

**Evaluation of Water Services
Public Private Partnership
Options for Mid-sized Cities in
India**

Final Report

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Acronyms

Capex	Capital expenditure
CCB	City Corporation of Belgaum
CMC	Coimbatore Municipal Corporation
DPR	Detailed Project Report
JV	Joint Venture
KUDWSB	Karnataka Urban Supply Water Distribution Board (Karnataka State Water Board)
NRW	Non-Revenue Water
O&M	Operating and Maintenance Costs
PHEO	Public Health Engineering Organization
PPBC	Phased Performance Based Contract
SPV	Special Purpose Vehicle
TWAD	Tamil Nadu Water Supply and Drainage Board (Tamil Nadu State Water Board)
ULB	Urban Local Body (City Government)

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Executive Summary

Indian cities, home to 375 million people, are growing by 11 million every year. Mid-sized cities—with populations between 500,000 and 5 million—will absorb much of this growth. Most water utilities in these cities are in need of assistance. They face a diverse set of challenges in terms of providing a continuous supply of water to the current population, as well as preparing for future demand from the rapidly growing population. Figure 1 highlights these challenges, substantiating them with examples from three mid-size cities which were studied as part of this evaluation—Bhubaneswar, Coimbatore and Belgaum.

Figure 1: Unique Water Sector Challenges in Mid- sized Indian Cities

Current Operations	<ul style="list-style-type: none"> Utilities don't exist very weak 	<ul style="list-style-type: none"> Coimbatore doesn't have a ring-fenced utility. Water services is one of many departments within city municipality, and staff are shared between departments Bhubaneswar and Belgaum's utilities are run like government departments, following hiring and accounting practices that are not well-aligned with the utilities' needs
	<ul style="list-style-type: none"> Operating cost recovery low 	<ul style="list-style-type: none"> Cost recovery in Bhubaneswar is 36.5% In Belgaum it is 75%, but this includes a government subsidy for electricity, which is half of operating expenditure
	<ul style="list-style-type: none"> Current service levels poor, water supply intermittent 	<ul style="list-style-type: none"> In Belgaum water is provided for two hours once every three days. In Coimbatore, it is provided for 2.5 hours every alternate day
	<ul style="list-style-type: none"> Low commercial and staff efficiency 	<ul style="list-style-type: none"> Bhubaneswar has 39 staff per 1000 connections. This is far above world average. Coimbatore's utility is understaffed and is over-reliant on outsourcing Bhubaneswar and Belgaum have less than 1% total metered connections and a high but unknown number of illegal connections.
Investment: To serve current population	<ul style="list-style-type: none"> Asset condition poor and largely unknown Poor hydraulic design of networks 	<ul style="list-style-type: none"> 70-80% of pipes in Belgaum and Bhubaneswar were laid prior to 1960, exceeding useful life. None of the cities had fully mapped distribution systems or sophisticated leak detection systems
	<ul style="list-style-type: none"> Non revenue water (NRW) unknown and often underestimated 	<ul style="list-style-type: none"> NRW estimated to be more than 50% in Bhubaneswar and Belgaum, despite low hours of water provision. Detailed project reports (DPRs) don't calculate or take into account NRW impacts, thereby reducing their reliability The viability gap increases exponentially with increases in NRW. For example, increasing average NRW by 35%, increases the viability gap from US\$8 million to US\$260 million in Coimbatore.
	<ul style="list-style-type: none"> Capital expenditure to rehabilitate is unknown 	<ul style="list-style-type: none"> Rehabilitation expenditures are inconsistently calculated and vary significantly between cities, based on underlying assumptions. For example, Coimbatore assumes a conservative replacement of pipes. This resulted in US\$8/capita on rehabilitation, but in Belgaum it was estimated at US\$150/capita, because it assumed 100% network replacement.
Investment: To serve future population	<ul style="list-style-type: none"> Population growth high but unknowable Where population will live unclear Financing sources unclear 	<ul style="list-style-type: none"> Coimbatore's city boundaries were increased, almost doubling city population. Several second-tier cities are going through similar population booms. Today Belgaum and Bhubaneswar are completely reliant on government grants to fund capital expenditure. Coimbatore funds 52% of growth from its own budget, and relies on government assistance for the rest. According to its DPR, Coimbatore will need \$104 million to meet demand until 2044, while Bhubaneswar will need \$623 million to meet growth for the next two decades.
	<ul style="list-style-type: none"> Capital expenditure planning weak and actual costs uncertain 	<ul style="list-style-type: none"> Inconsistent treatment of NRW numbers, water demand and population projections in capital expenditure planning (DPRs), in the case of Coimbatore and Belgaum. Low regard for capital efficiency and sequencing capital works in DPRs.
	<ul style="list-style-type: none"> Divided responsibility for city and periphery and/or distribution and bulk supply 	<ul style="list-style-type: none"> Until 2011, peripheral urban areas in Coimbatore were served by several small municipalities, and the Department of Rural Water Water services in Coimbatore were also divided between the state board (bulk supply augmentation and financing), and municipality (distribution).

PPPs can move the water sector in these cities forward by building stronger institutions, improving operational and management efficiency, and increasing access to capital. Unfortunately, traditional PPP models—Concessions, Leases and Management Contracts—

face particular challenges that may inhibit their successful implementation in mid-sized Indian cities. Figure 2 below explains why. In essence, the risks for the operator are too large in concessions or leases, given the information uncertainty and poor quality of assets to operate. On the other hand, the limited scope and duration of management contracts limit the ability of the operator to create lasting changes which would benefit Local Governments.

Figure 2: Traditional PPP Models Don't Stack Up

PPP Model	Description	Why it won't work
Concession	Run the business, finance investments, bound to service standards and tariff level from contract start	<ul style="list-style-type: none"> ▪ Viability gap large and unknown ▪ Risky to finance and plan investments due to uncertainty about asset condition. <p>↓</p> <p><i>Conclusion: Private investors won't sign up since it is too risky, or will charge very high fees or tariffs</i></p>
Lease Contract (Operations & Maintenance)	Provide service to customers to a specified level, for a given O&M fee	<ul style="list-style-type: none"> ▪ Service levels not known ▪ NRW not known ▪ Maintenance costs difficult to predict. <p>↓</p> <p><i>Conclusion: Operators won't sign up since it is too risky, or will charge very high fees or tariffs</i></p>
Management Contract	Provide management services to the utility for a fixed management fee	<ul style="list-style-type: none"> ▪ No utility to manage ▪ Turnaround longer than 5 years, so can't deliver sustainable results in short contract period ▪ Capex program management needed ▪ Low private sector commitment ▪ Hard to have long-term incentives to match nature of business or make accountable <p>↓</p> <p><i>Conclusion: Governments not convinced of the value from private operator</i></p>

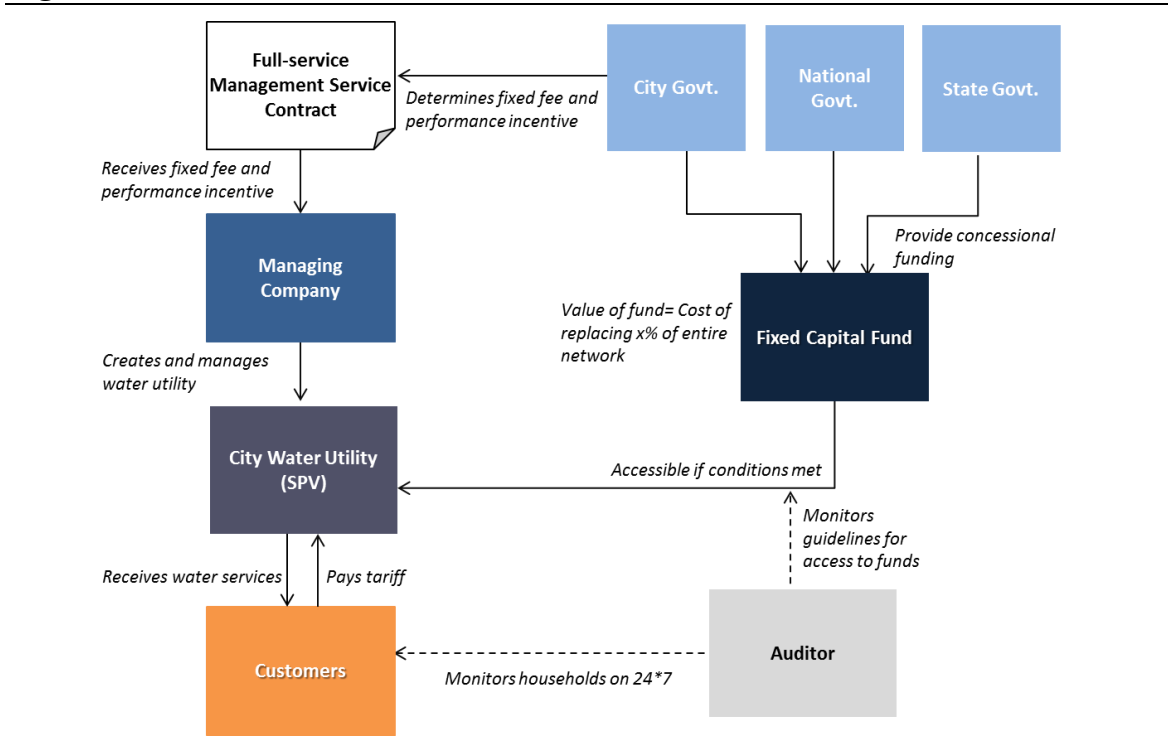
Therefore this report presents alternative PPP models tailored to meet the needs of mid-sized Indian cities. From this analysis two promising new options have emerged: a Phased Performance Based Contract, and a Joint Venture Partnership.

These models have been created by analyzing gathered from three diverse mid-sized Indian cities, discussions with experts, private investors and government officials, as well as lessons learned from PPPs in similar challenging environments.

Phased Performance Based Contract (PPBC)

This model is a two phase, 10 year full service management contract between the City Government and private operator. The initial objective will be to create a city water utility, incorporated under company law, owned by the City Government. The operator would manage the city water utility for the duration of the contract, with a target to get a set percentage of households onto 24 by 7 water supply. The structure is shown in Figure 3.

Figure 3: Structure of the Phased Performance Based Contract

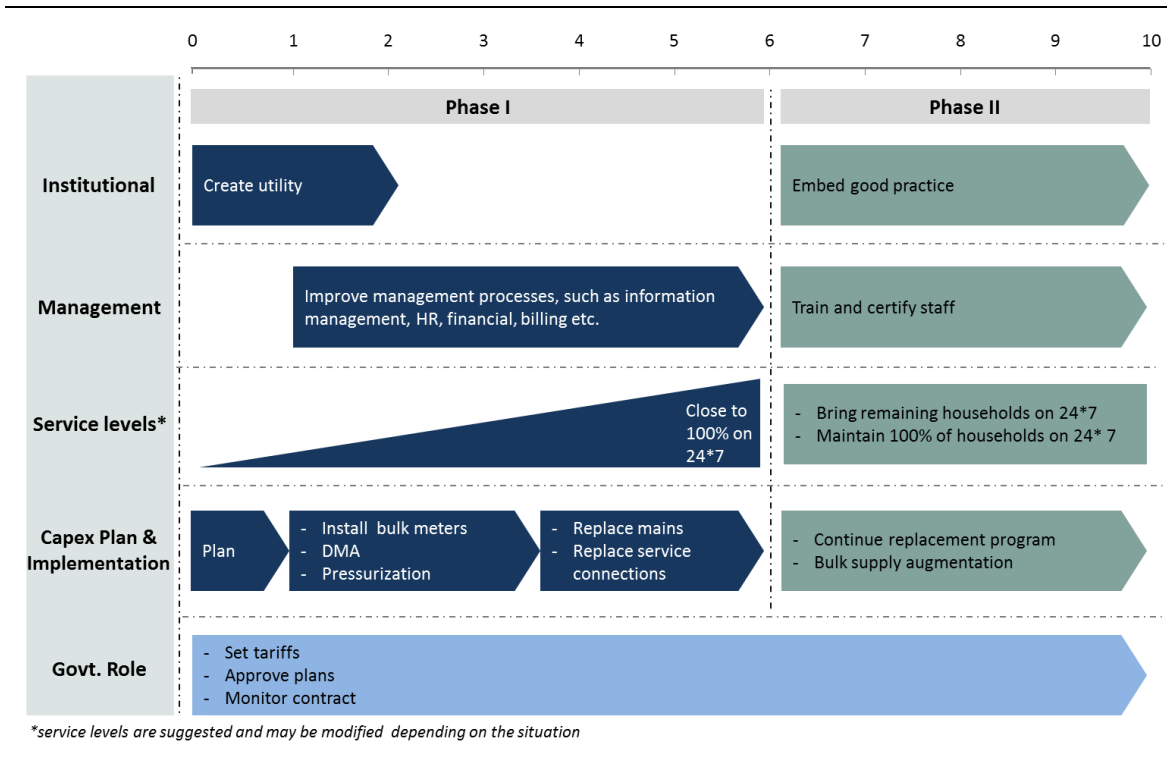


To support the investment needed for 24 by 7 supply, a fixed capital fund will be allocated at the start. The National and State Government and other development agencies will provide these funds, in the form of grants and concessional loans. The City Government may also contribute. The fund amount will be set at the estimated cost of meeting the 24 by 7 target. The contractor will be able to spend from the fund, following strict procurement guidelines as defined by the government. The fund can be used to make capital improvements, such as network transmission and production investments, and to reform the utility. Use of these funds would be independently audited. The continued provision of this capital fund will be subject to fulfilling certain conditions.

The operator will be paid a fixed management fee, and performance pay based on the efficiency with which it uses the capital fund to bring customers onto 24 by 7. The performance pay could be a share of any cost reduction in achieving the target service levels. Alternatively, the contractor could be paid a set amount for each additional household (above the target) provided with 24 by 7 service by a set date.

Proceeding to phase II—which would start in year six—will be contingent on satisfactory performance in phase I. More specifically, the operator will have to meet the minimum standards determined at the start, failing which the City Government can decide to terminate the contract. Figure 4 outlines how roles would evolve over time.

Figure 4: Phased Performance Based Contract: Roles over Time



During phase II, the operator will be expected to embed the good practices that it began to implement in phase I. Specific responsibilities, services standards, and fees may be adjusted in the transition to phase II, to take into account new information that has emerged.

The City Government will hold the operator accountable for achieving the standards set out in the contract. In particular, the private operator will be required to report the number of households it puts onto 24 by 7, and this will be monitored by an auditor. The government will continue to set tariffs and standards for the utility.

Key advantages of the PPBC over a management contract include the focus on building a utility at the very start, rather than just managing what exists, and stronger incentives for the aspects of performance that really matter—such as managing a capital program to achieve 24 by 7 service. The fixed capital fund provided upfront, also overcomes the difficulty of finding funding sources for a large improvement program. Moreover, the conditions set around using the fund, ensure that only cost-efficient investments are made. Finally, the longer duration and flexibility to respond to emerging information, are also important advantages.

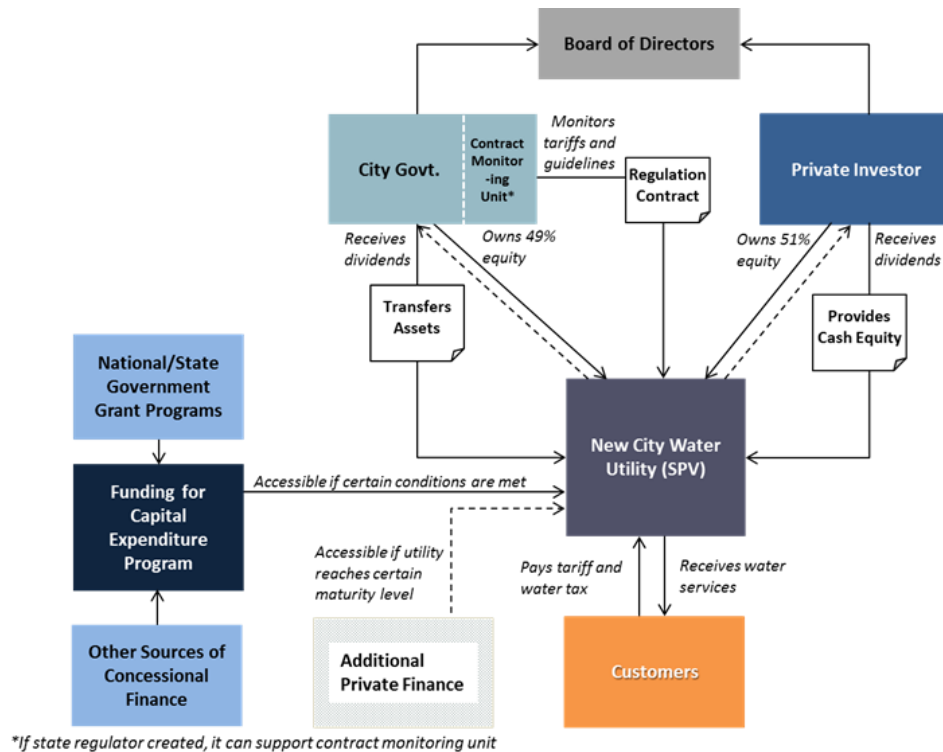
As a result, this model can be applied to a city utility with low cost recovery and a large viability gap. However, the government must be willing to agree to establish a ring-fenced utility—typically a Special Purpose Vehicle (SPV) created under company law and owned by the City Government—and possess the means to provide a fixed capital fund, replenishing it during phase II if necessary.

Joint Venture (JV) Partnership

This model also involves the creation of a new city-level water company, structured as a Special Purpose Vehicle (SPV), jointly owned by the City Government and a private investor, with the latter holding more than half the shares. This water company will be capitalized by the transfer of water infrastructure from the government to the company, and an equity injection by the investor. In the case that asset transfer is not the preferred route, the SPV will be a jointly owned concessionaire which will not own the assets, but will have the rights to use them over the long term⁵. In either case this new water services SPV will be responsible for all aspects of water service, including bulk water production, distribution, billing and collections, and capital program planning and implementation.

The private partner will be competitively selected. It must be an experienced utility operator, with capital to invest. The partner chosen will be the firm or consortium with the required skills and experience that is willing to inject the most equity in exchange for an agreed stake in the company. The basic structure of the JV Partnership is shown in Figure 5 below.

Figure 5: Structure of JV Partnership



The water company will raise money for investment. Concessional finance will be used wherever possible to keep the cost of capital down, while private finance will be used when

⁵ See Section 6.2, JV Partnership Variant: Concessionaire SPV for more details and diagram explaining the structure of this variation

needed to move more quickly, or expand investments beyond the limit of the concessional finance available.

The utility will be regulated through a contract that sets service standards and tariffs. These will be reviewed every three years, in accordance with the contract. Coverage and service standards may be changed in light of emerging information and new priorities. Tariffs would be set to cover reasonable cost, including a reasonable return on capital invested. Where necessary, the government may provide subsidies to keep tariffs at affordable levels. The utility's performance under the contract would be monitored and enforced either by a regulatory office in the City Government, or by a State Water Regulator, if one was created.

The JV Partnership has various advantages over a traditional concession. The rate of return approach to setting tariffs promotes capital investments, even in a situation of information uncertainty. Partial public ownership of the utility, and government representation on the Board, not only promotes trust and information sharing between the public and private sector, but also gives the company access to concessional financing. By giving the City Government a stake in the commercial success of the utility, the usual short term political incentives to hold tariffs below cost, will be somewhat counter-balanced. Finally, in addition to being a simpler contract to understand, the JV's potentially indefinite duration makes it well suited to sustain the performance of the utility over the long term.

As a result, this model can be applied to a city where the City Government is comfortable with entering a long-term agreement with a private partner, and will assist with organizing concessional loans. The utility must have a relatively strong financial position. It must be close to full cost recovery, and have (if at all) a viability gap that is small enough to close with concessional finance. This is crucial to attracting the initial private equity that is required to form the water company.

In conclusion, the two models presented in this report supplement the options for mid-sized Indian cities as they consider how best to provide quality water services to rapidly growing populations.

11 Introduction

Successful mid-sized cities⁶ will be vital to India's growth and prosperity in the coming decades. Indian cities are home to over 375 million people now⁷, and their population is likely to double by 2035.⁸ Yet water supply in most mid-sized cities falls short of Government of India benchmarks for service, efficiency and cost recovery. In many of them water flows in the pipes for 2 hours a day or less, its quality is poor, and it is provided by utilities that cannot even cover their operating costs.

Governments at both the State and Urban Local Body (ULB) levels across India, have realized that a new paradigm of safe, reliable, self-sustaining 24 by 7 water services is needed to sustain urban growth and improved living standards. These governments are thus looking for new institutional models—including public private partnerships (PPPs)—that can respond to India's unique challenges.

With this in mind, the Government of India (GoI) enlisted the support of the World Bank to develop India-specific PPP arrangements for the water sector. The World Bank hired Castalia and a team of Indian consultants⁹ to explore if innovative PPP models could be developed to improve water services quickly and sustainably.

The report is informed by:

- Consulting with officials from city Urban Local Bodies (ULBs), and the Ministry of Urban Development (MoUD) to identify the specific challenges affecting the sector;
- Engaging with international water operators like Veolia and Suez, to brainstorm emerging PPP models that could respond to the Indian challenge (see Appendix B);
- Gathering data on three representative cities—Bhubaneswar, Belgaum and Coimbatore—to ensure recommendations are grounded in reality; and
- Conducting a financial viability gap analysis on the cities, to understand the scale of financial demand imposed by improvements required.

⁶ Our definition of mid-sized cities includes second-tier and third-tier cities. As per Government of India definitions, second-tier cities have populations between 5 million and 1 million, and third-tier cities have populations between 1 million and 500,000.

⁷ "India's urban awakening: Building inclusive cities, sustaining economic growth," McKinsey Global Institute 2008, pg 37. The figure for 2012 was extrapolated from the 2008 figure, assuming a constant growth rate provided by the report (1.25%).

⁸ "India's urban population will double in 25 years," Times of India, Source: http://articles.timesofindia.indiatimes.com/2010-12-17/india/28259598_1_urban-population-urban-areas-pranab-mukherjee, (accessed December 7 2012).

⁹ The team included, S.R. Ramanujan, Anand Jalakam and Sanjay Dahasahastra

- Conducting a “market sounding” exercise with potential private sector operators¹⁰, to understand their views on the design of the PPP models. (See Appendix C: Feedback from Private Operators)

Drawing on these findings, two innovative PPP models were designed to overcome the unique challenges more effectively than (i) the traditional PPPs, and (ii) the business as usual approach.

Following a brief introduction to the three city case studies (Section 2), the report lays out the Indian water sector’s unique challenges, using case examples to substantiate findings (Section 3). The challenges include day-to-day operational issues associated with running a utility, as well as policy and planning issues that affect the utility’s governance and investment planning to meet current and future demand. The results of a financial viability gap analysis¹¹, applied to Bhubaneswar and Coimbatore reveal the magnitude of improvements required, and the key drivers that affect the utilities’ financial performance (Section 4). These complex challenges make traditional PPP models—Management Contracts, Concessions and Leases—less amenable for use in mid-size Indian cities. As Section 5 describes, this is because the traditional models are too risky for the operator or government, or too limited in scope to create lasting improvements.

The remaining sections focus on explaining the design and procurement strategy for the two innovative PPP models—the Phased Performance Based Contract and the Joint Venture (JV) Partnership (Section 6 and 7). These models have the potential to deliver better results than the traditional PPPs and business as usual scenarios. This is because in addition to reforming dysfunctional utilities into focused and accountable organizations, they are able to respond to information uncertainty, include strong incentives, have clear sources of funding, and promote capital efficiency.

¹⁰ Companies represented included Essel RPW Projects Pvt. Ltd., Doshion Veolia Water Solutions Pvt. Ltd., Jindal Saw Ltd., SPML Infra Ltd., Jain Irrigation Systems Ltd., and SUEZ Environment India.

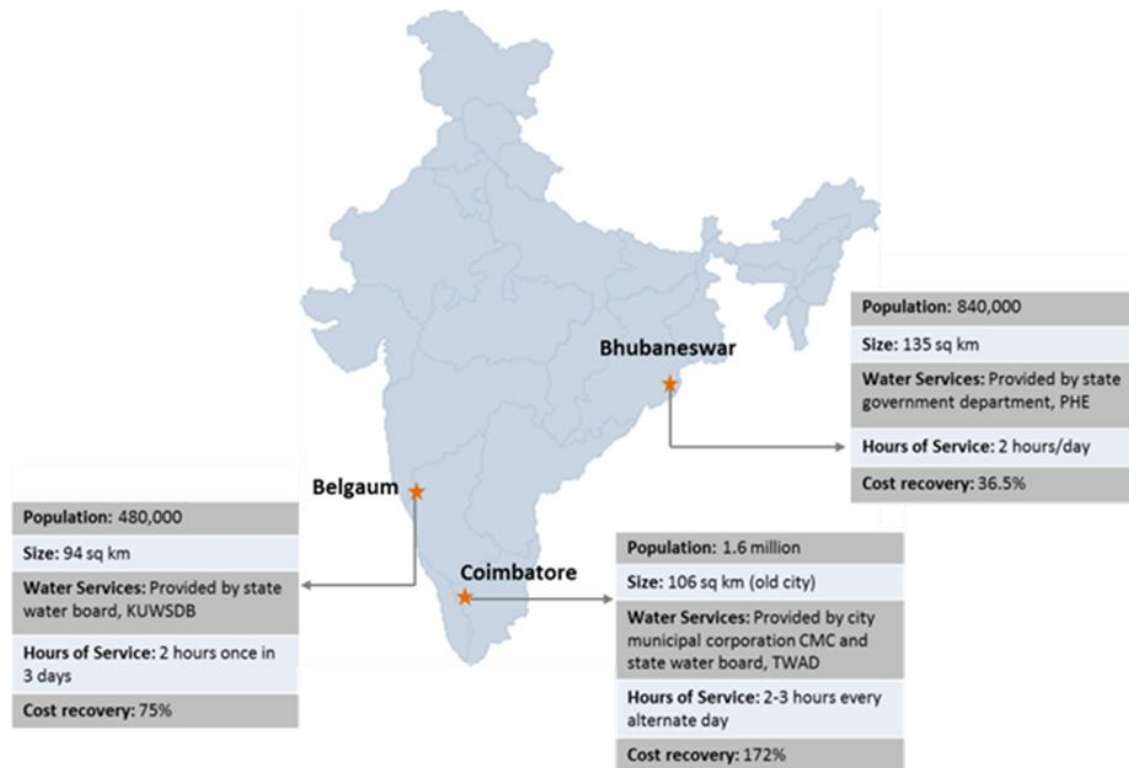
¹¹ The financial viability gap is the negative value that is left over when the net present value (NPV) of operating cashflows is less than the present value of capital expenditures required to run a business. The presence of a viability gap indicates the commercial unviability of a project or entity, while the size of the viability gap reflects the amount of subsidy that is needed to attract private sector interest in the business. (Section 4 provides more details on how to calculate the viability gap)

12 The Three Case Studies

Bhubaneswar, Coimbatore and Belgaum—each distinct in its own way—together capture the diversity of India’s urban water sector. Information gathered from these cities was used to complement the desk-based research, and help to ensure the innovative PPP models are grounded in reality. This section sets the stage for the rest of the report, by introducing the three cities.

Two key considerations ensured the data collected from the cities revealed factors that would be relevant. First, mid-sized cities were selected that were sufficiently different from each other in terms of water service levels, investment needs, physical size and population, institutional structure, political economy and governance issues. Second, a common data collection framework was prepared and applied to all the cities. This ensured that comparisons on parameters such as Non-Revenue Water (NRW)¹² levels, hours of service, pipe condition, staffing and so forth, could be made across the case studies. Each city’s main characteristics are shown in Figure 12.1 below. (The framework developed for the data collection is provided in Appendix A.)

Figure 12.1: Key Characteristics of the Three Case Studies



Bhubaneswar

¹² Non-Revenue Water is a measure of water losses, it is the difference between the volume of water put into a water distribution system and the volume that is billed to customers. NRW comprises three components: physical (or real) losses, commercial (or apparent) losses, and unbilled authorized consumption.

Bhubaneswar is the capital city of Odisha, and is situated on India's eastern coast. With an economy driven mainly by the metals and metal processing industries, it is a relatively small state capital with a population of 840,000, and a total area of 135 square km. However, being one of the most quickly developing cities in the east, it is expected to double in size over the next two decades. Water service in Bhubaneswar is poor—only half the population has access to a piped connection. Those who do have a connection receive water for just 2 hours a day. The water assets are leaky and illegal connections high, resulting in an estimated NRW level of 57 percent.

All water supply functions, including bulk water sourcing and supply, distribution, operations and maintenance are performed the Public Health Engineering Organization (PHEO). The PHEO is a state level body, under the State Department of Housing and Urban Development, that is responsible for providing water and sewage services in urban areas of Odisha. There is a specific Bhubaneswar division of the PHEO that caters to the city and its surrounding urban periphery. The City Government, the Bhubaneswar Municipal Corporation (BMC), currently does not have any responsibility for water supply or sewage in the city. This is in spite of the 74th amendment to the Indian Constitution, which requires that municipalities take responsibility for providing water services.

Despite having a relatively clear institutional structure, the PHEO, that provides water services to Bhubaneswar, is not run on modern commercial lines. Financial performance is poor, with cost recovery levels of 36.5 percent. The utility is run like a government department, instead of a revenue generating business, with no incentives to achieve financial self-sustainability. For example, the PHEO follows government hiring and budgeting processes, inconsistent with the needs of the utility. It is overstaffed, and 75 percent of its workforce is unskilled. Furthermore it is completely reliant on State Government grants to cover its operating losses and finance any capital works.

Coimbatore

Coimbatore is an industrial city in the southern state of Tamil Nadu. Its population is 1.6 million. The city is gaining recognition as an engineering and textile manufacturing hub and becoming increasingly prosperous. As a result of its rapid urbanization, Coimbatore's city limits were expanded in 2011 from 105 square km to 257 square km, to include its sprawling urban periphery. This has meant that the already poor performing water provider is overstretched. In the old city, water flows in pipes for two to three hours every alternate day¹³. NRW is surprisingly low, at approximately 23 percent. However, this number is subject to a wide margin of error, given the sparse data on the asset condition and low supply hours.

Currently the city's Urban Local Body (ULB)¹⁴—the Coimbatore Municipal Corporation (CMC)—is responsible for water distribution and operations. It operates some new bulk water assets, but is reliant on the State Water Board—Tamil Nadu Water Supply and

¹³ This data has been estimated as it is not reported consistently by authorities.

¹⁴ In India, ULB, City Government and municipality are used interchangeably and refer to the third-tier of government that manage cities and towns.

Drainage Board (TWAD)—for the rest of it bulk water production. This has recently led to coordination inefficiencies and disputes over raw water purchases. Furthermore, water operations within the CMC are fragmented. For example, the majority of the staff are shared across the ULB's numerous urban service functions. The CMC is also currently understaffed—even by international standards—with only 1.18 staff per thousand connections. This lack of dedicated technical staff and clear management processes will be detrimental to water provision in coming years.

Despite the poor service, cost recovery in Coimbatore is high, at 172 percent. This level of cost recovery can be attributed to the well-designed water tax linked to property values, which brings in over half the utility's revenues. As a result the financial position of Coimbatore's water utility is quite strong.

Belgaum

Belgaum is a strategic transport junction in the state of Karnataka, and connects major cities such as Mumbai, Bangalore and Goa in the western part of India. It has a population of 480,000, and covers a total area of 94 square km. The city's population is expected to grow by approximately 250,000 in the next two decades.

Water provision in Belgaum is beset with challenges. There are no metered connections, NRW is estimated at 56 percent, and almost 70 percent of the distribution network requires replacement.

However, the City Government has demonstrated a real willingness to try and turn the situation around. This is evidenced by the implementation of the World Bank funded pilot—Karnataka Urban Water Sector Improvement Program (KUWASIP)—that has managed to bring continuous supply to a small section of the city, previously known for its high number of illegal connections. In the rest of the city however, water provision is shockingly low—it is supplied for only two hours once every three days.

The City Government—the City Corporation of Belgaum (CCB)—has delegated bulk water supply, distribution and maintenance works to the State Water Board—the Karnataka Urban Water Supply and Distribution Board (KUDWSB). Although this delegation of responsibility has been in effect since 2006, it is still incomplete. Specifically, there is no clear understanding as to which organization is responsible for financing and implementing the much needed capital works in the city.

Furthermore, the utility's 75 percent cost recovery hides an unconditional state grant for electricity use—its largest operational expenditure. Like Bhubaneswar, Belgaum's water provider, KUDWSB, is effectively run like a government department, following state procurement, hiring and budgeting procedures that are not aligned with the needs of a well-functioning city utility. For example, a state freeze on hiring has meant that there is an unbalanced hierarchy in the utility's management structure, with far too many senior staff in relation to the lower levels.

13 Unique Water Sector Challenges in Mid-sized Indian Cities

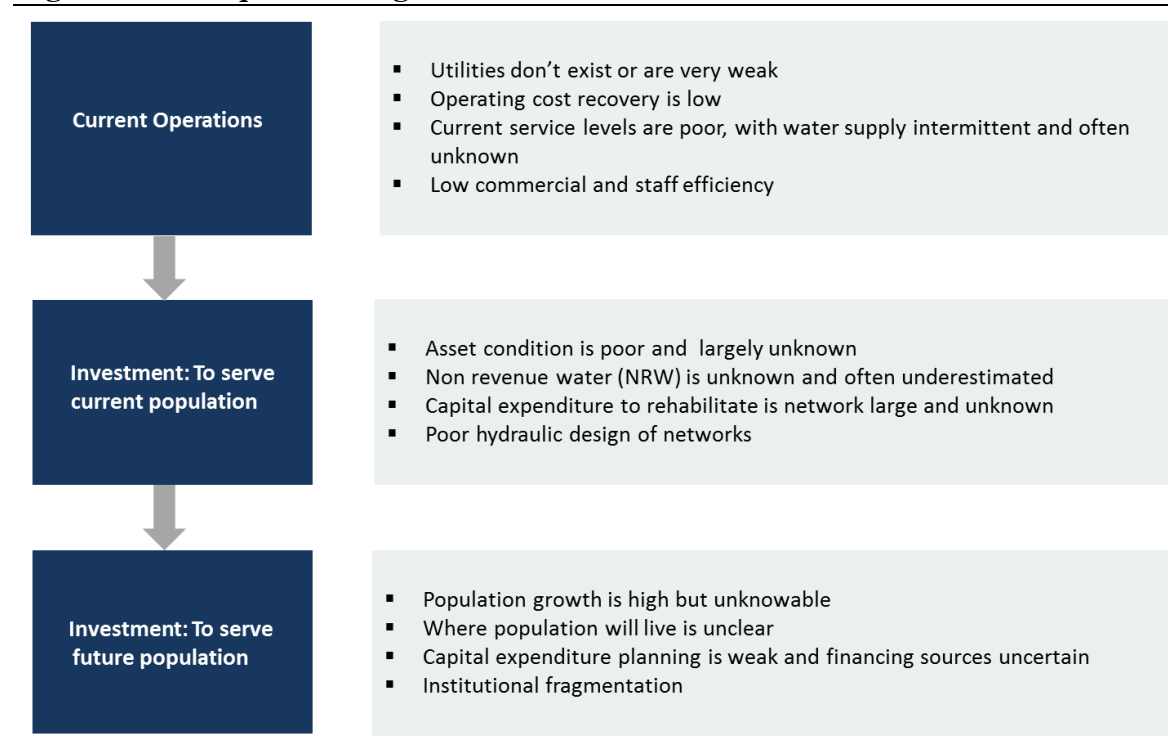
The Indian urban water sector's myriad challenges can be grouped into categories related to: current operations, investment needed to serve current population, and investment needed to serve future population. These problems are summarized in Figure 13.1, and discussed further below.

Problems related to current operations include service levels below benchmarks for quality, efficiency and cost recovery. Poor utility governance structures and weak performance incentives also belong in this category.

Investment needed to serve current population is driven by dilapidated water assets and leaky networks. These result in high NRW levels, preventing 24 by 7 service. To make matters worse, most utilities don't actually know the full extent nor the condition of their assets.

Explosive urban population growth means that massive investment is needed to serve the populations of the future. However, weak capital expenditures (capex) planning, uncertainty about where populations will ultimately settle, and scarcity of funding sources, makes this a daunting task.

Figure 13.1: Unique Challenges in India's Urban Water Sector



13.1 Current Operations

Current operations means running the utility on a day-to-day basis, supplying customers with water, and employing standard processes to manage costs and revenues. Most Indian water providers are unable to do this efficiently, resulting in poor financial performance. This in turn creates a vicious cycle, making it hard to improve infrastructure, management systems, and services. Utilities are badly structured, have low cost recovery, provide poor services, and struggle to reach commercial efficiency.

Poorly structured utilities

Existing service providers at the ULB level either formally don't exist (with service provided by a State level entity), or they exist but are "empty shells" with regards to the equipment, systems, and procedures to be expected in a modern utility. Many have poor governance, non-standardized management processes, and outdated technology. For example in Coimbatore, water service provision is mixed with other urban services provided by the City Government. Most staff are shared between these different services, so few, if any, are solely dedicated to managing water services.

In Bhubaneswar and Belgaum, there is no link between revenues and costs, as the government at the State level subsidizes operating losses. These subsidies arguably deter operational cost efficiency and organizational self-sufficiency.

Information management systems are weak across the board, either due to the low priority given to sharing information, the absence of technology, or lack of skilled staff. Finally, the links between operations and capital expenditure planning and finance are generally weak. In Belgaum, for example, there is lack of clarity over whether or not the State Water Board is responsible for capex planning and implementation. This is because the city municipality has not done a good job of clearly delegating roles and responsibilities to the Board.

Table 13.1 shows how the three municipal providers studied measure up against four key indicators of a well-structured utility.

Table 13.1: Poorly Structured Utilities

Issue	Bhubaneswar	Coimbatore	Belgaum
Defined entity?	✓ State government department PHE responsible for sourcing, bulk water and distribution in the city	✗ Water services is one of many departments within Urban Local Body (ULB), its staff is also responsible for other city functions	✓ City ULB delegated water supply functions to state board KUWSDB
Linked revenue and operations budget?	✗ Operating budget not constrained by revenue, because all losses subsumed by state	✓ Water services have independent accrual based accounting systems, with separate bank accounts and independent sources of revenue and finance	✗ Operating budget not constrained by revenue, because all losses absorbed by city and cross subsidy from industrial water supply
Appropriate management systems?	✗ Information management very weak, financial management and HR process management follow government guidelines, not aligned with utility's needs. Billing systems fair but very basic.	✗ Information management and performance management systems very weak and fragmented at zonal offices, several processes such accounting and finance systems management fair, but heavily reliant on outsourcing	✗ Billing management basic, HR systems and financial management exist, but large scope for improvement. Inadequate planning, project monitoring and information systems.
Link between operations and capex planning and financing?	✗ Funding for capital and operating investments comes from two different government budgets	✗ Until recently the bulk works built, managed and financed entirely by state board, with no link to city's operations and distribution system investment program	✗ State board performs operations, but no clear delegation of capex planning and financing

Low operating cost recovery

Operating revenues are often below costs, with typical cost recovery rates between 30 to 50 percent nationally.¹⁵ Bhubaneswar falls within this range at 36.5 percent, as shown in Table 13.2 below. Belgaum achieves 72 percent cost recovery. While relatively high, it still means the Belgaum utility cannot pay its way—and this is after a subsidy for electricity, its largest operational expenditure.

As Coimbatore shows, it is possible to do better—Coimbatore dedicates a certain amount of its property tax as revenue for water services. This allows it to cover operating costs and generate a surplus for investment.

Poor service levels

Most city water providers in India supply water for three to five hours per day¹⁶, compared to the Government's benchmark of 24 by 7 water supply. In the case studies this number is even lower, as shown in Table 13.2 below. Supply hours range from two per day in Bhubaneswar, to two every three days in Belgaum. Moreover, in Belgaum and Coimbatore daily hours of supply are not reported consistently or accurately.

Low commercial and staff efficiency

Existing providers suffer from low staff efficiency, meaning that staff are unable to perform tasks quickly and effectively. Bhubaneswar's utility is currently overstaffed, with 39 staff per

¹⁵ Castalia report on Water Professionalization, April 2011

¹⁶ Water and Sanitation Program (2008). Benchmarking Urban Water Utilities in India. WSP/World Bank. New Delhi.

1000 connections, far above international standards. In addition, there are too many unskilled workers, as shown in Table 13.2. On the other hand, some providers suffer from overreliance on outsourcing to independent contractors as a result of staff shortages. An example of this is Coimbatore, where maintenance works could be delayed or below standards due to difficulties managing and coordinating with independent contractors. In Belgaum, a freeze on staff hiring has led to a poor matching of staff skills with the utility's needs.

Commercial management systems are typically weak, as evidenced by an almost complete absence of metering in Bhubaneswar and Belgaum, shown in Table 13.2. In Coimbatore, although 100 percent of the connections are metered, the majority of the meters are old and should be replaced. It is difficult to tell how many meters are in working condition, as the utility rarely reads the meters, relying on past estimates instead.

Table 13.2: Challenges with Current Operations

Issue	Bhubaneswar	Coimbatore	Belgaum
Operating cost recovery levels	36.5%	172% However this includes a large water and sanitation tax as revenue	75% However electricity use, which is half of expenditures is covered by city grant to utility
Hours of service/day	2 hours per day	2.5 hours every 2 days	2 hours every 3 days
Extent of metering	1.2%	100% However, meters are old and often don't work, and meter readings are infrequent and often inaccurate	0%
Staff efficiency	39 staff/1000 connections 75% of staff is unskilled. Hiring not aligned with utility's need	1.31 staff/1000 connections Most staff is outsourced. Deficit of skilled and supervisory staff	4.32 staff/1000 connection However staff freeze has resulted in unbalanced hierarchy

13.2 Investment: To Serve Current Population

Achieving 24 by 7 service, even for the current population, will require huge investments. Investing to reduce the leakiness of the networks will be particularly important. The research highlighted the following common impediments to improving service levels for current population.

Poor and uncertain data on asset stock and condition

Base data on current assets is lacking. Systematic data collection, information management, and mapping systems, are all rare. For example, none of the cities have completely mapped networks, or make use of GIS systems. Many pipes were laid 40-50 years ago and have outlived their useful life, as in Bhubaneswar and Belgaum (see Table 3.3 below)

NRW underestimated

Engineering reports either fail to report NRW numbers (as in the case of Coimbatore) or do a poor job of calculating NRW. NRW projections are often grossly underestimated because engineers tend to overlook how NRW numbers might increase as hours of service increase.¹⁷ Typical NRW rates in India are high, at 50 to 60 percent.¹⁸ Bhubaneswar and Belgaum seem to fall within this range as shown in Table 3.3 (although there is doubt as to how these numbers were calculated). Lack of systematized revenue collection systems also results in large, but often unknown commercial losses (primarily illegal connections). Commercial losses are particularly hard to measure, for example in Bhubaneswar estimates of illegal connections vary from 11,000 to 30,000 (see Table 3.3 below).

Rehabilitation expenditure large and unknown

The water distribution system of most cities is in poor shape, with major investments required to replace pipe connections and install meters. As shown in Table 3.3 as much as 60 percent of the piped network in Bhubaneswar and 80 percent in Belgaum are thought to need replacement. In Coimbatore it is difficult to estimate the level of replacement needed, because there is not enough data on network condition.

Furthermore, Detailed Project Report's¹⁹ (DPR's) rehabilitation expenditure projections vary in their level of conservatism. For example, Coimbatore's DPR makes a conservative estimate of US\$8 per capita, while according to Belgaum's more liberal assessment, US\$152 per capita is needed (see Table 3.3 below).

Table 13.3: Investment: To Serve Current Population

¹⁷ Physical water losses increase linearly with hours of continuous, pressurized service. See Box 1.1 Impact of hours of supply on NRW, for a more detailed explanation.

¹⁸ Ministry of Urban Development, India (2009). Service Level Benchmarking Databook: MoUD, New Delhi

¹⁹ These are engineering reports written for the cities commissioned by the City Government. They are authored by external local engineering firms and provide indicators of current utility performance and try to project future needs.

Issue	Bhubaneswar	Coimbatore	Belgaum
Asset Condition (pipes)	60% pipes built in 1950s and need replacement Mapping of distribution network incomplete and pipe material unknown No GIS mapping system	No information on pipe condition through utility or detailed project report (DPR) No GIS system or consistent mapping of network	75%-80% pipes need replacement according to lab tests No GIS system or consistent mapping of network
Non revenue water	57% estimated Based on rough calculations, actual number uncertain	11%-27% estimated Based on rough calculations, actual number uncertain	51% estimated Based on rough calculations, actual number uncertain
Illegal connections	11,000-30,000 actual numbers unknown as household survey not undertaken	No major reports of illegal connections	High, but unknown, utility doesn't actively control losses from illegal connections
Total Capital expenditure to rehabilitate network	US\$ 25-27 million This is estimated based on replacing 50% of distribution network and 100% metering	US\$ 13-15 million This is estimated based on aggressive reductions in NRW and conservative replacement of pipes and connections	US\$ 69-73 million This includes replacement of entire distribution network and 100% metering
Rehabilitation expenditures/ current capita	US\$ 29-32/capita	US\$ 8-10/capita	US\$ 143-152/capita

13.3 Investment: To Meet Future Demand

As India's urban population is expected to increase by almost 11 million every year, water infrastructure will need to keep pace, running out networks into new neighborhoods, and abstracting and treating more water. The planning and financing challenges are immense, particularly given the inadequate structures now in place. The research highlighted the following four fundamental problems in expanding water supply networks to keep pace with growing urban populations.

High, but unknowable population growth rates

Urban population growth in India is predicted to increase at an unprecedented rate—adding 240 million people to its current 375 million by 2030.²⁰ Cities like Bhubaneswar and Coimbatore, already close to 1 million in size, are expected to grow by a further 0.5 to 1 million in the next two decades. This will compound the problem of dismal water service quality and stress existing infrastructure. It is also very difficult to predict where future populations will live. Furthermore, the Indian urban planning system, instead of molding the shape of cities, finds itself habitually following behind.

Capital expenditure planning is weak and actual costs uncertain

²⁰ "India's urban awakening: Building inclusive cities, sustaining economic growth," McKinsey Global Institute 2008, pg 37

Providers rarely develop detailed capital expenditure plans. In the three cities studied, the DPRs made inconsistent assumptions about capital cost drivers such as NRW levels and future water demand. As a result capital expenditure numbers predicted have a large margin of error. According to the DPRs, the numbers range from US\$121 per current capita in Bhubaneswar to meet demand until 2032, to roughly half that amount (US\$70) for Coimbatore until the year 2044.

Financing sources are uncertain

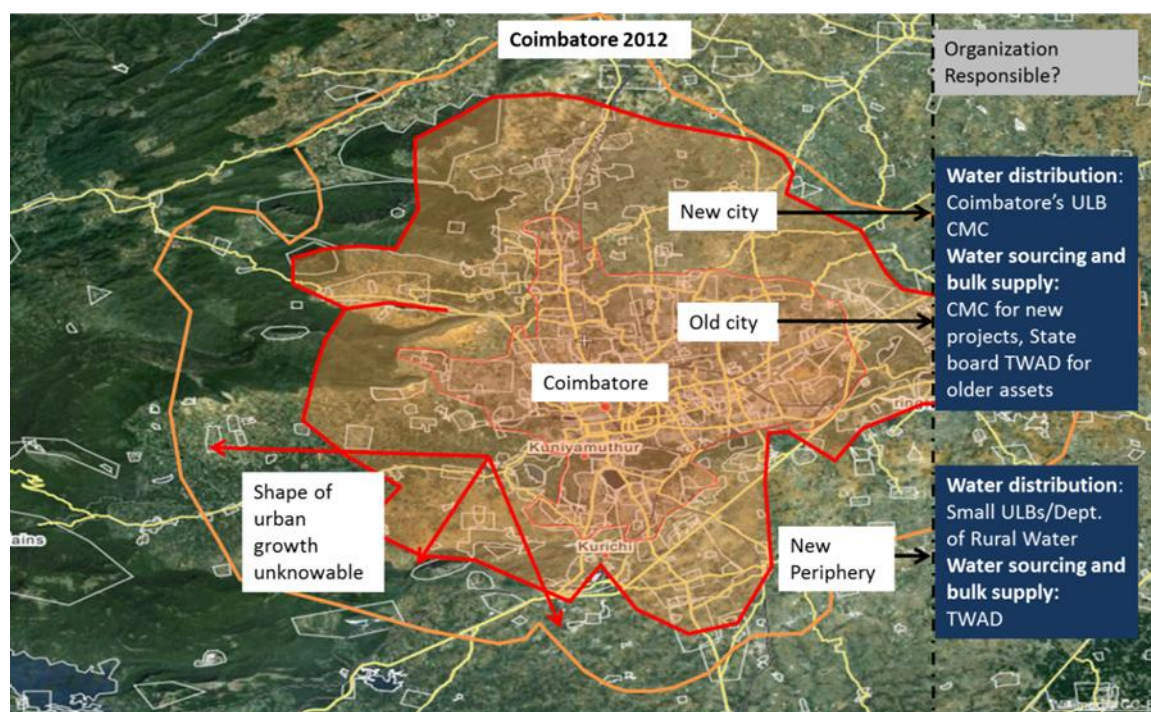
Currently few cities have the ability to cover operating expenses, let alone fund capital programs from tariff revenues. Belgaum and Bhubaneswar rely on grants for all their capital expenditure programs, while Coimbatore can cover just 52% of capital costs from its own budget. There is thus an over-reliance on State and Central grant funding. In the future, such grant funding is very unlikely to be available in the growing quantities in which it will be demanded.

Institutional fragmentation

Divided responsibilities between cities' core and periphery create inefficiencies and hinder responses to growth. This is a common challenge for Indian cities undergoing rapid urbanization. For example, until 2011, the urbanized peripheral areas of Coimbatore were served by multiple, small-scale ULBs (City Governments) instead of the Coimbatore Municipal Council. This was changed in 2012 when city limits were expanded. However, other forms of institutional fragmentation persist in Coimbatore. For example, the State Water Board and ULB have overlapping functions of owning and operating bulk water assets. Recently, this has led to an unresolved dispute over raw water payments between the two authorities.

The fragmented institutional structure and the challenges of rapid population growth are depicted for the city of Coimbatore in Figure 13.2 below.

Figure 13.2: Challenges to Meet Future Demand in Coimbatore²¹



²¹ The "New city" lines and "New periphery" lines around the old city are not an exact representation of city limits. They just serve the purpose of trying to illustrate the point of rapid urban growth.

14 Viability Gap—Analysis of Two Cities

This section explores the financial viability of water services in mid-sized cities based on detailed assessments in Bhubaneswar and Coimbatore. It draws lessons about what PPPs must focus on if they are to increase financial viability. It also highlights the effects that different levels of financial viability can have on the types of PPPs that can succeed. To measure financial viability, the concept of a “viability gap” (VG) has been used. The VG is essentially the shortfall of cash receipts over cash outflows, over an extended period, taking into account financing costs.

Most water utilities in India have a viability gap. They fail to meet operating costs from revenues, let alone finance capital expenditures from revenues. This lack of financial viability creates challenges for PPPs, since private firms are normally only interested in opportunities that are financially viable.

India has pioneered the concept of viability gap funding in road and other PPPs. In the context of road PPPs, the VG is the gap between projected toll revenues and roads’ operating and capital costs. Often the government provides an upfront capital contribution to the operator—equal to the value of the VG. The idea is that a government contribution ‘tops up’ the funding of a scheme, allowing private capital to be attracted for a large part of the capital cost. In this report, the VG is used as a measure of how far a PPP for water services would be from covering all its costs—both capital and operational—from user fees or other water specific funding sources.

This section discusses the results of a viability gap analysis conducted on Bhubaneswar and Coimbatore’s water utilities. The cities were picked specifically because of significant differences in their financial performance and institutional arrangements.

14.1 Calculating the Viability Gap

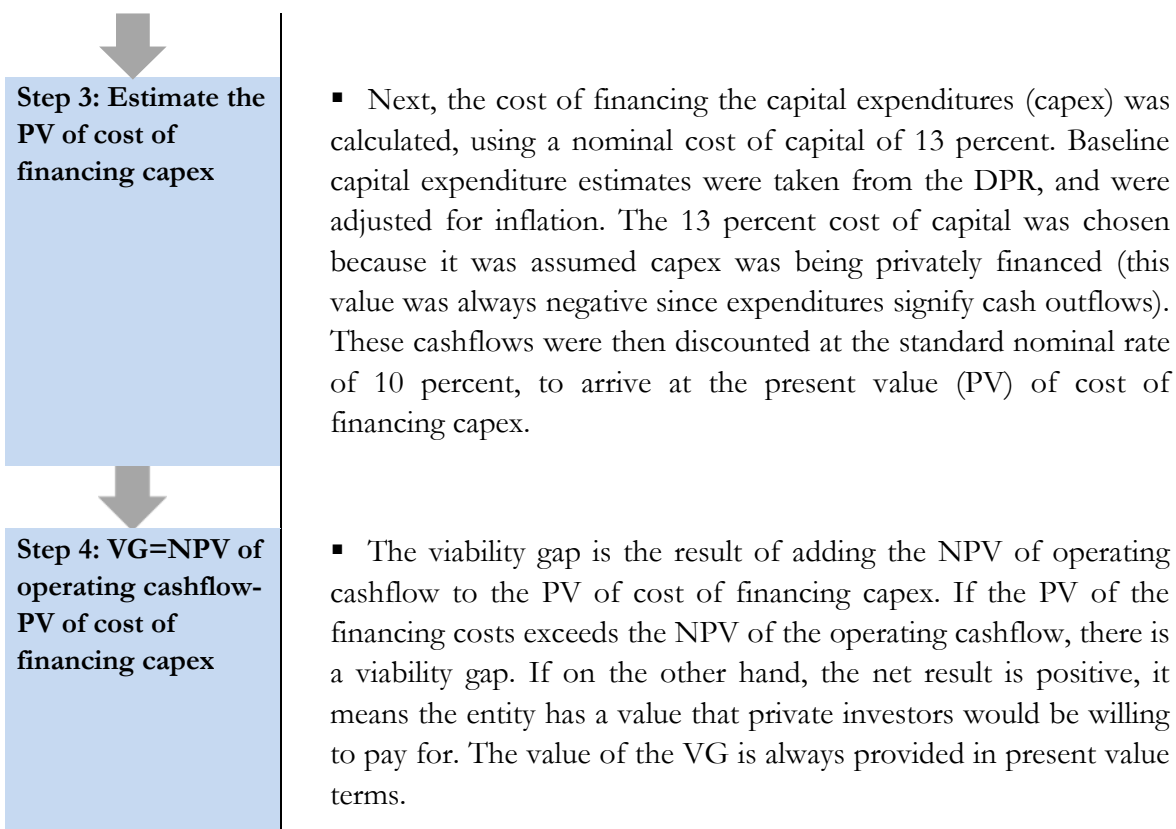
The viability gap for Bhubaneswar and Coimbatore was calculated using the following steps:

Step 1: Project demand, revenues and operating costs



Step 2: Estimate NPV of operating cashflows

- For each city, population growth, water demand, revenues and operating expenditures were projected for a given time period. The city DPRs, which assume all households will be on 24 by 7 within 5 years—were used to make these projections. Cashflows were adjusted for inflation.
- The revenues and operating costs were discounted using a standard nominal rate of 10 percent, to arrive at the net present value (NPV) of operating cashflow for each city. If this value was negative, it meant the utility had an operating cash deficit, and conversely if this value was positive, it indicated the city had an operating cash surplus.



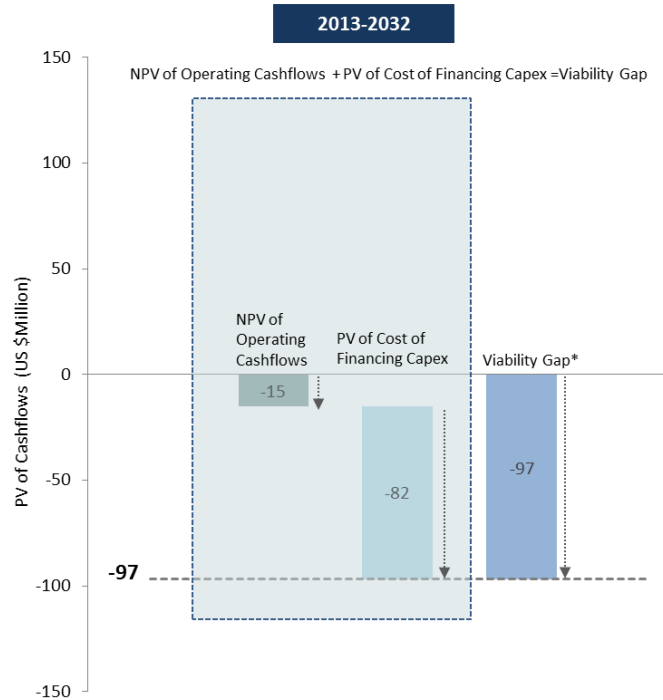
14.2 Main Results—Breaking Down the Viability Gap Components

Applying the viability gap methodology to the two cities yielded very different results. Coimbatore, with its small viability gap of US\$8 million is practically self-sufficient, and can fund almost all its planned capital improvements from its own budget. Bhubaneswar on the other hand has a viability gap of US\$97 million. In addition to needing subsidies for any type of capital work, Bhubaneswar needs subsidies to just keep operations going.

Bhubaneswar

The present value of the viability gap in Bhubaneswar is US\$97 million. As seen in Figure 14.1 below, the gap is composed of an operating cashflow gap (shown in gray), and a capex financing gap (shown in light blue).

Figure 14.1: Bhubaneswar Viability Gap



The operating cashflow gap arises because every year revenues are insufficient to cover operating costs. Over the 20 year modeling period, discounting the annual operating cashflows back gives an NPV of negative US\$15 million.

Capital expenditures need to be made over the next 20 years for capacity augmentation, network rehabilitation and expansion. It is assumed that this capex is privately financed at 13 percent²². The present value of the cost of financing this capital expenditure is US\$82 million.

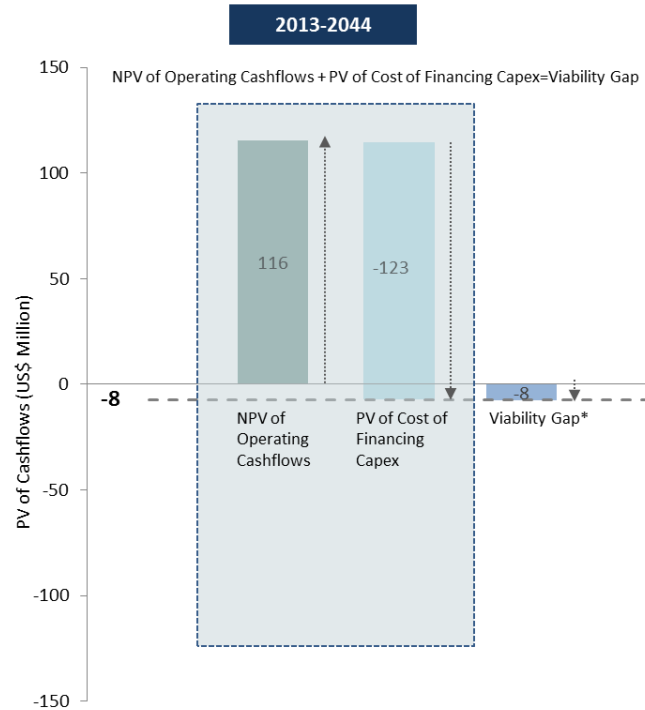
Adding these two negative present values together gives a total viability gap of US\$97 million. The forecast cost of owning, operating and funding this utility over the next 20 years is US\$97 million (in PV terms). The government would have to provide a subsidy with a present value equal US\$97 million if it wanted a private firm to take responsibility for operating and financing the utility. Equally, if the utility remains an entirely public responsibility, US\$97 million (in PV terms) is approximately the value of the funding it will require over the next 20 years.

Coimbatore

In contrast, the present value of the viability gap in Coimbatore is only US\$8 million. It is composed of an operating surplus (shown in gray), and a capex financing gap (shown in light blue). This is shown in Figure 14.2 below.

²² 13% percent is the assumed cost of private finance in India, with a 70-30 commercial debt to equity ratio.

Figure 14.2: Coimbatore Viability Gap



The operating surplus in Coimbatore exists because revenues are consistently outstripping operating expenditures by a wide margin. As a result, over the 32 year modeling period, discounting operating cashflows back gives a positive NPV of US\$116 million.

The capex financing gap arises because over the 32 year period, capital expenditure is needed for capacity augmentation, network rehabilitation and expansion. Using a private cost of capital of 13 percent, gives a present value of negative US\$123 million for cost of financing capex.

Adding together the positive NPV of operating cashflows, and the negative PV of cost of financing capex, results in a viability gap of US\$8 million (PV terms). Thus only US\$8 million in viability gap funding from government would be needed to make the water service in Coimbatore viable as a privately financed PPP.

14.3 Sensitivity of the Viability Gap to Variables

How can these utilities reduce their viability gaps? What changes might actually worsen their financial viability in the future? To answer these questions, this section looks at how the viability gap is affected by changes in the following parameters:

- NRW
- Tariffs
- Access to concessional finance

- Operational improvements, including collection efficiency, capital use efficiency, staff efficiency, maintenance and repair efficiency, and chemical use efficiency

By looking at how these operational and financial variables drive the viability gap—the sensitivity analysis can help to prioritize the design features that the innovative PPPs must include.

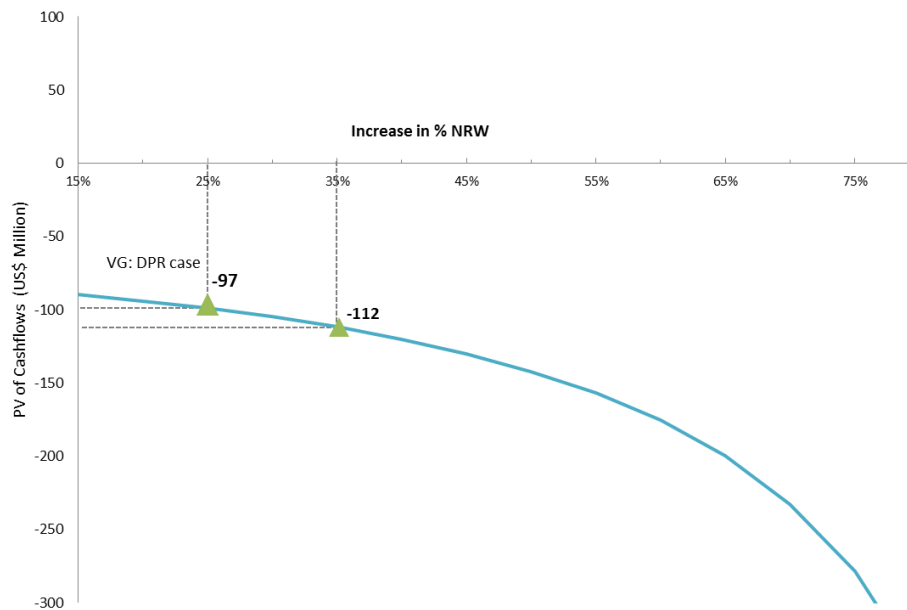
In both the cities analyzed, NRW levels, tariffs, and the use of concessional finance have a large impact on the size of the viability gap. Operational improvements have mixed results. In particular, staffing levels, efficiency in electricity and chemical use, and maintenance expenditure have lower impacts on the viability gap, while collection efficiency and capital expenditure efficiency have more substantial impacts.

Non-Revenue Water

Curbing NRW may offer the greatest potential for reducing the viability gap. At the same time, failure to reach target levels of NRW can have catastrophic effects on a utility's financial viability. As Figure 14.3 below shows, if Bhubaneswar fails to hit the DPR's NRW target of 25 percent, and instead achieves a level of only 35 percent, the VG surges from US\$97 million to US\$112 million—a US\$15 million increase.

The reason for this sensitivity is that the analysis assumes that the city must achieve 24 by 7 water supply. If NRW is above target levels, it means more bulk water must be put into the system in order to allow 24 by 7 supply to be sustained (if the additional bulk supply were not available, the city would again have to resort to intermittent supply of water). The cost of building the additional bulk supply is therefore added to the capital expenditure plan, to offset the higher NRW. At the same time there are operating cost increases associated with treating the water. This increase in capital and operating expenditure requirements drives the viability gap higher.

Figure 14.3: Sensitivity of Bhubaneswar's Viability Gap to NRW²³



A one percent increase in NRW from the base case (DPR) results in a one percent increase in the VG. However, Figure 14.3 shows, this relationship is not linear, so every incremental percentage increase in NRW (x-axis), results in a higher percentage change in the VG.

A similar nonlinear relationship is seen in Coimbatore. In fact, the VG in Coimbatore is even more sensitive to increases in NRW—a one percentage point increase in NRW from the base case (assumed to be 20 percent) results in a 15 percent increase in NRW.

Tariffs

An obvious way to improve financial viability is to increase tariffs. The sensitivity analysis shows how the VG reacts to different levels of annual tariff increase. As Figure 14.4 below shows, real tariff increases of five percent per annum over a 20 year period are needed to close the VG in Bhubaneswar. This means that average real tariffs over this period will have to almost double from current values.

In Bhubaneswar, the DPR case assumes that the tariff rate is indexed to inflation, hence in real terms²⁴ there is no change in tariffs charged over the entire period. This DPR case is shown with the left most of the two dotted vertical lines. The dotted line starts at zero percent per annum real tariff increase. If traced all the way down to the blue line—this gives

²³ In this chart the y-axis range goes up to negative US\$300 million for PV of cashflows. This has been done to demonstrate the extent of impact NRW has on the VG. In comparison, the y axis in the other charts—also showing PV of cashflows—go up to only negative US\$100 million, as the impacts on VG for these variables is not as large.

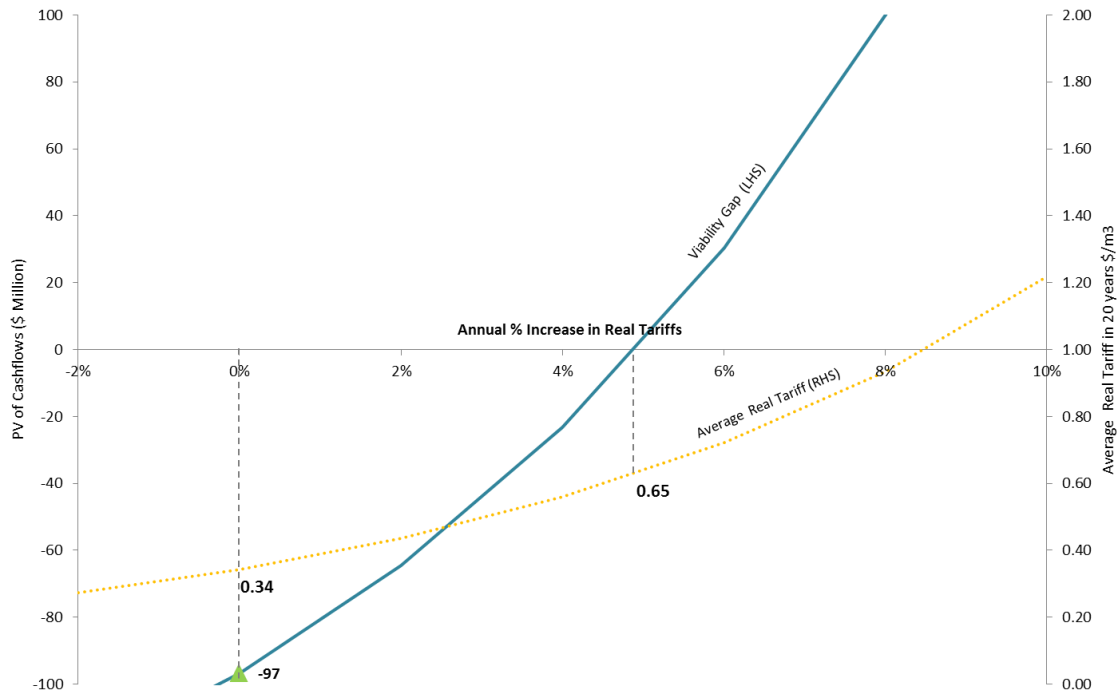
²⁴ Real terms means the monetary value in today's (2012 US\$) terms. Every year tariffs grow by the rate of inflation in the economy, so the relative value of the tariffs increases year-on-year, but in the real or inflation adjusted terms, tariffs stay at 2012 levels.

a viability gap of US\$97 million (see left axis, PV of Cashflows). The orange line further up—shows the average *real tariff* over the period at US\$0.35/m³ (see right axis, Average Real Tariff).

It is also possible to read off the graph the tariff increase that would close Bhubaneswar's viability gap. The blue line crosses the horizontal axis at 5 percent. This means that an average increase in tariffs of 5 percent per annum would be required to close the viability gap in Bhubaneswar.

The orange line then allows you to see what this means for the average tariff over the period. Reading down from an average real tariff increase of 5 percent to the blue line, and then across to the vertical axis on the right, shows that the average tariff over the period would be US\$0.65/m³—twice the current US\$0.34/m³ tariff.

Figure 14.4: Sensitivity of Bhubaneswar's Viability Gap to Real Tariffs



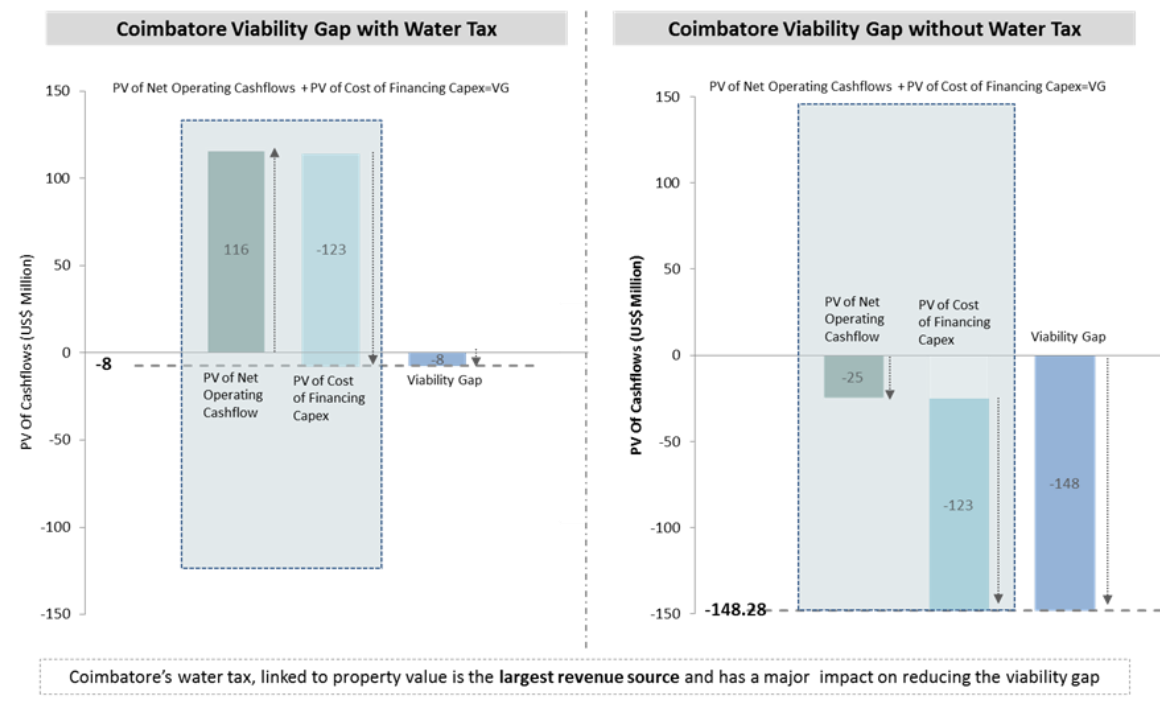
In Bhubaneswar's case, a one percent real tariff increase per annum will reduce the viability gap by 17 percent. However once again, this relationship is not linear, so every percentage increase in real tariff from the base case will have a progressively bigger impact on the percentage change in the VG.

The relationship between tariff increase and VG reduction is far more sensitive in the case of Coimbatore. Specifically, a one percent increase in the real tariff rate in Coimbatore results in the VG disappearing—the VG goes from being negative US\$8 million, to the utility having a positive value of \$20 million.

Thus it is clear that Coimbatore's tariff regime is the main explanation behind its strong revenue projections, and hence, its small viability gap. Customers pay a flat rate monthly tariff indexed to inflation, but are also charged a municipal property tax that is dedicated to water services. This has 'water tax' been treated as part of the water revenue in our analysis.

Figure 14.5 below shows how important this tax revenue is for the water sector's viability. Without the contribution from the property tax, the NPV of operating cashflows goes from being positive US\$116 million to negative US\$25 million. Not having a water tax increases Coimbatore's VG to US\$148 million—almost 19 times its original value.

Figure 14.5: Impact of Coimbatore's Water Tax on Viability Gap



Concessional finance

The viability gap is sensitive to the use of concessional finance. Concessional finance means lower than market rate loans, typically provided by government or development institutions. Concessional finance can be used instead of private finance, and will bring down the cost of capital significantly—for example the Government of India provides concessional loans for as low as 2 percent. The financing structure for capital expenditures can be all private finance, or all concessional finance, or somewhere in between. Depending on the structure chosen the weighted average cost of capital (WACC) will change. In the DPR case, it was assumed that all capital expenditure was privately financed, with a 70-30 private debt to equity ratio, yielding a weighted cost of capital of 13 percent.

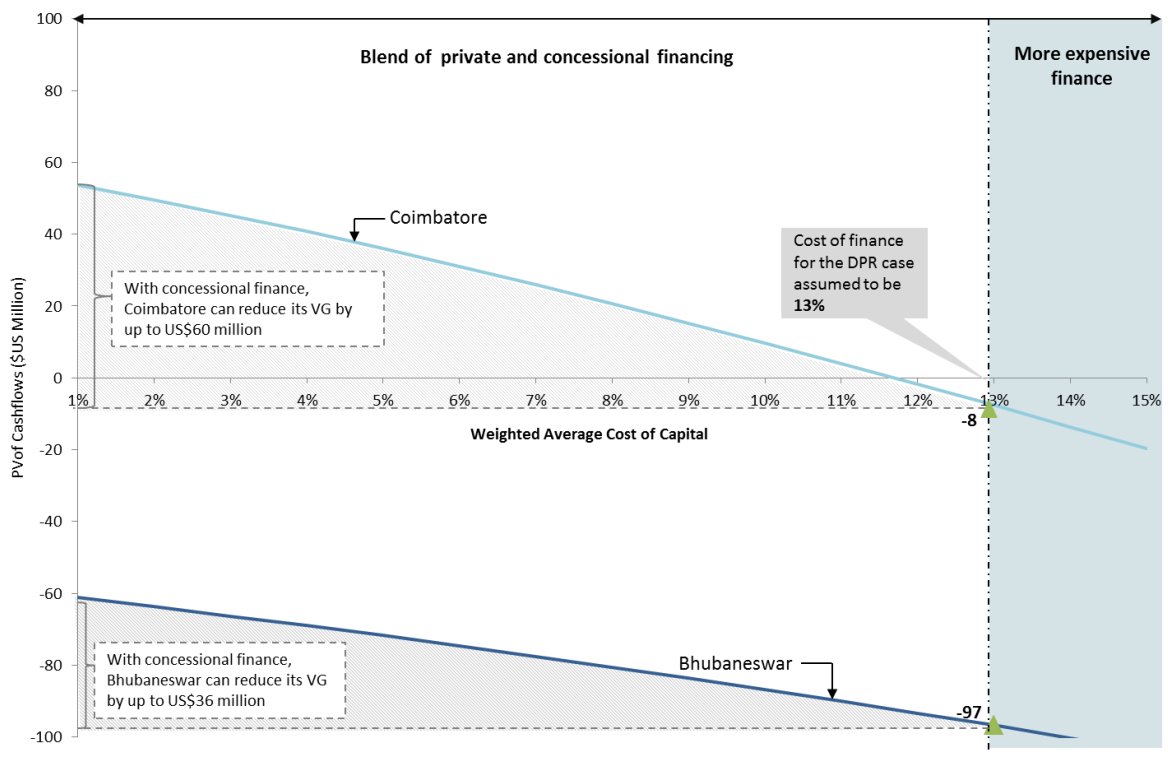
Figure 14.6 below shows how the VG changes when concessional finance is blended in. In Coimbatore, if the financing is structured so that the WACC falls to 11.5 percent, the

viability gap will disappear, making the business attractive to private investors. There are several ways this could be achieved. One option would be to use a 40-60 debt to equity ratio, with debt provided by the World Bank at a concessional rate of 6.5 percent, and Indian private equity being provided at a rate of 19 percent. This results in a WACC of 11.5 percent.

In the case of Bhubaneswar, the VG can fall by US\$36 million if all its capital expenditures are financed by a one percent concessional loan. Although this fall is significant, it is not enough to close the VG. In fact, even if all the Bhubaneswar water utility's capital expenditures were covered by grants, there would still be a viability gap. This is because its NPV of operating cashflows is negative.

The figure below also shows that the relationship between concessional finance and the VG is linear for both Coimbatore and Bhubaneswar. Specifically, if concessional finance is blended so that the WACC falls by one percent, the resulting fall in the VG is approximately 20 percent in Coimbatore and four percent in Bhubaneswar.

Figure 14.6: Impact of Concessional Finance on Viability Gap



Operational improvements

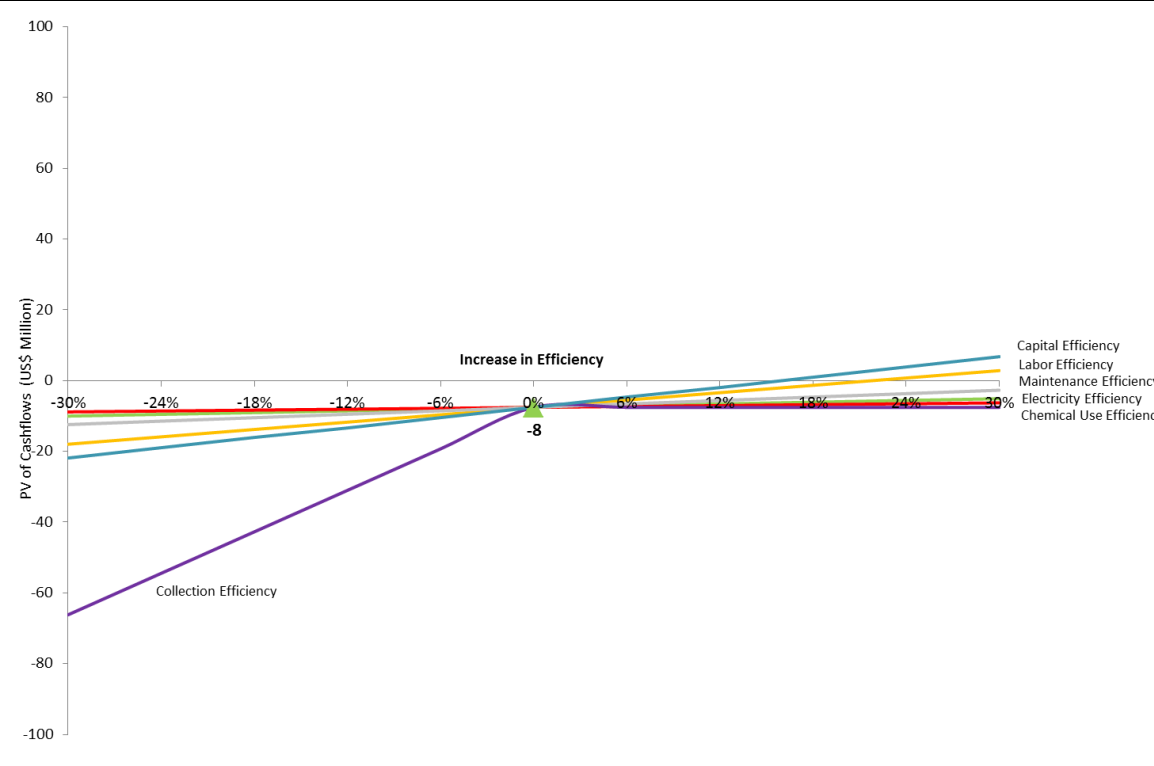
Figure 14.7 below shows the impact of various operational improvements on Coimbatore's water utility.

Capital efficiency—or the strategic use of capital to maximize improvements while spending as little as possible—has a moderate impact on the viability gap. If, for example, capital efficiency falls by 30 percent, the viability gap increases to US\$22 million from US\$8 million.

Collection efficiency seems to have the largest impact on the VG within this category, although it may not be very visible as collection efficiency is already at 100 percent for Coimbatore. However, if collection efficiency falls, the VG will rise sharply in response. For example, the VG can go from being US\$8 million to US\$68 million with a 30 percent fall in collection efficiency—an almost nine fold increase in the viability gap.

In contrast, if labor efficiency falls by the same percentage, the VG becomes US\$17 million. The impacts of one-off improvements in other operational variables, specifically—electricity use, maintenance and chemical use efficiency are even smaller.

Figure 14.7: Impact of Operational Efficiency on Coimbatore’s Viability Gap



Main implications of PPP model design from sensitivities

The table below summarizes the level of impact the main drivers have on the viability gap. It also highlights the implications of these findings on the design of innovative PPPs.

Table 14.1: Design Implications from Sensitivity Analysis

Driver	Sensitivity to Viability Gap	Implication for PPP Model
NRW	High	Must encourage the design and implementation of effective NRW programs, as a top priority.
Tariff rates/regime	High	Where possible progressive increases in tariffs should be allowed, perhaps linked to service improvements. Where tariff increases are not enough to close the viability gap, subsidies to cover the difference between costs and tariff revenues may need to be provided by the City Government.
Concessional finance	High	Concessional sources of finance should be made available, especially for larger capital works
Collection efficiency	Medium-High	Collection must remain high
Capex efficiency	Medium	The PPP structure should encourage the operator to find ways to use capital efficiently, reducing the capital expenditure needed to achieve any given objective.
Operational efficiency	Medium-Low	Contrary to what is often thought reducing labor costs or other operating costs need not be the driver for profitable and successful PPPs. Reducing NRW, using capital efficiently, accessing commercial finance, and getting tariffs and collections right, are likely to be much more important.

14.4 Scenario Analysis—Realistic Improvements versus DPR

The viability gap analysis was conducted using data from each city's DPR. Another scenario—the realistic improvements (realistic) scenario—has been simulated to these what happens if some of the DPRs' assumptions are unrealistic. In particular, the focus is on how effective the DPR capital programs will be on reducing NRW and thus achieving 24 by 7 water supply.

The realistic scenario assumes that capital expenditure does not reduce NRW as much as expected, and as a result, new bulk water supply facilities need to be built in order to supply enough water to provide 24 by 7 service.

Under the realistic case the present value of the VG increases to US\$142 million for Bhubaneswar, and to US\$249 million in Coimbatore.

Testing the DPRs' NRW assumptions

The city DPRs' assumptions about the reduction in NRW that can be achieved with the planned expenditure may well be too optimistic.

Bhubaneswar's NRW level is currently 57 percent. Such high NRW levels are indicative of poor asset and network conditions, which cause physical water losses. Additionally, it means there is significant unbilled water consumption, water theft in various forms, and underperforming metering systems. Reducing NRW thus means spending to improve asset condition.

Bhubaneswar's DPR assumes a dramatic fall in NRW levels, from 57 percent to 20 percent in just 5 years. NRW levels are assumed to then remain at 20 percent over the rest of the planned period. This is to be achieved with replacing 50 percent of the network and increasing metering to 100 percent (currently metering is 1 percent).

There is no doubt that this level of capital expenditure will improve network condition and reduce leaks. However, a reduction to 20 percent NRW combined with an increase in hours of supply to 24 per day, may not be achieved. The main reasons for this are:

- Hours of system pressurization—As the system is pressurized for 24 hours each day, leakage volumes would increase by 8 times, all else being equal. Thus the improvement in asset condition must reduce the leakiness of the network by a factor of 6.5 just to keep NRW percentages constant at 57 percent
- Lack of experience—Indian utilities and contractors are not used to concentrating on leakage reduction, and so may not achieve the theoretically possible levels, due to lack of experience
- Difficulty of detecting new leaks—It is likely that much of the replacement of pipes, service connections, and meters, would be done under conditions of intermittent supply. This would make it hard to detect new leaks that are being built in around, for example, new service connections.

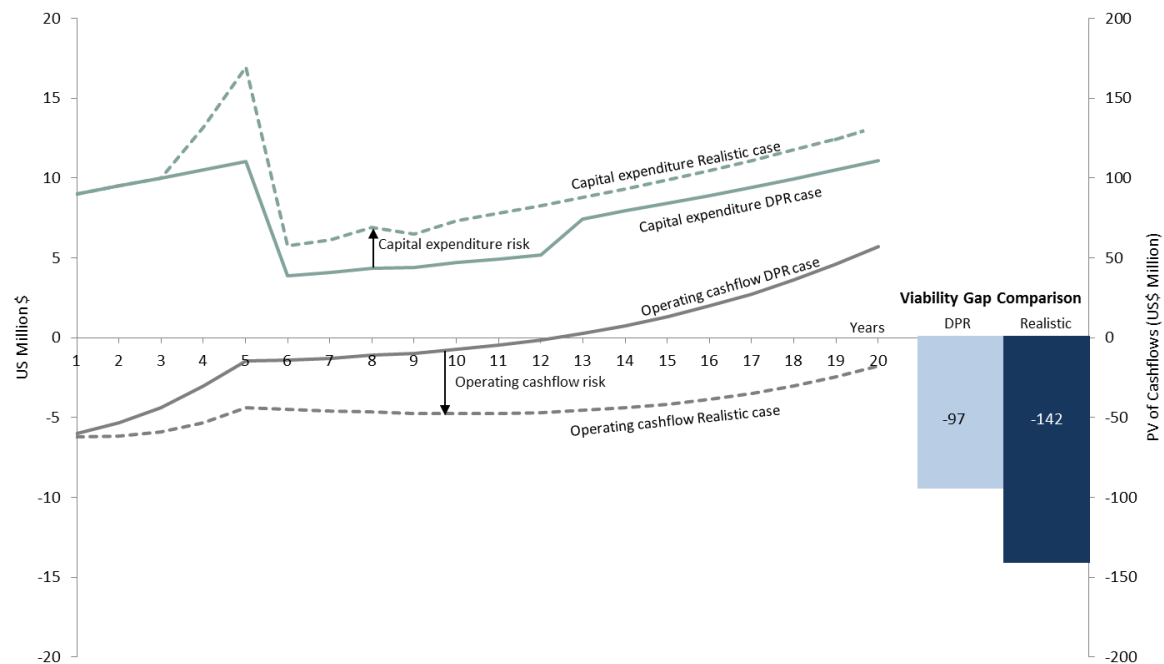
The realistic scenario therefore assumes that NRW falls from 57 percent to 50 percent in five years and then remains at 50 percent. This in effect means that the asset condition is improving with capital expenditure, but not as dramatically as the DPR assumes. As a result NRW is falling—but not as dramatically as the DPR expects. The assumptions made under the two scenarios are shown in Table 14.2 below.

Table 14.2: Scenario Assumptions- DPR versus Realistic Improvements

Issue	DPR Case	Realistic Improvements (RI)
Ultimate goal	▪ 24*7 water supply for all households	▪ Same as DPR
Investment in rehabilitation	▪ \$25.8 million over entire period	▪ Same as DPR
Operational unit costs	▪ 11 staff/1000 connections ▪ \$78 electricity costs/1000m3 of water ▪ \$3455 maintenance Costs/km of pipe	▪ Same as DPR
Non Revenue Water	▪ NRW% falls from 57% to 20% within 5 years. It remains at 20% for remaining period	▪ NRW falls from 57% to 50% and remains at 50% for remaining period.

As Table 14.2 shows, the only difference between these two scenarios is the assumption about NRW's responsiveness to capital expenditures. However, this has major implications. As can be seen in Figure 14.8 below, the viability gap under the realistic scenario is US\$142 million, almost one and a half times the VG in the DPR scenario. This is because higher expenditure—both in terms of operating and capital expenditure—is needed to sustain 24 by 7 water provision over the entire 20 year period.

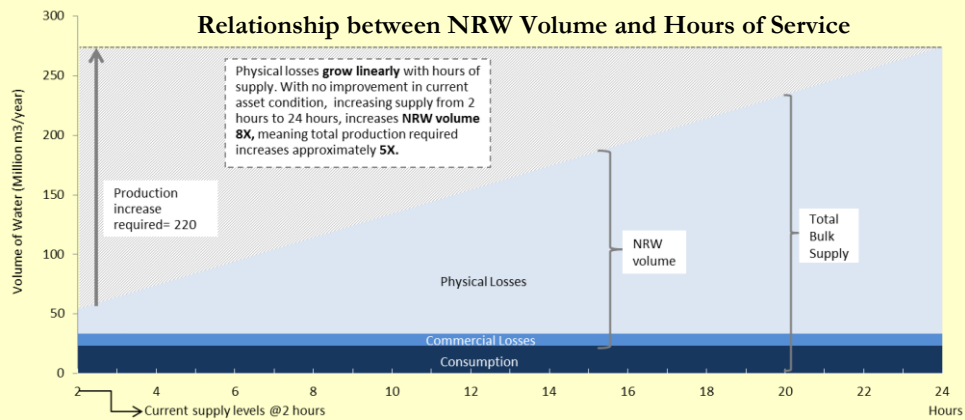
Figure 14.8: Scenario Analysis—DPR Case versus Realistic Improvements Case for Bhubaneswar



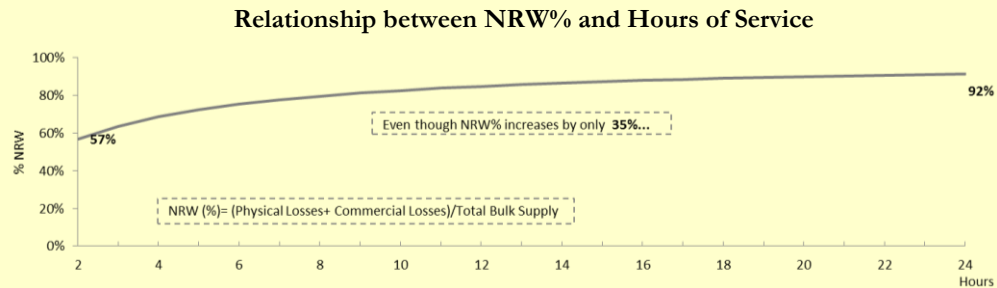
Box 1.1 further details the impact of hours of supply on NRW, using the example of Bhubaneswar.

Box 14.1: Impact of Hours of Supply on NRW

Water in Bhubaneswar is provided for 2 hours a day, and NRW is 57 percent. If the asset condition doesn't improve and service levels increase to 24 by 7, total water production will increase by five times, as shown in the figure below. This is primarily because physical losses grow linearly with hours of network pressurization.



Although water production required has gone up by five times, the NRW percentage increases by only 35 percentage points. This is shown in the figure below.



Thus if there was no improvement in asset condition, and water supply was increased from 2 hours to 24 hours, water production would rise by a factor of five, but NRW would increase by only 35 percentage points, although to an unimaginable level of 92%.

15 Why Traditional PPP Models Don't Stack up

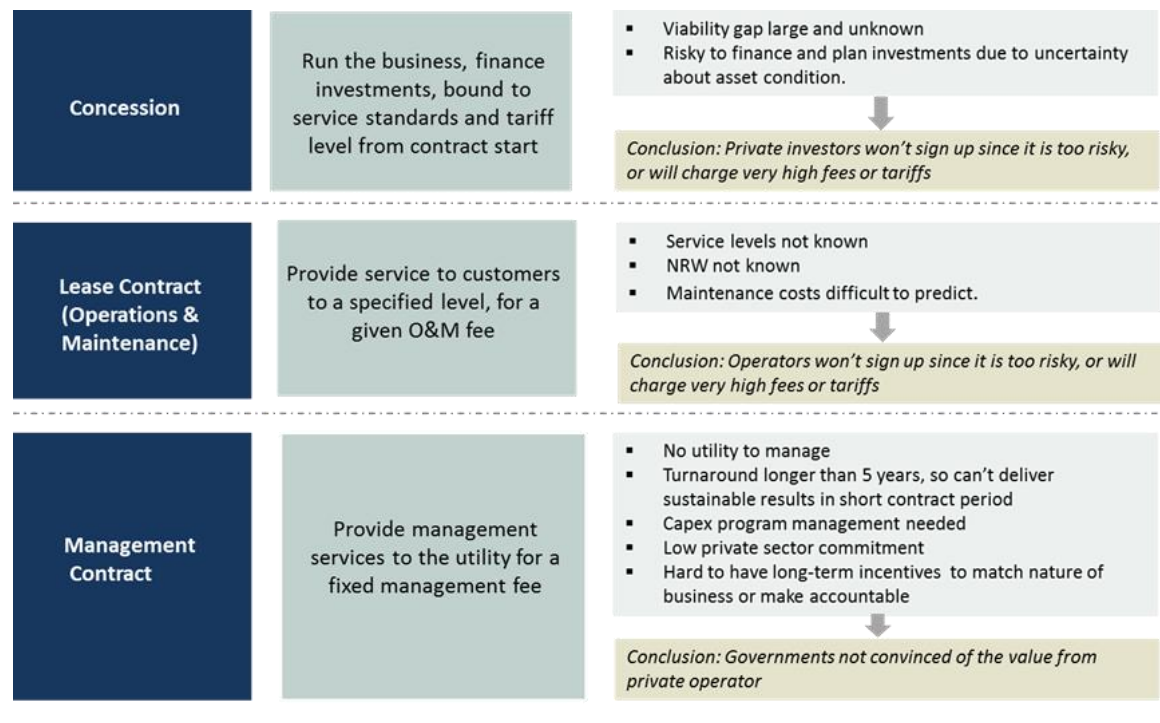
Public Private Partnerships (PPPs) are increasingly of interest to governments of mid-sized cities across India. PPPs have the potential to improve value for money, sustainability and accountability for water investments. However, the key to success is designing a PPP that fits the needs of the city.

This section highlights why traditional PPP models—Concessions, Leases and Management Contracts—may not work in mid-sized cities. The level of uncertainty, and the scale of improvements needed to turn around utilities, may deter operators from getting involved in concessions and leases. Alternatively, operators may demand high compensation to take on the risks. The limited time frame and scope of work for management contracts means they may not be of much value to the utility, since longer term interventions will be needed to make more sustained improvements. Having analyzed why traditional PPP models may not work, this section then lists the key issues the innovative PPPs must tackle.

15.1 Traditional PPP Models

Figure 15.1 below summarizes the main features of traditional PPPs and why they might fall short. These points are further elaborated in the sections that follow.

Figure 15.1: Traditional PPP Models Are Inadequate



Concessions

Concessions give private operators (concessionaires) responsibility not only for the operation and maintenance of the system, but also for financing and managing investments. Asset ownership rests with the government from a legal perspective; however the concessionaire has full rights to use the assets. After the concession period, which typically lasts 25 to 30 years, the right to use all the assets reverts to the government. This includes any new assets the concessionaire has created during this time. Famous concessions in water include Buenos Aires (Argentina), in the early 1990s, followed by cities like Manila (Philippines) and Jakarta (Indonesia).

Although concessions can improve the operational and investment performance of a water utility, they are difficult to implement. The tariff price cap used in typical concession can prove difficult in situations where there is great uncertainty about costs. Typically bidders are asked to bid a tariff they need to operate the service, but in conditions of great uncertainty, bidders will not be able to bid cost-reflective tariffs, since they cannot estimate costs.

As a result of the large financing and operational risks, the concessionaire may not find this type of contract appealing. Alternatively, the concessionaire would charge very high tariffs or demand large subsidies in order to compensate for the massive risks it would have to bear in committing to meet specified service standards, for fixed tariffs, in a situation where it cannot estimate costs.

Lease (Operations and Maintenance) Contract

Leases are typically ten to fifteen year contracts that give private operators responsibility for operating and maintaining the water service, but not for financing investments. Operators have to pay operations and maintenance costs, and for this they get to keep a share of the tariff revenues. In other words, from the tariff income generated they need to pay the operations and maintenance costs, and can keep whatever is left over as profit. There are variants of this arrangement in which the operator pays a fee to the city for the right to use the assets if the service is expected to generate operating profits. Conversely, the city may agree to pay a set amount per unit of water delivered (even if this is not covered by the tariff) if the service is expected to make an operating loss. As the operators' profits are determined based on the utility's sales and costs, there is an incentive for the operator to increase operational efficiency. Leases in the water sector have been very popular and successful in France and francophone countries such as Senegal. Other examples include Gdansk (Poland) and Cartagena (Colombia).

As the government is responsible for financing the capex program under a lease contract, it must co-ordinate with the operator. Although the lease may be easier to implement than a concession, depending on the time period, the scope for improvements may not be as large. This is because the operator typically does not control the capital expenditure program.

The unknown, but generally poor quality of assets, high NRW levels, low metering, and erratic service levels make it difficult to predict the operations and maintenance costs the operator would have to take on. The operator may not even want to be dependent on the government for capex investments, as that would directly feed into the utility's operational

performance. As a result the operator may not be prepared to undertake such a risky lease, or would charge high fees as compensation for doing so.

Management Contracts

Management Contracts transfer responsibility for managing a utility to a private operator, for a short time period—often three to five years—and offer a fixed management fee in exchange. They are simpler to implement than other PPPs, because of their more limited mandate, shorter time period and fixed fee structure. If the management contractor has flexibility to change the way the business is run and has clear performance incentives, it may improve operating performance.

Management contracts were a popular option for water utilities between 1995 and 2000. Examples include Amman (Jordan), Gaza, and Trinidad and Tobago.

However, given the constrained scope of the management contract and the short contract duration, it may not be adequate for tackling the various intertwined challenges in water services in medium cities. In many cities, there is no clearly defined water utility to manage. Often the turn-around period for the utility may be longer than five years. Furthermore, improvements required are not just operational—a major capex component must be included, as massive investments need to be made to rehabilitate and expand the network and reduce NRW levels. Finally it is challenging to design long term incentive for private operators in management contracts. In the absence of a long-term interest in the utility, operators may focus on quick fixes, instead of strategic changes that would benefit the utility over the longer term. As a result the government may not derive satisfactory value from this type of arrangement.

15.2 Features the Innovative PPPs Must Achieve

Under the ultimate goal to meet the Government of India's benchmark of providing **24 by 7 water supply for current and future city population**, any PPP model should achieve the following:

- **Build a ring fenced, well managed and efficient utility**—by consolidating all the water functions (bulk water, operation and distribution) under a single authority, untangling the various supporting functions (administrative, finance) from links they may have to other public services, defining service areas clearly, and finally putting in place a more autonomous governance structure that rewards performance and increases accountability.
- **Effectively control NRW levels**—through carefully designed programs that make the best use of the allocated funds to reduce leaks quickly and efficiently, and reduce illegal water losses by improving billing and collection systems.
- **Be robust to uncertainty about the costs of achieving service improvements**—by designing a PPP that includes incentives to invest time and resources into collecting information, because it can later benefit from this new information through adjustments in remuneration and service level targets.

- **Improve information management and accountability**—by making sure the utility adopts a governance structure that has clearly defined management roles and responsibilities, and giving the government the job of holding the utility to a high standard. This will see to it that citizen's interests are protected.
- **Access to funds for asset improvement, with declining reliance on concessional terms over time**—by first making available a large enough pool of concessional finance, arranged either through state governments or multilateral development agencies, and then giving the private provider enough freedom to make good operating and investment decisions. Strong incentives should also be tied to achieving financial sustainability, specifically through efficiency in the use and financing of capital, and making strategic operational and management changes to increase cost recovery.

16 Alternative PPP Models

Two PPP models have been developed to help mid-sized city utilities in India overcome the unique challenges they face in providing 24 by 7 water supply. Briefly, these are:

- **Phased Performance Based Contract:** This is a two phase, 10 year full service management contract between the City Government and private operator to run city water services. An autonomous city-level water utility company, incorporated under company law, will be created if one does not already exist. This company (commonly referred to as a Special Purpose Vehicle (SPV)),²⁵ will be fully owned by the City Government. In phase I, the operator will be engaged to get a pre-determined percentage of homes onto 24 by 7 water supply, in exchange for a management fee. Government entities will provide a fixed capital fund for the necessary investment. An additional performance-based payment will be available, if the operator exceeds performance targets. Proceeding to phase II—which would start in year six of the contract—will be contingent upon satisfactory performance in phase I. In phase II, the operator’s management fees and performance targets would be updated to reflect new information and priorities.
- **Joint Venture (JV) Partnership:** This option also involves the creation of a new water company (SPV). However in this case the new company will be a JV between by the City Government and a private partner, with the private partner owning a majority of shares in the company. Two variations are possible—the SPV can either be an investor owned utility that owns the infrastructure assets, or or a concessionaire (in which case the ULB will own the assets but the SPV will use them, and invest in their upkeep and expansion). In either case, this new SPV, will be responsible for all aspects of water service. This will include bulk water production, distribution, billing and collections, and capital program planning and implementation. The SPV will raise money for investment. Concessional finance will be used wherever possible, (particularly in initial years) to keep the cost of capital down, while private finance will be used when needed to move more quickly, or expand investments beyond the limit of the concessional finance available. The SPV will be regulated through a contract that sets service standards and tariffs. These will be reviewed every three years, in accordance with the contract. The SPV’s performance under the contract would be monitored and enforced by a regulatory office in the City Government, or by a State Water Regulator (if one was created). The JV Partnership model is inspired by the success of the mixed private-public ownership (‘empresa mixta’) model,

²⁵ An SPV or Special Purpose Vehicle is a separate legal entity established under company law for the purpose of providing defined services—in this case water services. SPVs can be set up by the public or private sector, and both can have ownership in the SPV. (See section 6.3 for further details on SPVs, and their various benefits)

particularly in Latin America²⁶, but with some adaptations to suit the Indian context.

16.1 The Phased Performance Based Contract

In this model a private operator will be brought in to reform and improve the operational and financial performance of the city's water services. The improvements will be delivered in two phases, with a focus on providing all households with 24 by 7 supply by the end of the contract. The City Government will motivate the operator to perform well by offering a performance incentive.

The Phased Performance Based Contract (PPBC) will initially focus on the creation of an autonomous utility company that is responsible for meeting the city's water needs. This type of utility company, established under company law, is often referred to as a Special Purpose Vehicle (SPV). Immediate access to a large capital fund, performance incentives tied to measurable outcomes, and a fixed time frame will make it likely that improvements are delivered quickly and sustainably. Furthermore, a review of the situation before the second phase begins, will allow for contract terms to be tailored to emerging information.

PPP structure

The structure of the PPP model during phase I is shown in Figure 16.1 below, and is explained in more detail in the sections that follow.

²⁶ Ringskog, K. (2003). The Empresa Mixta: Mixed Private-Public Ownership Companies. In: Appleton, B. (ed). Town Water Supply and Sanitation Companion Papers B6, Bank Netherlands Water Partnership, World Bank, Washington DC, pp. 211-215

Rivera, D (1996). Private Sector Participation in the Water Supply and Wastewater Sector – Lessons from Six Developing Countries. Washington DC. The World Bank.

Marin, P (2009). Public-Private Partnerships for Urban Water Utilities: A Review of Experiences in Developing Countries. Washington DC. PPIAF/World Bank

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graph TD
    CityGovt[City Govt.] -- "Determines fixed fee and performance incentive" --> Contract[Full-service Management Service Contract]
    NationalGovt[National Govt.] --> FCF[Fixed Capital Fund]
    StateGovt[State Govt.] -- "Provide concessional funding" --> FCF
    CityGovt --> FCF
    Contract -- "Receives fixed fee and performance incentive" --> MC[Managing Company]
    MC -- "Creates and manages water utility" --> SPV[City Water Utility SPV]
    FCF -- "Accessible if conditions met" --> SPV
    SPV -- "Receives water services" --> Customers[Customers]
    Customers -- "Pays tariff" --> SPV
    Auditor[Auditor] -.-> "Monitors households on 24*7" -.-> Customers
    Auditor -.-> "Monitors guidelines for access to funds" -.-> FCF
```

The flowchart illustrates the Water Utility Business Model with the following components and interactions:

- Government Entities:** City Govt., National Govt., and State Govt. (all in blue boxes).
- Contract:** Full-service Management Service Contract (white box with a folded corner).
- Managing Company:** Managing Company (blue box).
- Fixed Capital Fund:** Fixed Capital Fund (dark blue box).
- City Water Utility (SPV):** City Water Utility (SPV) (dark blue box).
- Customers:** Customers (orange box).
- Auditor:** Auditor (grey box).

Interactions and Flow:

- City Govt.** determines the fixed fee and performance incentive for the **Full-service Management Service Contract**.
- City Govt.**, **National Govt.**, and **State Govt.** provide concessional funding to the **Fixed Capital Fund**.
- The **Full-service Management Service Contract** receives a fixed fee and performance incentive from the **Managing Company**.
- The **Managing Company** creates and manages the water utility, represented by the **City Water Utility (SPV)**.
- The **Fixed Capital Fund** is accessible to the **City Water Utility (SPV)** if conditions are met.
- The **City Water Utility (SPV)** receives water services from **Customers** and pays a tariff to them.
- The **Auditor** monitors households on a 24*7 basis for the **Customers** and monitors guidelines for access to funds for the **Fixed Capital Fund**.

The initial objective of the PPBC will be to create a well-defined water utility company (SPV) at the city-level, if one doesn't exist already. Creating this utility will involve a series of measures, which will depend on the existing organizational arrangements. This first step will be to ensure there is a single corporatized entity—a company established under Company Law and owned by the City Government—that has the autonomy and authority to supply water services to the city, covering bulk water supply, operations and distribution functions.

In most cases, an entirely new corporate entity will need to be created, and assets and staff will be transferred into it from the current owners—by the ULB or a State Water Board. Alternatively, if a defined utility already exists, changes to its powers and structures may be needed to ensure it is autonomous and accountable. These may include giving the CEO power over personnel decisions, ensuring that there is a ring-fenced budget in which the utility is expected to cover expenses from revenues (including defined subsidies), and so on.

Phase I

Phase I will focus on delivering 24 by 7 supply to households. In six years' time²⁷—by the end of phase I—the private investor will be expected to provide close to a 100 percent²⁸ of households with 24 by 7 water supply. It will do this by improving the utility's infrastructure and operations. To improve operations, it will design and implement human resources, administrative, commercial and distribution system management programs well-suited to the utility's requirements. It will also plan and execute needed capital works program to rehabilitate and expand the network.

In return for these services, the City Government will pay the contractor a fixed annual management fee, and provide performance incentives (See section on performance efficiency incentives below). The City Government will also make available a fixed capital fund, composed of grants and concessional loans, for the operator to use for improving the infrastructure.

The capital fund

The main features of the fixed capital fund are outlined below:

- **Funding source:** State or National Government, donors, and the City Government itself.
- **Fund value:** A fixed budget will be allocated at the start of the contract. This may be set at the estimated cost of achieving the target level of households on 24 by 7. Performance incentives in the contract will motivate the operator to find ways to reduce costs below this level, or provide 24 by 7 service to more households for the fixed budget provided.
- **Guidelines for use:** The capital fund can be used for capital improvements, such as network, transmission and production investments, and to reform the utility. The government will design guidelines for use, including application and procurement processes. These guidelines will ensure probity and value for money in expenditure from the fund, while allowing the contractor the discretion it needs to achieve results.
- **Governance:** Each period, the operator will provide a detailed investment plan for requested funds. Procurement must follow guidelines. An auditor will oversee and approve fund draw-downs, and ensure they comply with guidelines.

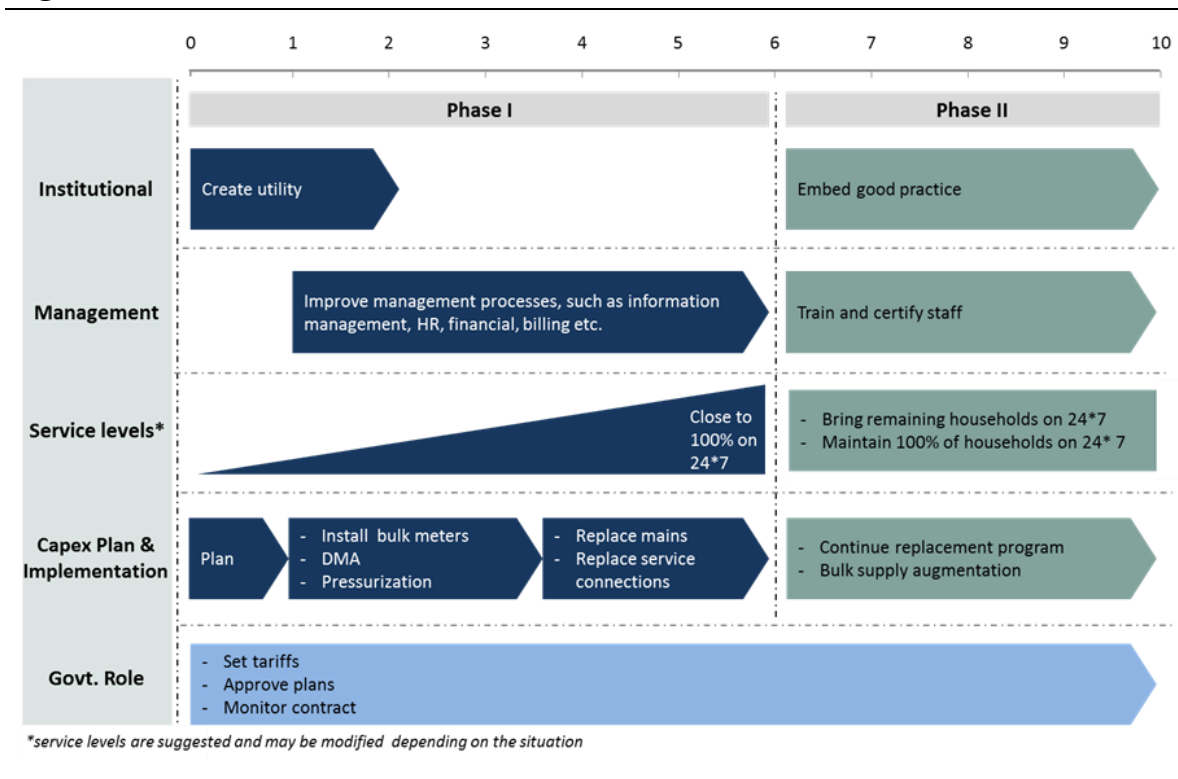
Phase II

At the end of six years, phase II will begin. Figure 16.2 shows how the role of the private operator and City Government will evolve over the 10 year period.

²⁷ This is the prescribed duration of phase I, however it may be negotiable based on the context. The same applies for the duration of phase II.

²⁸ This number is prescriptive, and can be modified based on pre-existing situation in the city.

Figure 16.2: Phased Performance Based Contract: Roles over Time



Prior to the commencement of phase II, the contract will undergo review. At this time, it will be determined whether or not the private operator has met minimum standards. If the operator meets minimum targets, the contract extension will be automatic.

During phase II, the operator will be expected to embed the good management practices, training programs and formalization of standard processes that it began to implement in phase I. It will also be required to continue with planning and implementing the capex plan to rehabilitate the network. With such continued efforts in place, by the end of 10 years, the goal will be to maintain continuous water supply for existing households, and bring any remaining households onto 24 by 7 water service.

Specific responsibilities, services standards, and fees may be adjusted in the transition to phase II, to take into account new information that has emerged. The capital fund may also need to be replenished, to fund the investments needed to bring any remaining households onto 24 by 7 service.

Accountability mechanisms in the PPBC

The City Government will hold the private operator accountable for achieving the standards set out in the contract. In particular, the private operator will be required to report the number of households it puts onto 24 by 7. The government will appoint an auditor to verify that households are in fact receiving continuous service. The auditor will also oversee use of

the capital fund. Service levels by area will be published, so citizens can let the city know whether the achievements the operator claims are in fact being achieved on the ground.

The City Government will also continue to be accountable to citizens. It will set water tariffs at reasonable levels and define the performance levels for the utility. At the same time, by bringing in private sector expertise to manage the day-to-day operations, the government will ensure a well-functioning, results oriented utility that can better meet the needs of citizens.

Performance efficiency incentives—Cost versus Service Efficiency

Achieving 24 by 7 water supply for all households is the ultimate goal for the PPBC, and can be arrived at in different ways. For example, a simple approach that some cities are adopting is replacing all their networks. However, this can prove to be expensive. Other approaches may deliver more value for money. An example of this could be targeting parts of the network most in need of replacement, and paying more attention to the hydraulic and pressure zoning of the network.

In Indian cities, given the uncertainty around network condition, it is difficult for the government to know which approach to getting to 24 by 7 will work best. Furthermore, in many cases the right approach can only be found by a process of trial and error of working on the network. As a result it may not be advisable to specify which approach to use at the start of the contract. In fact, this is an expertise the contractor is expected to bring.

The City Government therefore needs to find a way to incentivize the contractor to work hard and use its judgment to figure out which approach will maximize number of households on 24 by 7. At the same time, the government needs to ensure that this will be done in the most cost-effective manner. Based on these constraints, two variations of performance incentives have been developed for use with the PPBC. One model focuses on service expansion with a limited budget, and the other focuses on cost reduction for a given service level.

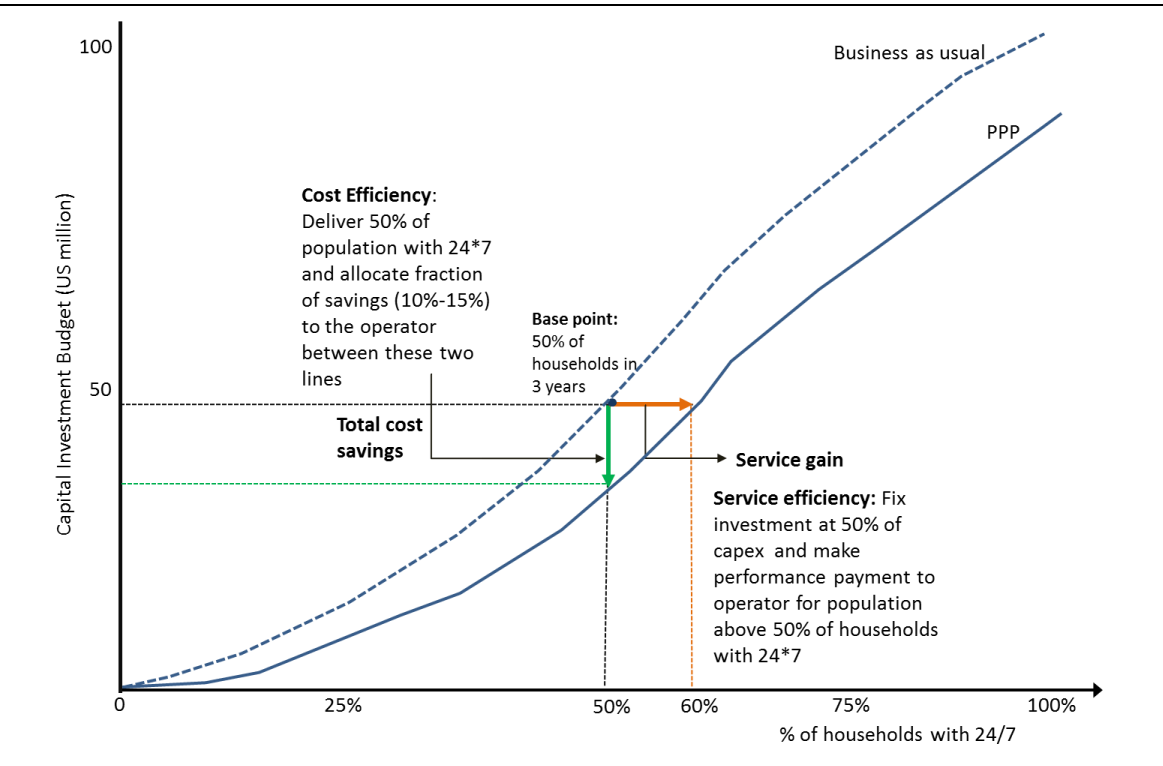
- **Cost Efficiency Model:** In this model the focus is on minimizing costs by giving the operator a share of savings. The operator keeps 10-15 percent of funds left over from the fixed capital fund, after the target percentage of households have been provided with 24 by 7 water supply. In this way the operator is incentivized to make cost effective improvements to the existing system, and deploy capital more efficiently than in the business as usual case.
- **Service Efficiency Model:** In this model the focus is on maximizing service for the fixed amount of capital expenditure funds available. The operator receives a fixed outperformance payment for every household above the target percentage of households provided with 24 by 7 water supply. The benefit is that more households will receive improved service, for the funds budgeted.

Figure 16.3 below depicts the difference between the two incentive models. To show this, the figure illustrates a DPR scenario, and a PPP scenario in which greater levels of efficiency are achieved. The dotted line plots the relationship between money spent and service levels

achieved under the DPR scenario. The PPP case is illustrated by the solid line to the right. This line shows that for any given level of expenditure, more households can be brought on to 24 by 7 supply. The greater number of households is shown by the orange arrow. Alternatively, for a given number of households on 24 by 7 supply, a lower level of expenditure would be needed. The cost reductions are shown by the green arrow.

In the cost efficiency model, the contractor would be rewarded by a share of the savings in getting a set number of households on to 24 by 7. In the service efficiency model, the contractor would be paid a performance incentive for each additional household brought onto 24 by 7 service within a specified expenditure cap.

Figure 16.3: Cost Efficiency versus Service Efficiency



Which of the two performance pay options is better will depend on the conditions of each specific city. The main differences are highlighted in Table 16.1 below.

Table 16.1: Differences between the Cost and Service Efficiency Models

Factor	Service Efficiency Model	Cost Efficiency Model
Visibility of improvements	Operator's outperformance very visible as it results in more households on 24*7.	Cost savings not visible to voters
Total cost to government for program	Capped at present capex budget (plus bonus if additional service levels achieved by operator).	Likely to be below cap, given incentives for efficiency. Provides budget certainty.
Method of determining performance pay	Fixed performance payment for each new household connected to 24*7 above target percentage. Can be monitored by customers and service audit.	Percentage of savings should go to private operator. Will need to define budget measures to spend, and determine if any adjustment for factors beyond control permitted.
Incentives for sustaining performance	Good. Performance payment can be tied to sustained 24*7 services.	Risk that cost-cutting could reduce sustainability of improvements.
Source of financing	If the government has a fixed grant allocated by a third party, this model would be preferred	If the government has to issue debt to fund the project, this model will be preferred, to try and minimize the amount that needs to be borrowed.

If expanding 24 by 7 service to the maximum number of households is a government priority, the service efficiency model may be preferable. Rapidly increasing the number of households on 24 by 7 service, above the initial target set out in the contract, is clearly aligned with this objective.

On the other hand, a cost-efficiency target limits government expenditure under the contract, and may be more acceptable in some cities, if it is felt that cash payments should be made for cash savings, not service improvements. This option also limits government expenditure to below a known figure. In contrast, paying for services could result in unexpectedly high performance payments, if far more customers than expected were brought on to 24 by 7 service.

It may also be possible to switch between these incentive structures over the 10 year period. For example in the first few years the goal may be to maximize the households on 24 by 7, making the service efficiency model preferable. Closer to the end of phase I, the government may be more interested in trying to minimize costs for bringing the remaining households on to 24 by 7, in which case it could switch to the cost efficiency model.

Selection of operator

The private operator will be selected through a competitive tender. The tender will follow an open and transparent process in which the final selection will be made on a quality and cost basis, considering the bidder's quality, skills and experience, technical proposal and fee expectation. However, this will be preceded by screening bidders through a prequalification stage.

While it is desirable to design strict prequalification criteria to attract high quality bidders, it is also important to encourage specialized firms with useful skills to compete. Given the wide mandate of this PPP contract, various skills will be needed to perform the functions. Functions could range from management of construction programs, NRW reduction programs, commercial operations and human resource management, to billing and collection. The prequalification criteria will break out these specific functions, along with the skills necessary to perform each. In this way potential bidders will have a better idea of how to meet requirements.

Several firms each with some of the skills could bid as a consortium that collectively had all the skills. For example it may be that a satellite TV operator is excellent at managing customer relations. A large Indian corporate may have mastered human resource management and accounting processes. An international engineering firm may have a proven track record in reducing NRW. While they wouldn't prequalify individually, together they could create a well-qualified team.

If the consortium can prove it has the requisite skills collectively, and there is a strong leader with experience managing a multi-party consortium—it can be prequalified. This approach will allow Indian firms to enter the market and develop, while also ensuring quality from day one.

Given the complexities in designing and implementing the prequalification, City Governments would benefit from assistance from transaction advisors. These advisors might be funded by donors or State Governments until the market develops.

Innovative features of the PPBC Contract

Certain features make this innovative model well equipped for dealing with the challenges of water supply in mid-sized Indian cities. These include:

- A contractual requirement to create a city-level, ring fenced water utility company at the start of the contract, provides a stable and long term entity to be responsible for water services in the city. This entity will also be accountable to the city population, because it is owned by the City Government.
- The creation of the stand-alone utility company gives the operator a clean slate to introduce good management and governance best practices
- A large capital fund governed by clear rules and managed by the operator recognizes the need for significant investment to improve services, and integrates this with operations
- The performance incentives promote efficiency in capital expenditure, something that has been difficult to achieve in India to date, given the uncertainty about the efficient costs for any given service improvement
- A review of the situation prior to the start of phase II, makes the contract responsive to emerging information.

Role of the City Government

As a result of the PPBC, the role of the City Government will be considerably changed. Overall, the City Government will take on a more supervisory and regulatory role instead of running daily operations. Initially, it will put in place reforms to create a city level ring-fenced water utility company, which it will then own. It will manage the bid process and select the private contractor. It will also make available the fixed capex fund at the start of the contract.

The City Government will continue to be answerable to the citizens for water services, and be responsible for setting socially acceptable tariff levels and defining performance levels. For this it will need to monitor the performance of the operator, ensuring compliance with the contract.

Where this model could work

This model can be applied to a utility in poor financial condition, with low cost recovery and a large viability gap. However, the City Government must have the means to set up the fixed capital fund at contract start, and be able to replenish it if the need arises during phase II. The PPBC will work in a situation where the government is reluctant to give up full ownership of the water services.

16.2 The Joint Venture Partnership

The JV Partnership involves the creation of a new corporatized water company (Special Purpose Vehicle (SPV)), co-owned by the City Government and a private partner. The private partner will have majority ownership in the company, and will also have management control over the various water service functions. The SPV can have two variations. If the government can transfer water assets, the SPV will be a jointly owned utility. In the case that asset transfer is not the preferred route, the SPV will be a jointly owned concessionaire which will not own the assets, but will have the rights to use them over the long term²⁹. The SPV will be subject to a regulatory contract that governs tariffs and performance levels. In this contract the tariff and service levels will be updated every three years.

This innovative PPP design has various benefits. The government's minority interest in the new company promotes trust and information sharing, while the private partner's controlling stake gives it flexibility to design a tailored improvement program.

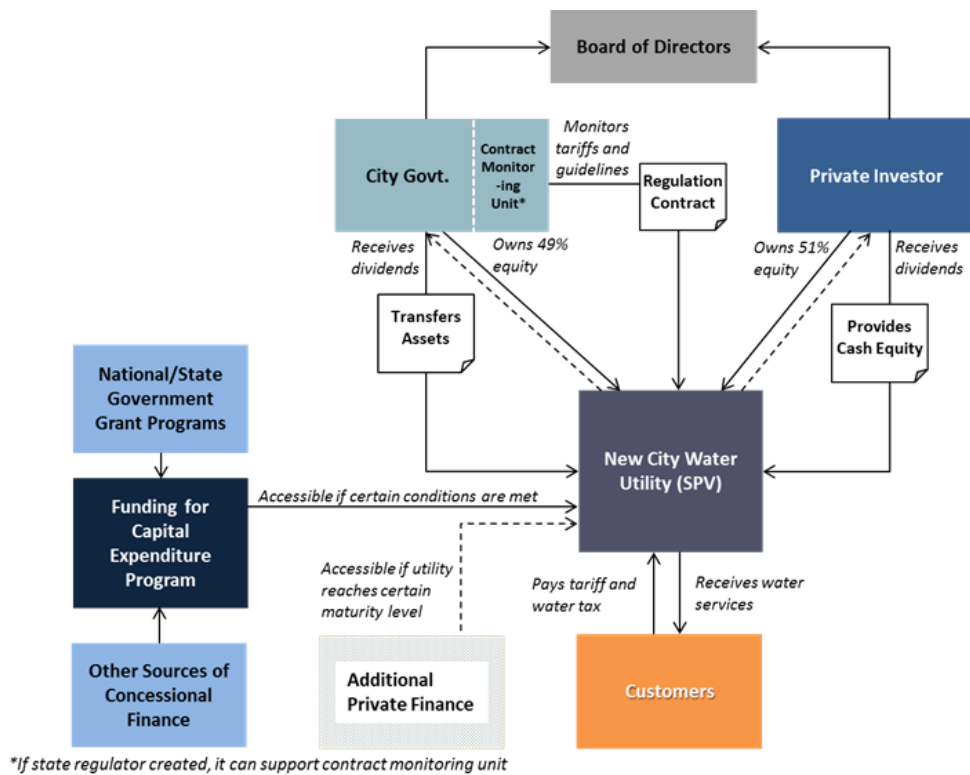
Partial government ownership also makes it easier to secure access to concessional finance, but at the same time gives flexibility to use private finance. Finally, the tariff and performance reviews, mandated by the regulatory contract, make sure the required services and the allowed costs are in line with emerging information.

PPP structure

In outline, the JV Partnership as a jointly owned utility, would look as pictured in Figure 16.4 below.

²⁹ This variation is discussed at the end of this section. See JV Partnership Variant: Concessionaire SPV for more details.

Figure 16.4: Structure of JV Partnership: Utility



Creation and Structure of the New Utility Company

A new SPV will be created to be the water utility for the city. The utility will be responsible for collecting tariffs, paying operating and maintenance costs, and generating operating profits, so that it can attract finance for new investment. The utility will own the water infrastructure assets, and plan and implement new capital investment, so that it can expand services as the city grows.

The City Government will select a private partner to co-own the utility with it. This partner should be an experienced utility operator, with capital to invest. The new utility company will be capitalized by the City Government (or current water provider) by transferring its water infrastructure and other existing water business assets to the new company, and the private partner investing cash that can help fund new infrastructure. Each partner will receive shares in the company.

It is in the City Government's interest to allow the private party a majority stake in the company—for example, a 51 percent stake. Letting the private party have management control will ensure that the utility is run as a business. Management control will be a necessary condition for attracting private investment in the utility. A private sector majority in the Boardroom will also help to insulate the utility from the vicissitudes of day-to-day politics, making it easier to create a professional and autonomous body.

The City Government will receive a substantial minority stake in the utility—for example, 49 percent—and representation on the company Board. As a shareholder, the City Government will also share in any dividends. The City Government may decide to either keep its dividends in the SPV as retained earnings or transfer them as revenue to the city budget. A shareholders' agreement between the City Government and its private partner will set out in detail the governance arrangements for the utility.

Regulatory mechanisms

The City Government will protect the interest of citizens through a regulatory contract between the city and the utility. This contract will set the coverage areas and define the service standards that must be met. Tariffs will be set to cover reasonable costs and provide a “reasonable rate of return” on capital invested. Penalties will be levied against the utility in the event that service standards are not met.

Tariffs and service levels will be reviewed every three years, to take into account the evolving needs of the city, and emerging information on costs and investment needs. A special regulatory unit within the City Government may be created to enforce the regulatory contract and conduct the reviews. Alternatively, a State Water Regulator may take on this role.

The City Government will continue to provide financial support to keep tariffs at socially acceptable levels and ensure water is affordable to poorer sections of society. Specifically, it will vend in its infrastructure assets at a value designed to keep tariffs stable, rather than at its book or replacement value. The City Government will also be able to continue to arrange for international, Union and State level concessional finance, wherever available. Concessional finance will soften the tariff shock from new investment required for service improvements. This is because a lower cost of borrowing will lower the rate of return required by the company, lowering tariffs for customers. Finally, the City Government will also make targeted subsidies available to keep tariffs low for disadvantaged groups, or to extend water services to disadvantaged areas of the city.

Selection of private partner

Picking the right partner is crucial. The selection process must be fair, competitive and transparent. To achieve this, candidate firms will be prequalified through an open competition with specially designed criteria. Expert assistance from State Governments or donor agencies should be given to City Governments to handle this process.

Since a wide range of functions will be necessary for managing water services, the prequalification requirements will outline the specific functions along with the skills necessary to perform each. Firms or consortiums that can prove they collectively have the skills necessary, will make the shortlist. Additionally, for this type of PPP arrangement the bidders must also have deep financial pockets.

Prequalified firms will bid for the shares on offer (for example, a 51 percent stake). The firm that offers the most for this stake will win and be selected as the City Government's partner.

The equity provided by the winning bidder will be invested in the utility to fund service improvement programs.

Innovative features of the JV Partnership

Certain innovative features of this model make it particularly well-suited to mid-sized Indian cities. This arrangement provides the city's water provider with a "clean slate"—the legacy of poor management practices and existing debt are not passed on when the government transfers assets. Instead, the utility is given the ability to recreate itself using well-defined processes and systems by leveraging private sector expertise. The ring fenced nature of the utility also ensures improvement efforts are focused on water services.

The flexibility of choosing between concessional and private financing options will likely improve the speed of service improvements. The rate of return approach to resetting tariffs every three years allows the utility to respond to emerging information. It also means that access to cheaper loans feeds directly into lower tariffs for customers.

Another innovative feature of the regulatory contract is that it aligns public and private incentives, and reduces conflict of interest. Preserving a public sector interest in the continuing financial success of the SPV can help to counterbalance the political pressures for short term tariff reductions at the expense of the long term health of the utility. Moreover, a seat on the Board provides government with a free flow of information which can promote understanding, coordination and trust.

Role of the City Government

As a result of a JV Partnership, the role of the City Government will be altered considerably. In the JV Partnership the City Government will play a major role in selecting the private investor, and designing the regulatory contract. After the establishment of the SPV and the transfer of management responsibilities to a private partner, the City Government's role will become one of regulation, governance, and assistance with planning and financing.

The City Government will enforce the regulatory contract, and work with the utility to update tariffs and service standards every three years. Through its seats on the Board, the City Government will be able to ensure that good corporate governance is followed, and contribute to utility strategy and planning. This will be particularly important in coordinating the expansion of water services with the expansion to the city itself.

The City Government will also help to attract as much concessional finance as possible, in order to minimize financing costs for new investment, and thereby keep tariffs down. Given these changes, the City Government can also decide to focus its attention on other issues relating to the water sector—such as designing special programs to provide affordable water to disadvantaged households.

Where this model could work

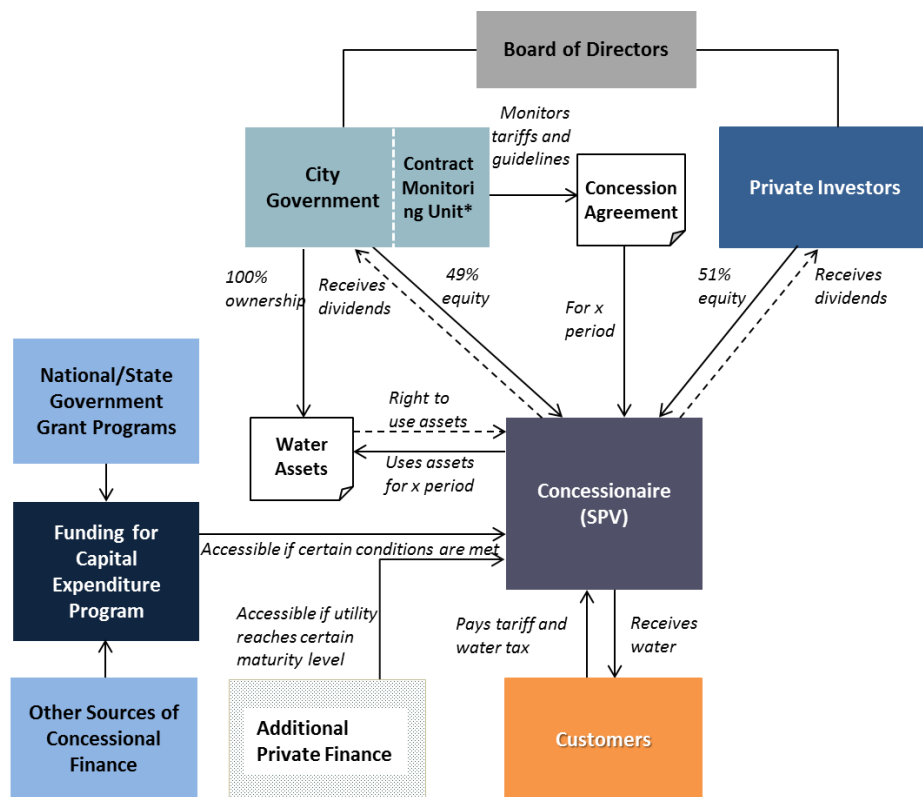
The JV Partnership can be applied to a city with a poorly defined or non-existent water utility, with significant room for improving governance structure and management processes.

However, the City Government should be willing to make a long term commitment to a private sector partner, transfer asset ownership, and assist with organizing concessional loans. The utility should be close to full cost recovery, if necessary through a history of reliably provided subsidies that can be embodied in the JV Partnership going forward. The utility's viability gap must be small enough, so that it can be closed with concessional finance. The ability to close the gap is crucial to attracting the initial private equity investment.

JV Partnership Variant: Concessionaire SPV

In some cases, governments may not wish to transfer ownership of the infrastructure assets to a firm that will become majority privately owned. A form of the JV Partnership will still be possible, with the main difference being that the joint venture SPV will be a concessionaire operating the service, rather than a utility that owns the assets. This means that instead of owning the water assets, the SPV will sign a concession agreement with the City Government with full rights to use the assets over the life of the contract. The City Government (or current public sector owner) will maintain ownership of the assets throughout. This model is shown in Figure 16.5.

Figure 16.5: Structure of JV Partnership: Concessionaire



*If state regulator created, it can support contract monitoring unit

Regulatory functions, like setting tariffs and service standards, and revising them every three years, will continue to be performed by either a special monitoring unit within the City

Government or a State Water Regulator. However, these functions will now be embodied in the concession contract instead of a regulatory contract. The concession contract would typically be for a 20 to 30 year period, with the concessionaire required to finance investment over that period.

16.3 Issues in Implementing an SPV for Water Supply

Both innovative PPP models require the creation of a new company—an SPV—dedicated to water service provision. The PPBC requires that the SPV be established under the Indian Companies Act, and owned 100 percent by the City Government. In the JV partnership the majority of shares in the SPV will be owned by the private partner, with the City Government holding a substantial minority stake.

Establishing such a stable, stand-alone entity with sole responsibility for water services creates a new institutional environment with flexibility to provide better services. Furthermore, establishing the SPV under company law imports clear governance practices in areas such as accounting standards, disclosure norms, and roles and responsibilities of managers.³⁰ However, there are some practical issues with creating an SPV that will need to be considered.

Fair value for existing water assets

Valuing the publicly owned water assets that must be transferred to the SPV is a complicated task. It is likely to be controversial in the case of the JV partnership model, since the private sector is either gaining (i) majority ownership of the assets under the utility SPV, or (ii) majority use of the assets under the concessionaire SPV. The public will want to ensure that the government gets fair value for the assets. Transfer at a discount should be avoided. This is a particularly sensitive issue in light of the recent controversy over other PPPs such as Delhi's Indira Gandhi International Airport³¹, where it is alleged that government land was leased to the private operator at a large discount.

These water assets will have cost more to construct than they are worth in the commercial or market value sense. This is because the market value is based on the profit that can be generated from the assets. However, these assets typically generate commercial losses. The public will need to be educated that book value (or replacement cost of the infrastructure) is not a good measure of its commercial value. The real focus must be on establishing a bid process that is both competitive and transparent, so that the fair value can be achieved.

Tax issues

Transforming a purely public entity into a corporatized SPV under company law could have tax implications. For example, an SPV set up under the Indian Companies Act is subject to Income Tax, Service Tax and Value Added Tax (VAT), which a public entity is generally

³⁰ Pg 1, Utility Models under KUWSMP- World Bank, Draft Discussion Paper (2012)

³¹ Implementation of Public Private Partnership, Indira Gandhi International Airport, Delhi, Report of the Comptroller Auditor General of India 2012

exempt from. It would thus be necessary to clarify if a water services SPV could be exempt from any of these tax burdens for performing what is essentially a public sector service.

Legal powers and duties specific to water services

It would also be prudent to check if the SPV (particularly if it is majority privately owned) has the legal authority to perform statutory water service functions on behalf the government. For example, the SPV may not have the right to break roads, access pipes on private property and so forth. As a result, such authority would need to be clearly and legally delegated to the SPV.

As per the 74th Amendment to the Indian Constitution, responsibility for water services in cities has been decentralized to City Governments. City Governments that want to have these services performed by SPVs cannot avoid this constitutional responsibility. However they can discharge the responsibility by delegating it to the SPV. This has already been done in Karnataka, wherein the responsibility for all water supply functions has been delegated to the State Water Board (KUWSDB). Thus City Governments would be well advised to ensure that a formal delegation to the SPV for supplying water services has been made, and that it is constitutionally effective.

17 Advantages of Proposed PPP Models

The two innovative models are designed with the needs of mid-sized Indian cities in mind. As a result, the Phased Performance Based Contract (PPBC) and JV Partnership are expected to outperform their traditional counterparts—the Management Contract and the Concession. This section compares the relative merits of the innovative models over the traditional models.

This section also discusses why the innovative PPPs will be better at water provision than the existing situation in typical mid-sized cities. Specific examples to illustrate these points are taken from Bhubaneswar and Coimbatore.

17.1 Advantages over Traditional Models

The PPBC and the JV Partnership can be compared to a management contract and a concession respectively—on points of duration, risk transfer, capital programs and financing—to draw out their various advantages.

Phased Performance Based Contract versus Management Contract:

Key advantages of the PPBC over a management contract include the focus on creating and then building the capacity of a utility that will have long term responsibility for providing water services in the city, as against than just managing what already exists. In addition the PPBC provides stronger incentives for the aspects of performance that really matter—such as managing a capital program to achieve 24 by 7 service. The longer duration and flexibility to evolve are also important advantages of the PPBC. These are summarized in Table 17.1 below.

Table 17.1: Advantages of Management Contract over Phased Performance Based Contract

Issue	Management Contract	Phased Performance Based Contract
Build utility	Not specified/required by contract	Operator mandated to create the utility (if it doesn't exist) and design or reform governance structure
Performance efficiency incentive	Difficult to incentivize operator to deliver desired results, as contractor's scope of work limited to improving management practices and not investing in system upgradation	Performance related incentives much larger than usual, and tied to providing households with 24*7 service .
Use capital efficiency	Small-scale and short term capital programs envisaged, incentives not enough to encourage capital efficiency	Yes, because both contract variations, i.e. performance and cost efficiency models are tied to using capital most efficiently
Long-term sustainability and private sector commitment	No. Contract term too short to create lasting improvements, and contractor has no vested interest in the utility after contract end	Yes. Phasing, with ability to modify contract allows the contract to change based on the situation. Subsequent phases could lead to more delegation of responsibility, and eventual ownership of utility, incentivizing operator to take long-term interest.
Serve growing market	No. Short term contract, with very limited scope. Management efficiencies are not sufficient to respond to meeting growth	Yes. Capex program included. Subsequent phases could expand the contracts mandate and include new areas

Unlike a management contract, the PPBC requires that a water company—with clearly defined governance rules—be built as the first step. Focusing on building a well performing water utility from the start will make the contractor more effective, and the improvements more lasting.

Performance incentives in the PPBC focus on reducing costs for providing a fixed number of households with 24 by 7, or maximizing the number of households on 24 by 7 with a fixed budget. This focuses the contract on the most important objectives, and promotes capital efficiency.

A PPBC is a 10 year contract, broken into two phases. In contrast, most management contracts last for just five years. A longer term arrangement means that larger, and potentially more complex improvement programs can be implemented. A break point between the two phases helps ensure good performance and adaptation to emerging information. Related to this, the PPBC will be better suited to keeping up with the city's growing needs.

JV Partnership versus Concession

The JV Partnership with the SPV as a utility has advantages over a traditional concession because it provides better alignment of incentives between the government and private sector, promotes on time investments through access to both concessional and private finance, and reduces the risks associated with lack of information. It is also a simpler contract to understand, and more likely to be sustainable in the long-term. Table 17.2 summarizes the main differences.

Table 17.2: Advantages of JV Partnership with a Utility SPV over Concession

Issue	Traditional Concession	JV Partnership
Ability to handle information gap	Low. Service standards and price cap set at start of 20 year contract. Adaption to new information difficult	High. Cost plus regulatory model adjusts tariffs and service standards to emerging information
Efficiency incentive	Through price cap, but hard to do in practice	Regulatory lag, scrutiny of costs and capex plans, efficiency shaping (glide-path) provisions
Predictability and investment	Tariff rates fixed in contract	Regulatory regime can be defined in contract. Rate of return guarantee promotes investment
Alignment of incentives	Not achieved. All government wants is to reduce prices and increase service. All concessionaire wants is lower costs and increase prices	Yes, Owning a stake in the company, and also providing loans, incentives the government to support good regulatory and financial behavior.
Public ownership and control	Government retains ownership of assets, however doesn't control assets, or utility, or have share in profits during contract	Government owns 49% in company. This includes governance rights, dividends and access to information. Ownership is not just in mostly invisible assets
Public acceptability	Lack of any real ownership by concessionaire reduces acceptability	Clear ownership structure and government presence increases acceptability
Long term incentives and sustainability	Contract end date starts affecting behavior by year 5, given long lived asset. End date disrupts the system that has been built up	Owners take a long term view in running the business, because assets don't have to be returned
Simplicity and understandability	Complex. The utility's assets are split between government, who owns them, and concessionaire who has a contractual right to use them	Simple, because the water utility company owns the assets that it produces services in and invests in.

All but the last three differences, shown in the table above also fully apply to the JV Partnership with the SPV as a concessionaire.

Both JV Partnership models are well-placed to handle information uncertainty. Lack of information is a common issue in the Indian context. The JV Partnership models are able to deal with this constraint through the “cost plus” regulatory contract that adjusts both tariffs and service levels every three years to reflect emerging information. In contrast, the traditional concession seeks to lock in services standards and tariffs as far as possible for the duration of the 20 to 30 year contract, making it brittle to initial uncertainties and unexpected developments.

An adaptive, cost-plus approach could be thought to bring with it a risk of inefficiencies. Both variants of the JV Partnership models achieve efficiency through three main mechanisms:

- The regulatory lag
- The scrutiny of costs and capex plans before tariffs are determined
- Tariff glide path provisions so that tariff adjustments reward the utility for past efficiency gains by allowing the utility to profit from them for more than three years.

A big advantage of the rate of return approach to tariff setting is that it promotes capital investments even in a situation of uncertainty.

Another advantage of the JV Partnership models over a traditional concession is its alignment of incentives between government and private sector goals. In a concession, the government is interested in increasing service levels while lowering tariffs as much as possible. This is at odds with the concessionaire’s interest in lowering costs, but keeping tariffs as high as possible. The JV preserves a public sector interest in the continuing financial success of the utility, through partial public ownership of the SPV. This feature counterbalances the political pressures for low tariffs at the expense of the long term health of the utility. The 49 percent public ownership stake also gives the government board membership, and hence access to corporate information and involvement in strategic decision making. This can promote understanding, coordination and trust.

The public often struggles to understand standard concession contracts, with their abstract of separation of asset ownership (which remains with the government) from use of the assets and provision of the services (which is vested in the private concessionaire). In contrast, the JV Partnership with the SPV as a utility uses more familiar commercial firms—the company owns the assets it needs to provide the service. Public ownership is provided through a substantial minority stake in the shares of the utility company. Control of service standards and tariffs are provided through a regulatory contract—as with electricity utilities in India, and water utilities in other English-speaking countries such as the UK, USA and Australia.

Admittedly, the JV partnership with the SPV as a concessionaire is more complicated in this regard. The concessionaire doesn’t own the assets, the city does. But the concessionaire uses

the assets and provides the services, and is also partly owned by the city. This could be hard to explain.

Because the JV Partnership with the utility SPV is of indefinite duration, it is well equipped to sustain the performance of the utility over the long term. In contrast both a concession and the JV with the concessionaire SPV will likely end after 30 years. The incentives for the concessionaire to plan and invest for the long-term start to diminish surprisingly early in the life of the concession, as problems arise in investing in anything that will have value after the end of the contract.

17.2 Advantages over Business As Usual in Two Cities

Well-designed PPPs offer mid-sized city water utilities real potential to improve services toward meeting Government of India benchmarks. PPPs can move the water sector in these cities forward by building stronger institutions, improving operational and management efficiency, and increasing access to capital.

Phased Performance Based Contract versus business as usual

Observations from the Bhubaneswar case study are used to show expected improvements under the Phased Performance Based Contract in Table 17.3 below.

Table 17.3: Advantages of PPBC over Current Structure in Bhubaneswar

Issue	Current Situation: Water Provided by PHE	Phased Performance Based Contract
Service provider	PHEO the state level body, within the department of Housing and Urban Development, provides water to Bhubaneswar and surrounding periphery. PHEO in charge of bulk supply, capital works and O&M. However, as per the 74 th amendment to the Indian Constitution, responsibility for water services must be transferred to the Bhubaneswar's ULB— the BMC	A new ring fenced ULB level water utility created, to serve Bhubaneswar and periphery. This new utility's assets are owned by Bhubaneswar's ULB, and it continues to provide all water service functions, in Bhubaneswar and periphery, but with improved systems and professional management
Utility governance	Weak. Uses government systems for hiring, accounting and other management processes. As a result utility is overstaffed, and there is no incentive to cut operational costs, as government subsidizes all operational losses	Operator puts in place new governance structure, with clear responsibilities and reporting structures, and sets up independent accounting systems
Operational performance	Poor. 1% metering, 54% coverage, and 0% households on 24*7, mainly due to outdated commercial, billing and collection systems. Cost recovery low at 36.5%	Operator incentivized to put in place best practice information management, billing and collections systems. This will result in increase in metering, coverage and households on 24*7, and as a result higher cost recovery.
Capital planning and funding sources	Low emphasis on capital planning. No incentives for capital efficiency, as the government "in theory" is willing to support entire capital expenditure through grants. However, so far few funds have been spent, as capital spending on water sector not considered state priority	Government will provide fixed capital fund at contract start. Funds accessible only if detailed plans for use submitted. Performance based incentives attached to ensure operator uses capital efficiently .

If a PPBC was to be implemented in Bhubaneswar a new ring-fenced water SPV would have to be created to serve the city's needs, replacing the current state level provider—the PHEO. This new utility SPV would be fully integrated (providing bulk water, operations and distribution), but most importantly would have its own accounting, hiring and management practices—in contrast to the current state of affairs. A private operator would be brought in

to make these management and governance changes, so that the utility is run like a business instead of like a government department. The performance incentives would make sure that in addition to reducing operating losses, a well thought out capital improvements program is being prioritized, in contrast to the existing situation.

JV Partnership versus business as usual

The current situation in Coimbatore is used to show the beneficial impact of a JV Partnership with a utility SPV in Table 17.4 below:

Table 17.4: Advantages of JV Partnership with Utility SPV over Current Structure in Coimbatore

Issue	Current Situation: Water Services Provided by CMC	After JV: Ring Fenced Water Utility
Overall services	Water, solid waste, street lighting, town planning, public health, education, etc.	Water and possibly sanitation in the future
Staff and management	Staff shared across different CMC functions. Lack of supervisory staff allocated to water services	Staff employed solely to manage water services independent hiring, hierarchy and performance incentives
Delegation of water services	Highly fragmented. Bulk water functions carried out by both CMC and state board. Financial management and service delivery split into separate divisions. Maintenance, repair and meter reading work outsourced	100% of the water services functions, including designing, financing and operating bulk supply and distribution and operations related work provided by the SPV, with outsourcing where cost effective
Accountability and autonomy of provider	Limited accountability, with multiple roles with unclear reporting structures. CMC as a whole autonomous, but utility departments are not, impeding staff decision-making power	Accountability ensured by contract. Autonomy higher, because single entity with single owner and majority privately owned
Institutionally equipped for growth?	Doubtful, as service areas need to be constantly expanded, causing current fragmentation to be an even bigger issue	Yes, regulation contract can bring new areas into SPV's jurisdiction.
Flexibility and efficiency of capital use	Very limited, as it is a government agency and cannot take on private debt. Further fragmentation between departments reduces efficiency of decision-making and implementing plans	High ability to use private finance enables financing flexibility, can increase the speed of service improvements. Improved management and information sharing practices increase capex efficiency.

A JV Partnership with a utility SPV would make several improvements to how water services are provided in Coimbatore. To begin with, Coimbatore's City Government and State Water Board would have to transfer the water assets, and jointly capitalize a new water utility SPV with a private partner. This would mean that water services would now be provided by a single entity, instead of being spread across several departments and other entities.

This new ring-fenced water SPV would be autonomous and would be managed by a private partner, with a majority stake. This private operator, in addition to bringing good management and governance practices, would have staff solely dedicated to providing water services. This is contrary to the existing state of affairs in Coimbatore. Furthermore, with clearly defined roles and responsibilities, staff would be held accountable for their behavior and be incentivized to perform well, instead of the existing situation where staff have unclear roles and limited decision-making ability.

The regulatory contract would also hold the utility SPV to a high standard, and increase the company's service area as the city grows—making it adaptable to the rapid growth expected.

This is in contrast to the current situation, wherein accountability is limited, and service expansion also limited due to institutional fragmentation.

Finally, the option to use both private and concessional finance would help to expedite capital improvement programs, and possibly fund larger ones, compared to the current situation, where only public finance is accessible.

18 Conclusion

India's mid-sized cities struggle to provide water services, and at the same time keep up with demand growth from rapid urbanization.

Service levels tend to be abysmal, compared to Government of India benchmarks for water service. For example, in most cities water flows through pipes for 2 hours a day or less, metering is negligible, and coverage is low. Something must also be done to curb NRW levels estimated at 50-60 percent.

Most city water utilities are loss making. With cost recovery levels in the range of 40-60 percent, they don't earn enough revenue to cover even operating costs, and are thus continually reliant on government subsidies. Moreover, with 11 million people being added to the urban population annually, their dilapidated water assets are coming under greater stress with each passing year.

It is clear that these water utilities need assistance. Many cities are considering PPPs to help respond to these challenges.

Through private sector involvement, city water utilities seek three main things:

- Improved skills and modern technologies;
- Access to a larger capital pool and financing flexibility; and
- A more focused institutional structure for water service provision, freed from the constraints of departmental management, and subject to greater incentives and accountability.

However, the unique challenges in mid-sized cities mean that traditional PPPs models may not work well. Some of the major challenges are outlined below:

- In many cases there is no utility that is solely dedicated to providing water to the city. Instead, as in the case of Coimbatore water utility functions are performed across multiple government agencies, often with overlapping functions. In other cases, such as Belgaum the City Government has delegated some responsibility for water services to a state level agency, but it is unclear who is responsible for capital works and system upgrading. Hence, the first job may be to *create* a utility company, as opposed to the typical PPP response of taking over and managing an existing one.

- The widespread lack of information on base data, such as NRW levels, asset condition and service levels, means that reasonable costs of service cannot be estimated. As a result private partners will be unwilling to bid fixed tariffs or sign up to meet service standards for fixed payments—it is simply too risky for them. This is especially true when the poor condition of assets requires large investments to be made upfront.
- The scale of change that is needed, and the institution building required, means a short duration management contract style PPP is not likely to help turn the utility around. Instead a longer term engagement is required, but again, traditional long term PPP models tend to be too risky under the conditions in Indian mid-sized cities.
- Resistance to tariff increases, combined with low levels of financial viability (due to poor service), means that continued public sector financial support will be needed. This will particularly be the case for financing the major capital programs. Few, if any, traditional models envisage providing concessional finance for large capital programs that are run by the private player.
- Rapid but unpredictable urban growth means that coverage areas, services standards, and other factors in a contract will need to be adjusted rather frequently. As a result the PPP contract will have to be amenable to change and have the ability to deal with large information gaps. Several traditional models struggle with being responsive to new information.

Two new models may assist City Governments looking for solutions.

The two innovative PPP models—the Phased Performance Based Contract (PPBC) and the Joint Venture (JV) Partnership—have been tailored to meet the needs of water utilities in mid-sized Indian cities.

Table 18.1 below summarizes how each model is able to overcome the major challenges the sector faces. A recap of each model is provided in the sections that follow.

Table 18.1: How the Innovative PPP Models Tackle the Sector's Unique Challenges

Unique Challenges in the Water Services Sector in India	Innovative PPP Solutions to Address them	
Issue	Phased Performance Based Contract	JV Partnership
No utility	<ul style="list-style-type: none"> Contractor creates utility 	<ul style="list-style-type: none"> Government assets and private sector equity contributes to create utility
<p>Low information on asset condition</p> <p>↓</p> <p>Viability Gap large and unknown</p>	<ul style="list-style-type: none"> Capex fund provided Contractor paid to manage utility Contractor responsible for managing rehabilitation and capex program Contractor incentivized by: <ul style="list-style-type: none"> Share of savings Maximizing customers on 24*7 for fixed budget 	<ul style="list-style-type: none"> Utility responsible for meeting service targets Regulatory contract adjusts tariffs over time Concessional finance keeps costs down
Coverage of growing city	<ul style="list-style-type: none"> Manages expansion program (6+4 years) Contract renewable thereafter 	<ul style="list-style-type: none"> Mandate and funding to cover urban growth areas

The Phased Performance Based Contract is like a management contract in terms of its reliance on government funding sources, level of government involvement, and basic remuneration structure—but it has some key differences. To begin with, if a ring-fenced city utility company (SPV) for water services doesn't exist, it must be created as the first thing the operator does. Thus the PPBC puts in place a utility SPV that will focus on providing 24 by 7 water service to all households in the city for the long term.

The operator will manage this utility, and ensure it is well run by making operational and management improvements. It will also be responsible for implementing capital programs, and will have access to a large fixed capex fund to do so. In addition, the operator will be eligible for performance payments, through one of two incentives structures, specially designed for use with the PPBC. Essentially, the incentives are designed to make sure the operator receives these performance payments for being cost efficient while getting households onto 24 by 7 service.

The contract will last 10 years, and be broken up into two phases. A performance review will be conducted after the first phase. Advancement to the next phase, and potential revision of fees and service targets, will be contingent upon the operator's performance.

The key advantages of this model are: (i) immediate access to a large capital fund, (ii) performance incentives tied to measurable outcomes, (iii) a fixed time frame that make it

likely that improvements will be delivered quickly and sustainably, and (iv) a performance review before the second phase begins, so that contract terms can be tailored to the operator's performance and the latest information.

This model may be suitable for cities with a large viability gap and low cost recovery. Under this model the government can continue to own assets, but must be willing to make a large capital fund available at the beginning of the contract, and replenish it for phase II if necessary.

The Joint Venture Partnership is a long term arrangement, in which a private firm is selected to partner with the City Government in creating a new mixed-ownership city water utility SPV. Alternatively, the SPV can be a jointly owned concessionaire, wherein the assets will remain in public sector ownership. In either case however, this private partner will have a majority controlling interest in the SPV. The winning partner, selected by competitive bid, must have the right mix of skills to improve performance, with capital to invest in making these changes.

The SPV will be responsible for all aspects of water provision in the city, from operations, to planning, to financing and implementing capex programs. The day-to-day operations will be managed by the private partner.

Tariffs and service standards will be set by a regulatory contract that makes adjustments to reflect new information every three years. The role of City Government will evolve from direct responsibility to policy, governance and regulation, as well as coordination with city planning and attracting concessional finance.

Advantages of the model include: (i) Financing flexibility—through access to both private and public sources of capital, given the joint ownership structure (ii) long-term (and potentially indefinite) contract duration, ensuring partners take a long-term and strategic interest in the utility (iii) adaptive response to emerging information, through the regulatory contract that sets tariffs on a “reasonable” rate of return basis.

The JV may be suitable for a city utility that is close to full cost recovery, and has a small financial viability gap that can be closed with concessional finance. The City Government must also be willing to enter into a long-term commitment with the private operator, and provide support through organizing concessional finance for the company.

In conclusion, the models presented in this report are a useful addition to the set of institutional and financial options open to mid-sized cities in India as they work on a step change in service levels to support a higher quality of life and increased urban productivity in a rapidly urbanizing country.

Appendix A: Framework for Data Collection

City Selection Criteria

- Second tier and third tier Indian cities
- Typical
- Diverse experiences
 - One good condition, one poor condition, one in the middle
 - One good condition, two poor condition but experiencing different difficulties
 - Located in Karnataka (because of World Bank's existing involvement in the state)?

Information on each City

- Background Data
 - Location
 - Population
 - Service area
 - Number of customers
- Government of India performance benchmarks (see Table A.1 below)

Table A.1: Government of India Performance Benchmarks

Indicator	Benchmark
Coverage (percentage of households connected)	
Per capita supply of water (litres per day)	
Extent of metering (%)	
Extent of Non-Revenue Water (%)	
Continuity of water supply (hours per day)	
Quality of water supplied (%)	
Efficiency in addressing customer complaints (%)	
Cost recovery in water supply services (%)	
Efficiency in collection of water supply-related charges (%)	

Source: *Professionalization of UWSPs in India – Capacity and Performance Gaps Assessment Report*

- Service levels
 - Average hours of water per day (as referenced Table A.1)
 - Percentage of the population served

- Percentage of potable water (e.g. the percent of samples that test negative for coliforms) (as referenced in Table 1)
- Capital expenditure needed to reach 24/7 water supply for existing population
 - Bulk supply deficit
 - Estimate of capital expenditure needed (R) for
 - Bulk supplies
 - Distribution system improvements
 - Age of pipes
 - Average age
 - Percentage of pipes that were constructed prior to 1950
 - Percentage of pipes that were constructed after 1950
- Reliability of information on capital expenditure needed
 - Reliability of capital expenditure estimate
 - Is pipe network accurately mapped?
- What is needed to meet growth?
 - Forecast population growth (20 years)
 - Forecast demand growth (20 years)
 - Capital expenditure needs estimated for serving the new population on 24/7 basis for
 - Bulk supply
 - Distribution
- Cost recovery (as referenced in Table 1)
 - Revenue (R)
 - Cash revenue (R)
 - Operating costs (exclude depreciation)
 - Staff per 1,000 connections
 - Average tariff (R/cubic meter)
 - Average household bill (R/month)
 - Operating cash margin
 - $(\text{cash collected} - \text{operating cost}) / (\text{operating cost})$
- Ability to improve cost recovery – indicate the extent to which this could be possible
 - Through measures such as:

- Increasing collection ratio
- Decreasing staff costs
- Decreasing energy costs
- Increasing tariffs
- Ability to fund operating losses
 - Where does the money come from now to fill the gap?
 - How sustainable is this?
- Ability to fund capital expenditure
 - How much capital expenditure was funded recently?
 - Who provided the money?
 - What sources can fund the future need?
 - How likely is it to be adequate?
- Government capacity
 - [What is the best way to report this?]
- Utility capacity
 - What is the best way to report this? (See **Table A.2** below for an option used by NWSC)


Table A.2: Process Management scorecard


SNo	Description	City1	City2	City3	General Remarks
1	Technical Process Management <ul style="list-style-type: none"> ▪ Water Resources Management ▪ Water Treatment Management ▪ Water Distribution Management ▪ Planning & Development ▪ Water Quality Procedures ▪ Maintenance Operations ▪ Connections ▪ Wastewater treatment ▪ Sewerage Management ▪ Asset Management and Risk 				


SNo	Description	City1	City2	City3	General Remarks
	Management				
2	Commercial Process Management <ul style="list-style-type: none"> ▪ Commercial Structure ▪ Customer Orientation ▪ Commercial Operating Procedures ▪ Connections Management ▪ Metering and Meter Reading ▪ Water Loss Control Management ▪ Billing Systems ▪ Revenue Collection ▪ Debt Management ▪ Customer Service ▪ Customer Relations 				
3	Human Resources Management <ul style="list-style-type: none"> ▪ Human Resources Manuals & HR information Management Systems ▪ Recruitment, deployment, Induction & Retention as well as completeness & comprehensiveness of the structure ▪ Participative staff appraisal ▪ Performance incentives ▪ Training, TNA and Training plan/Calendar ▪ Welfare ▪ Occupational Health and Safety 				
4	Financial Management				


SNo	Description	City1	City2	City3	General Remarks
	<ul style="list-style-type: none"> Financial policies & Procedures Manual Financial sustainability Asset Inventory (both in terms of numbers & value) Asset management policies 				
5	Management Information Systems <ul style="list-style-type: none"> GIS, Geo-referencing and mapping QMS & EMS 				
6	Cross Cutting Processes				
7	Performance Planning & Contracting <ul style="list-style-type: none"> Performance Improvement Plans (PIP) Performance Incentive Designs Performance Monitoring & Evaluation Project and Contract Management 				
8	Procurement & stores <ul style="list-style-type: none"> Efficiency of the MANAGEMENT CONTRACT's procurement system Efficiency of the stores 				
9	Logistics <ul style="list-style-type: none"> Vehicles, equipment, Computers (hard & soft ware) 				


Legend (Score 1 -5)

 - 1 (Poor or does not exist)

 - 2 (Weak)

 - 3 (Fair)

 - 4 (Fairly Good)

 - 5 (Good)

Source: *Professionalization of UWSPs in India – Capacity and Performance Gaps Assessment Report*

Appendix B: Case Study Tables from Interviews with Suez and Veolia

In interviews, Suez and Veolia discussed several international cases that showed aspects of good practice. In **Table B.1** and **Table B.2** below, we show the PPP anecdotes provided to us by Suez and Veolia in the interview, organized by the relevant aspect of PPP. In the tables, we also include the same aspects for the Haiti and Delhi PPP case studies. In the final column, we include the “ideal” arrangement relevant to each aspect that was suggested by Suez.

For the cases mentioned by Veolia and Suez, we include only the information that was discussed during the interview. The cases discussed in the tables are:

- **Port-au-Prince**—We describe a “management assistance” contract that includes provisions for the contractor to undertake capex planning and procurement, and capacity building. The contract includes an “emergency” turn-around phase in the first year. It requires the contractor to produce easy-to-monitor reports to enable the Government counterpart to track its progress toward meeting well-defined KPIs, including KPIs for capacity building. We have enclosed a separate, extensive case study on this contract
- **Delhi**—The privatization of the Delhi Vidyut Board provides a good example of how PPP can succeed in an Indian context by building political consensus. It also provides lessons on the restructuring of a public utilities—such as moving excess liabilities to a holding company—that attracted good bidders and incentivized them to invest in expanding the network
- **Algiers**—SUEZ discussed the Algiers management contract, which is an example of PPP that quickly turned around a water utility that was failing. The contract covered all aspects of utility management. Under the contract, SUEZ posted 27 full time managers in Algiers, and each of these managers was matched with a local counterpart to aid knowledge transfer. SUEZ did the planning and procurement for a \$500 million capex fund to extend and improve the network
- **Gabon**—Veolia discussed the example of the Gabon contract as an example of the “evolving” contract arrangements. The contract is a concession for both water and electricity, so the costs of providing water are cross-subsidized by electricity revenues
- **Jeddah**—Suez also discussed the Jeddah management contract as an example of an evolving management contract with capex and performance-based KPIs.

Table B.1: PPP Summary (Port-au-Prince, Delhi, and Algiers)

	Issue	Port-au-Prince	Delhi	Algiers
How did the PPP overcome...	1. Poor quality of assets and significant investment needs	The investment needs were to be met by an emergency capex plan, and a longer term capex plan, both of which were to be designed by the contractor and approved by the Government	Not an issue	Creation of a \$500 million fund for capex
	2. Poor management	Contract includes a robust capacity building program	Training Centre- CENPEID for own and other Utilities employees; Sanchay (Repository)—Knowledge Management Portal linking all employees; SEEKH (Learning)—Platform for Sharing of Best Practices and Knowledge; NDPL Innoverse and SHINE—Fostering culture of innovation & improvement	No information
	3. Low levels of service	Contractor incentivized to increase the number of connections and increase reliability of existing connections	Contractor incentivized to reduce losses, thereby improving reliability for customers	Low service baseline: Only eight percent had 24/7 supply
	4. Poor customer relations	No information	Improved billing and payment options. 14 new "customer care" centres and call centres established.	No information
	5. Weak commercial practices	Contractor implements new management systems and a capacity building program	Focus in contract on reducing commercial losses through a focus on billing , collection, and metering	No information
	6. Lack of good records on assets and performance	Contractor carries out capex planning but takes no risk on the condition of underground assets	Not a large issue	First step was due diligence, funded by Suez

	Issue	Port-au-Prince	Delhi	Algiers
What were the key aspects of the contract	7. Limited experience in PPPs	Contractor produces easy-to-monitor reports so that Government counterparts can enforce contract with limited knowledge or experience	Not a large issue	No information
	8. Political environment detrimental to reform process	Not a large issue	PPP reform was the outcome of a political mandate for Sheila Dikshit. Employees brought on Board with a promise of job security, pension security, and a bonus when reforms succeeded.	No information
	9. Management Control	National agency, DINEPA, in control, with contractor providing "management assistance"	The private operator owned controlling shares in the distribution companies.	No information
	10. Slum areas	Not explicitly included in contract, but slum areas benefit from improved reliability through their suppliers	Slums not targeted in contract. Companies undertook awareness building in slums on loss reduction initiatives	No information
	11. Capex planning management	Capex planning and management undertaken by contractor, with approval from DINEPA	\$550 million in capex investment undertaken.	They created a \$500 million fund, for which SUEZ did the planning and procurement
	12. Human resources	Contractor trains and works with utility staff, but does not have a say over HR decisions.	Staff were retained in privatized companies and given job security.	No information
	13. Payment conditions and mechanisms	Contractor is paid a fixed fee, with bonuses for meeting KPIs and penalties for failing to produce reports. The contractor can double the fees it receives through bonuses	The Government pays a tariff subsidy based on the operators AC&T loss reduction target	No information

Issue	Port-au-Prince	Delhi	Algiers
14. Key Performance Indicators	The KPIs are tied to: Technical and operational performance: Improved quality of service; Management performance: increased collection rates; Administrative and financial efficiency; Human resources performance: effective training of staff	AC&T Loss Reduction	No information
15. Evolution of the contract over time	Operator of the "management assistance contractor" will be in a good position to bid on more involved PPP of the water utility, if the contract progresses to such a phase	Government provided the subsidy until 2006, with cost recovery thereafter	No information
16. Cost Recovery	Operating and capital costs are very heavily subsidized by donors. Some progress toward cost recovery is made by reducing technical and commercial losses	Full cost recovery through tariffs after 2006	No information

Table B.2: PPP Summary Continued (Gabon, Jeddah, and Ideal Arrangement)

	Issue	Gabon	Jeddah	Ideal Arrangement as Defined by Suez
How did the PPP overcome....	1. Poor quality of assets and significant investment needs	Electricity cross-subsidizes water to meet water investment needs. The private investor is obligated to provide at least US\$135 million in rehabilitation investment over the life of the contract, 65% of which must be in water	No information	Set up "Caisse des travaux" for capital works, linked to capital planning undertaken by the contractor
	2. Poor management	The consortium lead, Veolia, provides management systems and expertise	No information	Contractor provides management systems and delivers capacity building program
	3. Low levels of service	Service improvement in the contract is tied to requirements for expansion of the network, and an index of interruptions	No information	Only three to four KPIs for which the operator is accountable
	4. Poor customer relations	No information	No information	Management systems include customer service systems. Expand payment options for customers to improve ease of payment
	5. Weak commercial practices	No information	No information	KPIs targeted to reducing commercial losses
	6. Lack of good records on assets and performance	Contract included a "first year study on coverage" and a "five year study on coverage" to determine achievable coverage rates given population trends and network condition	No information	Set up "Caisse des travaux" for capital works so that the operator does not take risks on assets. Or, have operator carry out required studies before contract commences

	Issue	Gabon	Jeddah	Ideal Arrangement as Defined by Suez
What were the key aspects of the contract	7. Limited experience in PPPs	Regulation is mostly by contract with minimal reliance on government/regulator capacity	No information	Contractor produces easy-to-monitor reports so that enforcing KPIs does not need to rely on extensive experience or technical knowledge
	8. Political environment detrimental to reform process	Gabon has a history of private participation in utilities dating to 1935. An economic crisis in the late 1980s strengthened the imperative for private participation to increase investment	No information	Select locations for PPP where a political mandate exists for reform. Bring staff unions on Board early and pay them a bonus when reform succeeds
	9. Management Control	Concessionaire has management control over all aspects of water and electricity.	No information	Apply a detailed "checklist" with various areas of management control, explicitly selecting which areas are the purview of the contractor, which are the purview of the utility, and which are co-managed
	10. Slum areas	Contract includes coverage targets for small towns and rural areas (not explicitly for slum areas)	No information	Include explicit targets and subsidies for slum-area access
	11. Capex planning management	"If a potential customer is located within the perimeter of water extension (100 meters from existing network) and is accessible via practicable roads, the concessionaire is responsible for carrying all the extension works at his expense"	No information	Capex planning undertaken by contractor. Planning can be procured separately if there is a risk that the planning cost is uncertain
	12. Human resources	No information	No information	Included as part of the "management control" checklist

Issue	Gabon	Jeddah	Ideal Arrangement as Defined by Suez
13. Payment conditions and mechanisms	The concessionaire receives payment in the form of tariffs from customers	No information	Operator paid a fee, with bonuses and penalties linked to the achievement of KPIs and milestones in the contract such as capex planning. Operator should have the opportunity to double the fees through bonuses
14. Key Performance Indicators	Investment obligations (\$135 million); Coverage obligations (54-70%), Quality obligations (indicators of service interruptions)	No information	Progress toward 24/7 supply; Improvement in operating cash flows; Capacity building
15. Evolution of the contract over time	Contract included a 2.5 year "transitory period" at the outset during which no penalties could be applied to the concessionaire, but the concessionaire also had a number of obligations, such as to define (and implement) an emergency repair plan and to establish the methodological basis and the tools for controlling the enforcement of the contract	No information	"Evolving service contract" can progress through several phases: a "rapid turnaround" phase (2 years), a "service contract phase" (3 more years), and a more involved lease concession after that
16. Cost Recovery	The contract defines a "social tariff" for consumption of less than 15m3 per month of about half the normal tariff. Costs of providing water are cross-subsidized by electricity revenues, such that there is not full cost recovery for water but there is full cost recovery on across both water and electricity	No information	If cost recovery cannot be achieved immediately, the contract should include transitional subsidies and a plan to reach cost recovery

Appendix C: Feedback from Private Operators

On March 18th 2013, the World Bank held a “market sounding” workshop in New Delhi with potential private operators. The purpose of this meeting was to get their feedback on the innovative PPP models being proposed. Companies that were represented included, Essel RPW Projects Pvt. Ltd., Doshion Veolia Water Solutions Pvt. Ltd., Jindal Saw Ltd., SPML Infra Ltd., Jain Irrigation Systems Ltd., and SUEZ Environment India. These companies were invited because of their interest in developing and operating water services in Indian cities. The main responses from this workshop are presented below.

Comments on the JV Partnership

The following points were brought up with respect to the JV Partnership:

- **The private sector thought that government ownership in the company (SPV) should be limited to 24%,** so as to reduce the dilution of the investor’s dividends and governance of the company. They believed this would give the private operator a large enough incentive to ensure the company would rapidly improve performance, as well as provide more freedom to manage.
- **The private sector thought that in light of the viability gap, government contributions would be needed.** Since most utilities would be expected to have relatively large viability gaps, upfront capital grants would be needed to close them. Such contributions would not be available through the private sector.
- **The private sector felt that it would be difficult to attract commercial finance in initial years.** This is because banks would most likely look at historic financial performance of the utility while it was under government management, and decide not to provide finance based on the poor track record.

Comments on State-level Involvement

In considering how State Governments would be involved in making the proposed models work the private operators shared the following views:

- **They preferred to have an independent State-level regulatory body set tariffs, particularly in the JV Partnership.** They felt that this would result in more neutral decision-making, and give the private operators an additional layer of comfort in partnering with the government.
- **They thought that State-level financial assistance would be needed in the form of capital grants, for viability gap funding.** This is because of the low financial viability they were expecting the utilities to have, and the absence of private sector alternatives. Cash-strapped City Governments might also not have the ability to provide such assistance.
- **They emphasized the need to transfer state owned assets used for city water provision to the SPV being created.** This would be regardless of whether

the SPV was owned 100 percent by the City Government, or was jointly owned with a private operator.

Comments on Procurement and Contract Supervision

In discussing the selection of operators, the following points were raised:

- **The private sector stated that it would be desirable for the State Government and donor agencies to assist City Governments with designing prequalification criteria.** This is because whilst the innovative models require applying strict prequalification criteria in order to attract high quality bidders, City Governments have little experience in administering such qualifications.
- **The private sector believed that strict contract supervision would be necessary, and City Governments would likely need assistance managing this.** This is because in practice it would be difficult to enforce strict prequalification in all cases, so the focus would also need to be placed on strict contract supervision. In this way if an under-qualified bidder was selected and was underperforming, remedial action could be taken more promptly.
- **The private sector wanted prequalification criteria to be designed in a way that would not preclude local operators and consortiums with requisite competencies from bidding.** For example local firms would not be able to compete with international counterparts in terms of years of experience, but could have better insights into the Indian context. They thought that giving local firms the chance to compete and win, would help to strengthen their expertise. However, strict quality standards were also supported. The idea that a consortium could form that would prequalify as a group was understood as a way to ensure quality while allowing firms with some but not all the required skills to enter the market through partnering with other firms.

