

**RMS and DAR Implementation Status
Thimphu and Phuentsholing Thromdes**

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

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1. Introduction

“Bhutan 2020: A vision for Peace, Prosperity and Happiness” is the Royal Government of Bhutan’s (RGoB) vision for country. The vision document provides strategy for Bhutan’s distinct path of development. It recognizes the country’s unique challenges as it undergoes a profound and rapid demographic transition from a largely subsistence rural economy to an urban society. The rapid urbanization growth is particularly challenging to meet the increased public service delivery commitments. To tackle the challenges posed by rapid urbanization growth, Royal Government of Bhutan has put in place National Urbanization Strategy which is aimed to ensure balanced and equitable growth. The strategy envisages provision of adequate urban infrastructure on the one hand and on the other hand capacitating the administrative institutions, especially at the local government level. The RGoB is also creating an enabling legal, institutional and operational framework to make the Class A Thromdes financially and administratively autonomous.

The urban population is growing and will continue to grow in the years to come. It is projected that the urban population will reach 50 % of the total population by the year 2020. Therefore, the administration, management, planning, infrastructure development and provision of essential services in a sustainable manner by facilitating direct participation of the people in the development and management of their social, economic and environmental well-being is vital for Thromde and its residents.

Ministry of Works and Human Settlement adopted the Thromde Rules of the Kingdom of Bhutan, 2011 in September 2011. The Thromde rules intent to provide a democratic and accountable government for the local urban communities and empowers the Thromdes to provide essential services, review and implement physical plans, to promote public participation in decision making and to manage the resources and growth of the Thromdes in a sustainable manner.

The World Bank has been supporting Royal Government of Bhutan by providing technical assistance to strengthen municipal management system under the Bhutan Urban Development Program II (BUDP II). The BUDP II project, through the World Bank’s IDA Credit comprised of the following components:

- a. Municipal Finance and Management
- b. Thimphu Northern Area Development
- c. Capacity Building

Under the Municipal Finance and Management, activities to strengthen and reform the institutional systems and financial processes in Thimphu and Phuentsholing Thromdes were undertaken. The main objectives of the activities were:

- a. Strengthen local revenue administration through computerization and re-engineering business processes
- b. Strengthen local government expenditure management and financial management systems and processes
- c. Enhance accountability of Thromdes to citizens through regular performance reporting

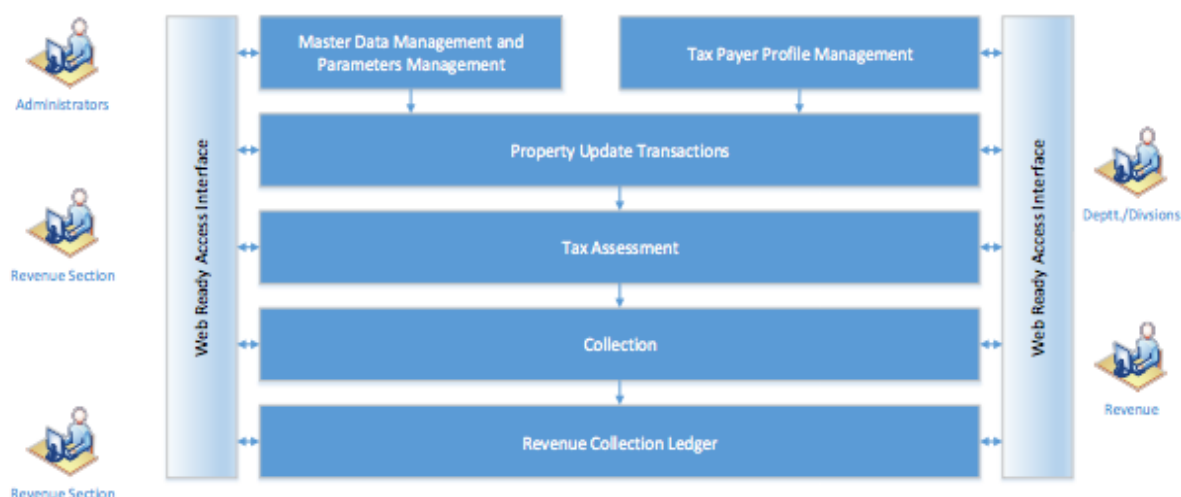
Revenue Management System (RMS) and Digitized Asset Register (DAR) are developed and implemented in Thimphu and Phuentsholing Thromdes.

2. System Background

2.1. Revenue Management System

Realizing the urgent need to strengthen revenue administration with a goal of expanding the revenue base and increase the outreach of revenue collection, revenue management system was developed with financial support from World Bank under the municipal finance and management component of Bhutan Urban Development Program II. The revenue management system covers all applicable sources of revenue which includes service fees and charges, property taxes (land Tax and Urban House Tax), parking fee collection, and environmental fines. The system comprises of property database and tax payer database.

The Revenue management system is web enabled system which can be hosted in intranet setup as well as can be configured to be hosted in internet.

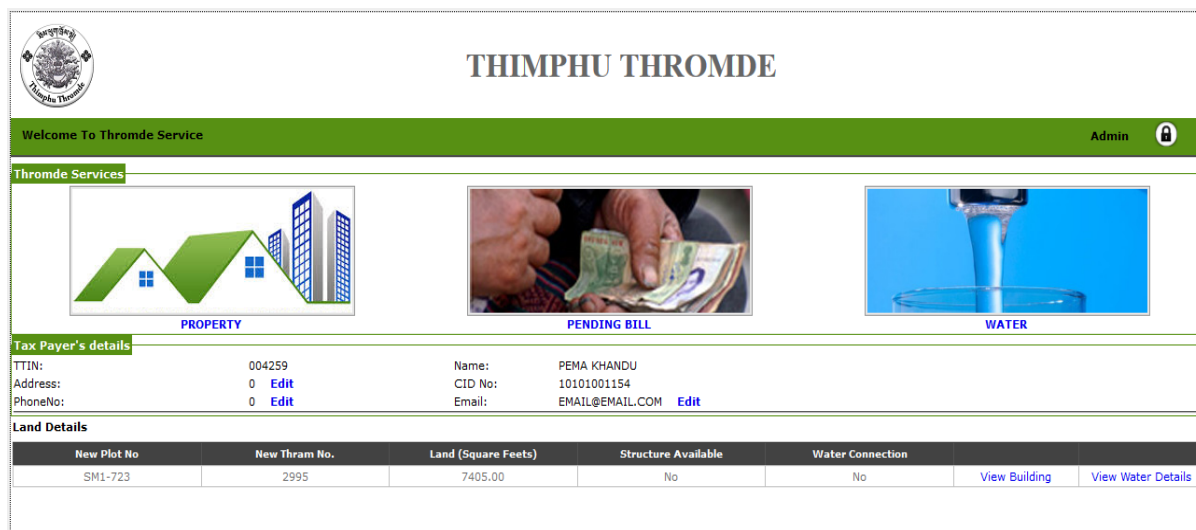


The system consists of following modules:

- a. **Master Data Management Module** – Master Data Management module provides functions and features for capturing master data and parameter definition which will be used during system updates.
- b. **Tax Payer Profile Module** – this module will provide functions to capture and manage profile information of the tax payers. The profile information is recorded only once.
- c. **Property Update Module** – This module will have provision to update property information of tax payers as a result of several transactions.
- d. **Assessment Module** – The assessment module handles the computation of tax as per rules and regulations.
- e. **Collection /Payment Module** – This module will handle collection of taxes as per the assessment, issue of receipt and refund processing.

- f. **Revenue Collection Ledger** – This module will handle revenue Ledger functions like adjusting receivables, reconciliation with bank statements, update journals and ledgers.

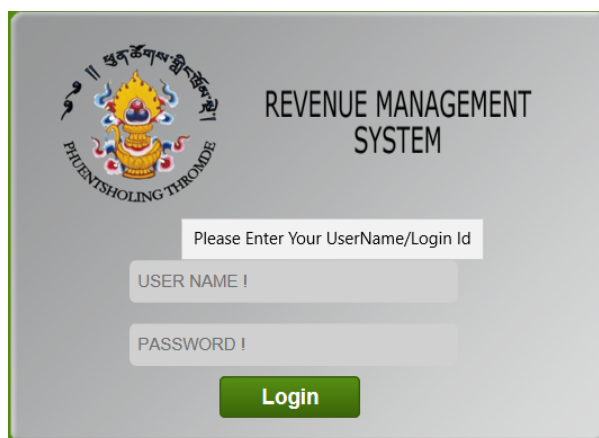
The Revenue Management System covers functions for management of master data and parameters, management of tax payer profiles, property update transaction recording, and assessment of tax /fees /charge liability with updated property status, collection of taxes /fees /charges as per the assessment of tax /fees /charges and revenue accounting.



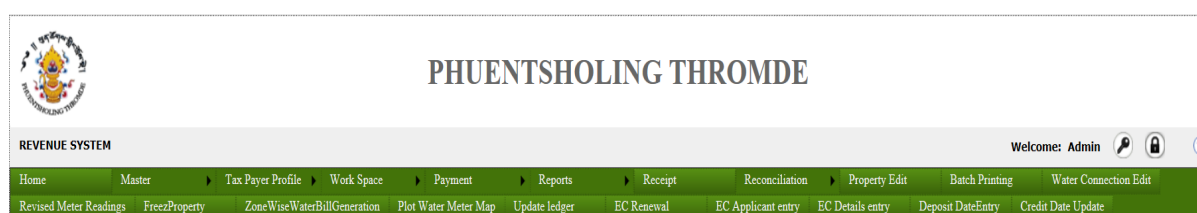
MIS reporting engine will allow the users to generate useful MIS reports as per the information captured into the system.

The Revenue Management system is web ready system which is developed using web technologies and can be hosting as web application in intranet setting as well as in internet setting.

The access control into the system is based on roles. Each role will be assigned with transactional pages. Users will be assigned with roles and users can access the features and functions as entitled to the role.



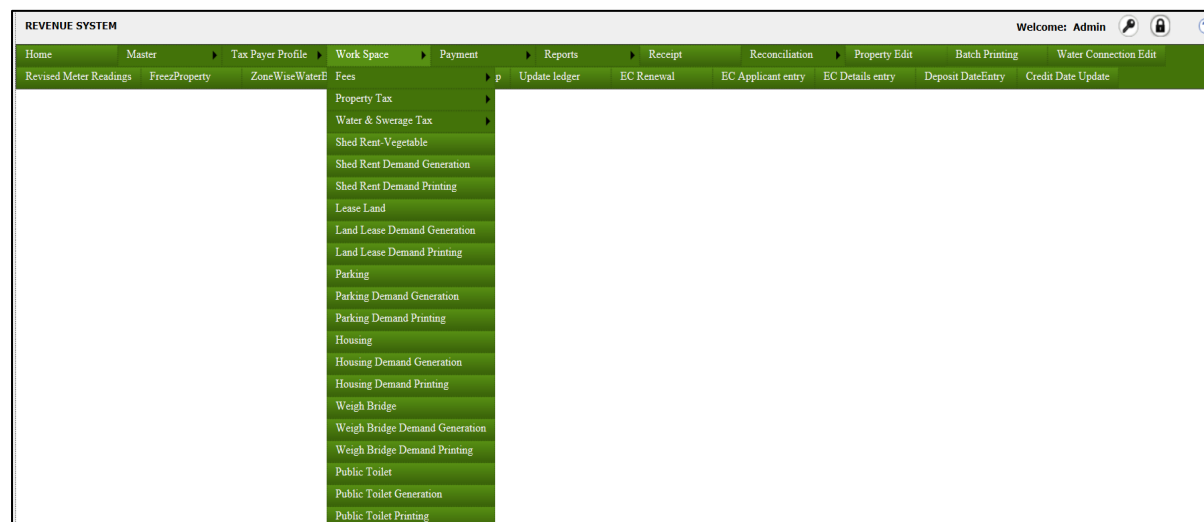
- Prepare and manage details of tax payers. Currently there is very limited information on tax payers and there is no complete database of tax payers in Thromdes resulting in many property owners not paying taxes
- Record and track the property updates of the tax payers and assess taxes as per the changes in the property transactions
- Assessment of taxes will be as per the updated property transaction records so that the tax payers pay and updated demand is generated
- Record collections as per the assessment including penalties for non-compliance. Refunds and surplus payment management
- Information exchange among different stakeholders during revenue collection cycle like status update of demand notice upon payment



Revenue Management System Modules

Modules	Functional Description
Master Data Management	The master data management modules will have functional features to manage master data and parameters used in other modules. Typical Master data includes: General Masters – this will allow capture and update of general masters like location, property types, departments, divisions, sections, units, etc. Tax /Revenue Source Masters – this will allow capture and configuration of tax /revenue sources and applicable rates and other parameters used for assessment Users and Roles – This will allow management of roles and users for accessing the system
Tax Payer Profile	Tax Payer profile will consist of information on the tax payers. Information on Tax payers will be obtained from Civil Registration once and uploaded in the system. User Interfaces will be available for entering tax payer information (both individuals and organizations) for updating the list of tax payers
Property Update Module	The changes in property ownership is captured in this module and appropriate demand notices are generated pertaining to each property update transaction. When payment is made for such demand notices status is updated accordingly
Assessment	The assessment module allows for computation of the tax liability of individual tax payers as per the parameters and property ownership of the tax payer.
Collection	The collection module provides mode of collection of tax liability as per the assessment and update collection records and initiate status update of payment status, and printing of receipts.

	Management of surplus payment and refund is available in the collection module
Revenue Ledger	The ledger records the data related to demand, collection and balance (DCB).
MIS Reporting	Management Information reporting module has the various reports used by the different departments, divisions, sections, units and the Thromde administration.



2.2. Digitized Asset Register

The Digitized Asset Register was developed under BUDP II project in 2013 -14. The system was developed as basic system to record asset data and search asset related information. The system has provision for asset classification and codification of assets.



Asset Searching

The system has advanced asset searching mechanism using different parameters like classification basis (Major Head, Minor Head and Detailed Head), ownership of asset (Division, section and Unit) Name of asset, status of asset, and location of asset. Details of

asset can be viewed after searching the asset records. Based on the access control mechanism asset information can be modified as well.

Asset Details

Details of the asset is organized as classification information, identification information, financial information and Technical information.

Technical information fields are dynamically generated based on the tertiary class (detailed head) as attributes used to describe the asset technically is different.

4. Technicals		
Attribute Name	Value	Unit
Identification :: Road Name	<input type="text"/>	N/A
Identification :: Location	<input type="text"/>	Location
Technical Details :: Width	<input type="text"/>	m
Technical Details :: Span Length	<input type="text"/>	m
Technical Details :: Number of spans	<input type="text"/>	No.

Asset Operation Information

Operational information about the assets is managed as follows:

Maintenance Information – Information regarding maintenance activities is recorded in the system. Multiple maintenance records is possible for any asset.


Assessment /Inspection Information – Multiple records of assessment /inspection information is managed for any asset.

Asset Code	Asset Name	Asset Status				
FARBBT000001-TT/ENG/RP/RBRO /UV1/BBS	Gumiji Lam	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal
FARBBT000002-TT/ENG/RP/RBRO /UV8/NRZ	Geyen Lam	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal
FARBBT000003-TT/ENG/RP/RBRO /UV4/MTT	Drimey Lam	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal
FARBBT000004-TT/ENG/RP/RBRO /UV8/NRZ	Road no 23	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal
FARBBT000005-TT/ENG/RP/RBRO /UV2/LTP	Wangchhu lam	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal
FARBBT000006-TT/ENG/RP/RBRO /UV2/LTP	Wangjog lam	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal
FARBBT000007-TT/ENG/RP/RBRO /UV1/BBS	Underpan road at Bangdu zam	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal
FARBBT000008-TT/ENG/RP/RBRO /UV2/LTP	139	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal
FARBBT000009-TT/ENG/RP/OAOP /UV4/MTT	Geneyen lam	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal
FARBBT000010-TT/ENG/RP/OAOP /UV7/N/A	Gangkha Lam	In Service	Edit/View	Insert/View Assessment	Insert/View Maintenance	Disposal

Assessment

Assessment information on any asset is managed either as ad-hoc assessment or based on the assessment schedule. During every assessment activity condition rating and confidence level is recorded which can be used for maintenance planning or disposal planning.

Assessment Details

Inspection Date: * 

Inspected By: *

Inspection Type: *

Condition Rating: *

Confidence Level: *

Remarks: *

Asset Maintenance

Maintenance information on any asset can be recording of ad-hoc maintenance due to breakdowns, emergency maintenance requirement or based maintenance schedule. Maintenance information comprises of service provider, spares used, service cost, and planning for next maintenance, etc.

Maintenance Details

Maintenance Type:* -Select One-
Maintenance Date:*
Reason For Maintenance:*
Remarks:*
Service Order Date:*

Cost Of Maintenance:*
Maintenance Carried Out by:* -Select One-
Spares Used:*
Service Order No.:
Date Of Next Maintenance*

Save

Asset Disposal

Final stage of the asset lifecycle, disposal information is recorded in the system. After the disposal data is recorded, no operation information can be recorded.

Disposal

Disposal Type:* -Select One-
Disposal Date:
Salvage Value:*
Disposal Approval Letter No.:
Disposal Approval Letter Date:

Save

The existing digitized asset register stores majority of the information regarding asset management lifecycle from acquisition to disposal. However, the system does not have any spatial information regarding the assets owned by the Thromde. Spatial information in can be incorporated in the existing digitized asset register and asset portal can be developed for easy tracking of assets.

3. Implementation Status

Since completion of development and implementation of the revenue management system in Thimphu and Phuentsholing Thromdes, Thromdes are continuously digitizing data and updating the systems.

3.1. Thimphu Thromde

3.1.1. Revenue Management System

Implementation status of revenue management system is at slightly different stage in each. Thromdes in terms of percentage of taxpayers' digitization and property data digitization and validation. Correction of data is still ongoing while Thromdes are seeking consensus on the correctness of data from the taxpayers.

Sources of Revenue

Thimphu Thromde has configured following sources of revenue in the system starting the tax year 2016.

2016	2017	2018
Full Property Transfer	Full Property Transfer	Full Property Transfer
Excess Land	Excess Land	Excess Land
Land Demarcation and Site Plan	Land Demarcation and Site Plan	Land Demarcation and Site Plan
Building Plan Processing and Construction Approval	Building Plan Processing and Construction Approval	Building Plan Processing and Construction Approval
Building Deviation	Building Regularization (Building Deviation)	Building Regularization (Building Deviation)
Land Registration	Land Registration	Land Registration
Plot Sub-division	Plot Sub-division	Plot Sub-division
Property Tax	Property Tax	Property Tax
Ground Rent	Ground Rent	Ground Rent
Land Lease	Land Lease	Land Lease
Document Fees	Document Fees	Document Fees
Environmental Fines	Environmental Fines	Environmental Fines
Water Bill	Water Billing	Water Billing
Vacuum Tanker Service	Vacuum Tanker Service	Vacuum Tanker Service
Water Connection	Water Connection	Water Connection
Occupancy Certificate	Occupancy Certificate	Occupancy Certificate
Water Line Shifting	Water Line Shifting	Water Line Shifting
Capacity Upgrade	Capacity Upgrade	Capacity Upgrade
Parking Fee	Parking Fee	Parking Fee
Sale of Dustbins	Sale of Dustbins	Sale of Dustbins
Vegetable Market Stall Rental Fees	Vegetable Market Stall Rental	Vegetable Market Stall Rental
Partial Property transfer	Partial Property transfer	Partial Property transfer
Sale of Product: Pegs	Sale of Product: Pegs	Sale of Product: Pegs
Water Tariff	Water Tariff	Water Tariff
Document Sale	Document Sale	Document Sale
Building Upgradation	Building Upgradation	Building Upgradation
Betterment Charges	CPLC (Betterment Charges)	CPLC (Betterment Charges)
Concession Payment	Concession Payment	Concession Payment
Water Meter Reconnection	Water Meter Reconnection	Water Meter Reconnection
Water Meter Shifting	Water Meter Shifting	Water Meter Shifting
Water Meter Replacement	Water Meter Replacement	Water Meter Replacement
Sewerage Connection	Sewerage Connection	Sewerage Connection
Construction Revalidation	Construction Revalidation	Construction Revalidation
Sale of Tender	Sale of Tender	Sale of Tender
	House Rent	House Rent
		Environmental Clearance

3.1.1.1. Taxes /Tariff /Fees /Charges

From the above sources, following taxes /tariff /fees /charges are collected by the Thromde and are configured in the revenue management system.

2016	2017	2018
Land Tax - Residential	Land Tax - Residential	Land Tax - Residential
Land Tax - Commercial	Land Tax - Commercial	Land Tax - Commercial
Land Tax-Semi Commercial	Land Tax-Semi Commercial	Land Tax-Semi Commercial
Urban House Tax-Residential	Urban House Tax-Residential	Urban House Tax-Residential
Urban House Tax-Shops and Restaurants	Urban House Tax-Shops and Restaurants	Urban House Tax-Shops and Restaurants
Urban House Tax-Hotels	Urban House Tax-Hotels	Urban House Tax-Hotels
Underdevelopment Tax-Residential	Underdevelopment Tax-Residential	Underdevelopment Tax-Residential
Underdevelopment Tax-Commercial	Underdevelopment Tax-Commercial	Underdevelopment Tax-Commercial
Underdevelopment Tax-Semi Commercial	Underdevelopment Tax-Semi Commercial	Underdevelopment Tax-Semi Commercial
Garbage Collection Charges	Garbage Collection Charges	Garbage Collection Charges
Street Lighting Charges	Amenities service fee	Amenities service fee
Water Charges	Water Charges	Water Charges
Sewerage Charges	Sewerage Charges	Sewerage Charges
Rent from Civic Amenities-Ground	Rent from Civic Amenities-Ground	Rent from Civic Amenities-Ground
Rent from Civic Amenities-Market	Rent from Civic Amenities-Market	Rent from Civic Amenities-Market
Rent from Civic Amenities-Parking	Rent from Civic Amenities-Parking	Rent from Civic Amenities-Parking
Rent from Lease Land	Rent from Lease Land	Rent from Lease Land
Development Charges-Construction Approval	Development Charges-Construction Approval	Development Charges-Construction Approval
Development Charges-Occupancy Certificate	Development Charges-Occupancy Certificate	Development Charges-Occupancy Certificate
Mutation Charges-Property Transfer fee	Mutation Charges-Property Transfer fee	Mutation Charges-Property Transfer fee
Mutation Charges-Sub-Division	Mutation Charges-Sub-Division	Mutation Charges-Sub-Division
Regularization Fee-Excess Land	Regularization Fee-Excess Land	Regularization Fee-Excess Land
Regularization Fee-Building Regularization	Regularization Fee-Building Regularization	Regularization Fee-Building Regularization
Water Connection Charges-Permanent	Water Connection Charges-Permanent	Water Connection Charges-Permanent
Water Connection Charges-Temporary	Water Connection Charges-Temporary	Water Connection Charges-Temporary
Sewerage Connection Charges-Permanent	Sewerage Connection Charges-Permanent	Sewerage Connection Charges-Permanent

Implementation Status of Revenue Management System and Digitized Asset Register

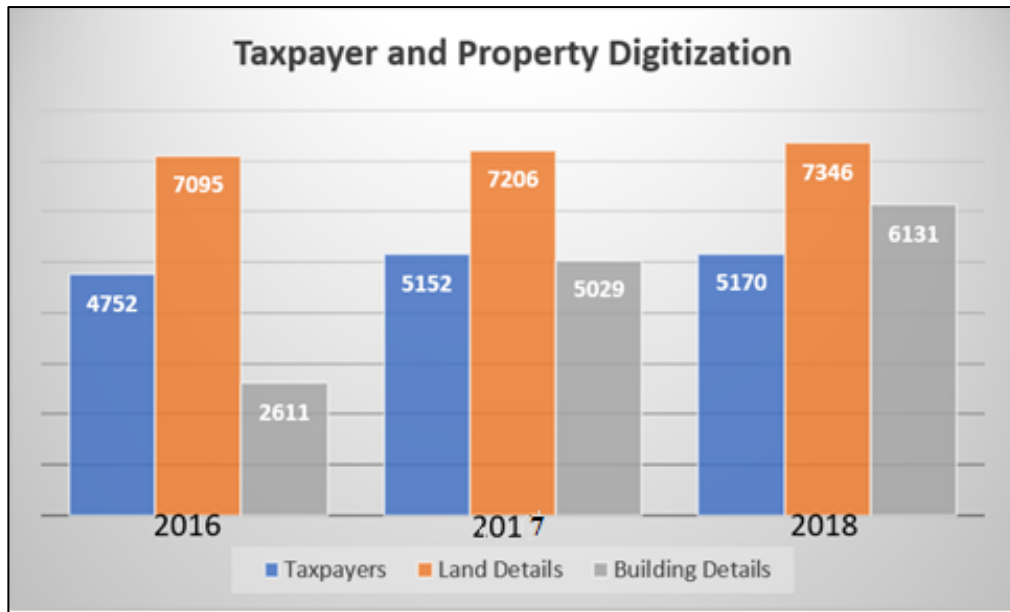
Sewerage Connection Charges-Temporary	Sewerage Connection Charges-Temporary	Sewerage Connection Charges-Temporary
User Charges-Environmental Fines	User Charges-Environmental Fines	User Charges-Environmental Fines
Service Charges-Land Demarcation	Service Charges-Land Demarcation	Service Charges-Land Demarcation
Service Charges-Site Plan Survey	Service Charges-Site Plan Survey	Service Charges-Site Plan Survey
Service Charges-Building Plan Survey	Service Charges-Building Plan Survey	Service Charges-Building Plan Survey
Service Charges-Construction Assessment	Service Charges-Construction Assessment	Service Charges-Construction Assessment
Service Charges-Vacuum Tanker	Service Charges-Vacuum Tanker	Service Charges-Vacuum Tanker
Service Charges-Road Cutting and Excavation	Service Charges-Road Cutting and Excavation	Service Charges-Road Cutting and Excavation
Documents-Application	Documents-Application	Documents-Application
Documents-Certificate	Documents-Certificate	Documents-Certificate
Products-Dust Bins	Products-Dust Bins	Products-Dust Bins
Products-Demarcation Pegs	Products-Demarcation Pegs	Products-Demarcation Pegs
Rental Deposits-Ground	Rental Deposits-Ground	Rental Deposits-Ground
Rental Deposits-Market	Rental Deposits-Market	Rental Deposits-Market
Rental Deposits-Parking	Rental Deposits-Parking	Rental Deposits-Parking
Lease Deposits-Land Lease	Lease Deposits-Land Lease	Lease Deposits-Land Lease
Security Deposits-Water Meter	Security Deposits/Water Meter Cost	Security Deposits/Water Meter Cost
Service Charge Refunds-Fees and Administrative Charges	Service Charge Refunds-Fees and Administrative Charges	Service Charge Refunds-Fees and Administrative Charges
Service Charge Refunds-Sale and Hire Charges	Service Charge Refunds-Sale and Hire Charges	Service Charge Refunds-Sale and Hire Charges
Mutation Charges - Land Registration	Mutation Charges - Land Registration	Mutation Charges - Land Registration
Water Connection Charges-Water Line Shifting	Water Connection Charges-Water Line Shifting	Water Connection Charges-Water Line Shifting
Road Cutting/Property Damage/Soil Dumping	Road Cutting/Property Damage/Soil Dumping	Road Cutting/Property Damage/Soil Dumping
Penalty	Penalty	Penalty
Betterment Charges	Betterment Charges	Betterment Charges
Scrutiny Fee	Scrutiny Fee	Scrutiny Fee
Service and Amenities Fee	Service and Amenities Fee	Service and Amenities Fee
Meter Rent	Meter Rent	Meter Rent
Cost of Fittings	Cost of Fittings	Cost of Fittings
Cost Of chamber	Cost Of chamber	Cost Of chamber
Handling Charge	Handling Charge	Handling Charge

Water Reconnection Charges	Water Reconnection Charges	Water Reconnection Charges
Water Connection Charges-Chamber Shifting	Water Connection Charges-Chamber Shifting	Water Connection Charges-Chamber Shifting
Sale of Tender	Sale of Tender	Sale of Tender
Lagthram-Fee	Lagthram-Fee	Lagthram-Fee
	Garbage Collection Charges Commercial	Garbage Collection Charges Commercial
	Amenities service fee Commercial	Amenities service fee Commercial
	House Rent	House Rent
	Penalty-Residential Property Tax	Penalty-Residential Property Tax
	Penalty-Water & Sewerage Charge	Penalty-Water & Sewerage Charge
	Penalty-Rent from Lease Land	Penalty-Rent from Lease Land
	Penalty-Service Charges-Site Plan Survey	Penalty-Service Charges-Site Plan Survey
	Penalty-Lease Deposits-Land Lease	Penalty-Lease Deposits-Land Lease
	Penalty-Rent from Civic Amenities-Market	Penalty-Rent from Civic Amenities-Market
	Penalty-Rental Deposits-Parking	Penalty-Rental Deposits-Parking
	Penalty-Rental Deposits-Market	Penalty-Rental Deposits-Market
	Penalty-House Rent	Penalty-House Rent
	Penalty-Commercial Property Tax	Penalty-Commercial Property Tax
		Environmental Charges
		Application Fee-Environmental Charges
		Penalty-Environmental Charges

It is evident that every year new tax is included in the list of taxes which mean Thromde is exploring options to enhance revenue through additional sources. Implementation of RMS has provided the Thromde with information for decision making.

3.1.1.2. Digitization of Taxpayers and Property Data

Digitization of taxpayer and property data for last three years is depicted as below. Cleaning of data resulted in certain decrease in records at times.



Digitization of taxpayer was fairly stable by 2016 which saw an increase by 8.42 percent in 2017 and by 0.35 percent in the year 2018. Digitization of Land property was also reasonably stable in 2016 with increase of 1.56 % in 2017 and 1.94 % in 2018. However, this does not mean all the digitized information was correct. Several rounds of data collection and correction happened in 2016 and 2017.

With only 2611 buildings information digitized in 2016, currently 6131 buildings information is digitized and maintained in the system.

Tax ledger Transactions

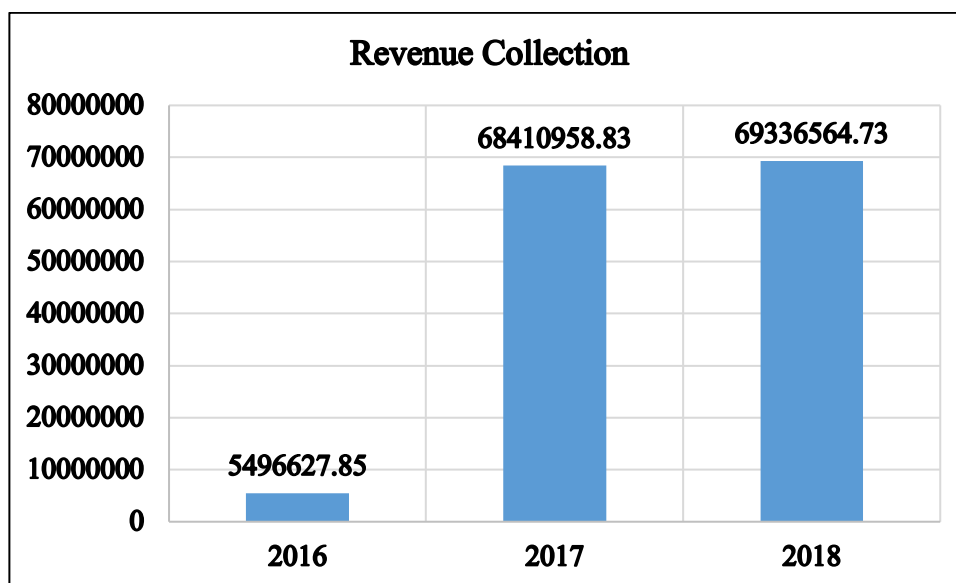
Ledger records (number of records) and the revenue collection for different taxes /tariff /fees /charges are presented below.

Tax	2016		2017		2018	
	No. of Ledger Transactions	Revenue Collected	No. of Ledger Transactions	Revenue Collected	No. of Ledger Transactions	Revenue Collected
Land Tax - Residential	1142	2363995.71	4027	10974806.04	1680	3953032.87
Land Tax - Commercial	56	145298.14	271	1764175.32	138	2337214
Urban House Tax-Residential	567	289467	2220	1150696.94	1004	620617
Urban House Tax-Shops and Restaurants	54	27945	515	338263.86	293	154446
Garbage Collection Charges	571	616440	2211	1538046.62	1005	752875
Street Lighting Charges	453	327372				
Water Charges	1	0	30954	11773033.38	43670	17323537.8
Sewerage Charges	1	0	30954	5886115.46	43670	8663327.55
Rent from Civic Amenities-Ground	1	10000	12	400000	20	910000
Rent from Civic Amenities-Market	2	1500800	3	9758657.01	3	7491353.96
Water Connection Charges-Permanent	1	300	206	61800	228	68400
Water Connection Charges-Temporary	1	300	48	14400	134	40200
Documents-Application	16	1600	302	31000	218	21600
Documents-Certificate	177	26400	1105	182200	848	183350
Rental Deposits-Market	101	134540	1496	2001532	1514	2007100
Security Deposits-Water Meter	2	4570	254	496860	362	709010
Sale of Tender	2	20000	24	166000	5	20600
Lagtharm-Fee	103	27600	861	214000	572	144600
Underdevelopment Tax -Residential			2325	1414313.03	609	311158.22
Underdevelopment Tax -Commercial			69	91460.72	30	130054.25
Amenities Service Fee			2136	789933.09	1003	377746
Rent from Lease Land			13	4878758.32	25	5409566.74
Sewerage connection Charges - Permanent			18	54000	26	78000

Implementation Status of Revenue Management System and Digitized Asset Register

Service Charges - Vacuum Tanker			38	94108	83	204000
Rental Deposits-Parking			3	1587595	7	12227525.9
Lease Deposits -Land Lease			8	7868978	4	1620832
Water Connection Charges-Water Line Shifting			11	5500	25	12500
Betterment Charges			1	200660.98		
Water Reconnection Charges			22	11000	17	29500
Water Connection Charges-Chamber Shifting			87	200470	80	199990
Garbage Collection Charges Commercial			512	1456262.28	292	598903
Amenities service fee Commercial			508	962545.52	292	397111
House Rent			4	189678	24	804174
Penalty-Residential Property Tax			1048	153567.07	2	386
Penalty-Water & Sewerage Charge			13295	1643553.11	17318	228614.5
Penalty-Rent from Lease Land			3	2417	8	49921
Penalty-Lease Deposits-Land Lease			5	1549		
Penalty-Rental Deposits-Market			582	47071	501	48099
Penalty-Commercial Property Tax			43	5948.08		
Development Charges-Construction Approval					122	12001
Scrutiny Fee					37	621125
Service and Amenities Fee					37	558616
Penalty-Rent from Civic Amenities-Market					1	120
Penalty-Rental Deposits-Parking					3	15357

Total Revenue Collection



Tax collection from the system increased by 1144.60 percent between 2016 and 2017 and by 1.35 percent between 2017 and 2018. Revenue figure for 2018 is obtained as of October end 2018. This would also mean almost all taxpayers and properties are digitized and migrated in the system.

3.1.2. Digitized Asset Register

Asset Classification

Primary Class	Secondary Class	Tertiary Class
Fixed Asset	Land	Open Space
		Grounds
		Parks
		Gardens
	Building	Office Buildings
		Commercial Complex
		Hospitals, Dispensaries and Health Posts
		Community Halls and Reading Rooms
		Guest Houses
		Staff Quarters
		Public Latrines and Urinals
	Roads and Bridges	Concrete Roads
		Black Top Roads
		Railing and Crash Barrier
		Parapets
		Bridges
		Flyovers and Over-Bridges
	Sewerage and Drainage	Subways and Causeways
		Underground Drains

Implementation Status of Revenue Management System and Digitized Asset Register

		Open Drains
	Water Works	Water Works
		Open/Bore Wells
		Reservoirs
	Public Lighting	Modern Lighting on Main Roads
	Plants and Machinery	Plants and Machinery
Movable Assets	Vehicle	Ambulance
		Buses
		Cars and Jeeps
		Cranes
		Trucks
		Tankers
Fixed Asset	Office and Other Equipment	Air Conditioner
		Computer
		Faxes
		Copier
		Refrigerator
		Network Equipment
	Furniture, Fixtures, Fittings and Electrical	Cabinets and Partitions
		Cupboards
		Fans
		Electrical Fittings
		Tables and Chairs
	Other Fixed Assets	Other Fixed Assets
	Roads and Bridges	PCC Roads
		Earthen Roads
		WBM Roads
		Footpath
		Side Drains
		Culverts
		Retaining Wall
		Dividers
		Signages
		Premix Roads
	Public Lighting	Control Panel
	Sewerage and Drainage	Treatment Plant
	Solid Waste Management	Collection Bin
		Waste Treatment Plant
	Sewerage and Drainage	Structures
	Water Works	Structures
	Solid Waste Management	Crematorium
	Sewerage and Drainage	Manhole
	Disaster stocks	stock pile
		Search & rescue
		Rescue

	Sewerage and Drainage	Sewerage
	Furniture, Fixtures, Fittings and Electrical	Colour printer
	Office and Other Equipment	ICT Equipment

Asset Counts

Total asset count has remained at 5445 since the data migration of data digitized during the development of DAR in 2013 -14. Not much have been added in the system after the completion of project.

Secondary Class

Secondary Class	Asset Count 2016	Asset Count 2017	Asset Count 2018
Land	3	3	3
Roads and Bridges	904	904	904
Sewerage and Drainage	1723	1723	1723
Water Works	172	172	172
Public Lighting	1565	1565	1565
Vehicles	134	134	134
Office and Other Equipment	8	8	8
Furniture, Fixtures, Fittings and Electrical	881	881	881
Other Fixed Assets	15	15	15
Solid Waste Management	39	39	39
Disaster stocks	1	1	1
Total Asset Records	5445	5445	5445

Tertiary Class

Tertiary Class	Asset Count 2016	Asset Count 2017	Asset Count 2018
Open Space	3	3	3
Concrete Roads	22	22	22
Black Top Roads	57	57	57
Railing and Crash Barrier	23	23	23
Parapets	30	30	30
Bridges	6	6	6
Underground Drains	864	864	864
Water Works	90	90	90
Open/Bore Wells	5	5	5
Reservoirs	50	50	50
Modern Lighting on Main Roads	1483	1483	1483
Cars and Jeeps	91	91	91
Cranes	4	4	4
Trucks	39	39	39
Computer	6	6	6
Network Equipment	1	1	1

Cabinets and Partitions	96	96	96
Cupboards	65	65	65
Fans	56	56	56
Electrical Fittings	427	427	427
Tables and Chairs	237	237	237
Other Fixed Assets	15	15	15
PCC Roads	10	10	10
Earthen Roads	48	48	48
WBM Roads	14	14	14
Footpath	79	79	79
Side Drains	229	229	229
Culverts	13	13	13
Retaining Wall	60	60	60
Dividers	17	17	17
Signages	38	38	38
Premix Roads	258	258	258
Control Panel	82	82	82
Treatment Plant	11	11	11
Collection Bin	1	1	1
Waste Treatment Plant	30	30	30
Structures	3	3	3
Structures	27	27	27
Crematorium	8	8	8
Manhole	845	845	845
Stockpile	1	1	1
ICT Equipment	1	1	1
Total	5445	5445	5445

Other DAR Transactions

The Digitized Asset Register provides functions for recording operational information like asset assessment /inspection details and maintenance details. DAR data review revealed that no operational data is updated in the system till date. Disposal information is not recorded as well. DAR also provides for ability to manage depreciation schedule for assets and generate valuation of the assets.

With new Asset Management and Valuation Guidelines, Thromdes will be able to manage asset information in line with the Asset Management and Valuation Guideline.

3.1.3. Issues Resolution and Feature Enhancement

Through formal annual maintenance support mechanism, issues resolution and feature enhancement happened in 2016-17 and 2017-18. When users use the system, issues arise due to technical bugs, incorrect business processes, overlooked business processes, data related issues and new reporting requirement. Several issues and changes of following categories were resolved during the support period.

Issues, changes and improvements resolved/executed in 2016-17 support cycle.

Sl. No.	Activities	Description
1	Data preparation, migration and correction	<p>Whenever users update erroneous data correction is made for those transactions that lack user interface to correct data.</p> <p>Water connection details (like digit of the meter) that were incorrectly updated in the system. Such incorrect data resulted in issues with resetting the meter reading.</p> <p>During the tax collection period, data correction when users update incorrect data.</p>
2	Reports	<p>Incorporation of following reports:</p> <ul style="list-style-type: none"> • Defective meter report – provides the list of defective water meters • Daily water account wise payment report – provides daily list of payments made every day • Monthly water consumption report • Defaulters for water tax report – provides the list of defaulters for water tariff • Missed out reading report – provides daily list of water connections missed while meter reading • Alternative payment receipt printing option • Report by demand notice No. – this can also be used to print miscellaneous receipt • Frozen property – to check if any property is frozen by investigating agencies /court
3	Feature Improvement	<ul style="list-style-type: none"> • To handle multiple payment modes for single invoice modification in the payment feature is incorporated. After the modification, multiple modes of payment are possible for single demand. • Tool to generate penalty before generating property tax • Water bill payment receipt modification to reflect the billing information instead of the property owner • Modification of water bill to include outstanding and penalty for outstanding • Incorporation of provision to generation and printing of occupancy certificate. The occupancy certificate is generated as report using the building data migrated in the system. • Provision to reverse the ledger entry. Reversal is required when incorrect ledger data is updated in the system.

		<ul style="list-style-type: none"> • Payment details update feature for reversed ledger records. • Single reconciliation function if single cheque is used to make payments for multiple tax /fees components • Incorporation of provision to make multiple bill payment in single receipt. Earlier each bill would generate respective receipts.
4	Water connection functions improvement	Improved the water connection information management and water bill processing by making water account as unique identifiers instead of property identifier and meter no. as unique identifier. Testing and operationalization of unscheduled water billing.
5	Improvement in record searching	Included water account no. to search transactions related to water services.
6	Application Tuning	Completed first application tuning to improve the performance of application system by removing temporary files, code review and logic improvement.
7	Database Tuning	Completed first database tuning to improve performance of database access. Database tuning included review of data access functions, data storage approach, and review of data access logs.
8	Digitized Asset Register	Modification of digitized asset register as per the requirement of Thromde Officials. Asset collection template shared with Thromde Officials for Asset data collection. Waiting for data as per the format shared during quarter two of the service period.

Issues, changes and improvements resolved /executed in 2016-17 support cycle.

Sl. No.	Month	Status
1	August 2017	Provision to make multiple bill payment in single receipt. Earlier each bill would generate respective receipts.
2		New Feature development to display water bill for any selected month
3		Development of new reports: Online payment report, online property tax report, financial year wise report
4		Tax generation based on calendar year. Previously calendars were designed to use Financial Year
5	September 2017	Data preparation and migration for Babesa, Sementokha and Dechencholing area
6		Design and Development of Defaulters reporters for property tax
7		Testing and operationalization land registration module

8	October 2017	Onsite support to validate data to ensure smooth usage after making changes from Financial year to calendar year
9		Modification of property edit module to incorporate new fields
10		Modification and operationalization of reconciliation module
13		Support to NGN Technologies on integration for Occupancy certificate
14	November 2017	Vendor data validation for parking fees and rental stall fees
15		Segregation of different bills -- e.g. water bill, property tax, fees and charges, fines and penalties, etc.
16		Occupancy certificate generation feature development.
17		Operationalization of Freeze Property and incorporation of file upload option
18		Audit trail features for building details to include additional data
19		Segregation of penalty amount for non-payment
20		Removal of underdevelopment tax for property located in E-4 Zone
21	January 2018	Modification of water meter reading function. Provide support to mobile app developers for integration with RMS.
22		Incorporation of water meter reading history feature
23		Defaulters list report with land details and tax amount
24	February 2018	Report development
25	March 2018	Incorporation of feature to enable making multiple payment modes in single receipt
26	April 2018	Incorporation of a new feature 'occupancy type' in occupancy certificate generation for making two different type of occupancy certificate. E.g. Compliance OC and normal OC
27		Incorporation of a new tax rate report to see all the rates in the system
28		Incorporation of a new tax name wise report to see each tax head wise collections
29		Incorporation of a new report named executive dashboard for executive.
30	May 2018	Incorporation of new module Environment clearance fees /renewal for environment clearance module
31		Incorporation of new report to search by Receipt No requested by CSD collector

3.1.4. Integration and Other Initiatives

RMS and DAR Integration:

RMS and DAR integration is expected to improve the system usage as users will be required to access single system and the functions and menus in the two systems will be merged. If users are required to operate RMS and DAR, single login will provide access to functional menus of both the systems as per the access privileges.

Current Status – As this integration is not part of the AMC services, we are working on the integration of RMS and DAR through implementation of the same systems in Gelephu and Samdrup Jongkhar Thromdes. The integrated system will be implemented in Phuentsholing and Thimphu Thromde without incurring additional cost once tested in Gelephu and Samdrup Jongkhar Thromdes.

Integration of RMS with e-Citizen Portal:

Integration of RMS with e-Citizen Portal will eliminate the requirement to update data in e-Citizen Portal and RMS. Data updated in e-Citizen Portal will be automatically be reflected in the RMS for revenue collected as transfer fee. Also, property ownership details will be updated in the RMS for property tax assessment after the transaction is complete in e-Citizen Portal.

Current Status – With help from the IT Officers from Thimphu Thromde and NLCS, the support team completed technical discussion and testing of the data sharing API developed for e-Citizen Portal. However, DITT has initiated Data Hub project and Property Database of NLCS is one of the data hubs. DITT has informed the support team and Thromde office to keep on hold the integration activities until the implementation of Property Data Hub is complete. We are informed that the implementation of Data Hub nearing completion but no exact date is provided. The support team can recommence the integration activity once data hub project is complete and tested. After discussion with NLCS IT Team, query was developed to configure API in the National API Platform. We have received confirmation for Data Hub team with regard to completion of API configuration for the following transactions in RMS:

- a. Updating Land transaction fees in RMS
- b. Updating Property details in RMS after completion of transfer process – both for Transferor and Transferee

Forms to process the data shared by NLCS using the API interface is being developed.

Integration of RMS with G2C Online Service Systems:

The online service systems provided by G2C Project deal with some of the revenue earning services. There is directive from Prime Minister's Office to use the online systems for service delivery. Some also provide online payment options. Existing of G2C system and RMS introduces duplication with regard to some of the services and revenue collection process. Integration of these systems will avoid situation to use multiple systems for same service.

Current Status: In order to integrate the systems, it is required that API /integration interface to be made available in the G2C systems. As the systems are launched recently in Thimphu Thromde, the systems are in process of stabilization. It is also unclear whether the developers of G2C system have contract framework to develop the API /integration interface for online systems (G2C) and provide us with interface which we can access for integration. We have already designed the integration interface for RMS that can be used by developers of G2C for data sharing and data consumption. Thimphu Thromde awarded development of integration interface in G2C systems to NGN Technologies. The integration activity is ongoing.

Integration of Accounting System with RMS and DAR:

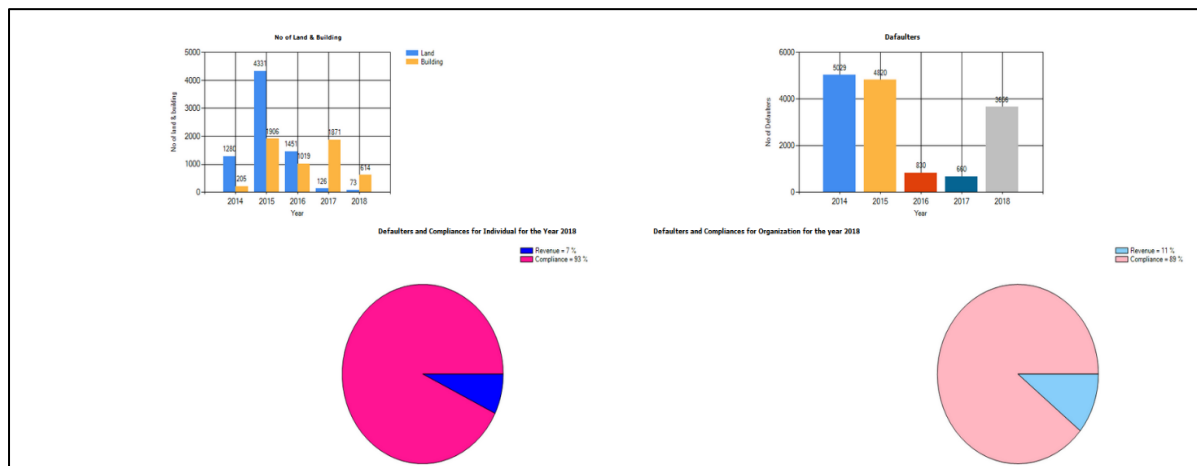
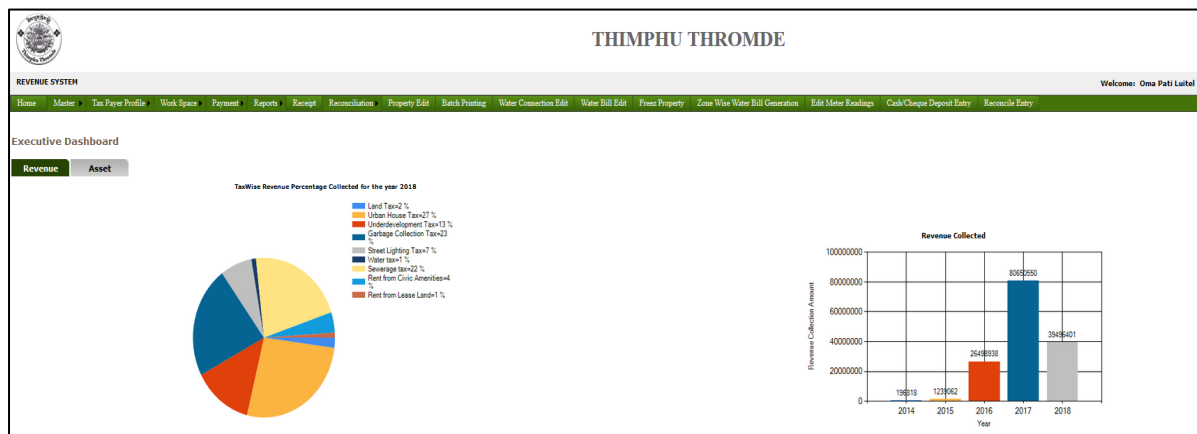
Implementation Status of Revenue Management System and Digitized Asset Register

Integration of accounting system with RMS will ensure revenue records be automatically updated in the revenue accounts of the accounting system. Integration of accounting system with DAR will ensure automatic update of fixed asset data into the accounting system.

Current Status: Integration of accounting system with RMS and DAR is included in the current AMC support terms. Further, no stable accounting system that has the capability share and consume data is used by the Thromde.

Executive Dashboard:

Executive dashboard is developed and deployed for testing and review. The Dashboard provides information on revenue and asset as two different tabs.



Others:

Thromde is keen on having GIS information integrated with the RMS and DAR. However, current platforms used in Thimphu Thromde do not have features to manage spatial data. GIS integrated asset register is being developed in Thimphu Thromde with funding support from APT.

3.1.5. Observations

After analyzing the information generated from the systems and interaction with user following observations are made that may have impact both positive and negative for sustainability of the systems in Thromde:

- a. Thimphu Thromde has taken commendable step to operationalize the system by limiting the issue of hand-written receipts.
- b. Mapping of water connection details and property details is underway. Once completed water tariff can be linked with the overall tax liabilities on the tax payer.
- c. As usage of the system is improving in annual tax collection, we recommend that the system be used for other revenue collection. Also, executive dashboard for management is developed for executives to watch the revenue trends.
- d. A GIS integrated Asset Management System project is prepared to enhance the Digitized Asset Register to include spatial information of the assets and enable locating of asset in Open Street Maps. All the asset information can be collected again and migrated along with GIS information of the assets.
- e. Most of the tickets attended pertains to data correction, incorrect transactions updated and deletion of records. For some feature record deletion feature is provided. However, some of the requests pertain to deletion of records that have financial information.
- f. Some new features were requested that are implemented to onboard some users who requested the features.
- g. Both Asset Register and Revenue Management System along with the backend database are hosted in single server hardware. This introduces risk of system failure through hardware failure. There is no proper backup and recovery mechanism deployed.
- h. In certain cases, it is observed that system access credentials are shared and system usage based on shared credentials.

3.1.6. Way Forward

Considering the above observations and current state assessment of ICT infrastructure in the Thromde following recommendations are made for way forward:

- a. Users are expected to be more careful not to update erroneous transaction in the system. Data cleaning using backend channel will not be sustainable in future as it skips certain audit trail functions leading to accountability issues.
- b. As the system is getting stable it is recommended that receipts generation and printing feature be used. This approach requires system to be up-to-date with the data required for taxation.
- c. Some functions have not undergone functional testing. During AMC duration new features were requested, incorporated and tested. As the system developed using specification provided by international consultants who have worked with many municipalities across the world. Thromde team should review the system and remove features that are not useful /not required by the Thromde.
- d. RMS is able to produce information related to the revenue management. However, the revenue information is not consolidated in the Thromde enterprise wide financial management process. Appropriate mechanism needs to be devised to transfer revenue data to main enterprise financial management.
- e. System is developed and implemented in technology stack available around 2013 – 14. As there is advancement in technology platform, it is recommended that the

- systems be upgraded in .NET Core with MS SQL Server 2017 as backend databased to ensure compatibility with other systems like the Data Hub, national API Platform and national digital identity platform.
- f. Some functions have not undergone thorough functional testing. During AMC duration new features were requested, incorporated and tested. As the system developed using specification provided by international consultants who have worked with many municipalities across the world. Thromde team has reviewed the system and recommended removal of features that are not useful /not required by the Thromde.
 - g. Plan for support and enhancement of the system as well as the infrastructure used to host the system.
 - h. Currently single hardware is used to host both DAR and RMS. Also, application system and Database is hosted in single machine. The approach is risky in the sense that failure of the hosting machine will bring the system to standstill. Recovery of the system will be contingent to recovery of the server machine and time required to recover the server machine. It is time that proper setup is available to bring back the systems in shortest possible time during outages through use of backup and recovery solutions, maintaining mission critical and disaster recovery setup, etc. Use of GDC or BT DC can be considered to maintain recovery site. Also, it is recommended that separate machines (or VM) is used to host application system and Database. This will ensure hardware failure will impact only one component of the systems. Therefore, it is recommended to Deploy backup and recovery solution with automatic failover capability so that all connected apps (payment, water billing, etc.) can provide convenience to the tax payers.
 - i. The hardware components (e.g. Server) and the platform software (Operating System, Database, etc.) were purchased and installed in 2013. Operating system used is Windows Server 2008 and Database used is MySQL 5.x.x. Application is developed in Dot Net 4.0 stack. Enterprise Subscription for MySQL was procured for three years in 2013 which has expired and currently instance of MySQL is running as Community Edition. It is recommended that the application system is upgraded to latest version of the technology stack that has better interoperability with other platforms. Upgrading the technology stack will ensure easy integration with other systems that are built on latest technology platforms like National Identity Platform, Data Hub, etc. Support for MySQL after being acquired by Oracle has become expensive and difficult to get. Further, MySQL is not ideal database package for Dot Net application platform. Therefore, it is recommended backend database be migrated to MS SQL Server which is interoperable in any platform now.
 - j. Assessment of IT infrastructure revealed that no enterprise grade antivirus /unified threat management /endpoint protection system is deployed. Even if the solutions are used, they are not used to protect every device in the Thromde network. The RMS and DAR being hosted in Windows platform, chances of systems being infected by malware are high. Hence, it is recommended that the protection and IT management is done as per the requirement in IT controls developed for Thromdes.
 - k. Now that the systems are stabilizing and data becomes the main source of decision making for Thromde, it is important the appropriate communication channels can be implemented for cost effective and efficient communication with taxpayers. Some of the effective and efficient communication channels are email and SMS. Email and SMS can be easily integrated with the RMS and DAR.

1. Thromde has been receiving support from BUDP II to implement, maintain and operate the system. However, when the project closes, Thromde is expected to have continuity plan in place to ensure smooth operation of the system and also the develop enhancements.

3.2. Phuentsholing Thromde

3.2.1. Revenue Management System

Sources of Revenue

Phuentsholing Thromde has configured following sources of revenue in the system starting the tax year 2016.

2016	2017	2018
Full Property Transfer	Full Property Transfer	Full Property Transfer
Excess Land	Excess Land	Excess Land
Land Demarcation and Site Plan	Land Demarcation and Site Plan	Land Demarcation and Site Plan
Building Plan Processing and Construction Approval	Building Plan Processing and Construction Approval	Building Plan Processing and Construction Approval
Building Deviation	Building Deviation	Building Deviation
Land Registration	Land Registration	Land Registration
Plot Sub-division	Plot Sub-division	Plot Sub-division
Property Tax	Property Tax	Property Tax
Ground Rent	Ground Rent	Ground Rent
Land Lease	Land Lease	Land Lease
Document Fees	Document Fees	Document Fees
Environmental Fines	Environmental Fines	Environmental Fines
Water Billing	Water Billing	Water Billing
Vacuum Tanker	Vacuum Tanker	Vacuum Tanker
Water Connection	Water Connection	Water Connection
Occupancy Certificate	Occupancy Certificate	Occupancy Certificate
Water Line Shifting	Water Line Shifting	Water Line Shifting
Capacity Upgrade	Capacity Upgrade	Capacity Upgrade
Parking	Parking	Parking
Sale of Dustbins	Sale of Dustbins	Sale of Dustbins
Vegetable Market Fees	Vegetable Market Fees/Weigh Bridge	Shed Rent-Vegetable Market
Partial Property transfer	Partial Property transfer	Partial Property transfer
Sale of Product: Pegs	Sale of Product: Pegs	Sale of Product: Pegs
Water Tax	Water Tax	Water Tax
Building Upgradation	Building Upgradation	Building Upgradation
Betterment Charges	Betterment Charges	Betterment Charges
Water Meter Reconnection	Water Meter Reconnection	Water Meter Reconnection
Water Meter Shifting	Water Meter Shifting	Water Meter/Point Shifting
Water Meter Replacement	Water Meter Replacement	Water Meter Replacement
Sewerage Connection	Sewerage Connection	Sewerage Connection

Implementation Status of Revenue Management System and Digitized Asset Register

Construction Revalidation	Construction Revalidation	Construction Revalidation
Sale of Tender	Sale of Tender	Sale of Tender
House Rent	House Rent	House Rent
Public Toilet	Public Toilet	Public Toilet
Weighing Bridge	Weighing Bridge	Weighing Bridge
Site Plan Fee	Site Plan Fee	Fees
		Water Service O&M
		General Fees & Fines
		Banner and sign board fees
		Education fees
		Hire charge
		Environment Clearance
		Water Meter Upgradation
		Weigh bridge
		Public Toilet
		Tenancy Fines
		Land Service Fee
		Road Service Fee
		Promotion Revoke
		Sewerage Connection Shifting

Taxes/Tariff/Fees/Charges

From the above sources, following taxes/tariff/fees/charges are collected by the Thromde and are configured in the revenue management system.

2016	2017	2018
Land Tax - Residential	Land Tax - Residential	Land Tax - Residential
Land Tax - Commercial	Land Tax - Commercial	Land Tax - Commercial
Land Tax-Semi Commercial	Land Tax-Semi Commercial	Land Tax-Semi Commercial
Urban House Tax-Residential	Urban House Tax-Residential	Urban House Tax-Residential
Urban House Tax-Shops and Restaurants	Urban House Tax-Shops and Restaurants	Urban House Tax-Shops and Restaurants
Urban House Tax-Hotels	Urban House Tax-Hotels	Urban House Tax-Hotels
Underdevelopment Tax-Residential	Vacant Land Tax-Residential	Vacant Land Tax-Residential
Underdevelopment Tax-Commercial	Vacant Land Tax-Commercial	Vacant Land Tax-Commercial
Underdevelopment Tax-Semi Commercial	Vacant Land Tax-Semi Commercial	Vacant Land Tax-Semi Commercial
Garbage Collection Charges	Garbage Collection Charges	Garbage Collection Charges
Street Lighting Charges	Street Lighting Charges	Street Lighting Charges
Water Charges	Water Charges	Water Charges
Sewerage Charges	Sewerage Charges	Sewerage Charges

Rent from Civic Amenities-Ground	Rent from Civic Amenities-Ground	Rent from Civic Amenities-Ground
Rent from Civic Amenities-Market	Rent from Civic Amenities	Rent from Civic Amenities
Rent from Civic Amenities-Parking	Rent from Civic Amenities-Parking	Rent from Civic Amenities-Parking
Rent from Lease Land	Rent from Lease Land	Rent from Lease Land
Development Charges-Construction Approval	Development Charges-Construction Approval	Development Charges-Construction Approval
Development Charges-Occupancy Certificate	Development Charges-Occupancy Certificate	Development Charges-Occupancy Certificate
Property Transfer fee	Property Transfer fee	Property Transfer fee
Sub-Division	Sub-Division	Sub-Division
Regularization Fee-Excess Land	Regularization Fee-Excess Land	Regularization Fee-Excess Land
Regularization Fee-Building Regularization	Regularization Fee-Building Regularization	Regularization Fee-Building Regularization
Water Connection Charges-Permanent	Water Connection Charges-Permanent	Water Connection Charges-Permanent
Water Connection Charges-Temporary	Water Connection Charges-Temporary	Water Connection Charges-Temporary
Sewerage Connection Charges-Permanent	Sewerage Connection Charges-Permanent	Sewerage Connection Charges-Permanent
Sewerage Connection Charges-Temporary	Sewerage Connection Charges-Temporary	Sewerage Connection Charges-Temporary
User Charges-Environmental Fines	User Charges-Environmental Fines	User Charges-Environmental Fines
Land Demarcation Fee	Land Demarcation Fee	Land Demarcation Fee
Service Charges-Site Plan Survey	Service Charges-Site Plan Survey	Service Charges-Site Plan Survey
Service Charges-Building Plan Survey	Service Charges-Building Plan Survey	Service Charges-Building Plan Survey
Service Charges-Construction Assessment	Service Charges-Construction Assessment	Service Charges-Construction Assessment
Service Charges-Vacuum Tanker	Service Charges-Vacuum Tanker	Service Charges-Vacuum Tanker
Service Charges-Road Cutting and Excavation	Service Charges-Road Cutting and Excavation	Service Charges-Road Cutting and Excavation
Documents-Application	Documents-Application	Documents-Application
Documents-Certificate	Documents-Certificate	Documents-Certificate
Products-Dust Bins	Products-Dust Bins	Products-Dust Bins
Products-Demarcation Pegs	Products-Demarcation Pegs	Products-Demarcation Pegs
Rental Deposits-Ground	Rental Deposits-Ground	Rental Deposits-Ground
Rental Deposits-Market	Rental Deposits-Market	Rental Deposits-Market
Rental Deposits-Parking	Rental Deposits-Parking	Rental Deposits-Parking
Lease Deposits-Land Lease	Lease Deposits-Land Lease	Lease Deposits-Land Lease

Implementation Status of Revenue Management System and Digitized Asset Register

Security Deposits/Meter Cost	Security Deposits/Meter Cost	Security Deposits/Meter Cost
Service Charge Refunds-Fees and Administrative Charges	Service Charge Refunds-Fees and Administrative Charges	Service Charge Refunds-Fees and Administrative Charges
Service Charge Refunds-Sale and Hire Charges	Service Charge Refunds-Sale and Hire Charges	Service Charge Refunds-Sale and Hire Charges
Land Registration	Land Registration	Land Registration
Water Connection Charges-Water Line Shifting	Water Connection Charges-Water Line Shifting	Water Connection Charges-Water Line Shifting
Refund - Demand Tax	Refund - Demand Tax	Refund - Demand Tax
Road Cutting/Property Damage/Soil Dumping	Road Cutting/Property Damage/Soil Dumping	Road Cutting/Property Damage/Soil Dumping
Penalty	Penalty	Penalty
Betterment Charges	Betterment Charges	Betterment Charges
Scrutiny Fee	Scrutiny Fee	Scrutiny Fee
Service and Amenities Fee	Service and Amenities Fee	Service and Amenities Fee
Meter Rent	Meter Rent	Meter Rent
Cost of Fittings	Cost of Fittings	Cost of Fittings
Cost Of chamber	Cost Of chamber	Cost Of chamber
Handling Charge	Handling Charge	Handling Charge
Water Reconnection Charges	Water Reconnection Charges	Water Reconnection Charges
Water Connection Charges-Chamber Shifting	Water Connection Charges-Chamber Shifting	Water Connection Charges-Chamber Shifting
Sale of Tender	Sale of Tender	Sale of Tender
Solid Waste	Solid Waste	Solid Waste
Street Light Operation	Street Light Operation	Street Light Operation
Lagthram Charge	Lagthram Charge	Lagthram Charge
	Shed Rent	Shed Rent
	Cost of Form	Cost of Form
	Property Tax-Penalty	Property Tax-Penalty
	Water & Sewerage Charge-Penalty	Water & Sewerage Charge-Penalty
	House Rent	House Rent
	Public Toilet	Public Toilet
	Weighing Bridge	Weighing Bridge
	Site Plan Fee	Site Plan Fee
		Water tanker
		General Fees & Fines
		Building Permit Fees
		Banner and sign board fees
		Vendor Penalty
		Education Fees
		Environmental Charges

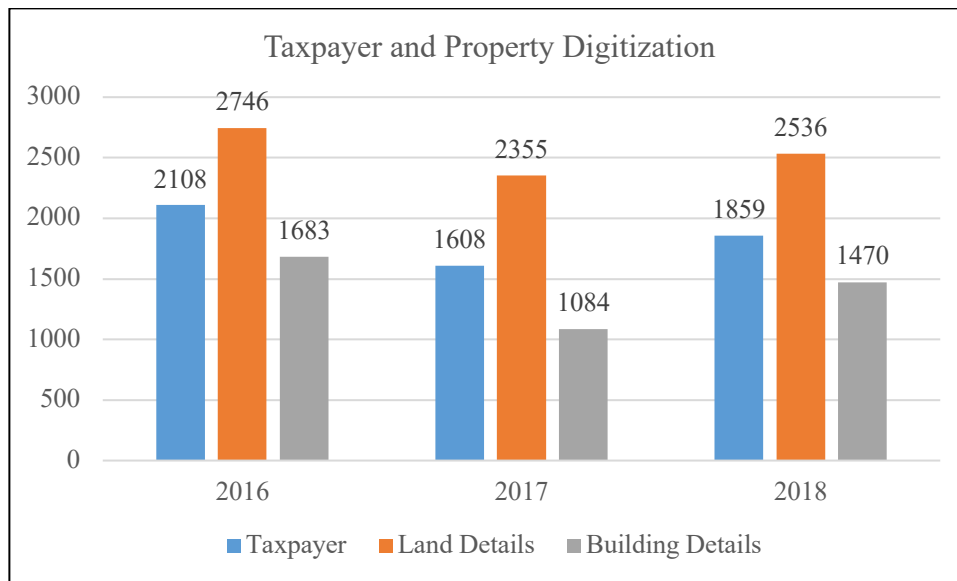
		Application Fee- Environmental Charges
		Penalty-Environmental Charges
		Machinery Hire Charges
		Water Connection Charges-Water Line/Point Shifting
		Lien Noting fee
		Lease Penalty
		Public Toilet
		Tenancy Fines
		Site Plan Fee
		Transaction Fee
		Lien Noting Fee
		Demarcation Charge
		Road Cutting Fee
		Road Fines
		Occupancy Certificate
		Land Lease Security Deposit
		Promotion Revoke
		Other Land Service Fees
		Drawing Revalidation
		Sewerage Shifting

It is evident that every year new tax is included in the list of taxes which mean that the Thromde is exploring options to enhance revenue through additional sources. Implementation of RMS has provided the Thromde with information for decision making.

Digitization of Taxpayers and Property Data

Digitization of taxpayer and property data for last three years is depicted as below. Cleaning of data resulted in certain decrease in records at times.

Implementation Status of Revenue Management System and Digitized Asset Register



Digital information of Taxpayers (2108), land property (2746) and Building property (1683) is the Data that was migrated in the system in 2013. Until 2016, very less was done in the system. Verification and updating of data began in 2016. Verification was done with the land details obtained from National land commission and the building survey conducted by the Thromde.

Source of Revenue Ledger Transactions

Ledger records (number of records) and the revenue collection for different revenue sources are presented below:

Revenue Source	2016		2017		2018	
	No. of Ledger Transactions	Amount Collected	No. of Ledger Transactions	Amount Collected	No. of Ledger Transactions	Amount Collected
Uncategorized				218570	1583	5185224.69
Full Property Transfer					28	8497328.15
Building Plan Processing and Construction Approval					51	2422114.25
Building Deviation					2	281338
Plot Sub-division					1	45778
Property Tax			320	318900.5	514	1186023
Land Lease					28	866242.92
Document Fees			71	7400	181	72500
Environmental Fines			12		110	98800
Water Billing			12588	11020481	16273	14177614.11
Vacuum Tanker			24	13000	63	259517
Water Connection			46	296828	99	646083
Parking					2	1594320
Sale of Dustbins			2		2	
Shed Rent-Vegetable			110		442	240360
Partial Property transfer			2	294238.7	11	3457890.44
Sale of Product: Pegs			5		7	3000
Building Upgradation					3	9652
Water Meter Reconnection			2	2000	3	3000
Water Meter/Point Shifting			2	3000	9	14700
Water Meter Replacement			10	2604	97	338401
Sewerage Connection			2	3000	5	15000

Implementation Status of Revenue Management System and Digitized Asset Register

Sale Of Tender			2		2	5000
House Rent			108	258990	452	1149890
Public Toilet			7		10	35735.96
Weighing Bridge			5		5	75000
Fees			4	500	420	317950
Full Property Transfer by head					4	645570
Sewerage Connection by head					3	
Water Service O&M					40	28400
General Fees & Fines					79	3205631.69
Banner and sign board fees					69	190209
Education fees					7	3508
Hire charge					12	198352
Environment Clearance					83	43002
Water Meter Upgradation					4	21705
Weigh bridge					3	
Public Toilet					4	13773
Tenancy Fines					3	198352
Land Service Fee					399	6737911.38
Road Service Fee					5	32080
Promotion Revoke					1	10000

Tax ledger Transactions

Ledger records (number of records) and the revenue collection for different taxes/tariff/fees/charges are presented below.

Tax	2016		2017		2018	
	No. of Tax Ledger Transactions	Amount Collected	No. of Tax Ledger Transactions	Amount Collected	No. of Tax Ledger Transactions	Amount Collected
Unknown					4	4000
Land Tax - Residential			308	198481.5	461	613476
Land Tax - Commercial					1	1200
Urban House Tax-Residential			36	23060	179	151075
Urban House Tax-Shops and Restaurants			36	3840	15	21828
Vacant Land Tax-Residential			58	30051	22	10524
Garbage Collection Charges			58	42312	91	259248
Street Lighting Charges			58	21156	89	128424
Water Charges			58	7489999.26	15584	9399698.14
Sewerage Charges			58	3655227.77	15583	4699811.97
Rent from Civic Amenities					4	9360
Rent from Lease Land					99	5120180.61
Property Transfer fee			2	294038.71	38	12745281.59
Sub-Division					1	45578
Water Connection Charges-Permanent			48	48000	72	67001
Water Connection Charges-Temporary			3	3000	24	23000
Sewerage Connection Charges-Permanent			1	3000	5	15000
User Charges-Environmental Fines					50	98800
Service Charges-Vacuum Tanker			9	13000	46	258317
Documents-Application			27	7400	95	67700
Rental Deposits-Market					1041	685650
Rental Deposits-Parking					2	1594320

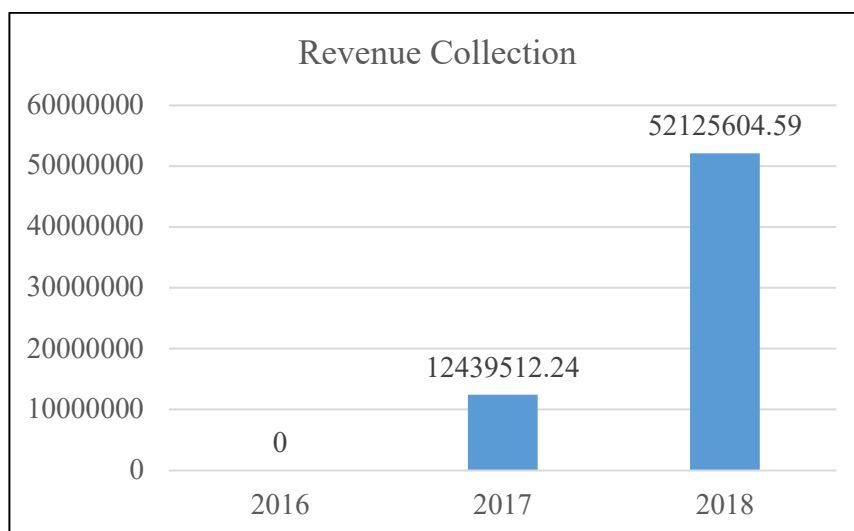
Implementation Status of Revenue Management System and Digitized Asset Register

Security Deposits/Meter Cost			52	119088	194	601735
Water Connection Charges-Water Line Shifting			2	3000	9	13500
Penalty					2	278338
Scrutiny Fee					54	1103933.75
Service and Amenities Fee					49	1330832.5
Meter Rent			10916	54580	15581	77905
Cost of Fittings			41	13637	94	44903
Cost Of chamber			51	114330	92	196410
Handling Charge			51	39270	96	70840
Water Reconnection Charges			2	2000	3	3000
Sale of Tender					1	5000
Lagthram Charge			2	200	33	6201
Cost of Form			51	1275	96	2300
Property Tax-Penalty					2	98
Water & Sewerage Charge-Penalty			3	76	7	196
House Rent			99	258990	533	1460447
Public Toilet					7	32135.96
Weighing Bridge					4	100000
Site Plan Fee			1	500	61	34000
Water tanker					18	26000
General Fees & Fines					39	3205631.69
Building Permit Fees					187	241250
Banner and sign board fees					3	8297
Vendor Penalty					2	48
Education Fees					2	3508
Environmental Charges					130	81914
Application Fee-Environmental Charges					130	38000
Penalty-Environmental Charges					21	105000
Lien Noting fee					18	22000
Public Toilet					5	18864

Implementation Status of Revenue Management System and Digitized Asset Register

Tenancy Fines					3	198352
Site Plan Fee					41	21500
Transaction Fee					67	78000
Lien Noting Fee					108	115000
Lagthram Fee					158	38000
Demarcation Charge					15	209205.5
Road Cutting Fee					5	32080
Occupancy Certificate					13	15500
Promotion Revoke					1	10000
Other Land Service Fees					9	6276205.88

Total Revenue Collection



With some collection to test the revenue collection, Phuentsholing Thromde actually started collection of revenue in 2018 except for water which was started in 2017.

3.2.2. Digitized Asset Register

Asset Classification

Primary Class	Secondary Class	Tertiary Class
Fixed Asset	Land	Institutional land
		Open Space
		Utility and services
	Building	Office Building
		Commercial building
		Utility and services
	Roads and Bridges	Concrete road
		Black top road
		Railing and crash barrier
		Parapets
		Bridges
		Footpath
		Side drains
		Culvert
		Retaining Wall
		Dividers
		Signages
		Sewerage
	Sewer Treatment Plant	
	Manhole	
Inspection chamber		
Junction box		

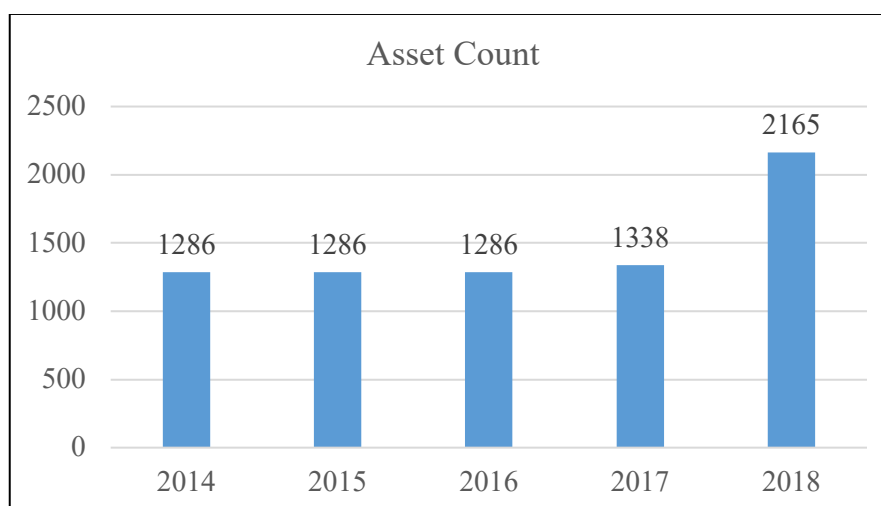
Implementation Status of Revenue Management System and Digitized Asset Register

	Water Works	Open/Bore wells
		Reservoirs
		Tanks
		Pipe Lines
		Valves
		Chamber
		Meters
		Pumps
		Treatment Plants
		Public Lighting
Compound lights		
Control Panel/Timer		
Movable Asset	Plants and Machinery	Water Supply Equipment
		Sewerage Equipment
		Survey equipment
		Road Equipment
		Electrical Equipment
		Building Equipment
		Solid Waste Equipment
	Vehicles	Service Vehicle
		Pool Vehicle
	Fixed Asset	Office and Other Equipment
Computer		
UPS		
Laptop		
Scanner		
Copier		
Plotter		
Water Filter		
Projector		
Network Equipment		
Multi-Functional Printer		
Walkie-Talkie Handsets		
Cash Counter		
Digital camera		
<i>Chadri</i> Items		
<i>Kuthangs</i>		
Projector Screen		
Carpets		
Sound System		
Furniture and Fitting		
		File Rack
		Almirah/Cupboard
		Sofa set/ <i>Chodrom/Dewan</i>
Solid Waste Management		Dumper Placer Dustbin
		Collection Bin

		Open Trolley
		Deep Freezer
	Other Fixed Assets	Other Fixed Assets
	Office and Other Equipment	Fax Machine
	Solid Waste Management	Solid Waste
	Office and Other Equipment	Printer

Asset Counts

The overall asset counts recorded in the DAR is depicted below.



Asset count in the years 2014, 2015 and 2016 is 1286. This is because after asset information was migrated in the DAR in 2014 by consultants, Thromde could not record additional asset details or record any other information.

Starting 2017 Thromde actively managed asset information. Approximately, 60 % of additional asset details are recorded in the system between 2017 and 2018.

Secondary Class

Secondary Class	Asset Count 2016	Asset Count 2017	Asset Count 2018
Land		9	9
Building		39	43
Roads and Bridges	135	317	353
Sewerage and Drainage	417	235	244
Water Works	116	57	190
Public Lighting	23	131	646
Plants and Machinery	2	30	40
Vehicles	27	35	46
Office and Other Equipment	466	231	253
Furniture, Fixtures, Fittings and Electrical	84	219	301
Solid Waste Management	16	19	19
Other Fixed Assets		16	21

Asset details increased for almost all secondary asset class from 2017 to 2018. The increase in number is due to commissioning /purchase of new asset as well as details update of existing assets.

Tertiary Class

Tertiary Class	Asset Count 2016	Asset Count 2017	Asset Count 2018
Institutional land		9	9
Office Building		7	8
Commercial building		10	10
Utility and services		22	25
Black top road		63	75
Parapets			1
Railing and crash barrier		24	24
Bridges		5	7
Footpath		65	67
Side drains		54	61
Culvert		35	39
Retaining Wall		36	44
Dividers		6	6
Signages		29	29
Sewer Pipeline		232	232
Sewer Treatment Plant		2	2
Junction box		1	1
Reservoirs		17	24
Tanks		12	27
Pipe Lines		14	33
Water Supply Equipment			8
Treatment Plants			3
Valves		14	34
Pumps			24
Open /Bore Wells			12
Meters			27
Street light Poles		131	646
Sewerage Equipment		21	23
Survey equipment		9	9
Service Vehicle		26	36
Pool Vehicle		9	10
Air Conditioner		5	5
Computer		69	70
UPS		9	9
Laptop		43	49
Scanner		4	6
Printer			7
Copier		6	8
Plotter		1	1

Projector		4	5
Network Equipment		4	4
Multi-Functional Printer		43	46
Walkie-Talkie Handsets		10	10
Cash Counter		3	3
Digital camera		17	17
Chadi Items		10	10
<i>Kuthangs</i>		1	1
Sound System		1	1
Tables and chairs		151	229
File Rack		23	25
Almirah/Cupboard		39	40
Sofa set/ <i>Chodrom/Dewan</i>		6	7
Other Fixed Assets		16	21
Fax Machine		1	1
Solid Waste		19	19

Other DAR Transactions

The Digitized Asset Register provides functions for recording operational information like asset assessment /inspection details and maintenance details. DAR data review revealed that no operational data is updated in the system till date. Disposal information is not recorded as well. DAR also provides for ability to manage depreciation schedule for assets and generate valuation of the assets.

With new Asset Management and Valuation Guidelines, Thromdes will be able to manage asset information in line with the Asset Management and Valuation Guideline.

3.2.3. Issues Resolutions and Feature Enhancement

Review of the issues and changes submitted to service providers during 2016-17 and 2017-18 annual support revealed that processes standardization has not happened and data related issues are impacting usage and adoption of the system. Certain revenue sources and processed were missed out during the first phase of development of the system.

- a. Until December 2016, rates and assessment rules were not thoroughly verified by the Thromde officials responsible for the assessment of taxes/fees/charges/tariff.
- b. While certain standard revenue reports were implemented in the system, reports specific to current reporting formats were not implemented in the system. Users requested for reports but took time to provide relevant formats.
- c. System uses master data for configuration of parameters like rates, slabs, assessment parameters. Thromde reported that the values for such parameters were incorrect in the system. Also, revenue components of different revenue sources were not relevant. The components were adopted from Thimphu Thromde.
- d. Land lease was included with other sources with similar processes but Thromde required land lease to implemented as separate revenue process.
- e. Terminologies used in Thromde were reported to be inappropriate to Phuentsholing Thromde. Hence, such terminologies were changed as per practiced in Phuentsholing Thromde.

- f. The user interfaces modification to display required information for the users. Some data fields were removed while in some cases new data fields were incorporated.
- g. Retreat review of the system by the Thromde team provided the support team with around 40 minor issues which included technical bugs, data related issues, minor modification in pages and logic. For instance, specific issues reported and resolved in one of the support quarter is depicted below.

Sl. No.	Requirement /Bugs
1	To provide all rates in the system to be reviewed by Thromde once again
2	All layouts of reports, receipts and invoices shall be generated and provided by consultant which is currently in the system for every service to be modified by Thromde and incorporated in the system
3	Consultant to provide the data format of the system for Master Data (property) by 21st Dec. 2016.
4	Along with Invoice generation, Head should be able to view the details and approve in every service
5	Building valuation process to be incorporated on Thromde providing required data and formula
6	E1 rate to be incorporated in the system as rural rate where there is no LAP
7	More 'Property Ownership type' need to be added apart from joint.
8	Land Lease to be separated from parking fees/land lease/vegetable market to be added under service fee with attributes provided by Thromde
9	Precinct to be shown in table in property detail during Property Transfer
10	Under development tax to be renamed as vacant land tax (not applicable for E1 precinct)
11	Land Type need to be removed from the system
12	Under land registration, remove lease from property type drop down
13	Land use category is to be changed as precinct and sub category as sub precinct, the precinct and sub-precinct details to be incorporated as per list provided by thromde
14	Remove old plot no and Thram no in the land details
15	User segregation as per division /section
16	Change in user details resets user password under master users.
17	tranPropertyFullTransfer.aspx - after transferee adds, if 2 property-row added mistakenly, delete button required to remove extra row
18	Need to relook into the information visibility on the system for different users depending on the sensitiveness of the data
19	Water Bill Interface -- on the water bill interface (hard copy), plot no., owner name and Thram no. need to be shown
20	Water connection edit -- page title and payer view details not working
21	Disconnection of Consumers -- Trans water disconnection - search by Consumer A/C or Meter No.
22	Vendors -- Select button not working
	Vendors -- Vendors name not shown in grid
	Delete Vendor with TTIN - 000787, 000789 and 002765

23	Sewerage Connection - Trans Sewerage Connection. When select the plot, connected water connection is not shown
24	New Water connection -- Incorporate Application Form cost, Meter rent not required, security Deposit /meter cost, cost of fitting, cost of chamber and handling charges no rate define
25	Reconnection of water meter -- Tax name. Only reconnection charge grid required. Rest grid not required
26	Meter Replacement -- tran water meter replacement. Issue on the page load. Charges for: Defective Meter - Not payable, Lost meter – payable
27	Shifting of water meter -- tran water meter shifting: issue on the page load. Point shifting - 1000, Meter shifting – 1500
28	Water Bill - Report service charge bill batch printing - for defective water meter, the standard water consumption needs to show (last three months' consumption)
29	Reports Required - 8 report format as of now. Missing format reports will be submitted later
30	Line type 40 mm and 80 mm needs to be added; 32 mm delete
31	Water & sewerage services -- to be incorporated in the system
32	Average payment for temporary water connection for short period ranging from 1 month to 3 months at the average consumption of 300 cum per month, probable for construction on commercial basis which is in our existing practice.
33	<ul style="list-style-type: none"> • Data entry for whole water meter connection and reading updates for past month • Validation of service charges (rates) for water and sewerage. • Fixing water & sewerage monthly demand generation problems. • Incorporating additional water & sewerage reports • Implementing new vendor demand generation and reporting. • Separating Land lease from property tax and developing new pages to capture data and demand generation.

3.2.4. Integration and other Initiatives

RMS and DAR Integration:

RMS and DAR integration is expected to improve the system usage as users will be required to access single system and the functions and menus in the two systems will be merged. If users are required to operate RMS and DAR, single login will provide access to functional menus of both the systems as per the access privileges.

Current Status – As this integration was not part of the AMC services, we are working on the integration of RMS and DAR through implementation of the same systems in Gelephu and Samdrup Jongkhar Thromdes. The integrated system will be implemented in Phuentsholing and Thimphu Thromdes without incurring additional cost once tested in Gelephu and Samdrup Jongkhar Thromdes.

Integration of RMS with e-Citizen Portal:

Integration of RMS with e-Citizen Portal will eliminate the requirement to update data in e-Citizen Portal and RMS. Data updated in e-Citizen Portal will be automatically be reflected in the RMS for revenue collected as transfer fee. Also, property ownership details will be updated in the RMS for property tax assessment after the transaction is complete in e-Citizen Portal.

Current Status – With help from the IT Officers from Thimphu Thromde and NLCS, the support team completed technical discussion and testing of the data sharing API developed for e-Citizen Portal. However, DITT has initiated Data Hub project and Property Database of NLCS is one of the data hubs. DITT has informed the support team and Thromde office to keep on hold the integration activities until the implementation of Property Data Hub is complete. We are informed that the implementation of Data Hub nearing completion but no exact date is provided. The support team can recommence the integration activity once data hub project is complete and tested.

Integration of RMS with G2C Online Service Systems:

The online service systems provided by G2C Project deal with some of the revenue earning services. There is directive from Prime Minister’s Office to use the online systems for service delivery. Some also provide online payment options. Existing of G2C system and RMS introduces duplication with regard to some of the services and revenue collection process. Integration of these systems will avoid situation to use multiple systems for same service.

Current Status: In order to integrate the systems, it is required that API/integration interface to be made available in the G2C systems. As the systems are launched recently in Phuentsholing Thromde, the systems are in process of stabilization. It is also unclear whether the developers of G2C system have contract framework to develop the API/integration interface for online systems (G2C) and provide us with interface which we can access for integration. We have already designed the integration interface for RMS that can be used by developers of G2C for data sharing and data consumption.

Integration of Accounting System with RMS and DAR:

Integration of accounting system with RMS will ensure revenue records be automatically updated in the revenue accounts of the accounting system. Integration of accounting system with DAR will ensure automatic update of fixed asset data into the accounting system.

Current Status: Integration of accounting system with RMS and DAR is included in the current AMC support terms. Further, no stable accounting system that has the capability share and consume data is used by the Thromde.

Others:

Thromde is keen on having GIS information integrated with the RMS and DAR. However, current platforms used in Phuentsholing Thromde do not have features to manage spatial data. GIS integrated asset register is being developed in Thimphu Thromde which can be replicated in Phuentsholing Thromde after being tested in Thimphu.

3.2.5. Observations

- a. Analysis of taxpayer data, property data, information transaction in the system and revenue collection reveals that Phuentsholing Thromde is still validating the data. Progress has been made but it unclear about the percentage of data that is validated and regarded as correct.
- b. Annual support team informed that most of the time data correction is required. The requirement of correction is a result of erroneous data entry, difference in interpretation of assessment rules by different people, use of manual calculation, etc. When assessment rule implemented in the system is used for assessment as per rule, amounts are correct but most of the time invoices are issued prior recording the transaction in the system. If there is error in manual assessment then modification in system is requested instead of re-issuing the correct invoice.
- c. It is evident that system is used for annual property tax and water tariff processing. Other service fees and charges from the system is progressing at slower pace than expected. This may be due to limited coordination among the divisions and sections. General feeling is that revenue management system is for revenue staff and digitized asset register is for procurement staff. This feeling should change and whole of Thromde is required to take ownership of the systems. This results in partial information /data being available in the revenue management system and digitized asset register.
- d. As the systems contain only partial data, reports generated from the systems (RMS & DAR) could not be considered sufficient for decision making.
- e. Duplicate data exists as the data was not properly prepared and maintained in the past. Edit functionality in the system could be used to clean the data after getting information from the property owners. Further, slight discrepancy in data which probably existed in manual process but was not detected and now detected is forwarded to IT team. Instead, such discrepancies can be best resolved by the owner of the data.
- f. Due to transfers, re-organization and time gap users seem to face problems to use the system. Users reported the requirement for training.
- g. As per the information provided by the focal person, there is no record of total property under Thromde jurisdiction as current practice requires the property owner to provide information about the property. If data in the system can be updated during one taxation period, data will be available for future use in the system. Due to lack of single source of truth, several rounds of review and verification of data by Thromde officials and property owners is required leading to delay in completion of digitization.
- h. Once all the modules from the system have been thoroughly used then we could build better and needy reports than the present reports which only limited information which we thought would be usable to Thromde.
- i. With introduction of numerous systems, users are sometimes required to use multiple systems which has surfaced to be one of the strong reasons for resistance. Thromde staff pool comprise of employees from different sectors. There are sector specific systems like G2C systems, NLCS's eCitizen Portal, MYRB and PEMS from Ministry of Finance. Therefore, certain modules of RMS and DAR appear to be duplication.
- j. The benefit of having RMS & DAR is not clear to Thromde staff. Thromde staff are considering the data update as additional responsibility. Thromde administration still considers the manual compilation and preparation of data trust worthy and forgive the human error which can be eliminate through use of information systems.

3.2.6. Way Forward

In view of the above observations, following is recommended as way forward:

- a. Users are expected to be more careful not to update erroneous transaction in the system. Data cleaning using backend channel will not be sustainable in future as it skips certain audit trail functions leading to accountability issues.
- b. As the system is getting stable it is recommended that receipts generation and printing feature be used. This approach requires system to be up-to-date with the data required for taxation.
- c. Some functions have not undergone thorough functional testing. During AMC duration new features were requested, incorporated and tested. As the system developed using specification provided by international consultants who have worked with many municipalities across the world. Thromde team has reviewed the system and recommended removal of features that are not useful /not required by the Thromde.
- d. Follow up with Thimphu Thromde to achieve certain advancements like integration with G2C systems, integration with e-Citizen Portal and integration with payment channels like online payment gateway, MBOB and MPay. Also, collaborate with Thimphu to get mobile apps used for water billing.
- e. Plan for support and enhancement of the system as well as the infrastructure used to host the system.
- f. Currently single hardware is used to host both DAR and RMS. Also, application system and Database is hosted in single machine. The approach is risky in the sense that failure of the hosting machine will bring the system to standstill. Recovery of the system will be contingent to recovery of the server machine and time required to recover the server machine. It is time that proper setup is available to bring back the systems in shortest possible time during outages through use of backup and recovery solutions, maintaining mission critical and disaster recovery setup, etc. Use of GDC or BT DC can be considered to maintain recovery site. Also, it is recommended that separate machines (or VM) is used to host application system and Database. This will ensure hardware failure will impact only one component of the systems.
- g. The hardware components (e.g. Server) and the platform software (Operating System, Database, etc.) were purchased and installed in 2013. Operating system used is Windows Server 2008 and Database used is MySQL 5.x.x. Application is developed in Dot Net 4.0 stack. Enterprise Subscription for MySQL was procured for three years in 2013 which has expired and currently instance of MySQL is running as Community Edition. It is recommended that the application system is upgraded to latest version of the technology stack that has better interoperability with other platforms. Upgrading the technology stack will ensure easy integration with other systems that are built on latest technology platforms. Support for MySQL after being acquired by Oracle has become expensive and difficult to get. Further, MySQL is not ideal database package for Dot Net application platform. Therefore, it is recommended backend database be migrated to MS SQL Server which is interoperable in any platform now.
- h. Assessment of IT infrastructure revealed that no enterprise grade antivirus /unified threat management /endpoint protection system is deployed. Even if the solutions are used they not used to protect every device in the Thromde network. The RMS

and DAR being hosted in Windows platform, chances of systems being infected by malware are high. Hence, it is recommended that the protection and IT management is done as per the requirement in IT controls developed for Thromdes.

- i. Now that the systems are stabilizing and data becomes the main source of decision making for Thromde, it is important the appropriate communication channels can be implemented for cost effective and efficient communication with taxpayers. Some of the effective and efficient communication channels are email and SMS. Email and SMS can be easily integrated with the RMS and DAR.
- j. Thromde has been receiving support from BUDP II to implement, maintain and operate the system. However, when the project closes, Thromde is expected to have continuity plan in place to ensure smooth operation of the system and also the develop enhancements.