



Economics of Sewage Management

Case Study of Waste-water Treatment Recycle and Reuse PPP Project

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Background

- **About 80-90% of the urban water supply consumption is residential consumption**
 - Large scale water consumers (industrial) typically are outside city jurisdictions

- **Potential for industrial and commercial consumers subsidising domestic consumers is limited**

- **Recycling of waste-water and supplying to industrial consumers cannot substitute existing consumption**
 - To be used to meet only incremental demand
 - Requires complete review of pricing of treated raw water and recycled water

- **Recycling of waste-water saves on costs of developing additional water resources**

Structure of the Presentation

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Objective of the Study for Greater Visakhapatnam Mun. Corp.

2

Project Background

3

Project Feasibility Assessment

4

Conclusion & Way Forward

Objective of the Study



Objective of the Study (1/2)

- **GVMC proposes to build a waste-water recycling and reuse plant in Vishakhapatnam on Design-Build-Finance-Operate-Transfer (DBFOT) basis**
 - Supply non-potable grade water (40 MLD) to industrial consumers
 - Industrial demand at 55 MLD
 - Divert potable grade water supply for incremental industrial water demand from industrial to domestic consumption
- **PPP model approach envisaged**
 - GVMC to provide the site for setting up the proposed Tertiary Treatment Plant (TTP) of 60 MLD
 - GVMC to provide secondary treated sewage from 2 STPs at Appughar and Old Sewerage Farm (near Laxmi Talkies) to developer
 - Concession period provided for 26 years including a construction period of 12 months
 - Private Developer to design, built, finance, operate, maintain and transfer the TTP
 - Developer to pay Royalty to GVMC for the supply of secondary treated sewage
 - Private Developer to fix tariff for sale of recycled water
- **Project Status**
 - GVMC invited Expressions of Interest (EOI) from private developers for the implementation of the project;
 - The EOI got response from 19 firms out of which 14 firms qualified at the EOI stage;
 - Only 2 out of the 14 firms qualified submitted their financial bid

Objective of the Study (2/2)

■ Project Status

- Bid parameter: Royalty paid to GVMC per KL of secondary treated sewage supplied
 - Presently, GVMC supplies secondary treated sewage to an industrial consumer
 - Royalty paid by existing industrial consumer of Rs. 2 per KL for the secondary treated sewage supplied was considered as the benchmark to determine the royalty payable by the bidders
 - Preferred bidder's quote was Rs. 2.25 per KL escalated at 5% p.a. over the Concession period
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- **The objective of this assessment is to determine whether GVMC should go ahead with the award of the project to the Preferred Bidder or not**

Conditions for award of project to Preferred Bidder by GVMC

- **GVMC would award the project to the Preferred Bidder subject to the fulfilment of the following conditions**
 - Royalty payable by the Preferred Bidder to GVMC for the supply of secondary treated sewage (i.e. Rs. 2.25 per KL escalated at 5% p.a.) is reasonable in line with the returns expected to be earned by the Preferred Bidder
 - The tertiary treated water will meet the incremental industrial demand for water without substituting the existing industrial demand
 - Tertiary treated water from the proposed project is supplied to industries and results in conservation of potable water supplied to industries for their incremental water demand so that it can be supplied to domestic users



Justification of the Royalty payable to GVMC

- **Assumptions made for the justification of the Royalty payable by the Concessionaire to GVMC**
 - The Royalty payable by the Concessionaire to GVMC is reasonable in line with a sufficient rate of return to the Preferred Bidder on its equity investment pegged at **15.5%** (**Equity IRR of 15.5%**)
 - The project would be structured as per the terms of the Concession Agreement tendered by GVMC for the selection of the Preferred Bidder
 - The Capital cost that would be incurred by the Preferred Bidder towards setting up this TTP and allied facilities is **Rs. 100 crores** in line with the terms of the Concession Agreement
 - The total project cost will be funded by the Preferred Bidder through Debt and Equity. No capital or operating subsidy support from GVMC is envisaged
 - The proposed project would be implemented over a **Concession period of 26 years** including a **Construction period of 12 months**

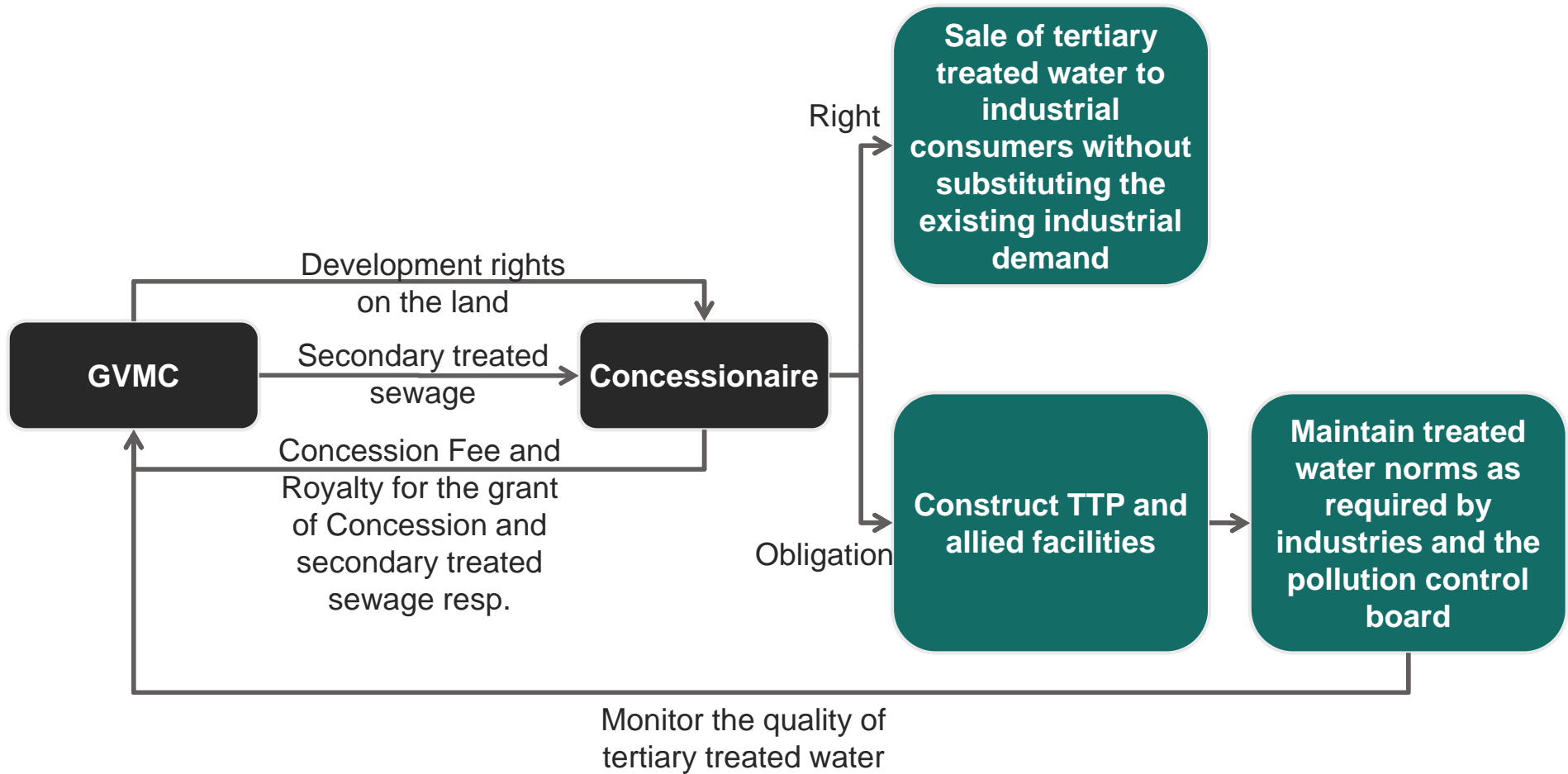
Reasonable rate of return for the Preferred Bidder

- **A reasonable rate of return (Equity IRR) for the Preferred Bidder is determined considering the following points**
 - **Low Demand Risk:** Sufficient industrial demand for tertiary treated water envisaged from the demand assessment study. This industrial demand is over and above the water supplied by GVMC to these industries and is also in excess of the tertiary treated water available at the output of the proposed TTP;
 - **Low Commercial Risk:** Potential industrial consumers include Vizag Steel Plant, Hindustan Petroleum Corporation Ltd.(HPCL), Coromandel Fertilizers Limited (CFL), Hindustan Zinc Limited (HZL), Vizag Port Trust, Naval Dockyard and Essar Steel Limited. Credit quality of these industries perceived to be good;
 - **Projects with similar risk profile earn 15.5% returns on equity:** The risk profile of the proposed project is similar to infrastructure projects like Power Transmission projects and Road projects of NHAI
 - Central Electricity Regulatory Commission (CERC) allows Power Transmission Companies a Return on Equity investment of 15.5% on a post tax basis; and
 - Annuity-based road projects of NHAI provide a Return on Equity investment of 14-16% on a post tax basis to equity investors
- **Accordingly, for the current project also, the equity returns to the developer of 15.5% have been assumed to be reasonable**

Project Structure



Proposed Project Structure



Project Feasibility



Revenue estimation

■ Sewage treatment assumptions*

Particular	2014	2015	2016	2017
Secondary treated sewage available at the input of the TTP (MLD)	30	45	60	60
Losses in the TTP (MLD)	10	15	20	20
Tertiary treated water available for sale at the output of the TTP (MLD)	20	30	40	40

■ Tariff assumptions

Sr. No.	Parameter	Detail
1	Year of commencement of commercial operations by the TTP (Base Year)	April 2014
2	Escalation in tariff	10%
3	Frequency of escalation	Once every year

* Sewerage treated reaches maximum capacity of 60 MLD by 2016

Scenario Analysis

- The table below provides royalty payable by the Preferred Bidder to GVMC for different rates of tertiary treated water tariff chargeable,

Tertiary treated water tariff (Rs./ KL)*	Royalty/ cost of secondary treated sewage payable (Rs./ KL)*
20	-5.93
25	-2.77
30	0.38
<u>32.96</u>	<u>2.25</u>
35	3.5
<u>36</u>	<u>4.2</u>
40	6.7
45	9.8
50	13
55	16.2
60	19.3

In the absence of certainty on tertiary treated water tariff chargeable by the Preferred Bidder to the industrial consumers, GVMC can explore the possibility a revenue-sharing mechanism with the Preferred Bidder if the tertiary treated water is sold at a tariff where the Preferred Bidder is making returns in excess of 15.5%

The tertiary treated water tariff and the royalty/ cost of secondary treated sewage would escalate at 5% p.a. over the Concession Period

Conclusion & Way Forward



Conclusion

- **For a tertiary treated water tariff of Rs. 32.96/kl, the royalty payable by the Preferred Bidder to GVMC of Rs. 2.25 per KL is reasonable in line with the GVMC benchmark**

- **From the perspective of GVMC, the royalty payable by the Preferred Bidder to GVMC is reasonable in line with the GVMC benchmark as long as the Preferred Bidder sells the tertiary treated water at Rs. 32.96 per KL or less**
 - However, in the absence of certainty on the tertiary treated water tariff chargeable, GVMC can explore the possibility of a revenue-sharing mechanism with the Preferred Bidder if the tertiary treated water is sold at a tariff above Rs. 32.96 per KL

Thank You

