/11/59	

ประวัติการใช้น้ำประปาย้อนหลัง 3 เดือน

วันที่อ่านน้ำ	15/08/59	15/09/59	15/10/59
จำนวนน้ำใช้	5	4	3

โปรดระวังบุคคลแอบอ้างเก็บเงินค่าน้ำประปา

V. 34.00

ชื่อผู้ใช้น้ำ นายไพฑูรย์ □ พัฒนผล
 ที่ใช้น้ำ 69/23 ม.2 ม.ล.ภาวัน ค.10 ต.บางพลับ อ.ปากเกร็ด
 นนทบุรี 11120

4.2. Water Tariff of Phnom Penh Water Supply Authority (PPWSA), Cambodia

PPWSA has been collecting water tariffs since 1984 and charges 166 Riels per unit for all utilities. In 1993, the rate was increased to 166 Riel per unit for commercial use and 515 Riel per unit, and was classified as household and commercial. In 1996, the household price was 250 Riel per unit. 700 Riel was collected per commercial unit. In 2001, the water price was renegotiated and the commercial rate was reduced. At this rate, it is still collecting and is still a very profitable and successful water supply organization. The PPWSA water rates are as follows:

PPWSA Water Rates Table

Water Tariff

1984 : 1st Tariff – 166 Riel/m³

1993 : 166 Riel/m³ for Domestic, 515 Riel/m³ for Commercial

1996 : 250 Riel/m³ for Domestic, 700 Riel/m³ for Commercial

1997 : 1st Block Tariff

Consumer Category	Block (m ³ /month)	Tariff (Riels/m ³)
Domestic	0 - 15	300
	16 - 30	620
	31 - 100	940
	>100	1260
Administra	flat rate	940
Commercial & Industrial	<100	940
	101 - 200	1260
	201 - 500	1580
	>500	1900

2001 : 1st Adjustment

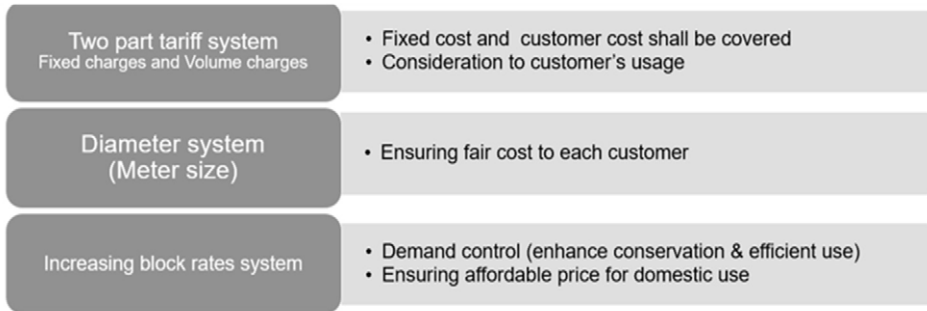
Consumer Category	Block (m ³ /month)	Tariff (Riels/m ³)	Tariff (USD/m ³)
Domestic	0 - 7	550	0.14
	8 - 15	770	0.19
	16 - 50	1010	0.25
	> 50	1270	0.31
Admin.	flat rate	1030	0.25
Commer. & Industrial	<100	950	0.23
	101 - 200	1150	0.28
	201 - 500	1350	0.33
	> 500	1450	0.36

4.3. Water Tariff of Tokyo Metropolitan Waterworks Bureau, Japan

4.3.1. In Tokyo, Japan, the water supply system must comply with the regulations set by the central government and comply with the requirements of the Local Public Enterprise Act and the Local Public Service Act. Local municipalities have the right to manage the water, but only with the approval of the Hluttaw and the will of the people.

4.3.2. Japan's water tariff is a Two Part tariff system (Fixed Charge and Volume Charges) and is charged by the Diameter System according to the meter size. Water bills are charged by the Increasing block rates system. Fixed Charges are paid monthly according to pipe size. Here is Tokyo's Rate Design:

Rate design in Tokyo



Class of charges		Fixed charges ^{←1} yen	Commodity charges (Volume charges) ^{←1}								
			1 m ³ ~ 5 m ³	6 m ³ ~ 10 m ³	11 m ³ ~ 20 m ³	21 m ³ ~ 30 m ³	31 m ³ ~ 50 m ³	51 m ³ ~ 100 m ³	101 m ³ ~ 200 m ³	201 m ³ ~ 1000 m ³	1001 m ³ ~
General use	13mm	860 yen	0 yen	22 yen per 1m ³	128 yen per 1m ³	163 yen per 1m ³	202 yen per 1m ³	213 yen per 1m ³	298 yen per 1m ³	372 yen per 1m ³	404 yen per 1m ³
	20mm	1,170 yen		213 yen per 1m ³	298 yen per 1m ³	372 yen per 1m ³	404 yen per 1m ³				
	25mm	1,460 yen									
	30mm	3,435 yen	213 yen per 1m ³						298 yen per 1m ³	372 yen per 1m ³	404 yen per 1m ³
	40mm	6,865 yen	213 yen per 1m ³						298 yen per 1m ³	372 yen per 1m ³	404 yen per 1m ³
	50mm	20,720 yen	372 yen per 1m ³								404 yen per 1m ³
	75mm	45,623 yen	372 yen per 1m ³								404 yen per 1m ³
	100mm	94,568 yen	372 yen per 1m ³								404 yen per 1m ³
	150mm	159,094 yen	372 yen per 1m ³								404 yen per 1m ³
	200mm	349,434 yen	404 yen per 1m ³								404 yen per 1m ³
250mm	480,135 yen	404 yen per 1m ³								404 yen per 1m ³	
300mm or more	816,145 yen	404 yen per 1m ³								404 yen per 1m ³	
Public bath use		is same as the general use up to 30mm, 6,865 yen for 40mm or more	0 yen	22 yen per 1m ³	109 yen per 1m ³						

4.4. Summary of other countries water tariff

In MWA (Thailand), PPWSA (Cambodia), Tokyo (Japan), a deposit is charged for fixed maintenance charges and a water connection fee. These deposits provide one-way capital for the water supply business. The collection of water tariffs by the Increasing Block Rate System is also a good way to prevent water scarcity in one way or another. These countries are highly profitable and successful organizations in the field of water tariffs, which were set more than 10 years ago, and should be emulated as a model for changing EDWS tariffs, which have many disadvantages.

5. Study Guidelines / manuals of other countries

The following guidelines from other countries: The YCDC's Guidelines for Increasing / Reducing Water Bills will be developed and submitted.

5.1. "Guidelines for water tariff setting" by Japan Water Works Association

Japan Water Works Association: Guidelines for Water Tariff Setting

First Edition: July, 1967
Revised: August, 1979
Revised: October, 1997
Revised: February, 2015

1. General Provisions
 - (1) Objective
2. Revenue Requirements
 - (1) Basic Concept
 - (2) Period of Calculation of Water Tariff
 - (3) Operational Cost
 - a. Personnel Cost
 - b. Chemical Cost
 - c. Electricity Cost
 - d. Repair Cost
 - e. Water Receiving Cost
 - f. Depreciation Cost
 - g. Asset Diminishing Cost
 - h. Other Operation & Maintenance Cost
 - i. Item of Deduction
 - (4) Capital Cost
 - a. Interest Cost
 - b. Asset Maintenance Cost
 - (5) Management Improvement Planning
3. Water Tariff Structure
 - (1) General Provisions
 - a. Individual Cost of Service Principle
 - b. Special Measures.....3
 - (2) Transitional Measures Adapting New Guideline

1. General Provisions

(1) Objective

Determination of water tariff shall be made by considering benefit and fairness for the valued customers and for development of the water supply services, and also deem to contribute to health/welfare of people in which water supply services (enterprise) are operating the business.

2. Revenue Requirements

(1) Basic Concept

Water tariff shall be determined by considering feasible forecast of water demand and facility planning to fulfill the demand based on the actual results in the past and economic and social conditions of the country/province. The water tariff includes operating cost and capital cost in order to assure sustainable healthy management of the water supply services (enterprise). Further more, external works such as entrusted construction including direct and indirect cost for both income and expense shall balance equally and compensate each other.

(2) Period of Calculation of Water Tariff

Period of water tariff determination will be between 3 and 5 years and plan as long as feasible periods.

(3) Operating Cost

Operating cost comprises the summation of personnel cost, chemical cost, electrical cost, repair cost, water receiving cost, depreciation cost, asset diminishing cost, other O/M cost and exclude deducting items.

Estimation of the each cost and deducting items are carefully made by considering water supply service planning and economic/social trend and conditions for the period of the water tariff calculation.

a. Personnel cost

Personnel cost comprises the summation of salary, allowances, wages, reward, legal welfare cost, retirement allowance and will be calculated properly by considering the actual results in the past, staff planning and increment of the aforementioned salary. Calculation of the retirement allowance will be made in accordance with the age structure of the staff.

b. Chemical Cost

Chemical cost will be calculated properly in accordance with the water supply planning and raw water quality of each raw water resources which will affect the unit process of raw water treatment method.

c. Electrical Cost

Electrical cost will be calculated properly in accordance with the individual operating plan of facilities which is based on the estimation of each block water demand.

d. Repair Cost

Repair cost will be calculated properly by considering actual results in the past and characteristic of water supply services (enterprise) and regional conditions in order to operate and maintain the water supply facilities in good conditions.

e. Water Receiving Cost

Water receiving cost will be properly calculated in accordance with the water receiving planning.

f. Depreciation Cost

Depreciation cost will be calculated principally by applying the straight line depreciation method to the book value of the assets which will be included in the calculation of the water tariff for the target periods.

g. Asset Diminishing Cost

Asset diminishing cost will be calculated by considering the actual results in the past and conditions of the existing water supply facilities.

h. Other Operation and Maintenance Cost

Other operation and maintenance cost such as communication and transportation cost, trustee income, commission will be calculated properly by considering the actual results in the past, future water supply planning, special characteristic of the individual cost and condition of the existing water supply facilities.

i. Deduction Items

Deduction items which the revenue come from commission related to the other operation of the water supply will be calculated properly by considering the actual results in the past and future water supply planning.

(4) Capital Cost

Capital cost comprises the summation of interest cost and asset maintenance cost which is necessary to maintain all water supply facilities and expansion of the facilities to meet the demand of the valued customers in the future.

a. Interest Cost

Interest cost comprises the summation of interest for corporate bond, commission, issued differential depreciation cost (prepaid expense) and interest of temporary borrowed money. And external revenue related receivable interest will be excluded from the interest cost.

b. Asset Maintenance Cost

Asset maintenance cost will be calculated by multiplying the all assets which are necessary to operate/maintain and reasonable percentage against the book value of the all assets in order to use the budget to support the existing operating cost and capital cost and expansion/rehabilitation of the facilities to meet demand of the valued customers in the future and redemption of the corporate bond.

(5) Management Improvement Planning

When calculation of the water tariff is made, we should review and evaluate the present management procedures regarding all water supply services and make management improvement planning in order to reflect the results of the evaluation to the revenue requirements

3. Water Tariff System

(1) General Provisions

a. Individual Cost Basis Concept

Water tariff will be determined to classify into the basic charge and the usage charge based on allocation of the revenue requirements to each customers group in accordance with individual cost basis. In this case, total income/revenue calculated by utilizing the determined water tariff should be equal to the revenue requirements

b. Special Measures

- (a) When special consideration/measures will be necessary for the basic charge of each customer group regarding basic human needs (BHN) and/or actual conditions of water supply demand, a part of capital cost could not be allocated to the basic charge and decrease burden of the special customer groups.
- (b) Usage charge could be allocated in decreased and/or increased tariff based on the classification of customer groups in accordance with actual condition of water supply demand.

5.2. "Manual 1: Principles of Water Rates, Fees, and Charges" by AWWA

AWWA Manual No. 1 Principles of Water Rates, Fees and Charges (5th Edition)

Section 1: Revenue Requirements

- Chapter 1 General Concepts
- Chapter 2 Revenue
- Chapter 3 Operation and Maintenance Expenses
- Chapter 4 Taxes
- Chapter 5 Capital-Related Costs
- Chapter 6 Example of Revenue Requirements

Section 2: Cost Allocation

- Chapter 7 Allocating Costs of Service Cost Components
- Chapter 8 Distributing Costs to Customer Classes

Section 3 Rate Design

- Chapter 9 Selecting Rate Structures
- Chapter 10 Uniform Rates
- Chapter 11 Declining Block Rates
- Chapter 12 Increasing Block Rates
- Chapter 13 Seasonal Rates
- Chapter 14 Fixed Versus Variable Charges
- Chapter 15 Marginal Cost Pricing

Section 4: Consumer-Specific Charges

- Chapter 16 Low-Income Affordability Rates
- Chapter 17 Negotiated Contract Rates
- Chapter 18 Economic Development Rates
- Chapter 19 Standby Rates

Section 5 Alternative Rates

- Chapter 20 Demand-Side Management
- Chapter 21 Price Elasticity
- Chapter 22 Value-of-Service Pricing
- Chapter 23 Drought Pricing
- Chapter 24 Rate Surcharges
- Chapter 25 Indexed Rates

Section 6: Capacity and Development Charges

- Chapter 26 Connection and Customer Facility Fees
- Chapter 27 Policies and Procedures for Water Service Extension
- Chapter 28 System Development Charges
- Chapter 29 Dedicated-Capacity Charges

Section 7 Fire Protection Charges

- Chapter 30 Rates for Fire Protection Service

Section 8 Wholesale Rates

- Chapter 31 Wholesale Rates

Section 9 Miscellaneous and Special Charges

- Chapter 32 Miscellaneous and Special Charges

Section 10 Implementation Issues

- Chapter 33 Public Involvement Definition
- Chapter 34 Legal Considerations
- Chapter 35 Data Requirements

Appendixes

- (A) Development of Capacity Factors by Customer Class
- (B) Equivalent Meter Ratios
- (C) Billing Tabulation Methodology
- (D) Example of Citizens Advisory Committee Guidelines

Glossary

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5.3. “Manual 54: Developing Rates for Small Systems” by American Water Works Association

Chapter 1 Customer Account and Usage Data

Chapter 2 Preparing a Financial Plan

Chapter 3 Determining a Pattern of Revenue Increases and Test-Year Revenue Requirements

Chapter 4 Rate Design

Chapter 5 Special Considerations

5.4. “Guidelines for User Fees and Cost Recovery” by African Development Bank’s

African Development Bank

Guidelines for User Fees and Cost Recovery (for Urban Water and Sanitation)

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1 Step one: Determining the Economic, Policy and Institutional Environment

2 Step two: Setting Cost Recovery and Service Objectives

3 Step three:

3.1 Determining Revenue Requirements

3.2 Calculating Average User Fees

3.3 Future Costs for Sustainability

3.4 Support to Revenue through Societal Contributions (Subsidies)

4 Step four: The Basis for Charging User Fees

5 Step five: Implementation of User Fees and Cost Recovery System

5.5. “Manual on Water Rates” by LWUA (Local Water Utilities Administration), Philippine

Chapter 1 Requisites of Water Rates

Chapter 2 Basic Guide to Water Rates

Chapter 3 Basic Connection Charges

Chapter 4 Development of Water Rates

Chapter 5 Computation of Water Rates

Chapter 6 Cash flow Projection

Chapter 7 Adjustment of Water Rates

Chapter 8 Public Hearing for Water Rate Increase

Chapter 9 Review of Water Rates

II Draft Guidelines for Water Tariff Setting in YCDC

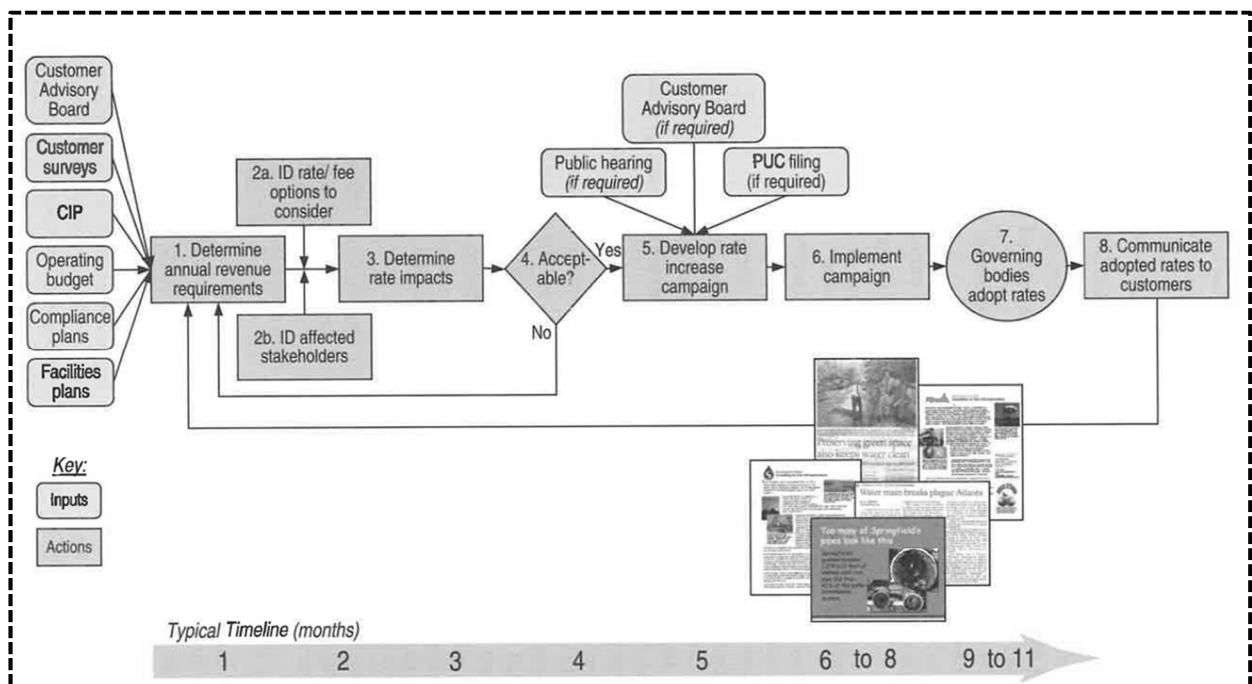
1. Process

1.1. New Tariff Decision Process

Water tariff is usually decided by Parliament or Committee which represent customers or citizens who pay water tariff. Following diagram is a typical decision process of water tariff in USA where governing bodies (parliament or committee) decide after several deliberate processes.

In Japan where municipal government manage water supply utility, local parliament is the final decision maker of water tariff.

In Yangon, the draft of tariff revision plan shall be made by EDWS. Then it is to be discussed in YCDC and proposed to Yangon Regional Government and be decided there. The Union Government of Myanmar shall concern about it from time to time.

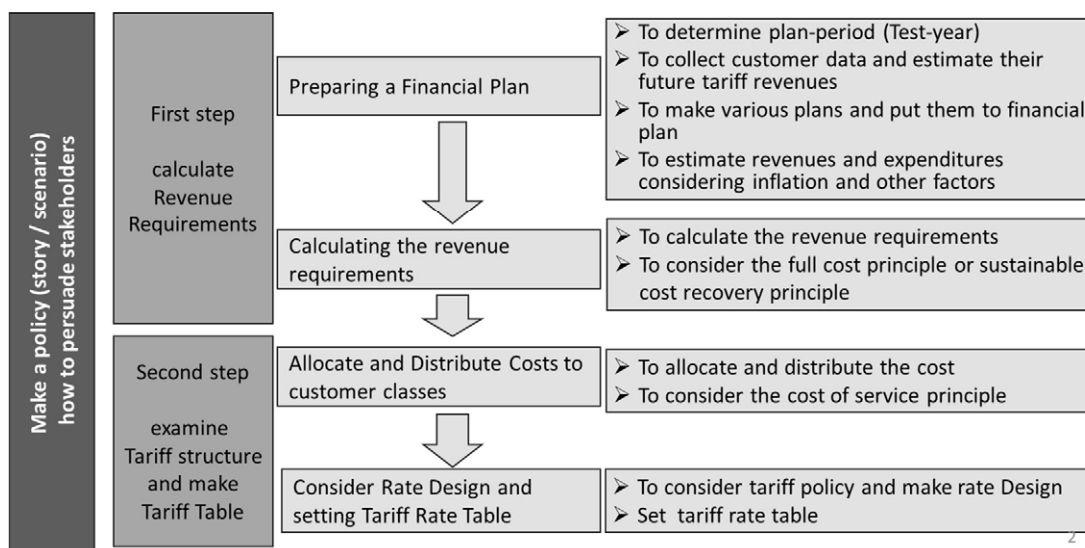


(Avoiding Rate Shock by AWWA April 2004)

1.2. New Tariff Drafting Process

The widening income-expenditure ratio at EDWS is widening with the implementation of new water supply projects; Obtaining foreign loans; EDWS's water tariffs must be increased due to the fact that the water tariff is too low. Customers who use water and stakeholders must be prepared to explain the reasons and information needed to increase water rates. Financial plans are being drawn up for the systematic increase in water tariffs. Developing Water Tariff Setting Guidelines has become a must.

Process of water tariff setting



EDWS 'current water tariffs are inconsistent with the cost of annual water revenues, which are very low compared to neighboring countries. About 20% of customers only pay flat rate water. In terms of water supply, there is a difference between part-time water supply and 24-hour water supply, but the water tariff rate should be reconsidered. The difference between commercial water rates and domestic water rates must also be carefully weighed. Household customers have a large number but low water consumption. Commercial customers, on the other hand, have smaller but larger water consumption. Therefore, we have to rely more on commercial connection when it comes to water tariffs. It is important to carefully consider the rates for home and commercial water.

It is better to set a block rate than a uniform rate and prevent water wastage in one way or another. Collecting water bills with the Minimum Charges system can increase the revenue of the water supply and reduce the need for capital. For general maintenance procedures, a monthly system of fixed-rate rates is a good way to increase the revenue ratio of the water supply.

However, if the water supply is to implement the Water Tariff Setting Guideline to increase water

tariffs, a reasonable water tariff must be considered after considering all the issues facing customers in their daily lives. Only then will the financial position of the water supply be strong and the water supply process will continue to grow. The Process of Water Tariff Setting for Water Tariff Setting Guideline is as follows:

The first step in this process is to calculate the Revenue Requirements. To do so, you need to prepare financial plans in advance. To write a financial plan, you must first set a plan period. Plan Periods are usually drawn up over a five-year period, after which customer data is collected and future revenue estimates are estimated. Different financial plans need to be prepared for different situations. In estimating revenue and expenditure, factors such as inflation and various factors that could affect the financial plan should be taken into account. After careful consideration, the Revenue Requirement must be calculated. When calculating revenue requirements, it is important to consider which approach to approach, the Full Cost Principle and the Sustainable Cost Recovery principle.

The second step is to Allocate and Distribute Costs according to Customer Class. The cost of service principle must be considered here. Then consider the Tariff Policy Design and Setting Rate Table.

Two steps of Water Tariff Setting Considerations for business and home enhancement

In the first step, a financial plan must be drawn up. Calculating income requirements; The government has decided to increase the water tariff by an average of 20% or 30%, based on the amount of government funding available and the deficit.

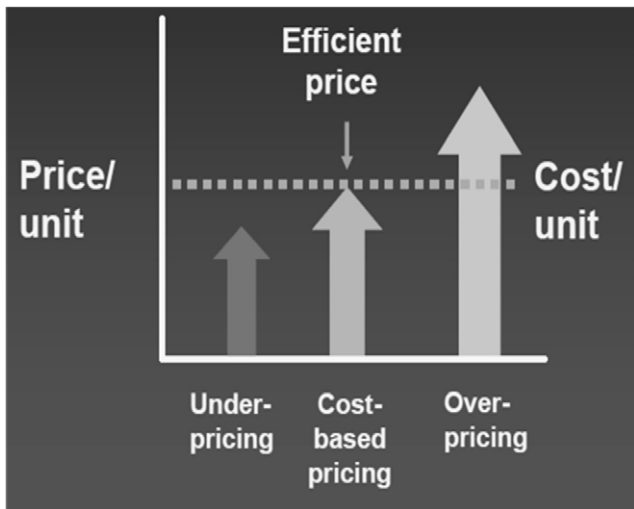
First step: Financial Plan □ Revenue Requirement

Second step: Cost Analysis □ Rate Design

The second step is to consider the% increase for each user class to balance the water user class. Water consumption by class of water users; Finding out the cost components; Establish a policy and rate design to ensure a fair price.

EDWS Setting Rate at Cost is presented with the following graph:

Setting Rate at Cost



Full cost recovery principle

- total cost = total revenue

EDWS can be considered as a Full Cost Recovery only if all total costs are recovered from Total Revenue. EDWS is subject to Under Pricing Level. Price Unit = Cost Unit Level. The Over Pricing Level is a profitable rate that covers costs. Therefore, step by step measures must be taken to systematically increase water tariffs.

1.3 New Tariff Consulting Process

1.3 Working with advisory groups for new water tariffs:

Expert advice is needed to change the water tariff. The mayor and department heads need to make the financial situation of the water supply system public from time to time.

Current water charges lower than production cost: Yangon Mayor

(Global New Light of Myanmar, 8 August 2019, By Nyein Nyein)

THE current rates for water supply do not cover production costs, said Yangon Mayor U Maung Maung Soe at a recent press conference on the Yangon City Development Committee (YCDC).

The calculations for water meter bills must include charges for laying the pipe network and the water distribution cost, he said. At present, the bills do not even cover the cost of distribution, he added.

“If we compare the water meter rates with the distribution cost, the existing bills are much lower than that, excluding the cost of machines. This being so, the government is making a loss on running this, like power supply,” said U Maung Maung Soe.

However, there is no plan yet to hike the water charges up for now, he said. At present, the Yangon authorities are raising awareness about systematic water meter installation, dealing with water pipe leakages, unsystematic water consumption, management of water loss in urban water distribution, and curbing illegal connections to the water pipe network, said U Maung Maung Soe. Currently, the rates for water are K88 per unit (220 gallons) for households and K120 per unit for businesses. The Gyophyu, Phoo Gyi, and Nga Moe Yeik reservoirs are the main sources of water supply in Yangon at present, providing over 2 million gallons of water every day.

To expand the water distribution network, projects are under way at Lagunpyin and Kokkowa, which aim to cover 90 per cent of the region’s population by 2025, according to the YCDC.

In addition, the YCDC is creating water supply resources to provide adequate drinking water to Yangonites, and is taking measures to reduce wastage in urban water distribution, with the

In Japan, an advisory committee has been set up to examine water tariffs and consult with the public to seek advice from water users.

Discussion by advisory committee & public consultations

An advisory committee is established to examine the tariff system and public consultations are held to seek customers input.

Advisory committee ensures:

1. accountability and information disclosure (utility has to make the case for revision);
2. objectivity in the decision-making process;
3. use of expert advice from members;
4. incorporation of customers’ inputs from representatives in the committee.



Advisory committee on waterworks management in Koriyama City

Source: <https://www.city.koriyama.fukushima.jp/481000/jogesuido/shingikai.html>

Ministry to brief MPs on power rate hikes

The rate hikes were determined after a five-stage process

1. Discussions were held with the electrification affairs committees in the Pyithu Hluttaw (Lower House) and Amyotha Hluttaw (Upper House).
2. Also, state and regional officials in charge of power and electricity were asked for their input.
3. The third stage involved talks with the private sector, represented by the Union of Myanmar Federation of Chambers of Commerce and Industry.
4. A comprehensive report on the rate hikes was then submitted to parliament.
5. The final stage involved seeking the advice of international organisations.

1.4 Public awareness for new tariff

Ministry of Electricity and Energy announces to the public about the change in electricity tariff

Public Announcement from Ministry of Electricity and Energy changes to electricity rates


1. THE Ministry of Electricity and Energy held a meeting with representatives of the public and organizations from different areas to discuss and elicit suggestions related to amending the rates of electricity consumption to a more suitable rate. This is aimed to support the long-term development of electric production and distribution through expansion projects, connecting non-electrified regions to the main power grid or an alternative energy source, continuously improving electric production, and increasing work processes.
2. In accordance with Section 41 of the Electricity Law (2014), the Ministry submitted a proposal to amend electricity rates to the Union Government, who gave their approval during their meeting No. (7/2019) held on 11 April 2019. With permission from the Union Government, the electricity rates across Myanmar will be amended to the following rates, outlined in the table, beginning from 1 July 2019:

One of Japan's case is shown as followings. They try to explain simply with illustration in the aged society.


Japan's case is shown as followings:

Public notification


The public is informed of the new tariffs.



Diameter of pipe **20mm**



Use of **20m³** /monthly



Monthly water tariff (excluding consumption tax, etc.)

(Present) April, 2015	(Revised) April, 2016	(Revised) April, 2017
1,915 JPY	2,060 JPY	2,140 JPY

+ 145 JPY + 80 JPY

Source: Suita City, <http://www.city.suita.osaka.jp/var/rev0/0096/0282/11641310928.pdf>

2. Financial Plan

2.1. Duration of test year

(1) The Plan Period must be clearly defined when drawing up the Plan. Data from water users will be collected and future water revenue revenues will be calculated. Three-year plan; A five-year plan must be drawn up. The plan includes other factors that may arise due to inflation; Revenues and expenditures must be estimated.

Developing the First Step

2.2. Estimation methods for expenditure and income

Income requirements include the calculation of income requirements to cover all costs and income requirements to cover the cost of each expense. Following boxed explanation is an example of estimation method which is published by Japan Water Works Association. (JWWA)

(1) Operating Cost

Calculation of operating cost will be made by considering the necessity of the efficient management of the water supply services (enterprise) and integrated water supply services (enterprise) planning and trend of the economic conditions. Furthermore, the integrated management of the water supply services (enterprise) shall include overall water supply programme, expansion/rehabilitation of water supply facility planning, financial planning, repair planning and staff planning. And economic trend will mainly mean the trend of the personnel cost and commodity prices.

Operating cost comprises the summation of personnel cost, chemical cost, electrical cost, repair cost, water receiving cost, depreciation cost, asset diminishing cost, other O/M cost and exclude deducting items.

Estimation of the each cost and deducting items are carefully made by considering water supply service planning and economic/social trend and conditions for the period of the water tariff calculation. <JWWA>

(a) Personnel Cost

Personnel cost will be the summation of salary, allowances, wages, reward, legal welfare cost, retirement allowance of which will be calculated by multiplying the average required personnel cost of the all staffs and number of the staffs for the period of the water tariff calculation. Estimation of the required staff will be determined in accordance with each divisional work load by considering the economic efficiency and effectiveness of the division.

The average personnel cost per capita will be calculated in accordance with seniority of the staff and annual increase of the rise of the wage base and the actual results in the past corresponding to the economic development. And significant productivity improvement were expected to occur, this will be included in the raise of the wage base as required. Retirement allowance will be calculated based not only on the payable allowance for during the water tariff calculation period but also prerequisite of the reservation fund system for retirement in order to attempt fairness of the burden of the water tariff by the valued customers.

Calculation method of the carried over of the retirement allowance will be properly made as follows;

- i) Supposing that all staff would retire at the end of the water tariff calculation period and got retirement allowance and all staff would have gotten the retirement allowance in the previous year. The difference of the two retirement allowances will become the retirement allowance.
- ii) Assuming that retirement allowance will be calculated for the estimated working year for all staff and allocated them in proportional to the water tariff calculation period. <JWWA>

(b) Chemical Cost

Chemical cost will properly be calculated by multiplying the total water supply volume and the unit chemical cost per 1 cubic meter of the water for the water tariff calculation period.

And if raw water quality is quite difference from each raw water source, then unit cost estimation should be made in accordance with each water resource. Also fluctuation of the chemical price be expected in seasonally, then this factor should be included in the calculation of the chemical cost.

(c) Electrical Cost

Electrical cost will be properly calculated by multiplying the unit cost of the electricity and basic contract charge and usage charge which is estimated based on the individual operating plan of each facility. If other power source will be used except electricity, cost will be calculated in accordance with the above mentioned method. When the revision of the electricity cost would be expected during the water tariff calculation period, this could be considered to calculate the electrical cost accordingly. <JWWA>

(d) Repair Cost

Repair cost will be calculated properly by multiplying the standard coefficient of expense against the acquisition cost of the operating assets (if re-evaluate the assets, use the latest one) and deducting the personnel cost and other cost included in the operating cost from the calculated cost. However, when the calculation of the standard coefficient of the expense will be extremely difficult, repair cost could be calculated by estimating repair cost for each facility taken into the actual experience in the past and/or service life of the component of the facilities.

Herewith, the acquisition cost of the operating assets equal to the deduction of land cost, other not depreciated assets so-called intangible assets from the total acquisition cost of the assets and allocate average cost for each year.

Standard coefficient of the expense will be properly estimated for each facility in order to operate and maintain the existing facilities and estimated based not only on the actual results in the past, but also the characteristic of each facility by considering integrated viewpoint of snow, transportation and other natural/social conditions together. However, when the estimation of the standard coefficient of the expense for each facility will be extremely difficult, fixed percentage of 3 % against the total cost of the operating assets could be used practically.

The same procedures could be used to estimate the standard coefficient of the expense by accumulating method based not only on the actual results in the past, but also the characteristic of each facility by considering integrated viewpoint of snow, transportation and other natural/social conditions together. And it will be better to establish reserve fund system for accounting procedures regarding repair cost. <JWWA>

(e) Water Receiving Cost

Water receiving cost will be properly calculated in accordance with the water receiving planning.

There are two (2) methods to receive water regarding raw water and treated water. First method is to allocate necessary fund to get raw water and treated water and second method is to purchase these water by contracting unit price. Allocation of the fund will be properly calculated based on the benefit of the water supply services and availability of the budget. Purchasing cost of the raw water and treated water will be properly calculated by multiplying the unit price and the estimated receiving volume of water. The receiving volume of water will be properly estimated based on the water supply and demand planning in both methods. <JWWA>

(f) Depreciation Cost

Depreciation cost will be calculated by applying the straight line depreciation method against the acquisition cost of the assets for the water tariff calculation period of the deprecation assets. However, fixed percentage depreciation method (fixed percentage on reducing balance method) could be also used when this method is still used and familiar to the water supply services. The salvage value and durable year of the facilities will be provided by the local public enterprise law (Regulation No. 8, clause 7,8 & 9, 1998, GoJ or).

Pipeline, water meter and house connection will be better processed as replaceable assets in order to maintain and operate the existing assets as sustainable as possible if financial and other conditions are feasible. The depreciation of the replaceable assets which is newly included in the assets will be depreciated until reaching 50 % (50/100) of the acquisition cost.

The total fixed assets including depreciated assets should be evaluated properly based on the services of the concerned assets. The cost required for removing the old facilities, allocation cost for raw and treated water and compensation cost to which will not be related the services of the assets or common administration cost deemed to be expense to get profits will not be included into the acquisition cost of the fixed assets but included into the expense to get profits.

And intangible assets such as land for installation of pipelines, submerged land due to the construction of intake dam will be studied to include the intangible depreciation assets in the future because utilization of the eternal asset of the land will diminish. <JWWA>

(g) Asset Diminishing Cost

Asset diminishing cost will be properly calculated based on the actual results in the past and present conditions of the water supply facilities.

The contents of the asset diminishing cost will be classified into two major items such as deduction cost and inventories. The former will be estimated in the long term so that deduction cost will proportionally change to the capacity of the water supply facilities, and the later will be estimated and calculated for the annual proper inventories based on the actual results in the past and water supply services (enterprise) planning, except special reasons be occurred. <JWWA>

(h) Other Operation/Maintenance Cost

Operating cost such as communication/transportation cost and trustee/commission fee which will not be included in the items mentioned above from (a) to (g) will be calculated properly by multiplying the appropriate unit price and/or adequate coefficient against the other administration cost which is calculated by each item of the water supply services (enterprise).

Quantity and size of the related to the each cost will be estimated properly based on the actual results in the past and overall planning of the water supply services (enterprise). Minimum inflation or deflation rate should be included to calculate unit price of the operating cost, taken into account the economic trend. <JWWA>

Item of Deduction

Deduction items which the revenue come from commission related to the other operation of the water supply will be calculated properly by multiplying unit price or ratio of revenue against the volume of the works or characteristic and size of the works.

Estimation of volume, size, unit price and ratio of revenue will be carefully made based on the actual results in the past and overall water supply planning and trend of the economy. <JWWA>

(2) Capital Cost

Capital cost comprises of the summation of the interest cost and the asset maintenance cost.

There are usually two (2) methods to calculate the capital cost, that is, rate base method and accumulate cost method. The rate base method deems to be reasonable because it will be possible to raise internal fund to keep profit rate balance with another company but also assure the standardization of the water tariff and promote improvement of the management of the water supply services (enterprise) together.

However, calculation of the capital cost based on the asset benchmarking (base rate method) will be difficult for the time being due to limitation of procedures of fund raising. Therefore, capital cost comprises of the summation of the interest cost and asset maintenance cost as calculated by the accumulation method and asset maintenance cost will be calculated by making full use of the advantage of the rate base method. Besides, interest revenue related to receivable account will be principally deducted directly from the payment interest but if the amount of the interest revenue is small, it could be deducted from the general administration cost in the operating cost. Allocation of the capital cost of the water supply facility division will be proportional to the book value of the each asset of the division regardless the source of construction fund per every special facility. <JWWA>

(a) Interest Cost

Interest cost comprises of the summation of interest of corporate bond

(b) Asset Maintenance Cost

Asset maintenance cost should be re-invested internally in the water supply services in order to maintain and operate the existing facilities and improve water supply to the valued customers. The amount of the asset maintenance cost included in the revenue requirements and required for expansion/rehabilitation of the facilities and redemption of the corporate bond will be calculated properly by applying the following formula. The fairness of the burden of the valued customers during the period of water tariff calculation will also be examined.

Asset maintenance cost = asset concerned × rate (percentage) of asset maintenance

Here,

(i) Asset concerned will be average balance between the beginning and end of depreciation cost during the period of water tariff calculation.

(ii) Rate of asset maintenance will be calculated as follows; Rate of asset maintenance = average ratio of net worth to total capital × transfer ratio (%)

Where, average ratio of net worth to total capital is 50 % and temporary target of the ratio could be made to mitigate the abrupt change of the water tariff. Transfer ratio (%) will be properly decided from average of the 5 year ratio of the government issued bond for the corporate bond. When water supply services (enterprise) cannot follow the ratio, average profit ratio of the owned capital for the general industry business will be used. <JWWA>

2.3. Reduce costs by further efforts

When we intend to raise water tariff, we have to make the most efforts to reduce costs. Usually

Management Improvement Planning

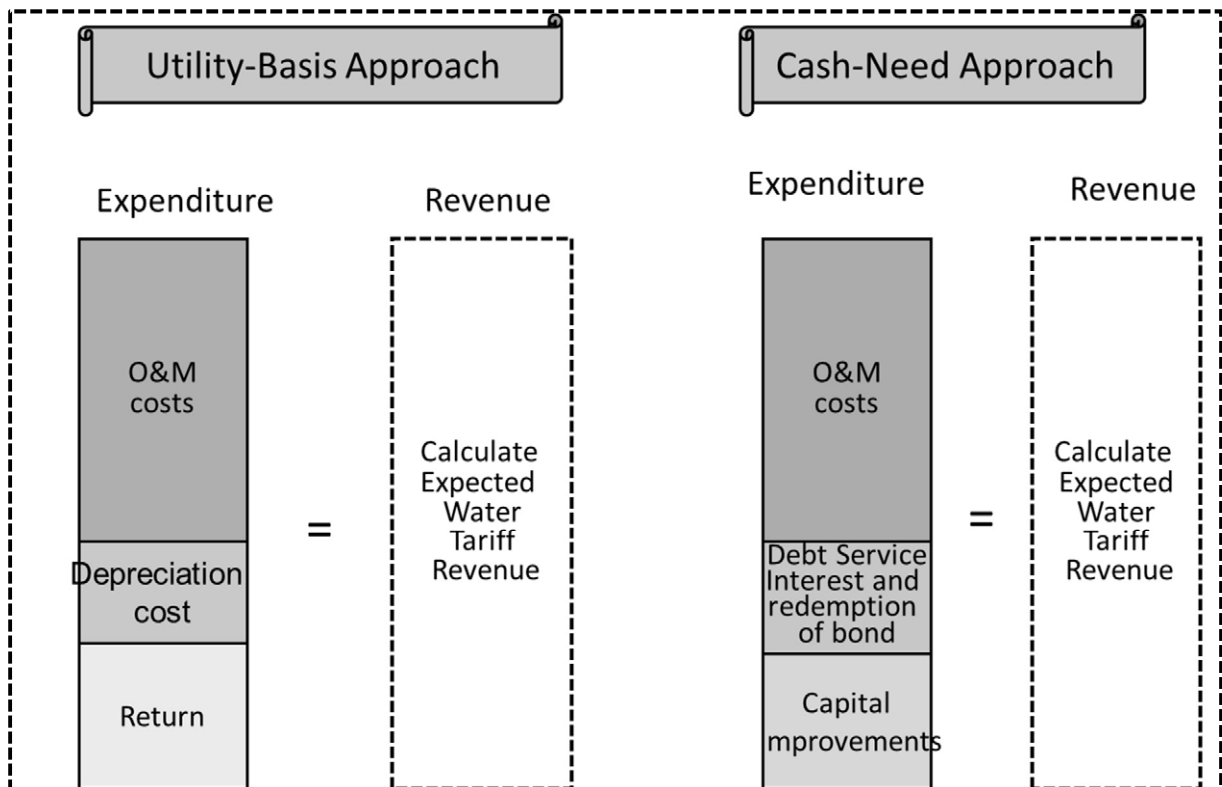
Water supply services (enterprise) should devote their efforts utmost to efficient management in order to make it possible to provide reasonable/inexpensive water tariff to the valued customers. When determination of water tariff is made, management improvement planning should be formulated and targeted cost reduction will be included in operating cost and capital cost of the revenue requirements. <JWWA>

water utility develop management improvement plan together with water tariff raise plan. Following explanation is an example of JWWA which request water utility to make utmost efforts for efficient management.

3. Revenue Requirements

3.1. “Cash-need approach” or “Utility approach”

Receipt of funds in calculating income requirements; Choosing a listing system; The cash need approach calculates the difference between income and expenditure, and the utility approach calculates the depreciation of fixed assets on an annual expense basis.



Cash Need Approach

Only cash transactions are listed. We only deal with cash transactions, so there is no need for cash. To pay interest; Easy to explain to customers and policy makers on loan repayment. Cash Basic system. Single Entry Format Accounting is done in one-sided forms. It is often used in government agencies and is compatible with government organization lists. No depreciation is required. Profit and loss statements and balances are not prepared, so it is not possible to know the actual profit and loss status of the business.

Utility Approach

Utility Approach is an Accrual Basic approach. In Public Corporate Accounting, accounting is used. This system focuses on business ventures, not revenue / expenditure. Accounts are drawn up as a two-way system. This system calculates the depreciation cost of fixed assets. It calculates the profit and loss of a business. Create a balance sheet called a balance sheet to find out the true ownership status of your business. Therefore, this system makes it easy to know the actual asset status of the department and the debt to be repaid. Data has been collected so that future plans can be optimized. However, this system is not suitable for customers. It is difficult for policy makers to easily understand.

ADVANTAGES	
<u>Utility Approach</u>	<u>Cash-Needs Approach</u>
<ul style="list-style-type: none">• Is less subjective.• Better matches cost of service with beneficiary use (e.g., used and useful analysis).• Is more consistent with generally accepted accounting principles.	<ul style="list-style-type: none">• Is consistent with governmental budget practices.• Can be easier to understand because it matches revenue with cash needs.• Is consistent with bond rating agencies' evaluation of revenue-producing capability.• Provides increased flexibility.• Bond covenants are predicated on cash needs.• Is generally accepted by governmental utility industry.
DISADVANTAGES	
<u>Utility Approach</u>	<u>Cash-Needs Approach</u>
<ul style="list-style-type: none">• May generate insufficient or excessive revenue for cash needs.• Is not generally accepted in governmental water and wastewater utility industry unless the utility is regulated.• Provides less flexibility.• Is more difficult to explain to customers/policy-makers.	<ul style="list-style-type: none">• Could result in large net profits or losses if financial statements are prepared in accordance with generally-accepted accounting principles.• Can be more difficult to match the recovering capital costs in varying periods.• Is not usually accepted as a valid method by state public service commissions.

3.2. "Full cost recovery" or "Sustainable cost recovery"

Full cost recovery is a rate that covers all costs (Tariff) equal to the cost of water received.

(Sustainable cost recovery) A rate that covers a fair cost. Tax revenue; All Costs = Tariff + Tax + Transfer In both countries, sustainable cost recovery is widely used in other countries.

Full Cost Recovery All costs are incurred at the same cost (Tariff). Includes capital expenditures (building expansion costs, upgrade costs, and renovations for existing buildings).

Sustainable cost recovery The rate at which fair costs are met Tax revenue; Grant 3 Ts included. Must be able to perform 3 Ts predictions. 3T = Transfer, Tax, Tariff

Sustainable Cost Recovery

A water tariff also needs to be a sustainable cost recovery. Cost includes the following components:

Cost includes the following parts:

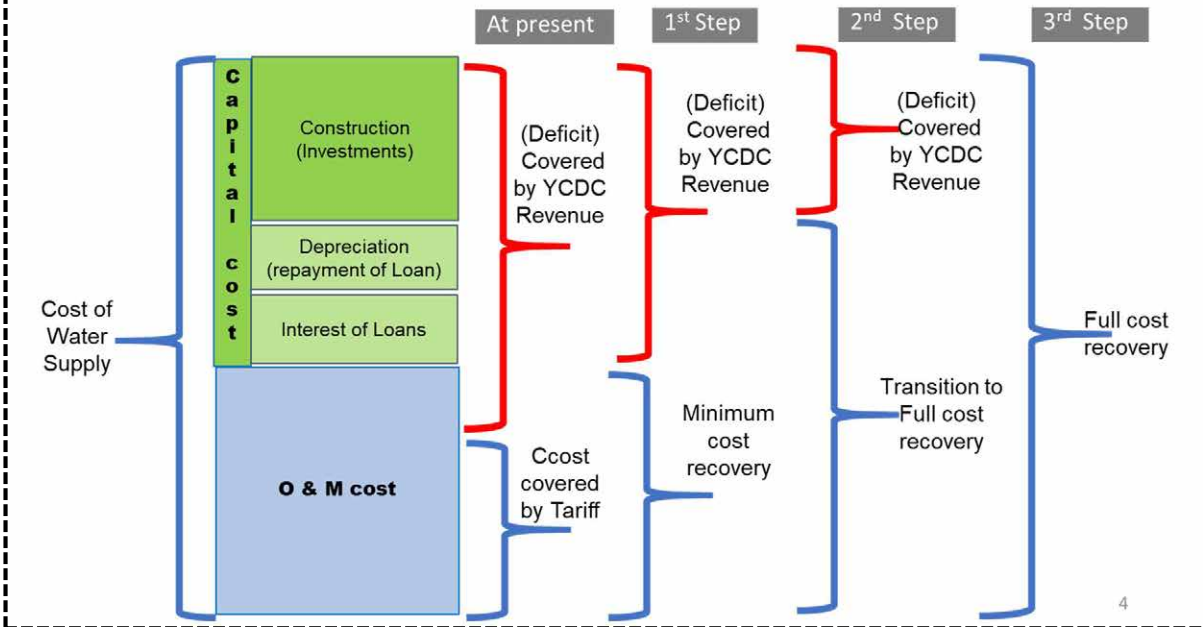
- (1) Cost for Operation and Maintenance
- (2) Administration Cost
- (3) Regulatory Levy
- (4) Debt Service (Payment of Loans)
- (5) Depreciation + Investments Cost

A water plan must be drawn up to cover each step, such as Type-1, Type-2, Type-3, Full Cost Recovery, as shown in the graph, in determining the water tariff for a sustainable cost recovery.

The following graph shows the classification of water rates to ensure sustainable cost recovery:

Cost recovery target

Minimum cost recovery to Full cost recovery



4. Cost Analysis

4.1. Cost Separation

- Variable Cost Operation costs

Operating costs are variable costs. Salary, electricity expenses; Chemical costs; Other general expenses are interest-bearing expenses.

- Maintenance Cost

Maintenance Cost for existing equipment.

- Construction Cost

Construction cost for construction of water supply facilities.

- Customer relating costs

Customer relating costs are high.

- Fixed Costs

Interest payment Debt repayment Depreciation is a fixed expense.

Develop policy to formulate policy

1. For cost-effective policies

- Establish a registration system
- To receive committee funding
- To receive grants

2. For service coverage policy

Meter systems

Price for meter maintenance and usage

Price charged per meter size

3. Collection for home use

Reasonable price for home use

4. Collect at a layered rate to ensure adequate funding

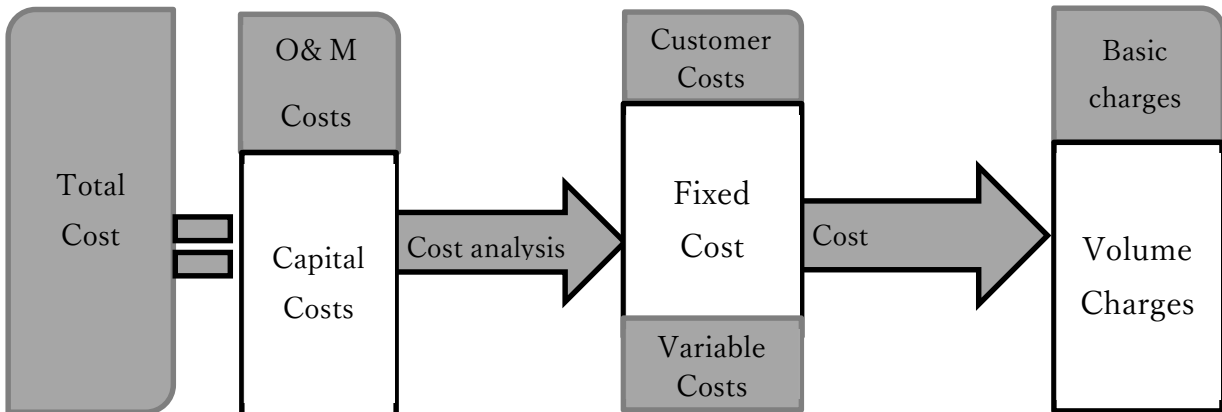
5. To stabilize income

6. To be balanced.

- **Cost recovery**
—the primary objective of any rate structure is to recover the revenue requirements or the costs of providing water service.
- **Revenue stability**
—rate structures should provide revenue that matches changes in the costs of water service..
- **Fairness (defendable)**
—rate structures viewed as fair are preferred from the standpoints of customer acceptance and legal defensibility.
- **Affordability (consideration to domestic use)**
—keeping water service affordable to customers enhances the collection of bills as well as revenue stability.
- **Consistency with cost-of-service principles**
—rate structures consistent with cost- of- service principles are easier to defend and they make it easier to recognize that those who cause costs should pay for them
- **Simplicity (understandable)**
—simple rate structures are most generally preferred to complicated ones; customer understanding is important to achieving customer acceptance.
- **Ease of administration (implementation)**
—feasibility and ease of administration are often important concerns. This objective might also include the capabilities of the billing system.
- **Resource efficiency (conservation)**
—if customers face prices that reflect the costs of providing water service, they can make informed choices about efficient water use, and water waste is minimized.
- **Legal**
—the rate structures should be consistent with applicable laws and regulations.

4.2. Cost Structure and Rate Design

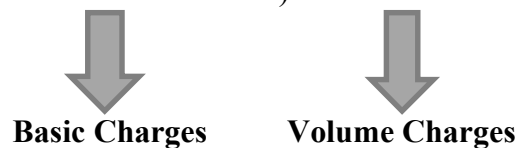
Cost Structure and Rate Design is presented with the following chart:



$$\text{Total Cost} = \text{O \& M Cost} + \text{Capital Cost}$$

Cost Analysis

$$\text{Total Cost} = (\text{Customer Cost} + \text{Fixed Costs}) + \text{Variable Cost}$$



JWWA: Allocation of Costs to Basic charges and Volume charges

Revenue requirements can be classified into customer cost, fixed cost and variable cost and then will be allocated to basic charge and usage charge in accordance with the following procedures.

(a) Customer Cost

All customer cost should be allocated to basic charge in accordance with the following procedures.

- (i) Customer cost which is related to the meter reading/tariff collection cost should be equally allocated to each valued customer.
- (ii) Customer cost related to water meter will be allocated by differential discriminated procedures in proportional to the purchased cost.

JWWA: Allocation of Costs to Basic charges and Volume charges (continued)

(b) Fixed Cost

A part of the fixed cost will be divided into basic charge and usage charge and then the cost allocated to the basic charge will be charged by differential discriminated procedures for the characteristic of demand of each valued customer and will be allocated equally by 1 m³ per usage. When the allocation of the fixed cost and allocation of the fixed cost to which allocated the basic charge will be properly selected from the following procedures by considering actual conditions of each water supply services (enterprise).

i) Procedure of Allocation of Fixed Cost

(i) Fixed cost is allocated in proportional to maximum distribution volume against the difference between maximum distribution volume to average distribution volume, and the remainder will be allocated to usage charge.

(ii) Cost of distribution/service division of the revenue requirements will be allocated to the basic charge and the remainder will be allocated to the usage charge.

ii) Procedures of Allocation of Basic Charge

(i) Basic charge will be allocated by analyzing the theoretical flow rate and the actual water consumption of the service area.

(ii) Basic charge will be allocated by considering ratio of the theoretical flow rate and ratio of the cross section of the water meter installed.

(iii) Basic charge will be allocated to proportionate the theoretical flow rate and the combined maximum daily water demand and/or maximum hourly water demand of each customer group.

(c) Variable Cost

All variable cost will be allocated equally to the usage charge.

5. Rate Design

When calculating the cost of water supply in calculating the cost of water supply, the less water is used, the less water will be produced. If you use more water, you will have to increase production costs.

5.1. Key factor (Principle) for rate design

Key points to ensure a reasonable rate of increase in water tariffs:

1. The rate that covers the basic cost to meet the income requirement should be the rate that supports the water supply business.
2. Fiscal stability for changing costs; To be strong.
3. Adequate funding.
4. Adapt to cost savings.
5. To make the public understand the issue of water tariff collection.
6. Make the collection rate easy.
7. Make it affordable for ordinary people.

The official collection rate is legal. Must comply with the rules and regulations.

Rising water prices are not good for water users, but good water quality and efficiency are needed to improve the water supply system. Water pressure Provide 24-hour water supply. Prior to the current water price increase, water pressure and water quality are being improved. The Kokkova Project is underway and is being prepared. To make the price that customers can pay. To improve the system, it must be calculated fairly. Things that need to be done need to be balanced.

Here is a basic explanation of rate design from JWVA's manual.

In many cases in water utility sector, if water rate design is set according to basic principle, fixed costs reflect to much higher basic/fixed charges and that is not good in economical, social and environmental aspects. There need some more appropriate cost allocation methods which included in the following article.

Criteria for Calculation of Individual Cost Basis

a. Basic Concept

Most extreme calculation method of revenue requirements is to allocate all the customer cost and the fixed cost to basic charge and all the variable cost is to allocate to usage charge. However, this method would result the basic charge extremely expensive to the valued customers and water tariff system itself will have very difficult problem as well as it will be against (conflict with/contradict) the basic principle of the water tariff determination as required to assure supplying potable water with reasonable/inexpensive prices to the valued customers.

Storage of raw water for a certain time will be possible, and then it will not be reasonable to allocate all the fixed cost to the basic charge because not all of the fixed cost deems to be proportional to the characteristic of demand of each valued customer. Accordingly, a part of the fixed cost which will be relatively proportional to the characteristic of demand of each valued customer and all the customer cost will be more appropriate to allocate to the basic charge. <JWVA>

5.2. Some examples of Rate Design

5.2.1. Flat rate or metered rate

The YCDC uses both fixed rates and meter rates to collect water bills. Work is underway to transition to a fixed meter billing system. The fixed rate should be abolished in the coming years for some reason mentioned in the manuals.

AWWA(*2) Unmetered customer or Flat rate customer

For utilities that have customers with unmetered water service, it is difficult to develop water rates that fully recognize the principles of fairness and equity to such customers. This is because the unmetered customers' annual or monthly usage cannot be measured. Additionally, unmetered customers tend to use more water than metered customers because they typically pay a flat charge regardless of water use. Therefore, they do not perceive a price signal to reduce unnecessary water use.

It is necessary to establish a separate class and rate for customers that have unmetered service. The utility may want to incorporate incentives in the water rates applicable to unmetered customers that would encourage such customers to change to a metered service, e.g., the water use levels assumed in developing the flat rate for unmetered customers are greater than the average use indicated for metered accounts or the utility may provide the meter and/or installation at no cost to the customers. Alternatively, the utility may establish a policy that requires all customers to be metered.

5.2.2 Two-part water tariff or utility unit water bill

The Tokyo Water Supply System charges a two-part water rate. YCDC can consider other options. Here are some suggestions on how to look or get an appointment for antique items:

LWUA's Manual: Two Part Tariff

A basic rate structure should be made up of two parts.

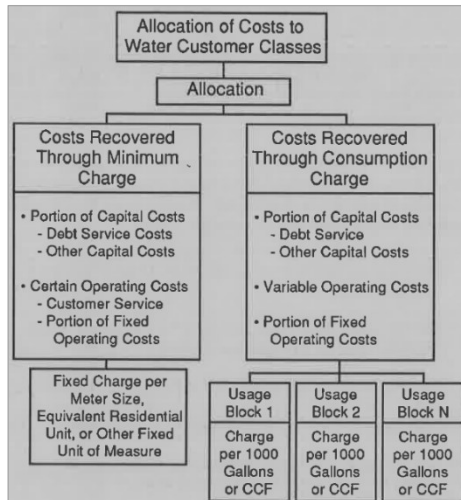
The first part, the base rate, is a charge per customer to recover fixed expenses, including the cost of debt service, reserve requirements, and capital improvements. This charge guarantees enough income to meet the utility's basic costs during periods of low water sales due to drought or other reasons.

The second part, called the unit rate, is a charge per unit of water sold to cover the cost of operation, maintenance, and administration.

With this two-part structure, all customers share equally in the basic costs of the water system and each pays only for the water used. It is important to note that a rate schedule that shares the fixed cost equally among all customers, regardless of how much water each uses, is fair only when the demand by all customers is relatively uniform (1/2 inch or 3/4 inch meters, for example). Customers with greater demand who require larger meters need to have an increased "base rate". The increase is calculated using an equivalent meter and service ratio.

Arthur Young Guide: Two Part Tariff: Minimum Charge and Consumption Charge

Minimum Charges (or Basic Charges)



The rationale for having a minimum charge is to recover certain costs as a fixed component of the customer's bill. The more costs recovered through the minimum charge, the more guaranteed revenue the utility can expect. On the other hand, the less control that the customer has in affecting his ultimate charge (as with a high minimum charge), the less likely he will be to conserve usage. Bond rating agencies look favorably upon user charge structures that recover a high percentage of revenue requirements through fixed charges, since bond holders are more protected when revenue is less dependent upon usage.

Some rate technicians assume that minimum charge provides for some allowance of water or wastewater usage. The term "minimum charge" in the context of this book does not require the charge to include such an allowance. The minimum charge as discussed in this chapter is defined as fixed "service charge" that might or might not include a usage allowance. Several types of costs could logically be recovered through the minimum charge.

First of all, capital costs associated with facilities that are available for providing basic service to the customer could appropriately be recovered through the minimum charge. When debt is used to finance major facilities, the utility has to pay debt service whether usage materialized or not. By recovering debt service costs through the minimum charge, the utility would be passing this fixed cost proportionately to each customer.

Another type of cost that could logically be recovered through the minimum charge would be customer service costs.

Finally, an argument can also be made for including other fixed operating costs in the minimum charge. Certain fixed operating costs have to be paid by the utility whether or not usage materialize, and the utility could logically recover these costs through the minimum charge.

In an extreme example, all utility costs might be recovered through the minimum charge. Such structures are called "flat rate" systems. In determining the types of cost to be recovered through the minimum charge, the utility would need to evaluate the impact on customers and other pricing objectives.

After the costs to be recovered through the minimum charge are identified, the next step is to identify the appropriate unit of measure for recovering these costs. For example on a "per account" basis or on meter-size equivalents. The meter size represents a potential level of demand placed on the water system by the customer, with the larger meter size recovering a greater percentage of demand-related cost.

Consumption Charge

Variable operating costs or some portion of fixed costs which not recovered through minimum charges must be recovered through consumption of water. Charges based on consumption vary by the amount of usage, typically measured through water meter readings.

5.2.3 Minimum water rate

YCDC's new water tariff, the minimum water tariff, should be considered with reference to the following quotes from AWWA:

AWWA(*1) Fixed Charges or Basic Charges and minimum charges

Water utilities use many different types of fixed charges (or Basic Charges) in their rate designs. Three commonly used fixed charges are **billing (or customer) charges**, **service (or meter) charges**, and **minimum charges**.

Billing or Customer Charges

The terms *billing charge* and *customer charge* are often used interchangeably. This charge typically recovers costs such as meter reading, billing costs, and other costs that the utility incurs equally per customer or per account.

This type of fixed charge can be the same for all customers or it can vary by customer class if certain customer classes have more complicated billing or customer service requirements.

These costs are not a function of the amount of consumption a customer uses. An example of a billing or customer charge is \$6.00 per bill. A billing charge is relatively easy to calculate, implement, and understand. A billing charge is frequently lower than other types of fixed charges (or represents a relatively small component of a larger overall fixed charge).

Service or Meter Charges

A *service charge* (or *meter charge*) is a fixed fee that increases with meter size. It often recovers the same costs as a billing charge plus other customer-related costs that change as a function of meter size. These other costs typically include meter-related costs such as meter testing, repairs, and replacements.

Table IV.7-1, based on inside-city unit costs of service from Table III.2-5, shows an example determination of a schedule of monthly service charges. Because service charges vary by meter size, they may be more complicated to explain and require additional data to allocate costs to each meter size in a fair and equitable manner.

In some cases, utilities include other costs to provide service to a customer as a part of a service or meter charge. The argument is made that utilities make investments to provide the ability to serve, and that these costs must be recovered regardless of the amount of water used during a given period. This is sometimes referred to as a readiness-to-serve charge. An approach that may be useful in establishing a cost basis for readiness-to-serve costs is referred to as the minimum system analysis.

This analysis considers that there is a minimum system in place to meet minimum service requirements regardless of use. The minimum needs are defined by determining the minimum size a system would be designed to meet minimum or average service needs (e.g., 4-in. service) not considering sizing for peak-day capacity needs or fire protection. The percentage of the distribution system related to meeting the minimum system needs would be applied to distribution related costs and would be collected in the fixed charges.

Incremental system sizing related to sizing the system to meet peak-day needs and fire flow requirements may also be considered for inclusion in the fixed charges. Fire protection charges are discussed in more detail in chapter IV.8.

The requirement to recover costs without regard to the volume of sales is real, but it does not necessarily suggest that fixed charges should represent a large portion of total revenue requirements, nor that the rate structure should match the cost structure of a utility. The use of a water system is reflected in both potential and average usage patterns, so a continued reliance on volumetric charges to recover fixed costs has value from an equity perspective. The extent to which a strategy of large service charges is employed is frequently limited as a result of concerns over impacts on affordability for smaller-volume customers.

AWWA(*1) Fixed Charges or Basic Charges and minimum charges (continued)

Minimum Charges and Water Allowance

A minimum charge is equal to the sum of the fixed-fee components of a water bill that must be paid regardless of metered usage. A minimum charge could consist of a billing charge, or a billing charge plus a meter charge. In some cases, a fixed fee based on an allowance for a certain amount of water consumption is included in the minimum charge.

The allowance is the minimum volume of consumption for which a customer is billed regardless of whether or not the water is used. The allowance is generally set at a relatively low level to equal an amount that is typically used by most customers in a month. Some utilities use an increasingly larger water allowance for larger size meters.

The minimum charge may be viewed as a means to recover a portion of fixed costs associated with investments to which all customers should contribute, because the utility continues to incur the fixed costs regardless of whether customers consumed water during that billing period.

This charge typically recovers the same costs as the billing and service charges, plus the cost of the allotted consumption allowance, multiplied by the consumption rate. For example, if a utility had a service charge of \$12.26 per equivalent ½-in. meter and a consumption charge of \$2.81 per thousand gallons (based on the residential cost per thousand gallons as displayed in Table IV.2-2) and it wanted to set a minimum charge that included 2,000 gallons, the minimum charge would be \$17.88 per equivalent meter ($\$12.26 + [2 \times \$2.81]$). Table IV.7-2 shows how to calculate a minimum charge by meter size. This example assumes the service charges presented in Table IV.7-2 and a consumption charge of \$2.81 per thousand gallons for all meter sizes.

Minimum charges generally result in the highest fixed fees of those fees discussed herein. Often they are criticized for being unfair in that they charge a customer for consumption even when the customer does not use the allotted amount of water.*

It is often assumed that a minimum charge adds to the utility's revenue stability. However, if the consumption allotment for a minimum charge is set at a low level, a utility may actually receive little benefit in terms of revenue stability. The amount of revenue generated from the consumption component of the minimum charge is revenue that, for the most part, would normally be generated from water sales using the consumption charge.

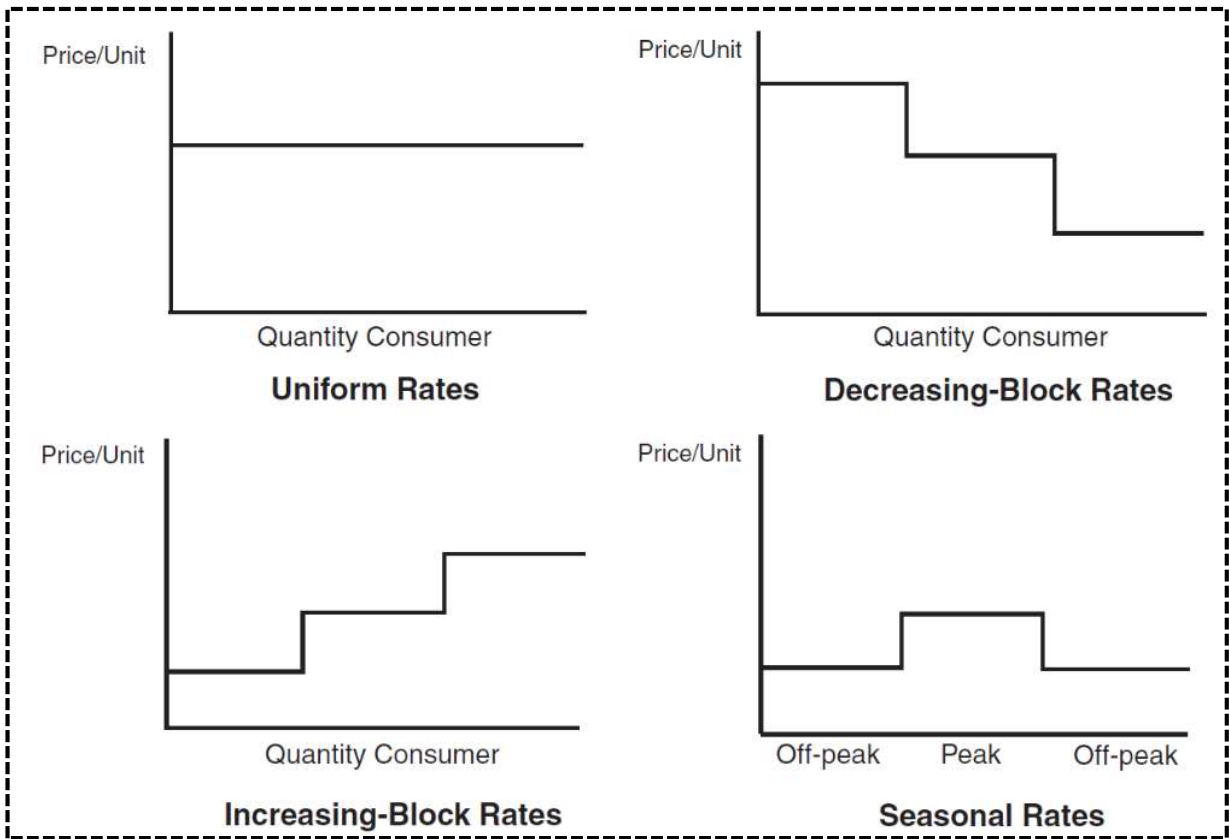
5.2.4 Increasing block rates or Uniform rate

In order to conserve water, the water utility should be familiar with increasing block rates or uniform rates when adjusting water tariffs. Examples of other rate designs and assessments can also be considered in the following articles.

Alternative rate design

When we set unit price we shall think of some patterns of unit pricing. Here are 4 patterns from AWWA Manual which describes “uniform rate”, “decreasing-block rate”, “increasing-block rate” and “seasonal rates”. Increasing-block rates is the most popular system globally and here is a table of comparison of evaluation of 4 patterns which pluses “flat rate” and excludes “decreasing-block rate” from the former figure. “Seasonal rates” is theoretically attractive but it needs more sophisticated data of customer usage in order to introduce.

AWWA *2: Alternative rate design



AWWA *2: Example of evaluation

Objectives	Increasing Block Rate	Uniform Block Rate	Seasonal Block Rate	Flat Rate
Fairness	High	Satisfactory	Low	Low
Conservation	High	Satisfactory	Low	Low
Equity	High	Satisfactory	Low	Low
Cost-of-Service Based	High	Satisfactory	Low	Low
Understandable	High	Satisfactory	Low	High
Feasible	High	Satisfactory	Low	Low
Defendable	High	Satisfactory	Low	Low
Revenue Stability	High	Satisfactory	Low	High
Cost Recovery	High	Satisfactory	Low	Low
Legal	High	Satisfactory	Low	Low

Key: Relative Support of Objective

High Satisfactory Low

5.2.5. Customer categories by diameter of pipe or domestic / commercial

There is no pipeline for the distribution of water for public and commercial use by the Water Supply and Water Supply Authority. Public use is charged at 88 kyats per unit and commercial use is charged at 110 kyats.

There is no pipeline distinction for foreigners living in foreign households. At 440 kyats per unit, foreign businessmen are charged as foreign traders.

Large hotels with high water consumption; For commercial use, there are separate sites, but the water fee is charged at 880 Kyats per unit.

Water supply to low-consumption foreign businesses is charged at Ks 880 / - per unit, regardless of pipeline.

Exercise

Exercise I Tariff setting exercise on Mid-term Management Plan

The Fiscal Year Plan has been drawn up from 2018-2019 to 2020-2021. With this project, calculations were made to increase water tariffs.

1. Financial Plan Development for Mid-term Plan

The financial plan for setting a fair water tariff is (1) the total number of water connections, (2) the availability of water, (3) the sale and collection of water, and (4) the revenue and expenditure accounts.

1.1. Three-Years Operating Income Forecast

Over the next three years, EDWS is envisaged to grow its income from 11,500 million Kyat in 2017/18 to 26,375 million Kyat in 2020/21. The annual increase ratio is expected to be 32% from 2017/18 to 2020/21. One of the key milestones is the starting operation of Lagunpyin WTP for Thilawa SEZ and domestic during the mid-term. Hence, the above operating income will be underscored by achievement of incremental operating profit by water supply of Lagunpyin WTP.

Operating income for the next three years is summarized as follows.

Items	Projection by fiscal year (mil.kyat)			Total
	2018-2019	2019-2020	2020-2021	
A. Operating Income Total	12000	23991	35973	71964
1 Water service charge	11419	20959	32941	65319
1-1 Department	1600	1600	1600	4800
1-2 Public Water Charge	9819	9035	9035	27889
1-3 Incremental revenue by improvement -Domestic	0	642	940	1582
1-4 Incremental revenue by improvement -Commercial	0	535	784	1319
1-5 Incremental revenue by Lagunpyin	0	9147	20582	29729
2 Water connection fee	450	450	450	1350
Incremental revenue by Lagunpyin	0	2450	2450	4900
3 Rental of shops and sites	70	70	70	210
4 Plumber license fee	1.3	1.3	1.3	3.9
5 Toll fee	0.1	0.1	0.1	0.3
6 Other incomes	60	60	60	180
	12000.4	23990.4	35972.4	71963.2

Table 1 Operating Income Forecast for FY2018/19-FY2020/21

1.2. Three-Years Operating Cost Forecast

Operating costs is assumed to increase 19,259 million kyat in 2017/2018 to 27,016 million kyat in 2020/21. The annual increase ratio is 13% from 2017/18 to 2020/21. During the period of this mid-term, operating costs for Lagunpyin WTP will be incrementally occurred.

Operating costs for the next three years is summarized as follows.

Table 2 Operating Costs Forecast for FY2018/19-FY2020/21

Three Year Financial Projection (Mid-Term Plan)				
အကြောင်းအရာ	ဘဏ္ဍာရေးနှစ်အရက်ကြိုတင်ခန့်မှန်းချက် (mil kyat)			စုစုပေါင်း
	၂၀၁၈-၂၀၁၉	၂၀၁၉-၂၀၂၀	၂၀၂၀-၂၀၂၁	
A. Operating Expenditure Total				
သာယာခန်းအသုံးစရိတ်စုစုပေါင်း	22319	24566	28013	74898
2-1 Salarly လစာ	2658	3008	3273	8939
2-2 Labour Charges လုပ်သားခ လုပ်အားခ	2084	1877	2042	6003
Incremental personnel costs by Lagunpyin				
လခွန်းပြင်စီမံကိန်းမှတိုးပွားလာသောဝန်ထမ်းဆိုင်ရာကုန်ကျစရိတ်	0	71	124	195
2-3 Electricity	9800	13322	14494	37616
Incremental Electricity costs by Lagunpyin	0	189	1308	1497
2-4 Petro & Lubricant မိတ်ဆီ နှင့်ဆော့ဆီ	100	90	97	287
2-5 Procurement ဝယ်ယူခြင်း	3339	1925	2094	7358
Incremental Chemical costs by Lagunpyin				
လခွန်းပြင်စီမံကိန်းမှတိုးပွားလာသောမိတ်ဆီဆေးရည်သုံးစွဲမှုကုန်ကျစရိတ်	0	23	162	185
2-6 Printing & Publishing				
ပုံနှိပ်ခြင်းနှင့်ထုတ်ဝေခြင်း	50	73	80	203
2-7 Materials, repair, maintainance and spare parts				
ပစ္စည်းပြင်ဆင်, ထိန်းသိမ်းခြင်းနှင့်အပိုပစ္စည်းများ	4178	3909	4253	12340
2-8 Other expenditure	111	79	86	276
	22320	24566	28013	74899

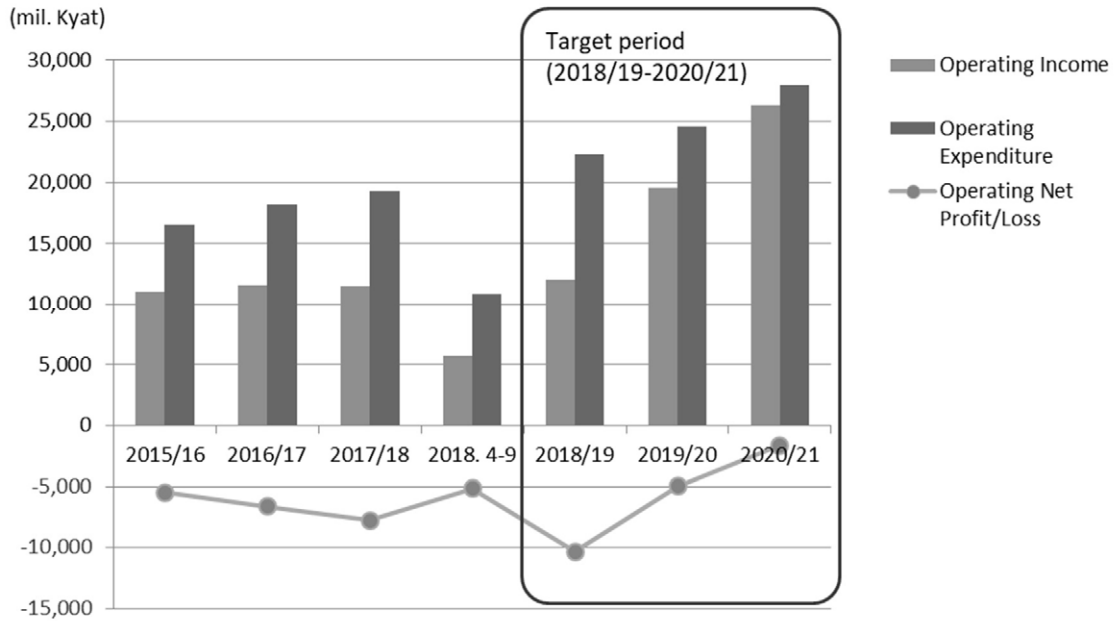
1.3. Net Operating Balance

The net operating deficit is estimated to be 10,319 million Kyat in FY2018/19, however it is expected to be an upward trend and the deficit will be largely recovered with 1,638 million Kyat deficit in FY2020/21. Hence, a significant target of financial management during the next three years could be mostly close to operating cost recovery. The net operating balance in FY2020/21 will be significantly dependent on the successful operation of Lagunpyin WTP and the appropriate billing and collection on schedule.

Table 3 Operating Balance Forecast for FY2018/19-FY2020/21

Items	Projection by fiscal year (mil. Kyat)		
	2018/19	2019/20	2020/21
A. Net Operating Balance	-10,319	-4,968	-1,638
Operating Income	12,000	19,598	26,375
Operation Expenditure	22,319	24,566	28,013

[Note] Operating costs does not include depreciation costs



1.4. Three-Years Capital Expenditure and Investment Forecast

The capital investment needs over the next three years will amount to 730,833 million Kyat, equivalent to the annual average of 243,611 million Kyat. This investment is necessary to construct water facilities to meet the future water demand of Yangon City. The major portion of investments for the mid-term covers the costs of on-going ODA projects such as Lagunpyin and Kokkowa projects.

Approximately 70% of the capital investment will be sought from donor funding of the Japanese government, and the remaining portion will be covered by the Union government budget.

Capital expenditure required for the next three years is summarized as follows.

Table 4 Capital Expenditure Forecast for FY2018/19-FY2020/21

Three Year Financial Projection (Mid-Term Plan)

Items	Projection by fiscal year (mil.kyat)			Total
	2018-2019	2019-2020	2020-2021	
B. Capital Expenditure	153001	286650	291171	730822
1 ODA Loans	126419	256992	257628	641039
1-1 Lagyunpyin WS Project (Total)	96644	76392	46490	219526
1-1-1 Lagyunpyin WS Project (YCDC)	19051	13692	10740	43483
1-1-2 Lagyunpyin WS Project (ODA)	77593	62700	35750	176043
1-2 Kokkowa River WS (Total)	29775	180600	211138	421513
1-2-1 Kokkowa River WS (YCDC)	9775	29931	45988	85694
1-2-2 Kokkowa River WS (ODA)	20000	150669	165150	335819
2 YCDC Activities	26582	29658	33543	89783
2-1 Intake & Treatment	1836	5782	3905	11523
2-2 Transmission and Distribution	8125	13071	16747	37943
2-3 Service Pipe and Meter	9795	5991	7901	23687
2-4 Other Infrastructure	6827	4815	4990	16632

25

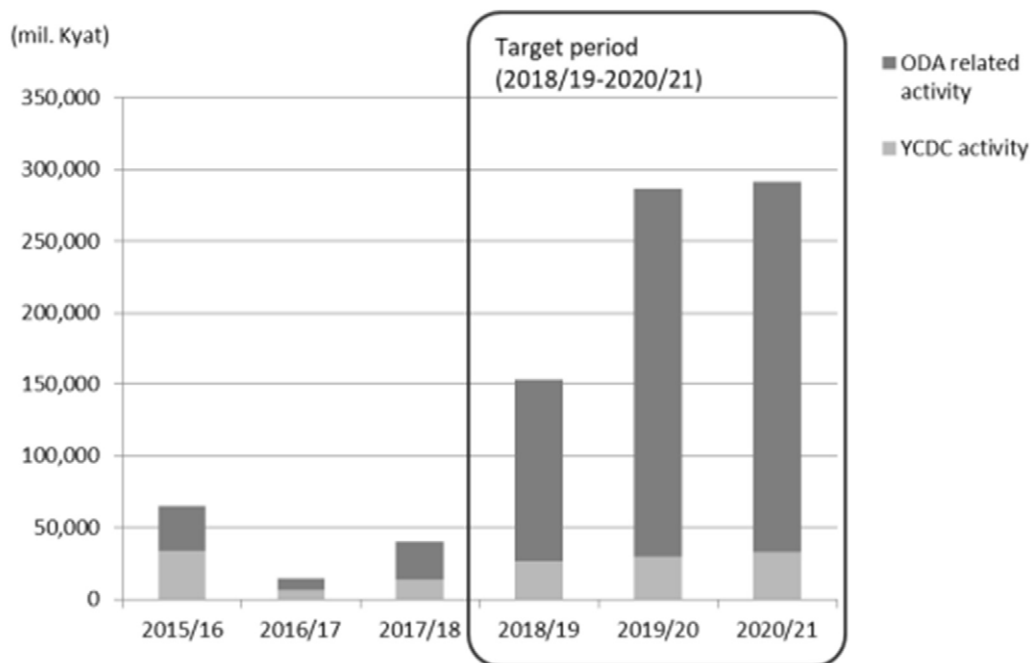


Figure 1 Capital Expenditure (Past and Projection for 2018/19-2020/21)

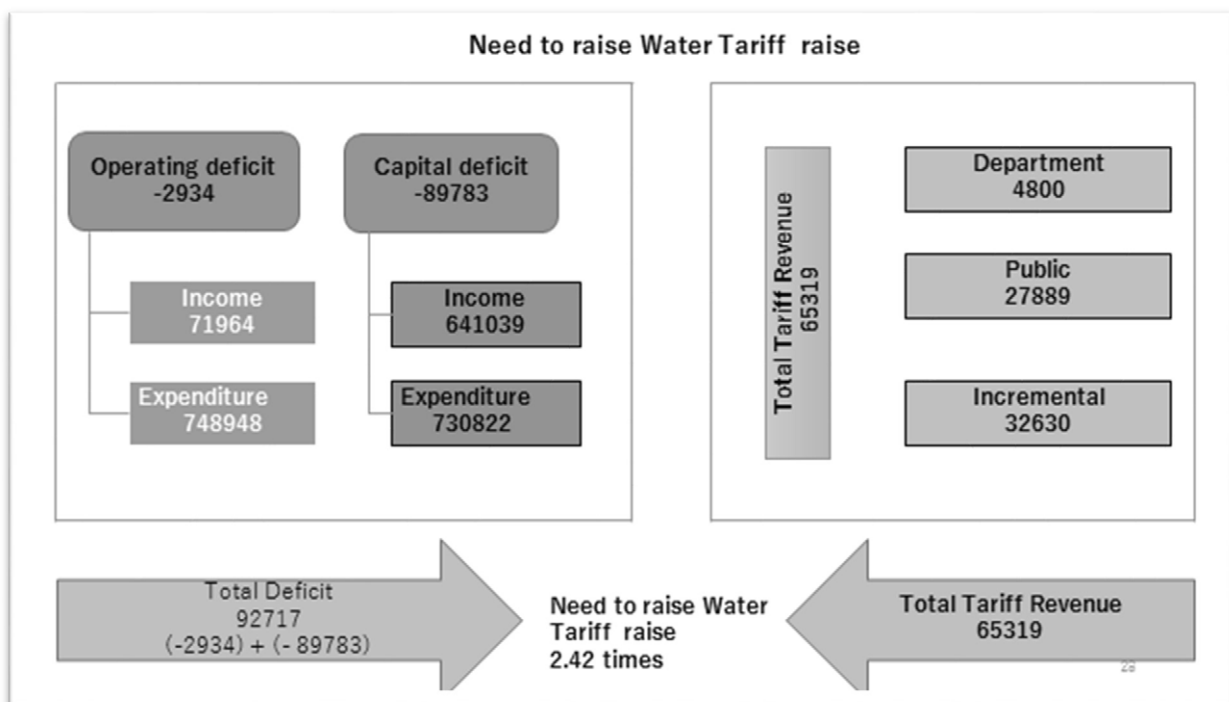
2. Exercise of tariff setting according to Mid-term Plan

2.1. Deficit Calculation

Particular	2018-2019	2019-2020	2020-2021	Total
Income				
Water Tariff Income	11419	20959	32941	65319
Other Income				6645
Total Operating Income	12000	23991	35973	71964
Operating Deficit				
Total Operating Income	12000	23991	35973	71964
Total Operating Expenditure	22319	24566	28013	74898
Total Operating Deficit	-10319	-575	7960	-2934
Capital Deficit				
ODA Loans	126419	256992	257628	641039
YCDC Capital Expenditure	26582	29658	33543	89783
Total Capital Expenditure	153001	286650	291171	730822

Total Deficit=Operating Deficit (2934) +Capital Deficit (YCDC's subsidy) 89783 = 92717

2.2. Calculation of Tariff raise ratio



2.3. Calculation of Full cost recovery v.s. Sustainable cost recovery

To obtain sustainable water management, deficit shall be covered by tariff and any other financial resources. In the developed countries, usually all costs are covered by water tariff, however, in developing countries it is often too ambitious target for short term. Step by step, it shall be realized and meanwhile subsidies from general account may be alternative financial resources to cover deficit which showed in the figure of page 60 “Cost recovery target – Minimum cost recovery to Full cost recovery.

	Revenue Requirements 158036 = 65319+92717	
	Operating Cost :8253 (2934+5319)	Capital Cost: 89783
	Full Cost Recovery (Type 1)	
	Water Tariff Raise 142% (2.42 Times) Water Tariff revenue : 158036	
	1. (Type 1) Full cost recovery calculation = 158036 / 65319 = 2.42 times 2.42 x 88= 213 kyat 213-88= 125 /88=142%	
Financial support From YCDC's General Account	Full Cost Recovery (Type 2)	
	Half of Capital cost 44892 (89783/2)	Water Tariff raise 1.73 Time (79%) Water tariff revenue 113144 (158036-44892)
	2. (Type 2)Half cost recovery calculation = 113144 / 65319 = 1.73 times 1.73 x 88= 152 kyat 152-88= 64 / 88 = 73 %	
	Sustainable Cost Recovery (Type 3)	
	All Capital Cost 89783	Water Tariff raise 1.045Time(4.5%) Water tariff revenue 68253 (158036-89783)
	Deficit 92717	Tariff Revenue 65319
	3. (Type 3)All operating cost recovery calculation = 68253/65319=1.045 times 1.045 x 88= 92 kyat 92-88= 4 /88= 4.5%	

1. Full cost recovery calculation (Type 1)	= 158036/65319=2.42 times	
	2.42 x 88= 213 kyat	213-88= 125 /88=142%
2. Half cost recovery calculation (Type 2)	= 113144/65319=1.73 times	
	1.73 x 88= 152 kyat	152-88= 64 / 88 = 73 %
3. All operating cost recovery calculation (Type 3)	= 68253/65319=1.045 times	
	1.045 x 88= 92 kvat	92-88= 4 /88= 4.5%

Exercise II An idea of Tariff Design for the coming stage

We must first discuss the current social and environmental conditions in order to set a new water tariff. At the same time, financial statements and revenue requirements for the future must be calculated based on past data. By introducing the ideas, the water tariff design will be designed and implemented for the new water tariff.

Yangon's existing water tariff and newly revised tariff

- At the current, the water tariff is being collected in Linear Tariff System (Flat rate).
- In addition to increasing revenue, in order to reduce NRW and uncontrolled water use, basic rate system and increasing block tariff system (IBT system) will be introduced.

Category	Consumption (unit – m3)	Tariff rate (MMK per m3)	Tariff rate (MMK per m3)
-Domestic	1 -5	1000 (Basic Rate)	2000 (Basic Rate)
-Departmental	6 – 15	88	220
domestic	16 - 30	110	275
-YCDC staff housing	31 and above	110	330
-Commercial	1 – 5	2000 (Basic Rate)	4000 (Basic Rate)
-Departmental	16 – 30	110	330
Commercial	31 and above	110	440
-FE (Domestic)	-	440	440
-FE (Commercial)	-	880	880

(This is just an example of alternative tariff designs)

References:

1. Guidelines for Water Tariff Setting (JWWA Manual, 2015), Japan Water Works Association (JWWA)
2. Principles of Water Rates, Fees, and Charges (Fifth edition, 2000), Manual of Water Supply Practices M1, American Water Works Association (AWWA)
3. Developing Rates for Small Systems (First edition, 2004), Manual of Water Supply Practices M54, American Water Works Association (AWWA)
4. Guidelines for User Fees and Cost Recovery (October 2010), African Development Bank
5. Manual on Water Rates and Related Practices (2nd Edition, February 2000) , Local Water Utility Administration (LWUA) Philippine
6. Water and Wastewater Finance and Pricing (Arthur Young Guide), George A. Raftelis, Lewis Publishers, 1989

2.C : 固定資産の管理及び経理

Annex-2.C: Maintenance of Fixed Assets Lists

(iv) To estimate the acquisition year based on the same product with similar conditions and functions

(v) To estimate the acquisition year based on the type and structure of asset

(vi) To estimate the acquisition year by referencing the manufacture catalogue

(vii) To set the acquisition year the same as the construction year of the building if the useful life of asset inside the building is not known

(viii) Can set the acquisition year of asset the same as project beginning year

(ix) To estimate the acquisition year by comparing inflation rate when the asset value is available

5.4 Calculating Depreciation

5.4.1 Acquisition Cost (MAS 11)

(a) Land, building, machines, tools and equipment with all information including the acquisition cost will be registered in the asset ledger.

Explanation: Initial cost includes all capital costs; eg. Land reform fee, transportation fee and construction fee.

(b) The acquisition cost of fixed asset will include new construction cost, expansion cost and maintenance cost. The purchased year and date, initial cost, additional useful life after maintenance, annual depreciation rate and cost, and current year's value will be kept record.

(c) When the asset purchased under capital cost is received, depreciation will be calculated since received year.

2C - 2

5.4.2 Depreciation

Depreciation of fixed assets will be calculated according to specified useful life. (If the minimum and maximum useful life is applied, the reason shall be mentioned.)

Useful Life (Explanation) MAS 3

(a) The period when the organization is expected to use an asset

(b) The estimated number of products to be produced from the property

Note: The useful life should be reviewed regularly and revised if necessary.

5.4.3 Depreciation Method

Straight-Line Method to be applied (Get approval to apply the method).

To adapt the depreciation method in line with the situation except for the rationale for adapting other methods. The depreciation method shall be practiced in a constant manner. In case of the change of depreciation method, the reasons of change and results of the changing period will be described.

5.4.4 Book value after Depreciation

The book value after depreciation is the remaining cost of an asset after the related amount of accumulated depreciation has been deducted from it.

Permission is needed to set residual value/salvage value.

5.5 Inspection of Fixed Asset

The inspection of the fixed assets within the department shall be conducted at least once a year by the respective in-charged to countercheck all fixed assets on ground with fixed asset ledger. If any difference is found, the inspector will report it to head of

department/officers without any hesitation. If the damage or loss of asset is found any time, the in-charged person will report it to officers of the department with no delay.

5.6 Maintenance of fixed assets

The respective in-charged person will be responsible to maintain the fixed assets in order to facilitate the operation of fixed assets. Regular monitoring and maintenance of fixed assets will be conducted periodically.

5.7 Cancellation of Fixed Asset

The Fixed Asset must be deleted from the fixed asset ledger if the asset is no longer used due to the termination of useful life. If the asset is still usable after useful life expiration, the expansion of useful life will be set.

5.8 Causes of Fixed Assets Cancellation

i) If the fixed asset is no longer useful (useful life expiry), the report of fixed asset suspension must be submitted to the relevant division.

ii) In case of selling, transferring, relocating and losing of fixed asset, the report shall be submitted to headquarter.

5.9 Retirement of Fixed Assets

i) The assets that are not used or unwanted, that can't be sold, and that the selling cost is higher than selling price

ii) Asset that needs complete restoration

iii) Missing data to build a building. There is no longer chance to build on that. The demolition of that building

iv) After the retirement or disposal of fixed assets such as property, plant and equipment, the difference between net income from disposal and net worth of the asset must be calculated and the net profit or loss generated by the disposal of asset will be recorded as income or expenditure in the profit and loss account.

6. Related Documents

No

7. Related Forms

EDWS-FD-OP1-W3-F1

Fixed Asset Ledger/Lists

EDWS-FD-OP1-W3-F2

Fixed Asset Registration Form

EDWS-FD-OP1-W3-F3

Depreciation Rate Table

EDWS-FD-OP1-W3-F4

Depreciation Rate Table

EDWS-FD-OP1-W3-F5

Depreciation Rate Table

EDWS-FD-OP1-W3-F6

Depreciation Rate Table

EDWS-FD-OP1-W3-F7

Depreciation Rate Table

EDWS-FD-OP1-W3-F8


Depreciation Rate Table


EDWS-FD-OP1-W3-F9

Depreciation Rate Table

8. References


Myanmar Accounting Standard (MAS 3, 11)


	<p style="text-align: center;">အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု) ဘဏ္ဍာရေး ဌာန</p>	SOP ကုန်အမှတ်	EDWS -FD- OP1 -W3-F5
		Version အမှတ်	01
		စတင်အသုံးပြုသည့်နေ့	9-Apr-21
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	<p style="text-align: center;">အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု) ဘဏ္ဍာရေး ဌာန</p>	SOP ကုန်အမှတ်	EDWS -FD- OP1 -W3-F4
		Version အမှတ်	01
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Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate			% Remark
			Min	Max	Max	
၉	(Collecting and impounding Reviserviors)	Syphon (MS)	25	25	4	
		Tunnels (RC)	30	40	3	
		Up Cannel	50	50	2	
		Dividing Well (RC)	5	10	10	
		Well and springs	10	20	5	
		Overhead Conductors	5	10	10	
		Overhead Device	20	30	3	
		Underground Conductors	5	10	10	
		Underground Device	5	10	10	
		Service Line	5	10	10	
၁၀	Electric Equipment	PVC Insulated Wire	3	5	20	
		Flexible Wire	5	10	10	
		Control Wire	3	5	20	
		Line cables	3	5	33	
		High Voltage Transformer	20	25	5	
		Step up Transformers	3	5	33	
		High Voltage Pump<(500KW)	10	20	10	
		Low Voltage Pump <(500KW)	5	10	20	
		High Voltage Motor<(6.6KV)	10	20	10	
		Low Voltage Motor<(400V)	5	10	20	
၁၁	Transformer & Pump	High / Low Voltage Starter Panel	3	5	33	
		Air Compressor	5	10	20	


Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate			% Remark
			Min	Max	Max	
6	Bridge	Concrete	25	25	4	
၇	ရေထောက်တံ (Reviserviors)	Wood	10	10	10	
		RC တံ	30	60	3.33	1.67
		အုတ်တံ	30	60	3.33	1.67
		ရေတံ	30	60	3.33	1.67
		Reservoirs (Concrete above ground)	50	50	2.00	
		Reservoirs (Concrete in ground)	50	50	2.00	
		Head Regulator (RC)	30	60	3.33	1.67
		Underground Tank	30	60	3.33	1.67
		Overhead Tank	30	60	3.33	1.67
		Reviserviors	30	60	3.33	1.67
		Lake	30	60	3.33	1.67
		other Intakes (RC)	30	60	3.33	1.67
		Conduit	30	60	3.33	1.67
		Intake weir (RC)	30	60	3.33	1.67
		Intake tower (RC)	30	60	3.33	1.67
		spill way (RC)	30	60	3.33	1.67
		Sand setting basin (RC)	30	60	3.33	1.67
		Storage Tank (Concrete)	30	60	3.33	1.67
		Storage Tank (Meatal)	30	60	3.33	1.67
		• Channel		မြောင်းရောင်း	25	35	4	3
RC မြောင်း	50			50		2


	<p>အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု)</p> <p>ဘဏ္ဍာရေး ဌာန</p>	SOP ကုဒ်အမှတ်	EDWS -FD- OP1 -W3-F6
		Version အမှတ်	01
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ခွင့်ပြုသူ			

	<p>အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု)</p> <p>ဘဏ္ဍာရေး ဌာန</p>	SOP ကုဒ်အမှတ်	EDWS -FD- OP1 -W3-F7
		Version အမှတ်	01
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ခွင့်ပြုသူ			

Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate			Remark
			Min	Max	Max	
	Transformer & Pump	Lift Engine & Pump	10	13	10.00	7.69
		Submersible Motor & Pump	3	5	33.33	20.00
၁၂	Circuit Breaker	400V Distribution Panel	5	10	20.00	10.00
		33 KV , Disconnecting Switch	10	20	10.00	5.00
		11 KV , Disconnecting Switch	10	15	10.00	6.67
၁၃	Disconnecting Switch	33 KV , Drop Out Fuse	3	5	33.33	20.00
		11 KV , Drop Out Fuse	3	5	33.33	20.00
၁၄	Drop Out Fuse	PT (66/33 KV)	10	20	10.00	5.00
		CT (66/33 KV)	10	20	10.00	5.00
၁၅	Station Equipment	MOF (33 KV)	10	20	10.00	5.00
		Capacitor Bank	3	5	33.33	20.00
		Battery Changer	2	3	50.00	33.33
		Battery Bank	10	10	10.00	10.00
		Water Fountain	2	5	50.00	20.00
		Tube Well Drill machines	3	5	33.33	20.00
		Filter	10	15	10.00	6.67
၁၆	Structure	(a) Concrete Pipe	25	25	4.00	4.00
		(b) MS Pipe	25	25	4.00	4.00
၁၇	Attached Pipe /Valve	(c) CI Pipe	100	100	1.00	1.00
		(d) DI Pipe	100	100	1.00	1.00
		(e) GI Pipe (4"Ø above)	25	25	4.00	4.00
		(f) GI Pipe (3"Ø below)	5	5	20.00	20.00
		(g) HDPE Pipe	50	50	2.00	2.00
		(h) PVC Pipe	15	15	6.67	6.67

Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate			Remark
			Min	Max	Max	
	Attached Pipe /Valve	(i) FRP Pipe	10	10	10.0	10.0
		Transmission Valve	15	15	6.7	6.7
		Distribution Valve	15	15	6.7	6.7
		Copper Valve	5	5	20.0	20.0
		Mechanical Valves	15	15	6.7	6.7
		Check Valves	15	15	6.7	6.7
		Butterfly Vave	15	15	6.7	6.7
		Air Valves	15	15	6.7	6.7
		Pipe Joint Machine	3	3	33.3	33.3
		Water Tower	25	25	4.0	4.0
		Overhead Tank	25	25	4.0	4.0
		Pipe Joint Machine	3	3	33.3	33.3
		Meter	5	5	20.0	20.0
		Flow Meter	5	5	20.0	20.0
		Hydrants	25	25	4.0	4.0
၁၈	Electric Line Equipment	Concrete Pole & Fixture	10	20	10	5
		Iron Lamp Post & Fixture	5	10	20	10
		Public Light & Fixture	3	5	33.33	20
		Hight Most Light & Fixture	3	5	33.33	20
		Drilling Machine	3	5	33.33	20
		Wedding Machine	3	5	33.33	20
၁၉	Machinery & Equipment	Generator	10	20	10	5
		Pipe Production Machine	10	20	10	5

	<p style="text-align: center;">အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု) ဘဏ္ဍာရေး ဌာနခွဲ</p>	SOP ကုဒ်အမှတ်	EDWS -FD- OP1 -W3-F8
		Version အမှတ်	01
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	<p style="text-align: center;">အင်ဂျင်နီယာဌာန (ရေနှင့်သန့်ရှင်းမှု) ဘဏ္ဍာရေး ဌာနခွဲ</p>	SOP ကုဒ်အမှတ်	EDWS -FD- OP1 -W3-F9
		Version အမှတ်	01
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Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate			Remark
			Min	Max	Max	
J၀	Electric Equipment	Auxiliary Machine	10	20	10	5
		Boiler	10	15	10	6.67
		Tool ,Shop and Ganage equipme	10	15	10	6.67
		Air Con	10	10	10	10
		1. UPS (Lot)	15	15	6.67	
J၁	Communications equipme	2. GPRS Router (Lot)	8	8	12.5	
		3. Pressure Transmitter	5	5	20	
		4. Residual Chlorine Analyzer	5	5	20	
		5. PLC Panel (Interface Panel)	5	5	20	
		Balance	5	5	20	
JJ	Vehicles	Distiller	5	5	20	
		Laboratory Equipment	5	7	20	14.3
		Data Communication Equipment	5	7	20	14.3
		Aquamarine	5	8	20	12.5
		Overhead crane	5	8	20	12.5
Vehicles	Vehicles	Truck	5	8	20	12.5
		Mini Truck	5	8	20	12.5
		Water Boxer	5	8	20	12.5
		Motor Vehicle	5	8	20	12.5
		Other Vehicle	10	10	10	10
		Bicycle	8	8	12.5	

Sr.no	1th Tier	2nd Tier	Year (useful life) / Depreciation Rate			Remark
			Min	Max	Max	
JR	Tools and appliances	Boat (Fiber , Iron)		3	33.33	
		Bicycle		8	12.50	
		Boat (Fiber , Iron)		3	33.33	
		Tool Equipments		8	12.50	
J၄	Furniture and Fixture (Office Equipment)	Water Fountain		10	10.00	
		Cupboard		15	6.67	
		Table		15	6.67	
		Chair		15	6.67	
		Computer other		8	12.50	
				5	20.00	

2.D : 顧客管理マニュアル (案)

Annex-2.D: Customer Management Manual (Draft)

List of materials

- Meter Reading Works Manual
- Collection Work Manual
- SOP (Tariff Collection Work)

Customer Management Manual (Draft)

Meter Reading Works Manual

Tools and materials to be brought for meter reading

- (1) Staff ID.
- (2) Wear full uniform.
- (3) Visit the customer during working hours.
- (4) Politely communicate with customers.
- (5) Bring water tariff invoice and tariff bill while visiting at customer's house.
- (6) Report the Customer Complaint and Information to township officers and HO.
- (7) Meter reading units shall be recorded in YaPa (1)

Meter reading shall follow:

- 1) The meter reading staff carried out meter reading regularly on the specified days and times. The specified number of House Holds must be completed by the specified date and time.
- 2) Meter reading procedure shall be followed by meter reader (procedure specified by the head office and township officer depending on the number of invoices).
- 3) Yapa-1 must be brought while meter reading.

4) Meter reader must wear the required uniform, bring staff ID card and visit the customer during office hours.

- 5) Politely communicate with customers.
- 6) Detail of customer information such as customer name, address, meter number and reading units shall be precisely recorded in Yapa-1.
- 7) In case of customer complaint during meter reading, it shall be reported to respective in-charged officer.

- 8) Collected meter reading data is returned to township office and input in computer system of township office together with computer operator.
- 9) If the current reading unit differs $\pm 40\%$ from previous month's reading unit at the time of meter reading, customer shall be notified about the difference and the case shall also be reported to township officer.

- 10) Meter damage, change of customer category,
- 11) While meter reading, meter reader regularly checks the meter condition, change of customer category and whether there is a room or house consuming water for free.
- 12) If there is any demolition of the building / vacant land despite the regular water bill, the relevant township officer shall be notified about the case. The township officer shall handle the case by following the procedures prescribed by the head office.

Checking/Inspecting the meter while the customer is at the house

- (1) Check the meter number and meter pointer.
- (2) Check the meter by turning the meter while the customer is using water and when not using water.
- (3) If the meter is running when the valve is turned off, confirm with the customer where the leaking pipe is and repair the leaking pipe.
- (4) The most leaking area in most houses is a broken toilet valve and broken pump head. The leaking points must be confirmed with customer and persuade the customer to repair.

(5) The volume of water leaking due to the fault of the customer and the volume of water used after repair shall be calculated and notified together with/to the customer so that the water tariff can be charged.

(6) In case of any irregularities, the Customer Phone Number and event shall be recorded in the Book of Abnormal Content and the relevant departments shall be notified if necessary through the Ward/Township Officer.

Checking/Inspecting the meter while the customer is at the house

(1) Check the meter by turning the meter while the customer is using water and when not using water.

(2) If there is a suspicion of leakage, the necessary information shall be written in the book and submitted to the relevant authorities for inspection.

(3) In case of leakage, if the customer is not present at the house, a notification letter shall be provided to the customer so that himself shall know and confirm.

(4) If it is difficult to notify the customer when he is not at home, Connections must be submitted to the township in charge on a monthly basis.

In case of improper functioning meter while the customer is at home (rising water consumption)

1) Check that the water meter is actually working properly.

2) If the meter is found to be running normally and the customer's water consumption is increasing, the reason for the increase in water consumption shall be discussed with the customer and confirmed.

3) If the meter is found to be increasing after 3 times of every 3 days checking whether the meter is actually working properly or not, the customer must be informed and confirmed whether the meter is broken or not.

4) In the cases of increased water consumption by regular meter operation and by non-regular meter operation; the customer must be notified after checking the meter functioning for 3 times of every 3 days for both cases of increased water consumption.

5) If the category of water connection changes, it shall be confirmed with customer and the water fee shall be changed.

In case of improper functioning meter while the customer is away from house

(1) Check that the water meter is actually working properly.

(2) The customer must be informed in writing that the water consumption is increasing.

(3) It shall be registered in Yapa-1 and a comment shall be made on the list of abnormal condition of water meter.

In the case of significant decline of water consumption

1) Make an enquiry to the customer when the water consumption decreases. The reason shall also be noted in the list of abnormal situations.

2) When the customer responds it is being used normally, check again the meter functioning while using water. If the meter is considered to be malfunctioning, the meter unit must be marked and the meter shall be rechecked.

3) If meter is found to be defective, the customer must be explained that the average consumption unit of previous 3 months will be charged for water tariff. Photographs must be recorded. Finally, customer must be informed that the water meter must be replaced with a new meter.

- 4) When the new meter is replaced, the invoice must be issued starting with the unit '0' (zero) Initial Reading '0' (zero) from the adjacent month.
- 5) Water meter reading staff should also be made aware of that the possibility of declined water consumption can be due to malfunctions of meter and while the customer is not at home.

- 4) When the time comes to read the water meter, make sure that the water meter reading on the House Hold ground is the same as the water meter reading on the water bill.

In the condition after leakage has been repaired

- 1) The leakage shall be monitored after repairing for 3 or 5 days and compared the water consumption before and after the leakage repair.
- 2) The customer shall be informed that the meter unit will be recorded in Yapa-1 and a bill will be issued according to the amount.
- 3) Get the confirmation from customer that she/he knows that the unit included in the water bill is calculated according to the specified principle.
- 4) Take a note down that the unit listed in Yapa-1 needs to be reviewed. In addition, the instability of consumption unit must be listed in the record.

Guidance on meter reading

- 1) Establish a water meter reading date based on the number of bills to be collected in each ward.
- 2) To explain the meter reading date and procedure of meter reading until the meter reading staff understands, and to bring up meter reading staff to be able to explain the design of the water meter reading to the customer through the meter reading staff
- 3) At present, depending on the number of staff and connections in the townships, the water meter shall be read every 1 or 2 months.

Collection Work Manual

Statistic Data Collection

- The data of damage meters and new connection list must be collected and recorded.
- Number of household member of each customer, consumption volume and address shall be stored.
- The customers shall be classified according to the categories such as commercial, domestics, etc.
- Considerations needs to be taken into account in buildings such as monasteries, temples, and other religious compounds to charge water tariff.
- The status of damage meter list shall be distinguished such as meter reading difficulty, meter failure etc.
- If the pipe burst is found or happens, the causes of pipe burst shall be categorized and integrated into the data in accordance with the property boundaries specified by the department.
- The customers, with respect to bill collection, shall be categorized as regular payment customers and non-payment customers so it is to be supportive for billing collection.
- Customers shall be informed that customer is responsible to pay for water loss from pipe burst beyond the meter within customer's territory.
- If the customers whose connections are cut off for a variety of reasons reuse the water or reconnect the connection by themselves without the permission from WRWSA, the case shall be recorded in the Customer Database. Action must be taken in accordance with the procedure.
- The details of non-payment customers and the reasons of non-payment shall be recorded.

Collection Cycle

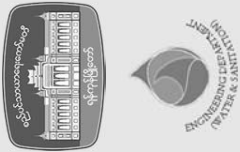
Last week of Month	Meter reading
	Sending invoice to customers
10 th Day	10 waiting days after sending notice invoice
40 th Day	If Customer is absent to pay the bill up to one month, a notice of debt payment will be sent to customer
70 th Day	If the Customer is still absent for payment upon debt notice, 1 st Warning Letter of water cut off will be sent to customer.
77-84 th Day	If the Customer is absent for payment upon 1 st Warning Letter, two more Warning Letters (2 nd , 3 rd Warning Letter) will be sent to customers.
91 st Day	In case of no payment after 3 rd Warning Letter, water cut permit shall be requested from Department.
The activity of water connection cutting off shall be timely reported.	

SOP (Tariff Collection Work)

Table of Contents

- I Summary
- II Contents
 - 1 Directives for new connection applicants/customers
 - 2 Instructions for staff of house connection section to issue house connection permit
 - 3 Instructions for supervision on house connection installation of new customer who has got house connection permit
 - 4 Instructions for bill collector to collect water charges from new connection
 - 5 Instructions for meter readers in township office
 - 6 Instructions for meter readers to tackle abnormal water consumption cases
 - 7 Instructions for average water tariff collection for damaged meter
 - 8 Instructions for depositing of water charges
 - 9 Instructions for receivable/debt collection management

10 Yapa Ito8

	Yangon City Development Committee Water Resource and Water Supply Authority Engineering Department (Water & Sanitation)	SOP Code No: <i>EDWS-FD-071</i> Version No: <i>01</i> Effective Date: Pages: <i>Page 1 of 2</i> Developer: <i>AE</i> Verifier: <i>DY/E</i> Approval:
	.....<i>Finance</i> Division Section ..... .....	..... ..... .....
	1. Duties and Responsibilities of Human Resource Section <i>Directives to fulfill the needs of customer</i> <i>Directives on full water tariff collection</i>	..... ..... .....
	2. Objectives & Scope <i>To gain customers— trust on water supply works</i> <i>To meet customers— satisfaction</i> <i>To collect water tariff fully and to carry out water supply activities with water charges revenue understand their duties and responsibilities</i>	..... ..... .....
	This SOP is disclosed to only staff of Finance Division under Water Resource and Water Supply Authority. <i>This SOP is applicable only for customers and staff who directly deal with customers.</i>	..... .....
	3. Abbreviations and definitions 1) (Ya Pha) Water Charges Accounting/Registration Record 2) (Hta Sa) Governmental Accounting Record 3) AA Administrative Authority 4) CC Completion Certificate 5) WO Work Order 6) PAE Plinth Area Estimate no abbreviation	..... .....

	Engineering Department (Water & Sanitation)			SOP Code No:	EDWS-OP1-A1
	..... Division			Version No:	00
	..... Section			Effective Date:	April 5, 2021
				Pages:	2 of 5

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Duties and responsibilities of staff directly dealing with customers	Township officer, Deputy township officer, House connection staff and customerFinance officer and Accountant	Township officer, Section in-charged, customersFinance Office
3	Receiving water charges and other income	Finance officer and Accountant	Finance Officer

5. Procedure

- 1) Planning and projecting connections list of each township to improve water supply and distribution.
- 2) Regular inspection for NRW prevention in order to fully deliver water to customers.
- 3) Persuading and coordinating with customers to alter their flat rate connections into meter connections
- 4) Providing full service for new customers
- 5) Raising customers— awareness to have the sense of responsibility to pay water charges for their consumption
- 6) To conduct public relation activities for the customers to understand current operation and activities of EDWS to meet the demand of customers— need and to supply clean and adequate water to customers.
- 7) To maintain the good condition of customer meter to obtain accurate meter reading units as the customer—s consumption.

	Engineering Department (Water & Sanitation)			SOP Code No:	EDWS-OP1-A1
	..... Division			Version No:	00
	..... Section			Effective Date:	April 5, 2021
				Pages:	5 of 5

- 8) Providing services that water charges can be easily and conveniently paid by the customers.
- 9) New customer who wants to access water from WRWSA shall follow the directives as per EDWS-CSS-OP1-W1.
- 10) Staff of House connection section shall follow this directive EDWS-CSS-OP1-W2 to issue House Connection Permit for new customer.
- 11) The customer with house connection permit

EDWS-FD-OP1-W2 shall be followed in disbursement of expense, accounting and financing

5.3 EDWS-FD-OP1-W3 shall be followed in managing fixed assets list.

6. Related Documents

- EDWS-FD-OP1-W1 Instruction for Receiving water charges and other income
- EDWS-FD-OP1-W2 Instruction for disbursement of expense, accounting and financing
- EDWS-FD-OP1-W3 Instruction for managing fixed assets list

7. Related Forms

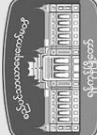
No

8. References

- 1) Myanmar Financial Regulations
Planning and Finance Ministry
Order No. 35/2017
1378, 5th Waxing of Tagu
(2017, 1st April)
2. Myanmar Accounting Standards 3, 11

9. Attachments

No

	Yangon City Development Committee Water Resource and Water Supply Authority Engineering Department (Water & Sanitation)	SOP Code No:	EDWS-CSS-OP1-W1
		Version No:	01
		Effective Date:	4/01/2019
		Pages:	Page 1 of 5
		Developer	Daw Aye Aye Mar
		Verifier	DYCE
		Approval	CE

1. Framework

Directives for new connection applicants/customers

2. Objectives & Scope

For easy and convenient service for new connection applicant/customer

This SOP is applicable only for township officers and staff of House Connection section.

3. Abbreviations and definitions

- no abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Service for new connection application of New Customer	House Connection Staff Respective township officer	Township Officer Head of House connection section

5. Procedure

Steps of New connection application

- The following procedure shall be applied when a new customer applies a new connection at township office “
 - Fill the application form at Township office (EDWS-HC-OP-F1)

	Engineering Department (Water & Sanitation) Division Section	SOP Code No:	EDWS-OP1-A1
		Version No:	00
		Effective Date:	April 5, 2021
		Pages:	2 of 3

2) Make sure applicant—s desired connection category.

3) Township officer is to inspect the ground situation for the availability of water access

4) Follow item 5.2 and 5.3 of EDWS-HC-OP-W1 to EDWS-HC-OP-W5 during ground inspection by township officer

5) Inform the customer if the water access is available (after ground inspection) in order to proceed the application process

5.2 The following procedure shall be done if water access is available for new applicant.

1) Obtain the supporting documents required from the applicant in accordance with Article 5.4 of EDWS-HC-OP-W5 in order to submit those to EDWS to allow the applicant water connection permit (To start counting Work Day from the first day of process)

2) The applicant is to pay house connection fee and meter cost

3) Water meter is to be taken from township office and meter installation shall be carried out within 3 days.

4) House connection installation shall be systematically performed by following EDWS-D&Ts-OP1-W1

5) Meter installation and connection registration at township office shall be systematically carried out according to EDWS-D&T-OP3-W1

5.3 The following procedure shall be proceeded to get house connection permit

1) District office shall submit the new connection application with all required supporting documents to HO while house connection installation is being carried out on ground.

2) To proceed the application in accordance with EDWS-HC-Op-W1 to EDWS-HS-OP-W5 until the permit is issued.

6. Related Documents

- | | |
|---------------|--|
| EDWS-HC-OP-W1 | Procedure of temporary connection permit |
| EDWS-HC-OP-W2 | Procedure of water connection permit |

	Engineering Department (Water & Sanitation)			SOP Code No: EDWS-OP1-A1
	..... Division			Version No: 00
	..... Section			Effective Date: April 5, 2021
				Pages: 5 of 5

- EDWS-HC-OP-W3 Procedure of old house water connection permit
- EDWS-HC-OP-W4 Procedure of secondary/extension water connection permit
- EDWS-HC-OP-W5 Procedure of water connection permit for excess consumption
(need to be confirmed)
- EDWS-D&Ts-OP1-W1 Instruction for house connection installation
- EDWS-D&Ts-OP3-W1 Instruction for meter installation

7. Related Forms

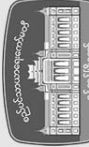
House connection application form (EDWS-HC-OP-A1)

8. References

No

9. Attachments

No

	Yangon City Development Committee			SOP Code No: EDWS-CSS-OP1-W2
	Water Resource and Water Supply Authority			Version No: 01
	Engineering Department (Water & Sanitation)			Effective Date: 6/04/2019
	..... Division			Pages: Page 1 of 2
	..... Section			Developer Daw Aye Aye Mar
	.....			Verifier DMYE
.....			Approval CE	

1. Framework

Instructions for staff of house connection section to issue house connection permit

2. Objectives & Scope

To issue house connection permit by House connection section

This SOP is applicable only for staff of House Connection section and Customer Service section.

3. Abbreviations and definitions

- no abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Works for water connection permit of each category (1) Temporary connection permit (2) New connection permit (3) Old house connection permit (4) Secondary connection permit (5) Water connection permit for excess consumption	Staff of House Connection section Staff of Customer Service section	Head of House connection section Head of Customer Service section

	Engineering Department (Water & Sanitation)			SOP Code No: EDWS-OP1-A1
	..... Division			Version No: 00
	..... Section			Effective Date: April 5, 2021
				Pages: 2 of 2

5. Procedure

- 5.1 Proceeding for connection permit according to the permit category of EDWS
 - 1) Proceed the connection application submitted by township office by following article 5.1 of EDWS-HC-OP according to connection category
 - 2) Get the approval sign from EE (House connection section) after scrutinizing the application and completing drawing, then sent it to Customer Service section
 - 3) Then, Customer Service section shall do the followings within 3 days “
 - i. inputting ‘Data of approved application’ on Online Water Supply Permit System,
 - ii. recording the drawing in the program,
 - iii. getting House Connection Permit from House connection section
 - iv. getting approval sign and stamp of ACE (Water Supply) on permit

6. Related Documents

EDWS-HC-OP Procedure of house connection permit

7. Related Forms

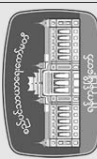
*House connection application form (EDWS-HC-OP-F1)
House connection Permit (EDWS-HC-OP-A1)*

8. References

No

9. Attachments

No

	Yangon City Development Committee			SOP Code No: EDWS-CSS-OP1-
	Water Resource and Water Supply Authority			WS
	Engineering Department (Water & Sanitation)			Version No: 01
	.....Customer Service..... Division			Effective Date: 16/04/2019
	..... Section			Pages: Page 1 of 2
				Developer Daw Aye Aye Mar
			Verifier DY&E	
			Approval CE	

1. Framework

Instructions for supervision on house connection installation of new customer who has got house connection permit.
Directives for new customer with house connection permit to follow for house connection installation

2. Objectives & Scope

To follow by new customer for house connection

This SOP is applicable only for House Connection staff from townships and new customers

3. Abbreviations and definitions

- no abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	To supervise the installation of house connection to be systematic	Township NRW staff	Township officer
2	Instructions for customer	customers who got house connection permit	customers

	Engineering Department (Water & Sanitation)			SOP Code No: EDWS-071-A1
	..... Division			Version No: 00
	..... Section			Effective Date: April 5, 2021
				Pages: 2 of 2

5. Procedure

- 1) Customer who has received house connection permit shall pay the water meter cost and service fee specified by the Committee and pay all cost for the connection line from distribution pipe to house connection.
- 2) Customer has to pay the specified meter maintenance fee for water meter leased by EDWS.
- 3) Customer has to pay the cost for meter replacement due to life span expiration of meter, broken meter, and meter lost or stolen.
- 4) Customer shall do house connection installation under supervision of in-charged supervisor of EDWS.
- 5) Customer must not do the following “
 - (i) Breaking the meter
 - (ii) Taking out some parts of meter
 - (iii) Replacing the meter
 - (iv) Changing the meter
 - (v) Connecting water pipe between water meter and distribution pipe line
- 6) Customer is responsible to take care of the meter.

6. Related Documents

No

7. Related Forms

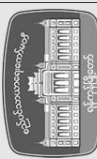
No

8. References

1. *YCDC Regulation*

9. Attachments

No

	Yangon City Development Committee			SOP Code No: EDWS-CSS-071-W4
	Water Resource and Water Supply Authority			Version No: 01
	Engineering Department (Water & Sanitation)			Effective Date: 16/04/2019
	.....<i>Customer Service</i> Division			Pages: Page 1 of 2
	.....<i>Water</i> Section			Developer <i>DW/E</i>
	.....<i>Water</i>			Verifier <i>DW/E</i>
	.....<i>Water</i>			Approval <i>CE</i>

1. Framework

Instructions for bill collector to collect water charges from new connection

2. Objectives & Scope

To collect water charges from new connection

This SOP is applicable only for Bill collection staff from townships

3. Abbreviations and definitions

- *No abbreviation*

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Bill collection	Township billing & Collection staff	Township officer

5. Procedure

- 1) Register the new customer in customer data of township office upon the completion of new house connection installation. Submit the data update to HO in order to start bill issuance.
- 2) Customer who has already completed the connection installation and not consumed water yet must also be registered in Computer Section.

	Engineering Department (Water & Sanitation)		SOP Code No: EDWS-CSS-OP1- W4
	..... Division		Version No: 01
	..... Section		Effective Date: 6-June-2019
			Pages: 2 of 2

- 3) Meter readers must, monthly, inspect the connections that are registered in Computer section but not consumed water yet.
- 4) Meter readers shall perform as the directions of EDWS if the connection does not consume water for mth/yr since installation.
- 5) To issue the bill of new connections, the copy of new connection permit shall be submitted to Computer section and countercheck the new connection list, then get approval from Computer section.
- 6) To issue the bill of new connections, the new connection list must be submitted to Computer section along with meter number [EDWS-MS-OP-F4].

6. Related Documents

No

7. Related Forms


No

8. References

No

9. Attachments

No

	Yangon City Development Committee		SOP Code No: EDWS-CSS-OP1- W5
	Water Resource and Water Supply Authority		Version No: 01
	Engineering Department (Water & Sanitation)		Effective Date: 16/04/2019
	.....Construction Services Division		Pages: Page 1 of 2
	.....Water Section		Developer DWSE
	.....Water		Verifier DWSE
		Approval CE	

1. Framework

Instructions for meter readers in township office

2. Objectives & Scope

To follow by meter readers in monthly meter reading

This SOP is applicable only for meter readers in township offices

3. Abbreviations and definitions

- No abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Monthly Duties and responsibilities for meter reading in township	Township meter readers	Township officer

5. Procedure

- 1) In the township, the respective staff shall conduct the meter reading for their assigned ward in accordance with EDWS-D & Ts-OP2-W1.
- 2) Meter readers must comply with EDWS-CS-OP-W1 to obtain the required information for Demand submission while meter reading on the ground.

	Engineering Department (Water & Sanitation)			SOP Code No: EDWS-CSS-OP-W5
	..... Division			Version No: 00
	..... Section			Effective Date: April 5, 2021
				Pages: 2 of 2

3) Meter readers shall regularly do meter condition inspection by following Meter reading manual prescribed by Customer service section.

6. Related Documents

- EDWS-D&Ts-OP2-W1 Rules for Meter reading*
- EDWS-CS-OP-W1 Monthly billing*
- Meter Reading Manual*

7. Related Forms

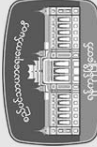
- (YaPa -1) Monthly Meter reading units recording form*

8. References

No

9. Attachments

No

	Yangon City Development Committee			SOP Code No: EDWS-CSS-OP1-W6
	Water Resource and Water Supply Authority			Version No: 01
	Engineering Department (Water & Sanitation)			Effective Date: 16/04/2019
	.....<i>Customer Service</i> Division			Pages: Page 1 of 2
	.....<i>Water</i> Section			Developer DY&E
	.....<i>Water</i>			Verifier DY&E
	.....<i>Water</i>			Approval CE

1. Framework

Instructions for meter readers to tackle abnormal water consumption cases

2. Objectives & Scope

To follow by meter readers in monthly meter reading

This SOP is applicable only for meter readers in township offices

3. Abbreviations and definitions

- No abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Meter Reading	Township meter readers	Township officer
		Ward in-charged	

5. Procedure

1) Meter reader shall bring detail customer data form [EDWS-CS-OP1-W6-F1] when meter reading.

2) If the current unit is \pm 40% more or less than regular usage, meter condition shall be inspected.

	Engineering Department (Water & Sanitation)		SOP Code No: <i>EDWS-CSS-OP-W6</i>
	..... Division		Version No: <i>00</i>
	..... Section		Effective Date: <i>April 5, 2021</i>
			Pages: <i>2 of 2</i>

- 3) To inspect meter function while customer is at home, Meter inspection shall be done according to meter reading manual.
- 4) To inspect meter function while customer is not at home, Meter inspection shall be done according to meter reading manual.
- 5) To inspect abnormal consumption while customer is at home, meter inspection shall be done according to meter reading manual.
- 6) Inspection on leakage repair completion shall be carried out in accordance with the meter reading manual.

6. Related Documents

Meter Reading Manual

7. Related Forms

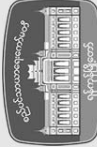
EDWS-CS-OP1-W6-F1 (*YaPa -1*)

8. References

No

9. Attachments

No

	Yangon City Development Committee		SOP Code No: <i>EDWS-CSS-OP1-W7</i>
	Water Resource and Water Supply Authority		Version No: <i>01</i>
	Engineering Department (Water & Sanitation)		Effective Date: <i>16/04/2019</i>
	.....<i>Customer Service</i> Division		Pages: <i>Page 1 of 2</i>
	.....<i>Water</i> Section		Developer <i>DWAE</i>
	.....<i>Water</i>		Verifier <i>DWAE</i>
		Approval <i>CE</i>	

1. Framework

Instructions for average water tariff collection for damaged meter

2. Objectives & Scope

To fully collect water charges of damaged meter connection
This SOP is applicable only for bill collectors of township offices

3. Abbreviations and definitions

- No abbreviation

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Bill collection while the meter is damaged	Bill collection staff in Township	Township officer

5. Procedure

- 1) Meter reader shall check the meter condition at the time of meter reading by following the article 5.3 (d,e) of EDWS-D&Ts-OP2 in order to collect water tariff fully.
- 2) Every meter reader shall register the consumption unit and water tariff of each customer, in their respective ward, in EDWS-CSS-OP1W7-F1/ Customer Service Management Program upon the completion of meter reading.

	Engineering Department (Water & Sanitation) Division Section			SOP Code No: EDWS-CSS-OP-W7
				Version No: 01
				Effective Date: 6-6-2019
				Pages: 2 of 2

- Water charges collection during operation for meter replacement due to meter failure (damage) shall be performed in accordance with EDWS-D & Ts-OP2 5.3.
- Customers shall be negotiated for meter replacement not to be more than 3 months of average consumption invoice due to meter damage.
- Meter replacement of damage meter for high consumption customer shall be carried out within one month.

6. Related Documents

EDWS-D&Ts-OP2 Instructions for meter condition inspection and collection of average consumption in case of meter damage

7. Related Forms

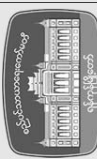
EDWS-CSS-OP1-W7-F1 (YaPa -2)

8. References

No

9. Attachments

No

	Yangon City Development Committee Water Resource and Water Supply Authority Engineering Department (Water & Sanitation) <i>Cashier</i> Division <i>Section</i> Section			SOP Code No: EDWS-CSS-OP1-W7
				Version No: 01
				Effective Date: 6/06/2019
	Pages:			Page 1 of 2
	Developer			DWAE
	Verifier			DWAE
	Approval			CE

1. Framework

Instructions for depositing of water charges

2. Objectives & Scope

To collect full water tariff

This SOP is applicable only for cashier (township staff) and township officer

3. Abbreviations and definitions

- *No abbreviation*

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Water charges collection and depositing	Cashiers (Township staff) and bill collectors	Township officer

5. Procedure

1) Water tariff/charges collection shall be carried out in line with article 5.3 (a,b) of EDWS-D&Ts-OP2.

2) A detailed list of collected water charges must be completed as directed in EDWS-CS-OP1-W8-F1 (Yapa 4)

	Engineering Department (Water & Sanitation)		SOP Code No: EDWS-CSS-OP-
	..... Division		W8
	..... Section		Version No: 01
			Effective Date: 4-4-2019
		Pages: 2 of 2	

- 3) The e-challan of daily revenue will be issued at township office and total daily revenue will be deposited at AYA bank and City Bank in respective township.
- 4) The deposit challan and EDWS-CS-OP2-W8-F1 will be submitted to Income section under Finance Division.
- 5) Non-regular-payment customers must be separately managed from Collection System.
- 6) Debt collection plan must be made to claim the receivable from non-payment customers for the debt of remaining month to pay.
- 7) If the daily revenue cannot be deposited at the bank in time, in-charged staff shall fill it in EDWS-CS-OP1-W8-F2 and submit the form and revenue to YCDC Township Administrator (EO).

6. Related Documents

EDWS-D&Ts-OP2 Instructions for water charges collection

7. Related Forms

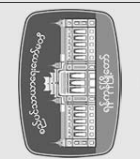
EDWS-CS-OP1-W8-F1 (YaPa -4) (Scan)
 EDWS-CS-OP1-W8-F2 Hta Sa - 6

8. References

No

9. Attachments

No

	Yangon City Development Committee		SOP Code No: EDWS-CSS-OP1-
	Water Resource and Water Supply Authority		W1
	Engineering Department (Water & Sanitation)		Version No: 01
	..... Division		Effective Date: 4/04/2019
..... Section		Pages: Page 1 of 2	
		Developer DWAE	
		Verifier DWAE	
		Approval CE	

1. Framework

Instructions for receivable/debt collection management

2. Objectives & Scope

To manage debt collection

This SOP is applicable only for bill collectors and non-payment customers

3. Abbreviations and definitions

- *No abbreviation*

4. Tasks, Responsibilities and Accountabilities

No	Tasks	Person	Responsibility
1	Receivable/debt collection	Township bill collector	Township officer

5. Procedure

- 1) In billing collection, the bill receipt will be handed over to customer if customer pays water charges at the time of collection, and the bill invoice will be given to customer if customer does not pay water charges at once.
- 2) The customer shall pay water charges within 10 days after receiving bill invoice.
- 3) If the customer is absent to pay water charges up to one month, township officer shall conduct sending notice letter to payment-absent customer.

2.E : 全部署標準手順書 (SOP) (目録のみ)

**Annex-2.E: Standard Operating Procedures (SOP) of All Sections of
WRAWSA (List only)**

SOP Lists of WRAWSA

Sr. by Sec.	Sr.	Facility Name/Section	SOP Title	SOP Code	Preparation Status	SOP Preparation Status	
						Burumese	English done
1	1	Yegu	Main SOP	EDWS-YPS-OP	Completed	0	0
	2		Working Instruction of Safety	EDWS-YPS-OP-W1	Completed	0	0
	3		Working Instruction of Admin	EDWS-YPS-OP -W2	Completed	0	0
2	4	Yegu P/S -1	Operation Procedure of Yegu Pumping Station No.1	EDWS-YPS-OP1	Completed	0	0
	5		Maintenance Procedure of Yegu Pumping Station No.1	EDWS-YPS-MP1	Completed	0	0
	6		Working Instruction of Operation of Yegu Pumping Station No.1	EDWS-YPS-OP1-W1	Completed	0	0
	7		Working Instruction of Maintenance of Yegu Pumping Station No.1	EDWS-YPS-MP1-W1	Completed	0	0
	8		Daily Checklist Record Form (PS 1)	EDWS-YPS-MP1-F1	Completed	0	0
	9		Weekly Checklist Record Form (PS 1)	EDWS-YPS-MP1-F2	Completed	0	0
	10		Monthly Checklist Record Form (PS 1)	EDWS-YPS-MP1-F3	Completed	0	0
	11		Annual Checklist Record Form (PS 1)	EDWS-YPS-MP1-F4	Completed	0	0
	3	12	Yegu P/S -2	Operation Procedure of Yegu Pumping Station No.2	EDWS-YPS-OP2	Completed	0	0
13			Maintenance Procedure of Yegu Pumping Station No.2	EDWS-YPS-MP2	Completed	0	0
14			Working Instruction of Operation of Yegu Pumping Station No.2	EDWS-YPS-OP2-W1	Completed	0	0
15			Working Instruction of Maintenance of Yegu Pumping Station No.2	EDWS-YPS-MP2-W1	Completed	0	0
16			Daily Checklist Record Form (PS 2)	EDWS-YPS-MP2-F1	Completed	0	0
17			Weekly Checklist Record Form (PS 2)	EDWS-YPS-MP2-F2	Completed	0	0
18			Monthly Checklist Record Form (PS 2)	EDWS-YPS-MP2-F3	Completed	0	0
19			Annual Checklist Record Form (PS 2)	EDWS-YPS-MP2-F4	Completed	0	0
20			Pump Operation Record	Yegu P/S	Completed	0	0
21			Repair and maintenance Record (Log books)	Yegu P/S	Completed	0	0
22			Monthly Report	Yegu P/S Office	Completed	0	0
23		Performance Indicator (PI Data) Form	EDWS-YPS-OP1-F1	Completed	0	0	
4	24	Electro Chlorination Plant	Operation Procedure of Yegu Chlorine Disinfection Facility	EDWS-YPS-OP3	Completed	0	0
	25		Maintenance Procedure of Yegu Chlorine Disinfection Facility	EDWS-YPS-MP3	Completed	0	0
	26		Working Instruction of Operation of Yegu Chlorine Disinfection Facility	EDWS-YPS-OP3-W1	Completed	0	0
	27		Working Instruction of Maintenance of Yegu Chlorine Disinfection Facility	EDWS-YPS-MP3-W1	Completed	0	0
	28		Daily Checklist Record Form (Electro Chlorination Plant)	EDWS-YPS-MP3-F1	Completed	0	0
	29		Monthly Checklist Record Form (Electro Chlorination Plant)	EDWS-YPS-MP3-F2	Completed	0	0
	30		Annual Checklist Record Form (Electro Chlorination Plant)	EDWS-YPS-MP3-F3	Completed	0	0
	31		Dosing Pump Control Chart	EDWS-YPS-OP3-A1	Completed	0	0
	32		Salt Consumption Ledger Record	Yegu P/S Office	Completed	0	0
	33		Sodium Hydroxide Consumption Ledger Record	Yegu P/S Office	Completed	0	0
	34		Sodium Carbonate Consumption Ledger Record	Yegu P/S Office	Completed	0	0
	35		Electro Chlorinator Operation Record	Yegu P/S Office	Completed	0	0
	36		Electro Chlorinator Repair and Maintenance Record (log book)	Yegu P/S Office	Completed	0	0
	5	37	SCADA System	Operation Procedure of Yegu SCADA System	EDWS-YPS-OP4	Completed	0	0
38			Maintenance Procedure of Yegu SCADA System	EDWS-YPS-MP4	Completed	0	0
39			Working Instruction of Operation of Yegu SCADA System	EDWS-YPS-OP4-W1	Completed	0	0
40			Working Instruction of Maintenance of Yegu SCADA System	EDWS-YPS-MP4-W1	Completed	0	0
41			Daily Report Compilation	EDWS-YPS-MP4-F1	Completed	0	0
42			Sim Card Recharged/Top-up record	Yegu P/S Office	Completed	0	0
6	43	HRD Section	Main SOP	EDWS-HRD-OP	Completed	0	0
	44		HRD KPI Format	EDWS-HRD-OP-F1	Completed	0	0
	45		Training Preparation	EDWS-HRD-OP-W1	Completed	0	0
	46		Training Needs Questionnaires	EDWS-HRD-OP-W1-F1	Completed	0	0
	47		Training Implementation	EDWS-HRD-OP-W2	Completed	0	0
	48		Schedule of Training Preparation	EDWS-HRD-OP-W2-F1	Completed	0	0
	49		Trainers' Feedback	EDWS-HRD-OP-W2-F2	Completed	0	0
	50		Trainees' Feedback	EDWS-HRD-OP-W2-F3	Completed	0	0
	7	51	Computer Section	Instructions to issue water bills	EDWS-CS-OP1	Completed	0	0
52			Instructions of monthly meter reading in Townships	EDWS-CS-OP1-W1	Completed	0	0
53			Monthly meter reading record form	EDWS-CS-OP1-F1	Completed	0	0
54			Form of monthly water charges bill	EDWS-CS-OP1-F2	Completed	0	0
55			Instructions to submit demand for monthly bill issuing (Yapha 1)	EDWS-CS-OP1-W4	Completed	0	0
56			Instructions for Customer Data inputting in Computer system	EDWS-CS-OP1-W5	Completed	0	0
57			Instructions to issues monthly meter bills (Yapha 3)	EDWS-CS-OP1-W6	Completed	0	0
58			Instructions to reissue the error bills	EDWS-CS-OP1-W7	Completed	0	0
59			Monthly meter reading record form	EDWS-CS-OP1-W1-F1	Completed	0	0
60			Water Connection Permit	EDWS-CS-OP1-W4-A1	Completed	0	0
61			Water Connection Permit	EDWS-CS-OP1-W4-A2	Completed	0	0
62			Monthly meter readings record form	EDWS-CS-OP1-W4-F1	Completed	0	0
63			Water Bill	EDWS-CS-OP1-W4-F2	Completed	0	0
64			Form of no. of bill approved (Yapha 6)	EDWS-CS-OP1-W4-F3	Completed	0	0
65			Data Server Operation Setp 1	EDWS-CS-OP1-W5-A1	Completed	0	0
66			Data Server Operation Setp 2	EDWS-CS-OP1-W5-A2	Completed	0	0
67			Data Server Operation Setp 3	EDWS-CS-OP1-W5-A3	Completed	0	0
68			Data Server Operation Setp 4	EDWS-CS-OP1-W5-A4	Completed	0	0
69			Data Server Operation Setp 5	EDWS-CS-OP1-W5-A5	Completed	0	0
70			Data Server Operation Setp 6	EDWS-CS-OP1-W5-A6	Completed	0	0
71			Data Server Operation Setp 7	EDWS-CS-OP1-W5-A7	Completed	0	0
72		Data Server Operation Setp 8	EDWS-CS-OP1-W5-A8	Completed	0	0	
73		Data Server Operation Setp 9	EDWS-CS-OP1-W5-A9	Completed	0	0	
74		List of Consumption units and water charges of customers	EDWS-CS-OP1-W6-A1	Completed	0	0	
75		Form of monthly water charges bill	EDWS-CS-OP1-W6-F1	Completed	0	0	
76		Form of no. of bill approved (Yapha 6)	EDWS-CS-OP1-W6-F2	Completed	0	0	
77		Request form to reissue the bill (township to HO)	EDWS-CS-OP1-W7-A1	Completed	0	0	
78		Form of monthly water charges bill	EDWS-CS-OP1-W7-F1	Completed	0	0	
8	79	Central Laboratory	Admin SOPs				
	80		Water Quality Monitoring	EDWS-LAB-OP1	Completed	0	0
	81		Daily Duty	EDWS-LAB-OP1-W1	Completed	0	0
	82		Weekly Duty	EDWS-LAB-OP1-W2	Completed	0	0
	83		Monthly Duty	EDWS-LAB-OP1-W3	Completed	0	0
	84		Sampling & Storage	EDWS-LAB-OP1-W4	Completed	0	0
	85		Instruction for Laboratory (Dos & Don't)	EDWS-LAB-OP1-W5	Completed	0	0
	86		Chemical Handling	EDWS-LAB-OP1-W6	Completed	0	0
	87		Meter Operation	EDWS-LAB-OP1-W7	Completed	0	0

88		Safety	EDWS-LAB-OP1-W8	Completed	0	0
89		Analysis SOPs				
90		EC (Electrical Conductivity)	EDWS-CL-AP-W-2	Completed	0	0
91		TDS	EDWS-CL-AP-W-3	Completed	0	0
92		Salinity	EDWS-CL-AP-W-4	Completed	0	0
93		Color	EDWS-CL-AP-W-5	Completed	0	0
94		Turbidity (HANNA)	EDWS-CL-AP-W-6	Completed	0	0
95		Portable Turbidity (HANNA)	EDWS-CL-AP-W-6	Completed	0	0
96		Suspended Solid	EDWS-CL-AP-W-7	Completed	0	0
97		Jar Test	EDWS-CL-AP-W-8	Completed	0	0
98		Total Hardness	EDWS-CL-AP-W-9	Completed	0	0
99		Calcium	EDWS-CL-AP-W-10	Completed	0	0
100		Total Alkalinity	EDWS-CL-AP-W-11	Completed	0	0
101		Chloride	EDWS-CL-AP-W-12	Completed	0	0
102		Maganese	EDWS-CL-AP-W-13	Completed	0	0
103		Iron (Fe)	EDWS-CL-AP-W-14	Completed	0	0
104		Nitrate-Nitrogen (NO ₃ -N)	EDWS-CL-AP-W-15	Completed	0	0
105		Nitrate-Nitrogen (NO ₂ -N)	EDWS-CL-AP-W-16	Completed	0	0
106		Ammonia (NH ₃ -N)	EDWS-CL-AP-W-17	Completed	0	0
107		Sulphate (SO ₄ -2)	EDWS-CL-AP-W-18	Completed	0	0
108		Phosphorous (PO ₄ -3)	EDWS-CL-AP-W-19	Completed	0	0
109		Lead (Pb)	EDWS-CL-AP-W-20	Completed	0	0
110		Zinc	EDWS-CL-AP-W-21	Completed	0	0
111		Arsenic (Portable Test)	EDWS-CL-AP-W-22	Completed	0	0
112		Phosphorous (Total LR)	EDWS-CL-AP-W-23	Completed	0	0
113		Phosphorous (Total HR)	EDWS-CL-AP-W-24	Completed	0	0
114		Nitrogen, Total LR (0.5 to 25 mg/L)	EDWS-CL-AP-W-25	Completed	0	0
115		Nitrogen, Total LR (1 to 16 mg/L)	EDWS-CL-AP-W-26	Completed	0	0
116		Nitrogen, Total LR (2 to 150 mg/L)	EDWS-CL-AP-W-27	Completed	0	0
117		Residual Chlorine	EDWS-CL-AP-W-28	Completed	0	0
118		Quanti Tray	EDWS-CL-AP-W-29	Completed	0	0
119		Total Coliform & Fecal Coliform	EDWS-CL-AP-W-30	Completed	0	0
120		Equipment SOPs				
121		pH Calibration for Mettler Toledo Brand	EDWS-SuD-EP-WI-1	Completed	0	0
122		EC Calibration for Mettler Toledo Brand	EDWS-SuD-EP-WI-2	Completed	0	0
123		Balance	EDWS-SuD-EP-WI-3	Completed	0	0
124		Oven	EDWS-SuD-EP-WI-4	Completed	0	0
125		Desiccator	EDWS-SuD-EP-WI-5	Completed	0	0
126		Measurement of Turbidity (HANNA)	EDWS-SuD-EP-WI-6	Completed	0	0
127		DO Meter	EDWS-SuD-EP-WI-7	Completed	0	0
128		U-50 Meter	EDWS-SuD-EP-WI-8	Completed	0	0
129		Jar Test (Laboratory Flocculator)	EDWS-SuD-EP-WI-9	Completed	0	0
130		DR-6000 (UV Spectrophotometer)	EDWS-SuD-EP-WI-10	Completed	0	0
131		Fume Hood	EDWS-SuD-EP-WI-11	Completed	0	0
132		DRB 200 Reactor (Digester)	EDWS-SuD-EP-WI-12	Completed	0	0
133		Burette	EDWS-SuD-EP-WI-13	Completed	0	0
134		Quanti-Tray Sealer Plus	EDWS-SuD-EP-WI-14	Completed	0	0
135		UV-Viewing Cabinet	EDWS-SuD-EP-WI-15	Completed	0	0
136		Incubator	EDWS-SuD-EP-WI-16	Completed	0	0
137		Auto Clave	EDWS-SuD-EP-WI-17	Completed	0	0
9	Mini Labs	Mini Lab's SOP	EDWS-LAB-OP2	Completed	0	0
139		pH measurement instruction	EDWS-LAB-OP1-W1	Completed	0	0
140		EC measurement instruction	EDWS-LAB-OP1-W2	Completed	0	0
141		Salinity measurement instruction	EDWS-LAB-OP1-W3	Completed	0	0
142		Total Dissolved Solid measurement instruction	EDWS-LAB-OP1-W4	Completed	0	0
143		Jar Test measurement instruction	EDWS-LAB-OP1-W5	Completed	0	0
144		pH measurement instruction for mini lab	EDWS-LAB-OP2-W1	Completed	0	0
145		Turbidity measurement instruction for mini lab	EDWS-LAB-OP2-W2	Completed	0	0
146		Color measurement instruction for mini lab	EDWS-LAB-OP2-W3	Completed	0	0
147		Chlorine measurement instruction for mini lab	EDWS-LAB-OP2-W4	Completed	0	0
148		Daily activities instructions in the lab.	EDWS-LAB-OP2-W5	Completed	0	0
149		Instruction for taking water sample	EDWS-LAB-OP2-W6	Completed	0	0
10	Pipe Sections (Transmissio	Duties and Responsibilities of Transmission Pipe Sections	EDWS-TPS-OP	Drafted	0	0
151		Daily Pipe Inspection Record	EDWS-TPS-OP-A1	0	0	0
152		Standards of Backfilling, paving thickness based on pipe diameter	EDWS-TPS-OP-A2	0	0	0
153		Regular Inspection Record	EDWS-TPS-OP-F1	0	0	0
154		Valve Operation Record	EDWS-TPS-OP-F2	0	0	0
155		Record of Pipe Burst repair	EDWS-TPS-OP-F3	0	0	0
156		Instruction for Transmission pipe inspection and maintenance	EDWS-TPS-OP-W1	0	0	0
157		Instruction for Transmission pipe repair	EDWS-TPS-OP-W2	0	0	0
158		Instruction for pressure control of Transmission pipe	EDWS-TPS-OP-W3	0	0	0
159		Instruction for the development of Transmission pipeline map	EDWS-TPS-OP-W4	0	0	0
160		Instruction for Transmission Pipe Extension	EDWS-TPS-OP-W5	0	0	0
11	Gyophyu Reservoir	Pump Operation	EDWS-GR-OP1	Drafted	0	0
162		Maintenance instruction	EDWS-GR-OP1-W1	Drafted	0	0
163		Pump operation instruction	EDWS-GR-OP1-W2	Drafted	0	0
164		Filteration basin operation instruction	EDWS-GR-OP1-W3	Drafted	0	0
165		Gyophyu pipeline maintenace instruction	EDWS-GR-OP1-W4	Drafted	0	0
166		Electrical & mechanical maintenance instruction	EDWS-GR-OP1-W5	Drafted	0	0
167		Filteration basin	EDWS-GR-OP2	Drafted	0	0
168		Gyophyu reservoir maintenance	EDWS-GR-OP3	Drafted	0	0
169		Gyophyu pipeline maintenance	EDWS-GR-MP4	Drafted	0	0
170		Electrical & mechanical maintenance	EDWS-GR-MP5	Drafted	0	0
12	Phugyi Reservoir	Safety works in Pyawbwsu pump station	EDWS-PBPS-OP1-W1	Drafted	0	0
172		Pyawbwsu Pump Station operation	EDWS-PBPS-OP1-W2	Drafted	0	0
173		Safety works in Phugyi pump station	EDWS-PGPS-OP1-W1	Drafted	0	0
174		Phugyi Pump Station Operation	EDWS-PGPS-OP1-W2	Drafted	0	0
175		Monthly PI data	EDWS-PBPS-MP1-F1	Drafted	0	0
176		Check Sheet	EDWS-PBPS-MP1-F2	Drafted	0	0
177		Weekly Check sheet for pump station (Pyawbwsu)	EDWS-PBPS-MP1-F3	Drafted	0	0
178		Monthly Check sheet for pump station (Pyawbwsu)	EDWS-PBPS-MP1-F4	Drafted	0	0
179		Yeartk Check sheet for pump station (Pyawbwsu)	EDWS-PBPS-MP1-F5	Drafted	0	0
180		Report System	EDWS-PBPS-MP1-F6	Drafted	0	0
181			EDWS-PBPS-MP1-F7	Drafted	0	0
182		Check Sheet	EDWS-PGPS-MP1-F1	Drafted	0	0
183		Weekly Check sheet for pump station (Phugyi)	EDWS-PGPS-MP1-F2	Drafted	0	0
184		Monthly Check sheet for pump station (Phugyi)	EDWS-PGPS-MP1-F3	Drafted	0	0
185		YEarkt Check sheet for pump station (Phugyi)	EDWS-PGPS-MP1-F4	Drafted	0	0
186		Report System	EDWS-PGPS-MP1-F5	Drafted	0	0
187			EDWS-PGPS-MP1-F6	Drafted	0	0
188		Safet ywork in Phugyi pump station	EDWS-PGPS-OP1-W1	Drafted	0	0
189		Phugyi Reservoir Orginzation Chart	EDWS-PR-OP1-F1	Drafted	0	0
190		Checking Phugyi Reservoir catchment area	EDWS-PR-OP1-W1	Drafted	0	0
191		Checking Phugyi Reservoir area & Intake	EDWS-PR-OP1-W2	Drafted	0	0
192		Checking Phugyi Reservoir Surface area	EDWS-PR-OP1-W3	Drafted	0	0
13	Hlawga Reservoir	Hlawgaw Reservoir Area Inspection Activiity	EDWS-HR-OP1	Drafted	0	0
194		Hlawga Reservoir Surface water maintenance	EDWS-HR-OP2	0	0	0
195		Hlawga Reservoir Safety	EDWS-HR-OP3	0	0	0
196		Maintenance of Hlawga Reservoir	EDWS-HR-MP1	0	0	0

		197	Maintenance of Hlawga Dam	EDWS-HR-MP2		0	0
		198	Maintenance of Hlawga Pipeline	EDWS-HR-MP3		0	0
		199	Maintenance of Spillway	EDWS-HR-MP4		0	0
14	Hlawga Pump Station	200	Hlawga pump station maintenance plan	EDWS-HPS-MP		0	0
		201	Hlawga Pump Station operation plan	EDWS-HPS-OP1		0	0
		202	Hlawga Pump Station Operation Plan	EDWS-HPS-OP2		0	0
		203	Hlawga Pump Station Operation Plan	EDWS-HPS-OP3		0	0
		204	Hlawga Pump Station Report System	EDWS-HPS-RS		0	0
		205	Hlawga Pump Station Security	EDWS-HPS-SE		0	0
		206	Hlawga Pump Station Safety First	EDWS-HPS-SF		0	0
		207	Specification	EDWS-HPS-SP		0	0
		208	Operation & Maintenance of the pumps	EDWS-HPS-W		0	0
15	Nyaungnapin WTP	209	The functions of Nyaungnapin WTP	EDWS-NWTP-OP1	Completed	0	0
		210	Low Lift Pump Operation	EDWS-NWTP-OP2	Completed	0	0
		211	Low lift pump operation record	EDWS-NWTP-OP2-F1	Completed	0	0
		212	Monitoring sheet for booster pump operation	EDWS-NWTP-OP2-F2	Completed	0	0
		213	ACH Using method	EDWS-NWTP-OP3	Completed	0	0
		214	Dosing Rate Table	EDWS-NWTP-OP3-A1	Completed	0	0
		215	Dosing Rate Table	EDWS-NWTP-OP3-A2	Completed	0	0
		216	Jar Test Data	EDWS-NWTP-OP3-AP1	Completed	0	0
		217	Dosing Record	EDWS-NWTP-OP3-F1	Completed	0	0
		218	Water Quality Data	EDWS-NWTP-OP3-F2	Completed	0	0
		219	Daily ACH Dosing Record	EDWS-NWTP-OP3-F3	Completed	0	0
		220	Flocculation basin operation	EDWS-NWTP-OP4	Completed	0	0
		221	Sedimentation basin operation	EDWS-NWTP-OP5	Completed	0	0
		222	Backwashin process in Rapid Sand Filter	EDWS-NWTP-OP6	Completed	0	0
		223	Booster Pump Operation	EDWS-NWTP-OP8	Completed	0	0
		224	Monitoring sheet for booster pump operation (Phase1)	EDWS-NWTP-OP8-F1	Completed	0	0
		225	Monitoring sheet for booster pump operation (Phase2)	EDWS-NWTP-OP8-F2	Completed	0	0
		226	Things to be carried out if power failure happens	EDWS-NWTP-OP9	Completed	0	0
		227	Things to be carried out when power recovers	EDWS-NWTP-OP10	Completed	0	0
		228	Pump operation & supplied water amount record (Phase 1)	EDWS-NWTP-OP-F1	Completed	0	0
		229	Pump operation & supplied water amount record (Phase2)	EDWS-NWTP-OP-F2	Completed	0	0
		230	Production (Reservoir, WTP, underground water) & Transmission	PI Data Record	Completed	0	0
16	GIS Section	231	Duties and Responsibilities of GIS section	EDWS-GIS-OP	Completed	0	0
		232	Instructions for Data Collection	EDWS-GIS-OP-W1	Completed	0	0
		233	Table of pipe information	EDWS-GIS-OP-W1-F1	Completed	0	0
		234	Table of valve information	EDWS-GIS-OP-W1-F2	Completed	0	0
		235	Table of tubewell information	EDWS-GIS-OP-W1-F3	Completed	0	0
		236	Table of monthly consumption data	EDWS-GIS-OP-W1-F4	Completed	0	0
		237	Table of NRW information	EDWS-GIS-OP-W1-F5	Completed	0	0
		238	Table of Pumping Station Information	EDWS-GIS-OP-W1-F6	Completed	0	0
		239	Table of Water Quality data/information	EDWS-GIS-OP-W1-F7	Completed	0	0
		240	Directive on Data inputting in GIS	EDWS-GIS-OP-W2	Completed	0	0
		241	Specifications for pipeline data inputting	EDWS-GIS-OP-W2-A1a	Completed	0	0
		242	Pipe color specifications	EDWS-GIS-OP-W2-A1b	Completed	0	0
		243	Specifications for valve data inputting	EDWS-GIS-OP-W2-A2	Completed	0	0
		244	Specifications for tubewell data inputting	EDWS-GIS-OP-W2-A3	Completed	0	0
		245	Specifications for water consumption data inputting	EDWS-GIS-OP-W2-A4	Completed	0	0
		246	Specifications for tubewell data inputting	EDWS-GIS-OP-W2-A5	Completed	0	0
		247	Specifications for pumping station data inputting	EDWS-GIS-OP-W2-A6	Completed	0	0
		248	Specifications for water quality data inputting	EDWS-GIS-OP-W2-A7	Completed	0	0
		249	Directive on GIS Data analysis	EDWS-GIS-OP-W3	Completed	0	0
		250	Map of the comparison of Active and Inactive area of wards	EDWS-GIS-OP-W3-A1	Completed	0	0
		251	Map of average monthly consumption of wards	EDWS-GIS-OP-W3-A2	Completed	0	0
		252	Table of average monthly consumption data of wards	EDWS-GIS-OP-W3-F1	Completed	0	0
		253	Instructions for GIS map updating	EDWS-GIS-OP-W4	Completed	0	0
		254	Standard Mapping Format	EDWS-GIS-OP-W4-A1	Completed	0	0
		255	Survey measurement instructions	EDWS-GIS-OP-W5	Completed	0	0
17	Major Maintenance Section	256	Maintenance of Motor vehicles, generators, vehicles and mechanisms and	EDWS-HDM-MP	Drafted	0	0
		257	Maintenance of vehicles and generators	EDWS-HDM-MP-W1	Drafted	0	0
		258	Maintenance of booster pumps	EDWS-HDM-MP-W2	Drafted	0	0
		259	Maintenance of Transmission Pipes (60" and 66" Concrete Pipe)	EDWS-HDM-MP-W3	Drafted	0	0
		260	SOS Interval Chart	EDWS-HDM-MP-A1	Drafted	0	0
18	Customer Service Section	261	Directive on fulfilling the need of customer Directive on collecting water charges fully	EDWS-CSS-OP1	Completed	0	0
		262	Instruction for new customers	EDWS-CSS-OP1-W1	Completed	0	0
		263	Instruction to staff of House Connection Section	EDWS-CSS-OP1-W2	Completed	0	0
		264	Instruction for the Customer to comply with, regarding connecting to water	EDWS-CSS-OP1-W3	Completed	0	0
		265	Instruction for township staff to collect water charges for new connections	EDWS-CSS-OP1-W4	Completed	0	0
		266	Instruction for meter readers	EDWS-CSS-OP1-W5	Completed	0	0
		267	Instruction for abnormal consumption	EDWS-CSS-OP1-W6	Completed	0	0
		268	Instruction for billing of damaged meter	EDWS-CSS-OP1-W7	Completed	0	0
		269	Instruction for paying water bill	EDWS-CSS-OP1-W8	Completed	0	0
		270	Debt collection	EDWS-CSS-OP1-W9	Completed	0	0
		272	Yapha 1	EDWS-CSS-OP1-F1	Completed	0	0
		273	Yapha 2	EDWS-CSS-OP1-F2	Completed	0	0
		274	Yapha 3	EDWS-CSS-OP1-F3	Completed	0	0
		275	Yapha 4	EDWS-CSS-OP1-F4	Completed	0	0
		276	Yapha 8	EDWS-CSS-OP1-F8	Completed	0	0
19	Finance Division	277	Duties and Resopnsibilities of Finance Division	EDWS-FD-OP1	Applied	0	0
		278	Instruction for receiving water charges and other income	EDWS-FD-OP1-W1	Applied	0	0
		279	Instruction for Disbursement of expenditure, making expenditure list, and list of expense activities	EDWS-FD-OP1-W2	Applied	0	0
		280	Instruction for Fixed Assets maintenance	EDWS-FD-OP1-W3	Applied	0	0
		281	Invoice for Departmental Water charges	EDWS-FD-OP1-W1-A1	Applied	0	0
		282	YaPha 2	EDWS-FD-OP1-W1-F1	Applied	0	0
		283	YaPha 5	EDWS-FD-OP1-W1-F2	Applied	0	0
		284	YaPha 7	EDWS-FD-OP1-W1-F3	Applied	0	0
		285	YaPha 8	EDWS-FD-OP1-W1-F4	Applied	0	0
		286	HtaSa 5	EDWS-FD-OP1-W1-F5	Applied	0	0
		287	HtaSa 6	EDWS-FD-OP1-W1-F6	Applied	0	0
		288	HtaSa 7	EDWS-FD-OP1-W1-F7	Applied	0	0
		289	HtaSa 9	EDWS-FD-OP1-W1-F8	Applied	0	0
		290	HtaSa 6 B/S	EDWS-FD-OP1-W2-F1	Applied	0	0
		291	HtaSa 8	EDWS-FD-OP1-W2-F2	Applied	0	0
		292	HtaSa 9 Governmental Accounting Budget item	EDWS-FD-OP1-W2-F3	Applied	0	0
		293	Expenditure list (Expense activities)	EDWS-FD-OP1-W2-F4	Applied	0	0
		294	Expenditure list (Budget Estimation)	EDWS-FD-OP1-W2-F5	Applied	0	0
		295	Disbursement of Expenditure (Advance)	EDWS-FD-OP1-W2-F6	Applied	0	0
		296	Disbursement of Expenditure (လက်ကျန်ငွေထုတ်ပေးခြင်း)	EDWS-FD-OP1-W2-F7	Applied	0	0
		297	Stock Request Form	EDWS-FD-OP1-W2-F8	Applied	0	0
		298	Submitting Project List (Investment Form 1)	EDWS-FD-OP1-W2-F9	Applied	0	0
		299	Submitting Project List (Investment Form 2)	EDWS-FD-OP1-W2-F10	Applied	0	0
		300	Submitting Project list (Report of Progress summary)	EDWS-FD-OP1-W2-F11	Applied	0	0
		301	Submitting Project list (Report of Progress details)	EDWS-FD-OP1-W2-F12	Applied	0	0
		302	Total Fixed Asset List	EDWS-FD-OP1-W3-F1	Applied	0	0
		303	Fixed Asset Registration	EDWS-FD-OP1-W3-F2	Applied	0	0
		304	Depreciation Rate table	EDWS-FD-OP1-W3-F3	Applied	0	0
20	Main Store	305	Duties and responsibilities of Main Store	EDWS-MS-OP	Drafted	0	0

	306			EDWS-MS-OP-W1			
	307			EDWS-MS-OP-W2			
	308			EDWS-MS-OP-W3			
	309			EDWS-MS-OP-W4			
	310			EDWS-MS-OP-W5			
	311			EDWS-MS-OP-F1			
	312			EDWS-MS-OP-F2			
	313			EDWS-MS-OP-F2			
21	314	Planning Section	PI Data Monitoring and Analysis	EDWS-PS-OP	Completed	0	0
	315		Sub-Format Data request to Township (Data Collection)	EDWS-PS-OP-W1	Completed	0	0
	316		Combination of Township Data	EDWS-PS-OP-W2	Completed	0	0
	317		PI Datasheet Inputting	EDWS-PS-OP-W3	Completed	0	0
	318			EDWS-PS-OP-W4	Completed	0	0
	319		Clear Sub-format	EDWS-PS-OP-W1-F1	Completed	0	0
	320		Distribution & NRW Township Data Format	EDWS-PS-OP-W1-F2	Completed	0	0
	321		Monthly Data of Connection and Consumption Unit	EDWS-PS-OP-W1-F3	Completed	0	0
	322		Combination	EDWS-PS-OP-W2-F1	Completed	0	0
	323		Combination of NRW KPI	EDWS-PS-OP-W2-F2	Completed	0	0
	324		Connection and Consumption Data Sheet	EDWS-PS-OP-W2-F3	Completed	0	0
	325		Transmission Flow Measurement	EDWS-PS-OP-W3-F1	Completed	0	0
	326		Inputting Combination Data in PI Datasheet/Water Quality Summary	EDWS-PS-OP-W3-F2	Completed	0	0
	327		PI of Finance	EDWS-PS-OP-W3-F3	Completed	0	0
	328		PI of Admin and HR	EDWS-PS-OP-W3-F4	Completed	0	0
	329		Sales & Collection	EDWS-PS-OP-W4-F1	Completed	0	0
	330		Distribution and NRW PI Data Sheet	EDWS-PS-OP-W4-F2	Completed	0	0
	331		Distribution and NRW data request to Township	EDWS-PS-OP2	Completed	0	0
	332		Meter Connection & Consumption Data request to Township	EDWS-PS-OP3	Completed	0	0
	333			EDWS-PS-OP3-F1	Completed	0	0
	334			EDWS-PS-OP3-F2	Completed	0	0
22	335	Admin Section	Duties and Responsibilities of Admin Division	EDWS-ADM-OP	Completed	0	0
	336			EDWS-ADM-OP-W1	Completed	0	0
	337			EDWS-ADM-OP-W2	Completed	0	0
23	338	Districts & Townships	Instruction for Township works	EDWS-D&TS-OP	Completed	0	0
	339			EDWS-D&TS-OP1	Completed	0	0
	340			EDWS-D&TS-OP2	Completed	0	0
	341			EDWS-D&TS-OP3	Completed	0	0
	342			EDWS-D&TS-OP4	Completed	0	0
24	343	NRW Section	Plane table survey		Drafted	0	0
	344		Pipeline marking (Pavement cutting line)		Drafted	0	0
	345		How to check digging depth, width and depth		Drafted	0	0
	346		How to write construction signboard		Drafted	0	0
	347		Pipe laying work (Distribution - DIP, RRV, HDPE, Service Pipe)		Drafted	0	0
	348		Pressure test		Drafted	0	0
	349		Drilling for service connection		Drafted	0	0
	350		Backfill		Drafted	0	0
	351		Material management		Drafted	0	0
	352		Equipment management		Drafted	0	0
	353		Pipeline drawing (Offset drawing, As-Built drawing)		Drafted	0	0
	354		Pressure measurement		Drafted	0	0
	355		Flow measurement		Drafted	0	0
	356		Leakage volume measurement		Drafted	0	0
	357		Leak correlator		Drafted	0	0
	358		Leak detection		Under preparation	0	0
	359		Minimum Night Flow		Under preparation	0	0
	360		Night Step Test		Under preparation	0	0
	361		Customer Survey		Drafted	0	0
	362		DMA Management		Under preparation	0	0
	363		Main SOP		Drafted	0	0
	364		Main SOP Physical Loss		Drafted	0	0
	365		Main SOP Commercial Loss		Drafted	0	0
25	366	Aung Tagon Pumping Station	The functions of Aung Tagon Pumping Station	EDWS-APS-OP	Completed	0	0
	367		Maintenance of Pump station & water intake	EDWS-APS-MP1	Completed	0	0
	368		Daily Check Sheet of Pumping Station	EDWS-APS-MP1-F1	Completed	0	0
	369		Performance Indicator (PI Data) Form	EDWS-APS-MP1-F2	Completed	0	0
	370		Maintenance of Water Intake	EDWS-APS-MP1-W1	Completed	0	0
	371		Maintenance of Pumps	EDWS-APS-MP1-W2	Completed	0	0
	372		Operation of pump station & water intake	EDWS-APS-OP1	Completed	0	0
	373		Operation of Water Intake	EDWS-APS-OP1-W1	Completed	0	0
	374		Operation of Pumps	EDWS-APS-OP1-W2	Completed	0	0
26	375	PR Section	The functions of Public Relation Section	EDWS-PR-OP	Applied	0	0
	376		The functions of Public Relation Section	EDWS-PR-OP1-W1	Applied	0	0
	377		The functions of Public Relation Section	EDWS-PR-OP1-W2	Applied	0	0
	378		The functions of Public Relation Section	EDWS-PR-OP1-W3	Applied	0	0
	379		Phamlets	EDWS-PR-OP1	Applied	0	0
27	380	Design Section	The functions of Design Section	EDWS-DS-OP	Not finished	0	0
	381		Instruction for details pipeline drawing	EDWS-DS-OP-W1	Not finished	0	0
	382		Instruction for Design calculation	EDWS-DS-OP-W2	Not finished	0	0
	383		Instruction for Hydraulic Design calculation	EDWS-DS-OP-W3	Not finished	0	0
	384		Table for pipeline layout	EDWS-DS-OP-A1	Not finished	0	0
	385		Table for demographic per township	EDWS-DS-OP-A2	Not finished	0	0
	386		Future water coverage area for each township	EDWS-DS-OP-A3	Not finished	0	0
	387		Water Demand Calculation Flow Chart	EDWS-DS-OP-A4	Not finished	0	0
	388		Roughness Coefficient Table	EDWS-DS-OP-A5	Not finished	0	0
	389		Survey measurement record	EDWS-DS-OP-F1	Not finished	0	0
	390		Drawing Title Block Form	EDWS-DS-OP-F2	Not finished	0	0
28	391	Estimate Section	Inspection & Calculation on detail expenditure in the department	EDWS-SD-OP	Applied	0	0
	392		Instruction for primary investigation	EDWS-SD-OP-W1	Applied	0	0
	393		Instruction for calculation	EDWS-SD-OP-W2	Applied	0	0
	394		Estimated cost form for the works which are above 50 Lakhs	EDWS-SD-OP-W1-F1	Applied	0	0
	395		Estimated cost form for the works which are between 50 to 60 Lakhs	EDWS-SD-OP-W1-F2	Applied	0	0
	396		Estimated cost form for the works which are between 30 to 50 Lakhs	EDWS-SD-OP-W1-F3	Applied	0	0
	397		Estimated cost form for the works which are between 25 to 30 Lakhs	EDWS-SD-OP-W1-F4	Applied	0	0
	398		Estimated cost form for the works which are between 20 to 25 Lakhs	EDWS-SD-OP-W1-F5	Applied	0	0
	399		Estimated cost form for the works which are up to 20 Lakhs	EDWS-SD-OP-W1-F6	Applied	0	0
	400		Estimated cost form	EDWS-SD-OP-W1-F7	Applied	0	0
	401		Cover form	EDWS-SD-OP-W1-F8	Applied	0	0
	402		Details estimation form	EDWS-SD-OP-W1-F9	Applied	0	0
	403		Work Schedule	EDWS-SD-OP-W1-F10	Applied	0	0
	404		Departmental Form	EDWS-SD-OP-W1-F11	Applied	0	0
	405		Necessary items table	EDWS-SD-OP-W2-F1	Applied	0	0
	406		Estimated materials form	EDWS-SD-OP-W2-F2	Applied	0	0
	407		Labor Charges Form	EDWS-SD-OP-W2-F3	Applied	0	0
29	408	House Connection Section	Procedures for House connection permit	EDWS-HC-OP	Applied	0	0
	409		House Connection permit form	EDWS-HC-OP-A1	Applied	0	0
	410		Permit for water use	EDWS-HC-OP-A2	Applied	0	0
	411		Onground survey by the township officer	EDWS-HC-OP-A3	Applied	0	0
	412		Water Connection application form	EDWS-HC-OP-A4	Applied	0	0
	413		Procedures for House Connection permission	EDWS-HC-OP-W1	Applied	0	0

	414		Procedures for House Connection permission (Final water connection)	EDWS-HC-OP-W2	Applied	O	
	415		Procedures for House Connection permission (Old house water connection)	EDWS-HC-OP-W3	Applied	O	
	416		Procedures for House Connection permit (branch water connection)	EDWS-HC-OP-W4	Applied	O	
	417		Procedures for House Connection permit (extra water connection)	EDWS-HC-OP-W5	Applied	O	
30	418	Other reservoirs (Kandawgyi)	Maintenance of Kandawgyi & Inya Lakes	EDWS-K I-OP	Applied	O	
	419		Strengthening of the bank of the lakes and cleaning activities	EDWS-K I-OP-W1	Applied	O	
	420		Cleaning the weeds, algae and water born plants in the lakes	EDWS-K I-OP-W2	Applied	O	
	421		Cleaning the surface of the water using Skimmer	EDWS-K I-OP-W3	Applied	O	
31	422	Electrical & Mechanical Section	Digging and Maintenance of Tubewells and pumps	EDWS-EM-OP	Applied	O	
	423		Instruction for operation of Tube well section	EDWS-EM-OP-W1	Applied	O	
	424		Instruction for tube well and its related activities	EDWS-EM-OP-W2	Applied	O	
	425		Instruction for maintenance of Tube well section	EDWS-EM-MP-W1	Applied	O	
	426		Instruction for electrical section	EDWS-EM-MP-W2	Applied	O	
	427		Instruction for Mechanical Section	EDWS-EM-MP-W3	Applied	O	
	428		Instruction for safety and emergency	EDWS-EM-OP-W3	Applied	O	
	429		Pumps inspection format	EDWS-EM-MP-F1	Applied	O	
	430		Instruction for the pump operators	EDWS-EM-MP-A	Applied	O	
	32	431	Planning Section	Preparation and management of Mid-term Management Plan		Under preparation	
432			Form- Current performance and challenges				
433			Form- Questionnaire on priority policy for MTP				
434			Form- PIs target				
435			Form- Financial projection				
436			Form- Activity				
437			Form- Table of contents				
438			Form- Monitoring performance				
33	439	Lagunpin WTP			Under preparation		

Total 413 336
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