



FINANCIAL VIABILITY OF OPERATION AND MAINTENANCE OF SEWERAGE SYSTEM

- Case of Patan Municipality

Performance Assessment System

Submitted By

Urban Management Centre



The Urban Management Centre (UMC) is a not-for-profit organization based in Ahmedabad, Gujarat, working towards professionalizing urban management in India and South Asia. UMC provides technical assistance and support to Indian state local government associations and implements programs that work towards improvement in cities by partnering with city governments. UMC builds and enhances the capacity of city governments by providing much-needed expertise and ready access to innovations on good governance implemented in India and abroad. UMC is a legacy organization of International City/County Management Association (ICMA) and hence is also known as ICMA-South Asia. See more at www.umcasia.org



PAS, a five-year action research project, has been initiated by CEPT University with funding from the Bill and Melinda Gates Foundation. PAS aims to develop better information on water and sanitation performance at the local level to be used to improve the financial viability, quality and reliability of services. It will use performance indicators and benchmarks on water and sanitation services in all the 400-plus urban areas of Gujarat and Maharashtra. UMC and the All India Institute of Local Self Governance are CEPT's project partners in Gujarat and Maharashtra, respectively. More details are available on www.pas.org.in



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Under the Performance Assessment Project

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Acronyms and Abbreviations

13th FC	Thirteenth Finance Commission
Capex	Capital Expenditure
DCB	Demand Collection Balance statement
GOG	Government of Gujarat
GoI	Government of India
GPCB	Gujarat Pollution Control Board
GUDC	Gujarat Urban Development Company
GUDM	Gujarat Urban Development Mission
GWSSB	Gujarat Water Supply and Sewerage Board
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
MoUD	Ministry of Urban Development
NGO	Non-Government Organization
O&M	Operation and maintenance
Opex	Operating Expenditure
SCS	Sewerage Collecting System
SLB	Service Level Benchmark
SPS	Sub Pumping Station
STP	Sewerage Treatment Plant
ULB	Urban local body
WATSAN	Water Supply & Sanitation
WDS	Water distribution system

Units of measurements

HP	Horse Power
kl	kiloliter
kld	kiloliter per day
Kwh	Kilo watt hour
lpcd	Liter Per Capita Per Day
Mld	Mili liter per day

Executive Summary

The Government of Gujarat has initiated design and installation of underground drainage and sewerage treatment plants (STP) in 167 urban local bodies in the state under the Swarnim Jayanti Mukhya Mantri Shaheri Vikas Yojana (SJMMSVY). Gujarat Urban Development Corporation (GUDC) is the nodal agency for setting up the STP.

This is a laudable initiative by the State Government to support construction of basic infrastructure in all cities of the State, however, this study assesses the lack of financial capacity of urban local bodies to support operation and maintenance of the infrastructure. The State Government is supporting the capital expenditure and operation and maintenance cost for the first 2 years.

The study focuses on a class A Municipality of Patan and assesses its financial health, its rates of recovery of taxes and efficiencies in collection of taxes. The study projects the operating expenses that the ULB will have to bear in order to successfully operate the underground drainage and the sewage treatment plant.

An estimated Rs. 181.81 lakh would be required in the third year for the O & M of the plant which is high as compared to revenue income with improve collection efficiency of Rs. 44.02 lakh. The assessment builds two scenarios with improvements to the municipal revenue income. With these improvements and considering that the Municipality does not make any improvements or expansions in its other departments (water supply, fire, health, education, civic amenities, solid waste etc.), the municipality still faces a deficit of 20% in O&M expenses.

Based on the study, it is recommended that the State Government should carefully assess the current financial health of the ULB and estimate the O&M expenditure for the proposed projects. Other low-cost solutions for provision of safe collection and treatment of waste water from cities should also be explored (such as settled sewers, designed aerated lagoons with root zone filters etc.).

1. Introduction

The Government of Gujarat under the Swarnim Jayanti Mukhya Mantri Shaheri Vikas Yojana (SJMMSVY) has initiated the construction of underground sewerage projects across all 167 ULBs in the state. Along with laying of the networks, provision of appropriate sewage treatment plants is also undertaken. The total cost of construction and operation and maintenance of underground sewerage systems for initial two months for 104 ULBs is around Rs. 2760 crores. Patan is one such city where the works for laying underground sewer network and setting up of sewage treatment project has been initiated.

As per provisions under the scheme, the state government is providing full funding towards capital expenditure of the sewer utility as well as operation and maintenance (O&M) expenditure (*referred to as opex in the note*) for the first two years after which, the utility will be handed over the respective ULBs.

The focus of this paper is to assess the financial capacity of the urban local body to continue to support opex after the sewerage utility has been handed over to the ULB. The objective of the note is to highlight the steps that ULBs will have to take to have adequate finances to support the O&M. Without adequate finances, ULBs will be stressed to operate and maintain the sewer system which would lead to the deterioration of the useful life of the systems necessitating premature replacement of many system components and hence will also affect overall sanitation. Even after creating such assets by investing millions of rupees, ULBs would be unable to provide the services effectively to the community for which they have been constructed, as they remain defunct or underutilized most of the time.

It is in this context that the case of Patan municipality has been reviewed in detail. This assessment has been undertaken under the ongoing Performance Assessment System Project (PAS). One of the key areas of improvements in cities under the PAS project has been to improve financial viability of the service delivery.

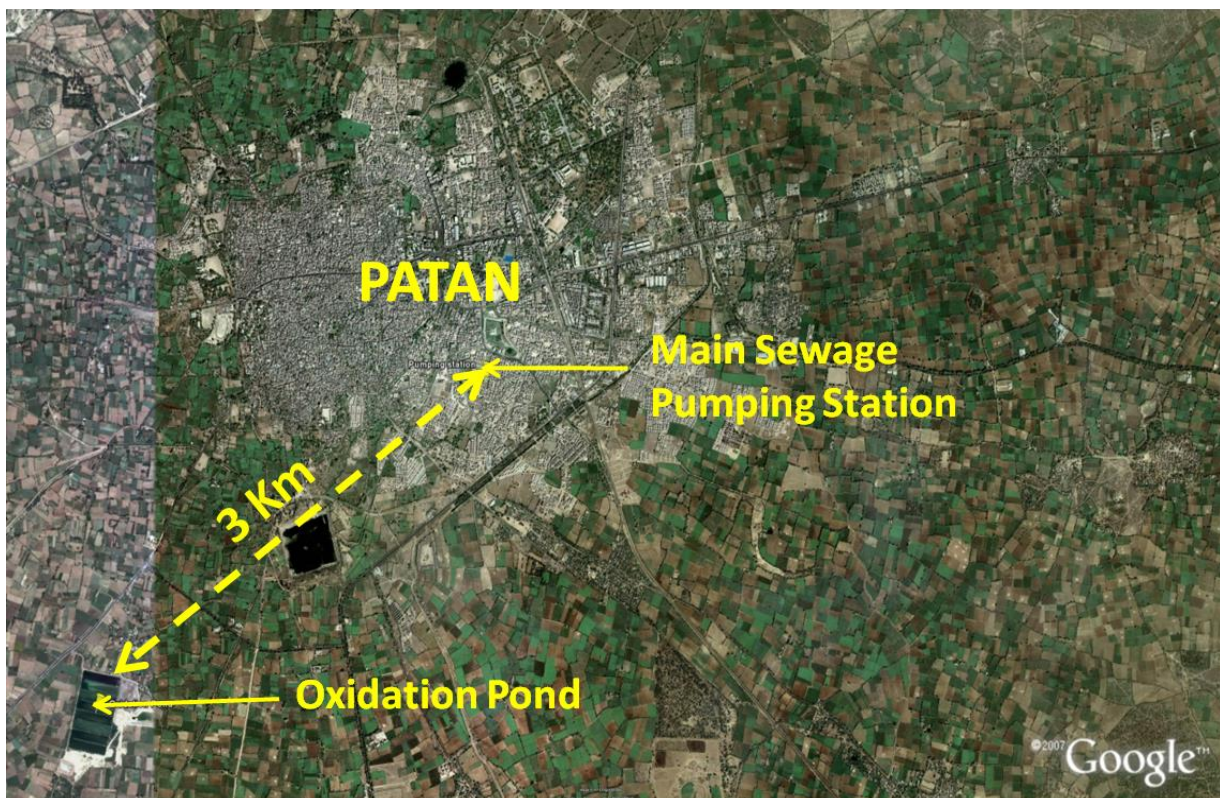
2. About Patan

Patan, the erstwhile capital city of Gujarat, is a Class A municipality located about 90 km from Gandhinagar. As per Census 2011, the city houses a population of 125502 residing in 27000 households. The city is spread over an area of 13.32sq.km and has about 20 % of population living in slums. Based on ULB estimates, there are about 25,558 people residing in 4997 slum households in 2012.

Existing waste water scenario in Patan

The city has an underground sewer network that covers most of the *gamtal* area and about 26% of the city-area. This network was commissioned in 1998. Based on PAS-SLB data, only about 25% of the properties are currently connected to the network¹. All the remaining properties depend on septic tanks/ soak pits.

The sewer network has 4 sub-pumping stations (SPS) and one main pumping station (MPS). The main pumping station carries the waste water to the facultative (oxidation) pond through a 3 km long rising main. The treatment capacity of the system is estimated to be 13.4 MLD.



The oxidation pond in Patan has a system of four facultative ponds. A separate study conducted by UMC showed that with some minor improvements, the treatment system could be made efficient to meet the CPHEEO standards.

Proposed sewerage system for Patan

The proposed sewerage system which is supported by GUDM has been designed for a horizon of 30 years and includes collection & conveyance system, pumping station, pumping main, treatment plant and disposal arrangement. The approximate cost of the

¹There are total 58,744 residential and commercial properties in the city, out of which only 26,439 properties have toilets. There are total 14,739 sewer connections; forming only 25 percent of properties with toilets connected with waste water network services.

sewerage system (including underground drainage and sewage treatment plant) is Rs. 52.28 crores (costs of DPR prepared in the year 2010). This STP is an activated sludge plant (ASP) with a capacity of 25 MLD and is sited at the same location as that of the facultative ponds.

The government grants include a capital expenditure of Rs. 52.28 crores and an opex of Rs. 82.13 lakhs per year for the first 2 years of commissioning of the system. Thereafter, it is expected that the city will undertake the O&M on its own and through its own finances. The following section analyses the current financial health of the Patan Municipality and assesses various scenarios for Patan to be able to meet O&M expenses. Table 9 in Annex shows the detailed projections of costs for O&M of the plant as per the DPR prepared by GUDM.

3. Assessing Patan's financial capacity to support waste water opex

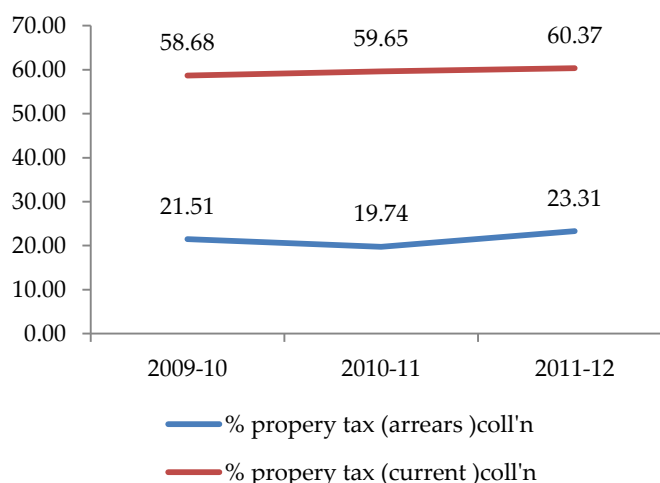
The financial capacity of the municipality has been assessed by calculating the gap between the revenue stream of the ULB and the projected waste water opex. Most of the assumptions taken for the projections are based on the DPR for the project that has been prepared.

Currently, the municipality charges Rs. 200 for a new residential sewer connection and Rs 500 for a new commercial connection

and levies an annual tax called the sewerage tax for waste water service. As in most cities of the state, a unified bill along with the property tax bill is generated and dispatched.

The sewerage tax tariffs for residential and commercial settlements are Rs. 200 and Rs. 500 respectively. This is applied to all properties that are assessed whether they have a sewer connection or septic tank/soak pit.

Figure 1: trend of property tax collection by Patan Municipality



Over the past three years the collection efficiency of property tax of the municipality has ranged between 58-60%. This is for the current taxes, while the efficiency of collection of arrears is around 23%.

On an average over the last four years, the municipality has been able to collect 66% of the sewerage tax levied. In the year 2012-13, the city collected Rs. 47.49 lakh of sewerage tax. The following table compares the trend of revenue receipt of Patan Municipality with that of revenue expenditure for water supply, sewerage and solid waste management. It can be seen that the revenue receipt in the water supply, sewerage and SWM sectors is almost equal to the revenue expenditure in these sectors. Any new expenditure that the city incurs in these sectors will have to be supplemented by increase in revenues.

Table 1: Trend of revenue receipt and expenditure in water supply, sewerage and SWM, Patan

	Revenue income in water supply, sewerage and SWM (in lakhs)	Revenue expenditure for water supply, sewerage and SWM (in lakhs)
2009-10	294.90	689.11
2010-11	287.01	602.57
2011-12	280.26	607.63

Table 2: Net revenue income and expenditure, Patan

Surplus from F. Y. 2010-11	Amount (Rs. In Lakh)
Total revenue income (own source and revenue grants)	1291.53
Total revenue expenditure	1139.57
Net balance (A)	151.96

Key issues identified are:

- The city levies very low connection charges of Rs. 200 for a residential connection and Rs. 500 for a commercial connection. Among Class A cities, Patan has second lowest connection charges with Navsari as the highest charge at Rs. 1470 and Botad with Rs. 1250. The one time connection charges could be increased to at least Rs. 1000 to cover the expenditure costs for providing the connections
- The city also needs to improve its tax collection efficiency from the current 66%.

Projecting Opex and Revenue Streams for Patan

The operation and maintenance costs for the waste water system for a period of 15 years from the year of its commissioning has been calculated based on the capital expenditure. The assumptions for each aspect have been detailed in Table 5 of Annex and the detailed calculations are in Table 6.

The opex costs of the sewerage system has been calculated at Rs. 190 lakh in the third year of the system's commissioning and it increases to Rs. 331 lakh in the fifteenth year of operation. This increase is due to the high increase in O&M costs for the STP from the 15th year onwards.

As a practice, such utilities are not insured and hence the insurance premium is not included. However, a 10% of machinery costs (after deducting the depreciation) has been taken as the insurance premium and has been included in the costing. The inflation costs on various expenditure heads have however not been considered.

Similarly, an analysis has been done to project the city's revenues. The key assumptions here are based on assumptions taken in the DPR of the project. These are:

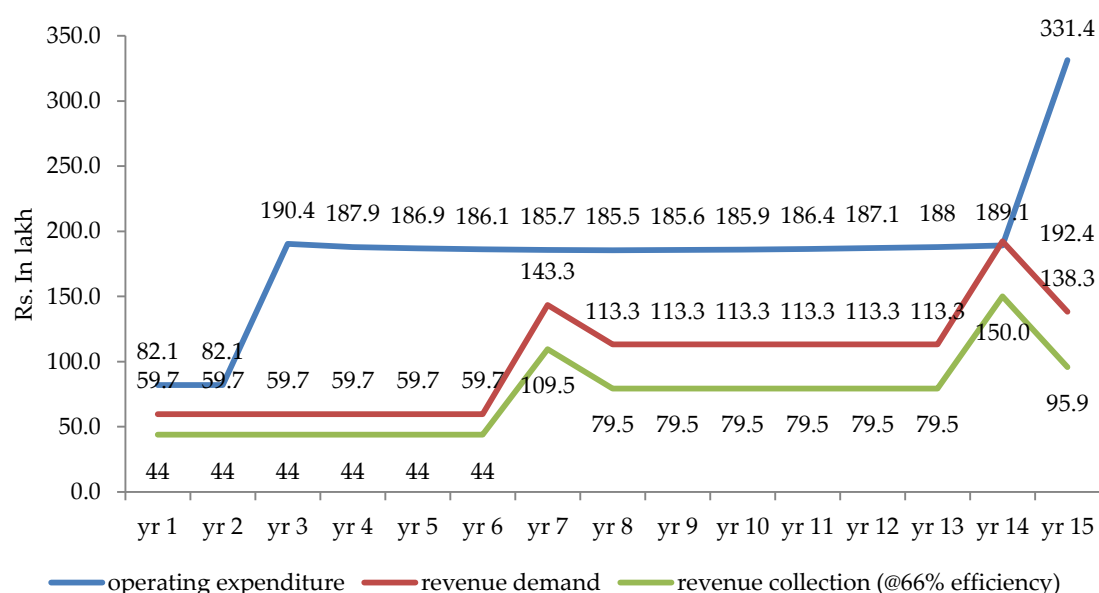
- The sewerage tax will be increased by 25 percent every 6 years and that Patan will continue to sell the treated waste water to farmers at existing rate. (as of 2013)
- New sewer connections would be provided from the 7th year of project initiation and hence the new connection charges have been factored from this year onwards.
- The connection charges and the sewerage tax have also been increased in the income projections as follows:

Table 3: Proposed increase in sewerage charges (in Rs.)

	Current connection charges	Proposed connection charges	Current sewerage tax	Proposed sewerage tax
Commercial connection	500	1000	500	1000
Residential connection	200	1000	200	400

The revenue demand shows an increase from Rs. 59.6 lakhs in 2013-14 to Rs. 143.4 lakhs in 2014-15 with the addition of new connections and the 25% increase in sewerage tax as well. The sale of waste water to farmers is stable at Rs. 13.65 lakh per annum.

Figure 2: Projected opex and revenue demand for 15 years –Business as Usual with only DPR assumption



4. Achieving Financial Sustainability

The city has an overall surplus of about Rs. 151 lakh that can be ploughed into the O&M for the sewerage system, however these other sectors that include streetlight, water supply, solid waste, civic amenities, health, parks & garden, building, lake, education and *aanganwadis* also require huge revenue expenditure and continual improvements.

There is a wide gap between the opex and the revenue demand in each year. With an average 66% collection efficiency of taxes, this gap is almost Rs. 106 lakhs from 2016 to 2019. Looking at this wide gap and aim of achieving financial sustainability, the following scenarios have been worked out:

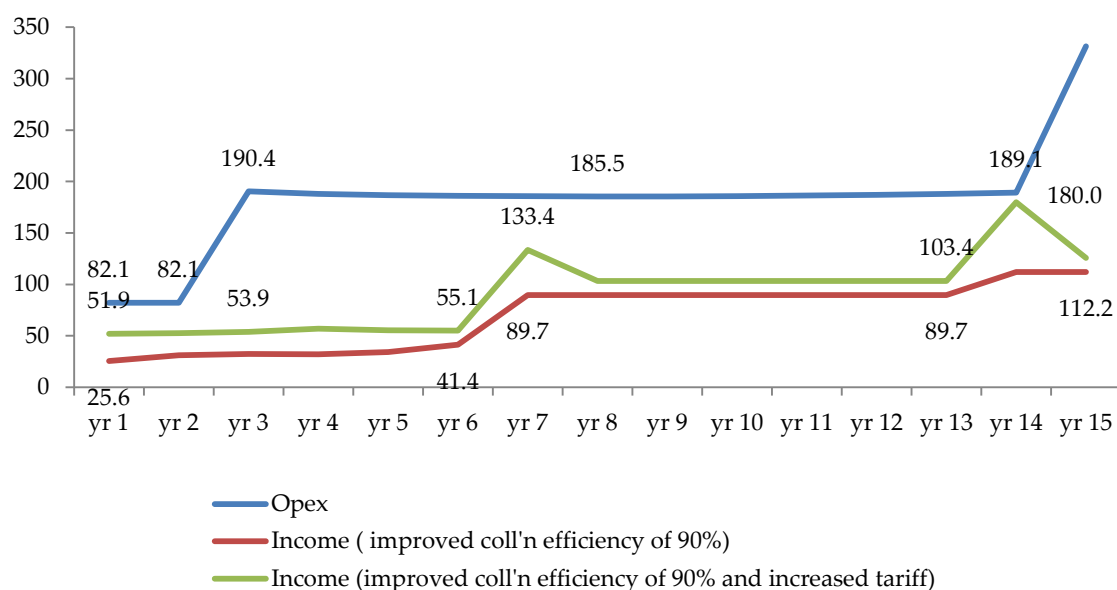
4.1 Scenario 1: Improve collection efficiency

The first initiative is to improve the collection efficiency of taxes that are billed by the municipality. Out of Rs. 100 property tax billed, the city on an average is able to collect only Rs. 60. Even the collection efficiency of sewerage taxes is 66%. This needs to be increased to 90%.

Many cities across the country have achieved more than 90% collection efficiencies by ensuring timely dispatch of the property tax bills, a rigorous follow up, door to door tax collection, putting banners of highest defaulters in market areas and other such measures. Analyzing the timeline for various stages in tax collection, it can be seen that Patan has a prolonged time period of bill generation and dispatch. There is no incentive for early payment of taxes. The period when penalty or interest on taxes is to be charged is also delayed by 3 months. This also delays the time for sending the first notice to tax payers. The ULB also does not have a procedure for either sending out the second notice or reminder to citizens and it does not also issue warrants or seal notices. Absence of these procedures shows lack of seriousness in the ULB to collect taxes timely. Some of the recommendations for Patan to improve collection efficiency include:

- Early, consolidated and focused periods of bill preparation and dispatch in month of April.
- Providing a sizeable, well-defined rebate period with equal incentive to past defaulters as well
- Levying an interest of 15-17% after the regular payment period
- Multiple door-to-door visits by ULB staff for reminders and collection of payment
- Specific staffs and teams for door-to-door collection with concrete targets
- Issuing multiple notices as well as seize warrants as early as possible
- Publicly displaying notices and defaulters' lists

Figure 3: Projected opex and revenue demand for 15 years –with improved tax collection and increased sewerage taxes



4.2 Scenario 2: Improved collection efficiency with tariff revision

Figure 3 shows that even with efforts to improve tax collection efficiency, there is a gap of Rs.132Lakhs per year to meet the revenue expenses. Hence, even after proposing the doubling of current sewerage tax from Rs. 200 to Rs. 400, the tariff would further need revision to Rs. 1100 to meet the opex and with a 25% increase every sixth year.

Table 4: Proposed revision in taxes to sustain O&M costs (in Rs.)

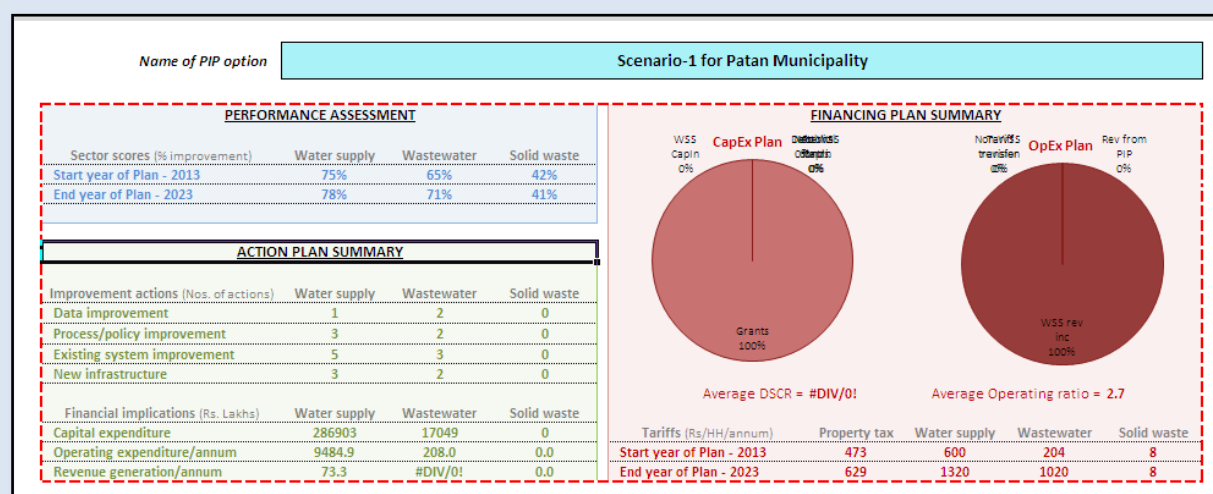
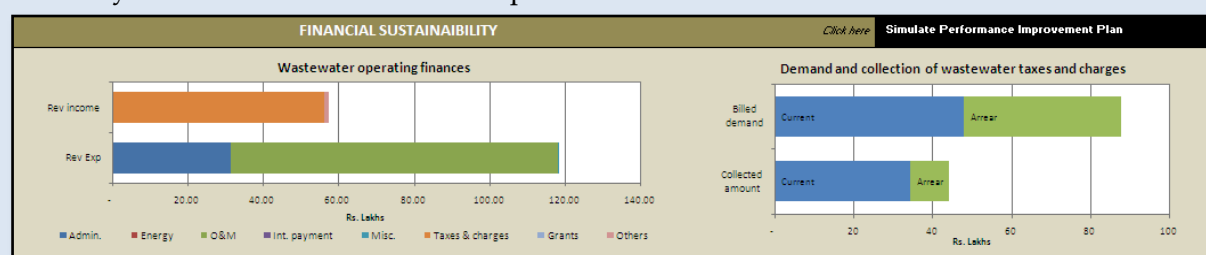
	yr 1	yr 2	yr 3	yr 4	yr 5	yr 6	yr 7	yr 8	yr 9	yr 10	yr 11	yr 12	yr 13	yr 14	yr 15
Sewerage tax	200	200	200	200	200	200	400	400	400	400	400	400	400	600	600
Increase in tax that is required to cover O & M cost			826	814	827	807	647	909	891	893	914	899	903	737	2124
Proposed sewerage tax			1026	1014	1027	1007	1047	1309	1291	1293	1314	1299	1303	1337	2724

VALIDATION USING THE PIP MODEL

The PIP Model facilitates preparation of city-wide performance improvement plans using the approach developed under the PAS Project. The PIP Model facilitates the development of a financially viable plan of action for improvements in delivery of local services for urban water supply, sanitation and wastewater and solid waste management. The emphasis in this Model is on moving away from 'infrastructure investment plans' to evolving 'service improvement plans' which include a wide set of actions including policy and process reengineering. The Model starts with a measurement of current performance levels. This is followed by the identification and design of a set of plan actions required to achieve performance improvement. Phasing and financial implications of these actions are assessed and a financing plan (that includes tariff revisions and borrowings) is developed.

UMC used this model to assess the implications of the newly commissioned underground sewerage utility in the city of Patan. Various data pertaining to the new sewerage system were fed into the model viz.-DPR data for phasing of additional new connections, the total project cost, the sale of treated waste water to farmers, O&M costs.

Additional possible improvements through enhanced tax collection efficiency, tariff revision have also been added. With these inputs, we assessed the gap between the revenue projections and the O&M costs. The model highlights that the existing collection efficiency is low, and even with increased efficiencies, the ULB would have to increase tariff from current Rs. 200 to Rs. 1020 from the third year of commissioning of the utility in order to meet the O&M expenses.



The opex projections made by the team was also cross-checked with the cost calculations made in the Detail Project Report (DPR). There was a difference of only Rs. 2.17 lakh between the two projections with DPR projecting costs at Rs. 179.64 lakh as compared to UMC projection at Rs. 181.81 lakh.

LOW COST OPTIONS TO IMPROVING THE EXISTING OXIDATION POND AT PATAN

- Provide pre-treatment units (screen and grit chamber), desludge the facultative ponds (FP), remove algae
- Prevent garbage from getting into FP by installing screen or building solid barrier between FP and solid waste site. Improve solid waste treatment including leachate management.
- Provide flow measuring device at inlet.
- Organize pumping of treated sewage for irrigation only from the last FP unit so that the crop is not damaged.
- Provide out channel for FP to avoid flooding in monsoon season.
- Provide separate location within solid waste treatment site for septage treatment. Improve solid waste & septage treatment so as not to allow it (and leachate) into FP.

Conclusions and recommendations

It is laudable that Government of Gujarat has initiated construction of underground drainage systems and sewage treatment plants for all cities in the state. This is a capital intensive intervention. The state is also supporting the opex for running these utilities for the first two years. However, it is important for the state to review and rationalize existing taxso as to meet the opex and hence successfully operate the systems.

ULBs need to understand that they will have to rationalize tax structures, identify areas where cost cutting measures could be adopted, put in energy efficient systems so as to be able to meet revenue expenses. There is also a need to for cities to improve their tax collection efficiencies.

Maharashtra Government has issued a detailed GR that helps cities to calculate appropriate taxes for meeting revenue expenditures. This could serve as a guiding document to frame similar GR for Gujarat cities.

Although, this note does not dwell into issues of staffing and capacities, there is a great need to build capacity of cities, both in terms of adequate and skilled human resources who are equipped for O&M of these new utilities.

Annex A

Table 5: Basis of projecting costs for operations and maintenance

Sr.	Heads	Operation & Maintenance (% on Capital Expenditure)
1	Construction Civil works	
	House connection with chamber nos.	1% for first 15 years 3% from 16 th year onwards
	Pumping station wet well types	1% for first 15 years
	Control room at M.P.S	1% for first 15 years
2	Pipes	
	Sewerage collecting system	1.2% for first 15 years
	Pumping main	1.2% for first 15 years
3	Plant & Machinery	
	Pumping Machinery and allied works	2 for routine and 3 % for periodical every 3 years first 14 years
	Sewerage treatment plant	5% for first 14 years 12% from 15 th year onwards
	Equipment / Machinery for O & M	5% for first 14 for 15 th year onwards 12%with 60% replacement on capital cost years
	Procurement of Power Supply at MPS	5% for first 14 years
4	Establishment expenditure	5% per year
5	Insurance premium after depreciation (Machinery equipment only)	10% per year

Source: Khalil 2008, *USAB technology for sewage treatment in India: Experience, economic evaluation and its potential in other development countries*

Table 6: Projected increase in opex costs over the years (amount in lakhs)

Sr	Expenditure Heads	Capex (from DPR)	opex increase (% of capex)	Yr 1 & 2	yr 3	yr 4	yr 5	yr 6	yr 7	yr 8	yr 9	yr 10	yr 11	yr 12	yr 13	yr 14	yr 15
1	Construction Civil works																
	House connection with chamber nos.	323.89	1%	Grants given by State Government	3.24	3.24	3.24	3.24	3.24	3.24	3.24	3.24	3.24	3.24	3.24	3.24	3.24
	Pumping station wet well types	161.52	1%		1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
	Control room at MPS	3.45	1%		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	Total	488.862			4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.89
2	Pipes																
	Sewerage collecting system	1874.21	1.20%		22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49
	Pumping main	537.11	1.20%		6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45	6.45
	Total	2411.31			28.94	28.94	28.94	28.94	28.94	28.94	28.94	28.94	28.94	28.94	28.94	28.94	28.94
3	Plant & Machinery																
	Pumping Machinery and allied works	122.80	2%		2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	12.28
			3%				3.68			3.68			3.68			3.68	
	Sewerage treatment plant	1850	5%		92.5	92.5	92.5	92.5	92.5	92.5	92.5	92.5	92.5	92.5	92.5	92.5	222.00
	Equipment / Machinery for O & M	25.86	5%		1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	18.61
	Procurement of Power Supply at MPS	15.28	5%		0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	1.83
	Total	2013.94			97.01	97.01	100.69	97.01	97.01	100.69	97.01	97.01	100.69	97.01	97.01	100.69	254.73
4	Establishment expenditure		5%		25.62	25.62	26.90	28.25	29.66	31.14	32.70	34.33	36.05	37.85	39.75	41.73	43.82
5	Insurance premium after depreciation (Machinery equipment only)		10%		25.36	22.82	20.54	18.49	16.64	14.97	13.48	12.13	10.92	9.82	8.84	7.96	7.16
	Grand Total	4914.11			181.81	179.28	181.97	177.57	177.14	180.64	177.02	177.30	181.49	178.52	179.43	184.21	339.54

Table 7: Projected revenue demand of Patan Municipality for next 15 years (Amount in lakhs)

Sr.	Particulars	yr 1	yr 2	yr 3	yr 4	yr 5	yr 6	yr 7	yr 8	yr 9	yr 10	yr 11	yr 12	yr 13	yr 14	yr 15
1	Sewerage tax Demand; @ Rs. 400 for residential connection and Rs. 1000 for commercial connection and assumed to increase at 25% every sixth year with the first increase in 2014-15 and the next in 2021-22	46.02	46.02	46.02	46.02	46.02	46.02	99.69	99.69	99.69	99.69	99.69	99.69	99.69	124.61	124.61
2	Waste water sale to farmers	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65
3	Additional demand for new 6610 connections (@ Rs. 1000 per new connection for 3000 connections in 2015 and Rs, 1500 for 3610 connections in 2022)							30.00							54.15	
	Total	59.67	59.67	59.67	59.67	59.67	59.67	143.34	113.34	113.34	113.34	113.34	113.34	113.34	192.41	138.26

Table 8: Projected tax collection of Patan Municipality for next 15 years (amount in lakhs)

Sr	Particulars	yr 1	yr 2	yr 3	yr 4	yr 5	yr 6	yr 7	yr 8	yr 9	yr 10	yr 11	yr 12	yr 13	yr 14	yr 15
1	Actual income received (@ current collection efficiency)	30.37	30.37	30.37	30.37	30.37	30.37	65.80	65.80	65.80	65.80	65.80	65.80	65.80	82.24	82.24
2	Waste water sale to farmers	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65
3	Additional demand for new 6610 connections							30.00							54.15	
	Total	44.02	44.02	44.02	44.02	44.02	44.02	109.45	79.45	79.45	79.45	79.45	79.45	79.45	150.04	95.89

Table 9: Estimated expenditure in the proposed DPR; (source Patan DPR, GUDM) (amount in lakhs)

PATAN AUGMENTATION UNDER GROUND SEWERAGE PROJECT TA.PATAN DIST.PATAN Annexure No.26 (G) Operation & Maintenance Charges for 30 Years																		
Sr. No.	Description	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2041
1	Establishment Charges	25.62	26.39	27.18	28.00	28.84	29.70	30.59	31.51	32.45	33.43	34.43	35.46	36.53	37.62	38.75	39.92	62.19
2	Energy Charges	125.14	125.14	137.66	137.66	137.66	151.42	151.42	151.42	166.56	166.56	166.56	183.22	183.22	183.22	201.54	221.70	357.04
3	Chemical Charges	2.17	2.28	2.39	2.51	2.64	2.77	2.91	3.06	3.21	3.37	3.54	3.71	3.90	4.10	4.30	4.52	9.39
4	Fuel and O & M For Vehicles	3.65	3.83	4.02	4.23	4.44	4.66	4.89	5.14	5.39	5.66	5.95	6.24	6.55	6.88	7.23	7.59	15.78
5	Maintenance & Repair	22.86	24.00	25.20	26.46	27.79	29.18	30.63	32.17	33.77	35.46	37.24	39.10	41.05	43.11	45.26	47.52	98.80
6	Miscellaneous Sundries	0.20	0.21	0.22	0.23	0.24	0.26	0.27	0.28	0.30	0.31	0.33	0.34	0.36	0.38	0.40	0.42	0.86
7	Depreciation	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35	98.35
	Total	277.99	280.20	295.03	297.43	299.94	316.33	319.07	321.92	340.04	343.14	346.39	366.43	369.96	373.65	395.83	420.00	642.40
	O & M cost (excluding Depreciation.)	179.64	181.86	196.68	199.09	201.60	217.98	220.72	223.57	241.69	244.80	248.04	268.08	271.62	275.31	297.48	321.66	544.06

Note :

- a). Establishment charges are assumed to be increased by 3% annually.
- b). The cost of power is assumed to be increased by 10% once in three years.
- c). The cost of chemicals is assumed to be increased by 5% annually.
- d). Repairs and renewal charges are assumed to be increased by 5% annually.

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