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IS PPP FEASIBLE IN WASTE WATER RECLAMATION?

>>> By Mr. Sudhir Malik

eing a strong proponent of PPP, I see great role for Public Private Partnership in waste water reclamation for reuse. I see two major reasons for this. One: There would be acute shortage of fresh potable water. Two: Water will be recognised as precious economic commodity.

With the population having almost tripled in just six decades and fresh water resources declining by about 70%, time is running out to capture waste water else, we will be forced to drink slush. In 1951, the per capita water availability was about 5,177 m³. This has now reduced to about 1,545 m³ in 2011 (Source: Water Resources Division, TERI). Perennial sources of water from rains, rivers and water bodies have limitations to meet the demands of new settlements and ever expanding cities. Once used, water gets dirty. This dirty water has to undergo the natural hydrological cycle of rebirth, lasting many months, passing through drains, rivers, sea, evaporation and then precipitation, before it is available for re-use via Waste Water Treatement Plants (WTPs) and an extensive distribution network.

Waste water, is the water that has been adversely affected in quality by anthropogenic influence, originating from a combination of domestic, industrial, commercial or agricultural activities, surface runoff



IN FOCUS (((

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or storm water and from sewer inflow or infiltration.

RE-USABLE WASTE WATER

Water is a most undermined and underprized commodity. Planners failed to take note of fast receding water resources. New cities are built without water budgeting, with huge dependence on underground resources. If water is precious, ignoring waste water is precious. Somehow capturing waste water before it goes into full hydrological water-cycle is the only silver lining.

Thus, churning out re-useable water from waste water is the first premise of conceiving a waste water treatment project whether by the Governments or through PPP. The choice is to either let waste water go into the hydrologic water cycle or use a smaller sub-water cycle,by reclaiming locally controllable water resource that exist right there in urban environment, where it is needed most and priced the highest.

Closing the loop of the water cycle makes economic sense, provided industries and large government setups like railways, metros or large plantation/farm owners agree to pay for it. It has successfully been experimented with in many cities and countries like California, New York, Australia, Israel, Germany and the United Kingdom. Water reuse has become an essential element of future water resources development in integrated water resources management. Even in India there is a spurt in tendering for the setting up of STP plants.

The second premise is, what governments can do, entrepreneurs can do better, except of course politics, policing and protecting the country from enemies.

WASTE WATER & PPP

Having instilled fear in the mind of readers, let me bat for PPP in the waste water sector, without getting into defining what is PPP or the technologies or methodologies for waste water reuse, looping water supply and waste water disposal.

PPP is essentially a business. Like any other business, it too is prone to successes and failures. However, unlike other business, when a PPP project fails, the tax payers' money is also lost, besides monetary loss to the entrepreneur. Thus, Government agencies, being custodians of the tax payer's money are wry and unwilling partners in PPP projects. Additionally, waste water projects do not yield decent returns on investments. Being that public utility

investments. Being that public utility service projects have a higher risk quotient, even banks shy away from funding.

HOW CAN WE MAKE PPP A SUCCESS IN WASTE WATER?

Advantages of PPP in waste water are shared diagnostics, infrastructure development

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> and operating tools, long-term sustainability and greater autonomy of the service. These are the cardinal rules on which PPP projects can be built. Waste water assets are usually owned by the state, to be shared with a private party which can bring finances and technologies to construct and run the system. Providing autonomy while sharing risks by one and making reasonable profits by another is the game both parties play in a well-defined set of rules.

The most common model for waste water projects is the Build–Operate– Transfer (BOT) model, as reflected in the increase in new waste water projects. On the other hand, water supply projects are usually BOT, Transfer-Operate-Transfer (TOT) and divesture models since most of the projects involve the modification or rehabilitation of existing facilities as well. Divestiture models are mainly intended to fund operational and management costs for existing treatment plants.

In a typical waste water project, the private sector looks after the design, finance, construction, management and maintenance of the assets and transfers at the end of concession. Assets are owned by the public sector agency. The fee is high and the duration is between 15 and 30 years.

In project finance, lenders and investors rely either exclusively ("non-recourse" financing) or mainly ("limited recourse" financing) on the cash flow generated by the project to repay their loans and earn a return on their investments. This is in contrast to corporate lending where lenders rely on the strength of the borrower's balance sheet for their loans. Therefore, financial modelling for a PPP waste-water project should aim to create a cash surplus project using all possible resources, aids, subsidies and possibilities, while carefully accounting for risks and contingencies. STP assumptions are not same as WTP.

REVENUE ASPECTS

- Water reclamation and reuse is dependent on subsidies, grants, shadow user charges /tipping fee, free access to land, and other fiscal benefits to make the business economically and financially viable. All these freebies are expected to be contributed by the Government as partner and at the end not to expect any dividend or profit share.
- Recovering costs through the sale of recycled water is the first obvious choice. Cost can be recoverd from sale of waste water for toilet flushing, landscape irrigation, large gardens, parks, road side plantations, golf courses, ornamental lakes, industrial use, cooling towers, cooling ponds, irrigation and ground water recharge. Revenue is directly related to quality and quantity of output. Depending upon the need and acceptable impurity, projects with appropriate technologies can be planned for desired results.
- Indirect revenue or cross subsidisation models can be applied in STPs abutting water bodies with a secondary objective of maintaining the quality of water bodies. An ancillary project, one that the competent authority allows the project developer to run in conjunction with a PPP project

in accordance with the PPP policies and the request for proposal based on a decision that such ancillary project is necessary for the developer to recoup its investment or ensure normal operation of the project. Hyderabad Metropolitan Development Authority came with a novel idea to maintain STPs abutting lakes and water tanks by allowing the operator to recover revenue from water sports, boating, ad revenue from hoardings on the banks, canteen rentals, entry fee for parks etc. The project was however abandoned midway for unspecified reasons.

- Even with a small margin for the reclaimed water used for toilet flushing in commercial buildings and apartment complexes, one can produce profits for its water reclamation and reuse systems over the concession period.
- Determined efforts by city officials are needed, however, to expand service areas and renovate commercial buildings. Water reuse for toilet flushing can be economically justified in many water-scarce urban areas.

CAPEX

Water reclamation costs range widely. Each project has its peculiarities. A common misconception in planning for water reclamation and reuse is that reclaimed water represents a low-cost-new-water supply. This assumption is true only where water reclamation facilities are located near users and where no or minimal additional treatment is required beyond the existing water pollution

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control facilities. It is, therefore, important while preparing feasibility studies, that costs adequately cover all assumptions and factors associated with allocation of costs while comparing alternative sources of wastewater treatment, and water reclamation and reuse. Although costs associated with the secondary treatment of wastewater are often considered to be pollution control costs, they serve as a baseline cost for comparison with tertiary and/or advanced treatment facilities for water reuse.

A construction cost breakdown for various treatment processes within a secondary treatment system is distributed as: primary treatment about 25%, secondary treatment about 40%, sludge treatment about 20%,and the remaining approximately 15% towards laboratory, maintenance, buildings, etc. (figures are based on the total capital cost of secondary treatment system in a developed country) expenses associated with the installation of in-building dual distribution systems as well as the cost of installing pipelines in built-up and congested areas. These reclaimed water prices reflect competition for new water resources and these expenses are the necessary cost of doing business in highly urbanised metropolitan areas.

The conveyance and distribution systems for reclaimed water represent the principal cost of most water reuse projects.

OPEX

PPP projects are launched with much fanfare and high hopes, as if some miracle will happen once the project is commercially operational. The turnkey phase of a PPP project is smooth with VGF, aids, debt and subsidies flowing in and then interest tapers off as the project enters the operations and maintenance phase. Being the longest phase, the O & M phase is the most demanding and time consuming, as well as the phase where management fatigue may lead to neglect and failure.

Central government sponsored funding schemes like JNNURM, VGF cater only to CAPEX while OPEX is expected to be funded by the PPP from internal accruals and



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> the tipping fee or shadow coming from poor UIBs. This is a dangerous trend that needs to be addressed. In my view, VGF should be given in the O & M phase of a PPP instead of CAPEX. This will ensure higher upfront investment by the private party into building the project, which is recovered through the project cycle in the shape of a performance linked tipping fee.

Public sector partners need to develop their capacity to collaboratively manage their private sector partners ensuring proper upkeep of the public sector asset so that at the end of the concession period, the asset is fully functional and a sustainable asset reverts back to the public sector owner.

To make the O&M phase of a PPP project successful, project managers can undertake the following:

Accept that PPPs involve services that are required and should be monitored for the duration of a project and make adequate provisioning

of resources in terms of funds, technology and manpower.

- Carefully estimate expenses associated with O&M and build them into the project lifetime model using sensitivity analyses. Identify risk mitigation costs and budget for it.
- Avoid over-optimistic revenue projections. Be realistic in making feasibility reports.
- Cost reduction is an on-going process and must be attempted through the project cycle of 20/30 years.
- Unexpected costs and cost overrun due to delays can be fatal. Make fair estimates.
- Standard O&M management practices ensuring proper upkeep of project assets, insurance cover, AMC.
- Both the public and private sector partners have a mutual responsibility to identify failures and address them aggressively when they are identified.
- Tariff adjustments may not be an acceptable solution to cover cost overruns and have political and regulatory ramifications.

- Have a robust project monitoring framework to ensure that O&M milestones are monitored and corrective mitigations are taken.
- Have a robust legal framework to protect the project, ensuring that both public and private sector partners meet their obligations during the full project lifetime

PPP projects cannot be deemed to be a success until they have completed 10 to 30 years after the euphoria has faded after the project's ribbon cutting ceremony.

BANKABLE PROJECTS

To ensure a project is bankable, a project feasibility analysis is to be performed based on estimated cash flows, which can be derived from the perspective of the project itself, of the shareholders and of lenders. To analyse the project feasibility of the project itself, indicators like Net Present Value (NPV) or Internal Rates of Return (IRR) can be computed using cash flows from operating and investing activities. Shareholders would analyse project feasibility using cash flows that reflect invested capital, dividends, and cash payback for capital reduction to calculate the IRR of shareholders' cash flows, which is equal to return on equity (ROE). Viability gap funding is usually needed to meet return expectations.

Lenders would compute their IRR using cash flows that show loans, principal and interest payments. They would also use Debt Services Coverage Ratio (DSCR), occurrence of short-term borrowings and the debt-to-equity ratio to gauge the possibility of recovering the loan principal and interest.



IN FOCUS

IS PPP FEASIBLE IN WASTE WATER RECLAMATION?

Though estimating a project's cash flows is a very complex and difficult task, it is the basis for determining the structure of project financing. Cash flow estimation involves certain assumptions about a number of variables. Uncertainties rule the roost in such projects. Thus sensitivity analysis becomes important to see how fluctuations in variables change key feasibility analysis indicators. A scenario analysis can also be performed using changes in key variables assumptions to present several alternative future developments.

PROJECT STRUCTURE

The project structure can be drawn keeping following in mind:

- PPP projects can be planned as JV or Concession or Service agreement or BOT/DBFO.
- Revenue to the private party could be minimum as prescribed or profit sharing.
- ULBs may firstly privatise assets and then develop and implement a PPP project to attract investment and a know-how devising mechanism for asset transfer and their accounting in the subsequent PPP project. This allows, at least initially, the maintenance of a degree of control over public services and thus, the possibility of retaining control over fixed assets.
- Unless there is a possibility to establish the principle of full user charge recovery for services, ULBs have to shell out the difference as shadow user charge. This adds to revenue risk and requires a suitable approach to structure the agreement and commitment of

all parties for the sustainability of the project.

- Degree of risk transfer is critical to the success of any PPP project. Particularly in environmental projects where there is a myriad of policies, laws, rulings, standards and quality provision targets. In a PPP, it is even more necessary for the public sector to have effective monitoring, control, payment and penalty systems in place to ensure the project meets expectations and can be corrected effectively in case of problems.
- Devising innovating incentive schemes to encourage the private players to improve performance and efficiency to bridge the difference between the objectives of the ULB's statutory responsibility to guarantee quality and standard and the private sector's single mind objective to enhance revenue.
- Being a public utility project, sharing data, allowing the public scrutiny of performance against targets and linking user charges to performance if not satisfactory could be resorted to. This 'consumer pressure' provides an added incentive to link revenue with outcome.
- □ Grants play an important role in achieving an equitable balance between commercial and public interests. The government can effectively ensure that quality standards are fully incorporated ensuring that there is no undue benefit flowing to either parties and PPP contracts are developed in an open and transparent manner.
- PE Funds/Private investors/FI financing the projects, because of its financial contribution,

can be roped in to enhance the overall socio-economic quality of projects through reviews of contracts or project designs.

- Undertaking realistic and rigorous project preparation particularly on affordability and financial sustainability factors is critical to project success and to correctly determine the appropriate amount of commission funding.
- The agreements should ideally reflect the amount of investment, commitment of rate tariffs, the expected returns, and other factors.

CONSTRAINTS SPECIFIC TO WASTE WATER PROJECTS

Besides being unprofitable, waste water projects face a host of other challenges and risks. Some of the concerns associated with waste water reclamation/reuse one has to keep in mind are:

Administrative Bottlenecks

- Seen mostly as an environmental hazard rather than a commodity, waste water is a low priority item for government agencies. Plans are made but years pass by and plans remain on papers and files buried in the cupboards somewhere. Improvements are required in transparency, accountability and management by the managing authorities.
- Lack of public awareness and participation to seek reuse. Unchecked misuse of storm water drains with impunity over the years has got imbibed in our social fabric in such a way that even the public does not demand a sewage system. We





as a people, do not feel the need to have a sewage system.

- Water utilities saddled with the twin responsibilities of water supply and waste water reclamation focus only on supplying fresh water; waste water reclamation is completely ignored.
- Energy consumption increases as the source of water to recycle or reuse shifts from rain water to storm water to grey water to sewage water. The water tariff doesn't account for the full recovery of reclamation cost.
- Availability of the source/s of water for recycling and/or reuse near user.
- Approvals required to use the source/s of water for recycling and/or reuse.
- Estimate the CAPEX and OPEX for the life of the project with precision in given set of uncertainties.

CORPORATIONS UNSUITABLE PARTNERS!

Corporations fail to implement waste water projects. Why? I have over the years found many reasons which are linked to the basic grain of a ULB's functioning:

- Low financial resources or their own.
- High dependence on Central funded schemes
- Lack of technical experts at ULBs' level to approve DPR prepared by consultants. DPRs are referred to the technical cell of the State Government for approval, which delays the process.
- Delays in approvals of project reports.
- Projects usually have no timeline for completion. Process for approvals lingers on for years and yet no one is accountable.

Years pass by and plans remain on papers, buried in files.

- Weak tendering system for appointing contractors to carry out the job.
- Weak monitoring system to ensure functionality and desired outcome.
- Frequent transfers of administrative heads.
- Ignorance coupled with inability to rope in private players as PPP partners.

Political will

- Sustained political and public sector support to the strategic decisions around the PPP in waste water is needed.
- A conducive legal, regulatory and financial framework supporting the development and implementation of PPPs.
- True understanding by the parties of the needs and

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IS PPP FEASIBLE IN WASTE WATER RECLAMATION?

objectives of each other necessary to draw rules of the game.

- Rigorous preparation and planning needed to ensure that the PPP approach delivers value for money and is sustainable in such long gestation projects.
- Continuity of polices over 15/20 years to enable cost recovery by the private partner.

CONSTRAINTS COMMON TO PPP PROJECTS

Resistance to change is human and the advent of PPP was no different. PPP faces a host of legal and commercial issues on its own way. Some of the key issues are outlined below:

Legal and regulatory

The legal and regulatory infrastructure in PPP activities present a risk to private investors. Laws which govern PPP activities are not always consistent with one another, or government policies may be revised with little consideration for the impact on private partners.

Tariff pricing policies

The slow pace of deregulation of tariffs for public services impacts project profitability for the private investor.

Lack of transparency in the bidding process

Most PPP projects suffer due to a lack of transparency in the bidding and selection processes, forcing under or aggressive bids.

State level participation

State-owned enterprises/PSUs/ Public Enterprises also bid like private entities, creating a category of public SOE partnerships elbowing out smaller players.

Access to capital

Waste water projects generally have a long-term horizon of up to a few decades but long-term financing options in the domestic financial markets are limited.

Contract duration

Water sector represented the longest project/contract periods with durations of often over 20 years. This is inherent in the relationship between the size of capital invested, degree of private sector involvement and length of time required to ensure investment and profit recovery.

Transfer of responsibility

Higher degree of responsibility is passed on to private parties which the private developer is expected to finance and assume market risk.

Demand risk

Demand risk is much higher in this field and hence the government's role is crucial in indicating that the public sector is also, in part, responsible for ensuring the financial viability of a project.

Availability risk

The general pattern suggests that risks under this category are distributed in relation to the characteristics of the project and the parties. This would tend to confirm the principle that risk should be adopted by the party best able to manage it. A number of cases demonstrate ineffective risk distribution and



also the consequences resulting from it.

Contract type

Concessions and joint ventures are the most common forms of structures encountered. However this in part demonstrates the continued lack of standardisation of nomenclature with respect to PPP structures. Within the contracts termed concessions or joint ventures are found elements of BOT, BOO or DBFO structures.

Successes in the area of infrastructure PPP projects require perseverance and long-term commitment by governments to achieve a meaningful paradigm shift. It takes an extended period of time for private operators to buy into a PPP model and even longer for projects to result in improved services at a lower cost to the government.

PPP case studies: Innovative tools employed

- The project awarded through international competitive tendering supports private participation by giving control of management and investment to a private company and by linking its remuneration to efficiency gains and operational performance.
- Lack of adequate skills is one of the main rationales for inviting experienced domestic/ foreign operators. The sponsors

to develop local skills in areas such as operations management, energy efficiency, capital budgeting and financial management and the city may also look forward to sharing a profitable dividend. The size of the dividend or the ability of the operator to generate profits is directly related to performance and increasing efficiencies due to the price cap mechanism. This provides a degree of consumer protection. The private operator is expecting economic profits, which they are trying to obtain by improving operational efficiency and by ensuring that revenues from the water tariff are effectively collected.

- Risk concerning revenue flows as tariff collection is made the responsibility of the operator where the contract foresees no tariff changes in the short to medium term, implying thereby that a degree of risk for the operator as operational efficiencies has to be built in the tariff.
- As one of the first PPPs in the local water sector, the private contractor was selected through international competitive tendering. The terms and conditions of the agreement are considered consistent with international best practice. The concessionaire is paid under a price cap type tariff mechanism. This provides incentives for cost

reductions, which are shared with consumers in the form of lower prices and/or higher levels of service quality.

Participative public-private partnership (4P) was used to meet the needs of people with little access to water and for whom traditional solutions are inadequate. This is to provide a guarantee of service access with an appropriate pricing policy. The 4P model aims to incorporate a process of consultation with local participants from the tender phase onward.

The 4P approach was based on the following:

- The local authority makes its request as manager of the public service and in consultation with the local population.
- International institutions, such as development banks, are responsible for the portion of the financing that the local authorities and end customers cannot bear. They therefore also assume the related risks.
- The pricing structure takes into account consumers' actual ability to pay and the need for the operator to have sufficient revenue to maintain the infrastructures.
- The group promises to transfer its skills at prices adapted to every situation.

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