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PPP Models for Water Supply: an evaluation



This report is based on Pankaj Chandak internship under the guidance of Browne & Mohan consultants.

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Background

Water is an important input for economic development. Since water sources in the country are limited, there is an urgent need to focus attention on development of water sources and use of water efficient technologies to source and recharge the various water sources. The exploitation and development of various sources of water and making water available at affordable rates is one of India's major thrust areas.

Water supply requires a huge amount of capital investment in infrastructure such as pipe networks, pumping stations and water treatment works. It is estimated that Organization for Economic Co-operation and Development (OECD) nations need to invest at least USD 200 billion per year to replace aging water infrastructure to guarantee supply, reduce leakage rates and protect water quality. Once infrastructure is in place, operating water supply systems entails significant ongoing costs to cover personnel, energy, chemicals, maintenance and other expenses. The sources of money to meet these capital and operational costs are essentially either user fees, public funds or some combination of the two.

But this is where the economics of water management start to become extremely complex as they intersect with social and broader economic policy. The basic information about water availability and water use are, nevertheless, highly relevant to understanding how critical water issues will affect business and industry in terms of both risks and opportunities.

Public-Private Partnership (PPP) describes a government service or private business venture which is funded and operated through a partnership of government and one or more private sector companies. These schemes are sometimes referred to as PPP or P3.

The PPP models for water supply vary from short-term simple management contracts (with or without investment requirements) to long-term and very complex BOT form, to divestiture.

These models vary mainly by:

- Ownership of capital assets
- Responsibility for investment
- Assumption of risks, and
- Duration of contract

A brief summary of some of the types are given as following:-

Management Contracts

A management contract is a contractual arrangement for the management of a part or whole of a public enterprise by the private sector.

Management contracts allow private sector skills to be brought into service design and delivery, operational control, labor management and equipment procurement. However, the public sector retains the ownership of facility and equipment. The private sector is provided specified responsibilities concerning a service and is generally not asked to assume commercial risk. The private contractor is paid a fee to manage and operate services. Normally, payment of such fees is performance-based.

Usually, the contract period is short, typically two to five years. But longer period may be used for large and complex operational facilities. In this form of PPP, the Government defines and grants specific rights to an entity (usually a private company) to build and operate a facility for a fixed period of time. The Government may retain the ultimate ownership of the facility and/or right to supply the services. In concessions, payments can take place both ways: concessionaire pays to government for the concession rights and the government may also pay the concessionaire, which it provides under the agreement to meet certain specific conditions. Usually such payments by government may be necessary to make projects commercially viable and/or reduce the level of commercial risk taken by the private sector, particularly in the initial years of a PPP programme in a country when the private sector may not have enough confidence in undertaking such a commercial venture. Typical concession periods range between 5 to 50 years.

Build-Own-Operate-Transfer (BOOT) is a form of project financing, wherein a private entity receives a concession from the private or public sector to finance, design, construct, and operate a facility stated in the concession contract. This enables the project proponent to recover its investment, operating and maintenance expenses in the project. Due to the long-term nature of the arrangement, the fees are usually raised during the concession period. The rate of increase is often tied to a combination of internal and external variables, allowing the proponent to reach a satisfactory internal rate of return for its investment.

Build-Rehabilitate-Operate-Transfer (BROT) arrangement, a private developer builds an add-on to an existing facility or completes a partially built facility and rehabilitates existing assets, then operates and maintains the facility at its own risk for the contract period. BROT is a popular form of PPP in the water sector.

Design-Build-Finance-Operate (DBFO) arrangement, the public sector comes in contract with a private party to design, build, operate & finance a facility for a defined period, after which the facility reverts to the public sector

The facility is owned by the private sector for the contract period and it recovers costs through public subvention. The key driver is the utilization of private finance & transfer of design, construction & operating risk. It suit to projects that involve a significant operating content particularly suited to water & waste projects.

Some key water supply PPP projects

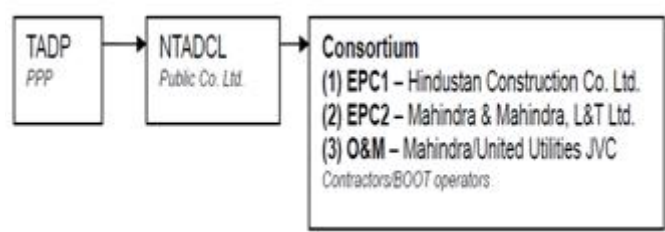
3) Tirupur Water Supply and Sewerage Project

The Tirupur region has an extensively developed garment industry with large export earnings of about Rs. 5,000 crores per year through the export of Ready Made Garments (RMGs). Tirupur is a major center of knitwear industry in South India situated at about 56 km from Coimbatore. In Tirupur, the demand for water and sanitation was especially high. This Tamil Nadu town of a little over 500,000 is India’s largest cotton knitwear centre, accounting for 90% of the country’s exports in the sector. Clean water - crucial for dyeing and bleaching - was being supplied through tankers, employing thousands of Lorries to make several trips daily, in order to supply water for textile processing. In fact, many farmers resorted to selling ground water to the local industries, adversely affecting the water source for agricultural purposes. Groundwater over-extraction and contamination posed enormous challenges for local public authorities. There was no dedicated waste water collection and treatment facility; the municipality lacked a sewage collection and treatment system, and slum areas lacked adequate sanitation facilities. Moreover, domestic water supply was limited to two hours on alternate days.

PPP Features

The Tirupur Area Development Project (TADP) was set up as a PPP by three partners - the Tamil Nadu Corporation for Industrial Infrastructure Development (TACID), mandated by the Government of Tamil Nadu to identify infrastructural projects to enhance export potential; the Tirupur Exporters Association (TEA), and the Infrastructure Leasing and Financial Services (IL&FS). Together, they created the New Tirupur Area Development Corporation (NTADCL) as a special purpose vehicle (SPV) through which to access commercial funding and manage the risks associated with the project. The Government of Tamil Nadu and Tirupur Municipality granted NTADCL a concession to develop a water supply system on strictly commercial principles and on an integrated basis.

The project was split into three separate contracts, two awarded on an Engineer, Procure, and Construct (EPC) basis, and one to Operate and Maintain (O&M) the finished water and sewage treatment facilities. The EPC1 contractor was responsible for building a river intake, well, and pumping station; a water treatment plant and booster pumping station; a transmission main, and a master balancing reservoir. The EPC2 contractor was responsible for three feeder mains, water distribution stations, distribution networks, a sewerage system, and low cost sanitation.



NTADCL chose this consortium through a transparent international competitive bidding process. Marketing strategies succeeded in generating positive responses, including 40 domestic and international formal expressions of interest. In several contracts drawn up, successful private sector companies were bound to the following responsibilities:

- Off take, treatment, and transmission of water
- Distribution of water to industries and the municipality (domestic consumption)
- Collected sewage treatment
- Maintenance of sewage treatment plants

Financing

Financing involved a mixture of debt and equity taken on by government, various commercial interests, financial institutions, and international funding agencies. This innovative structure facilitated the repayment of funds raised in international and domestic markets, while balancing the interests of shareholders. Infrastructure Leasing and Financial Services (IL&FS) and USAID provided loan guarantees over 30 years for US\$ 25 million. The World Bank provided a line of credit to IL&FS. In addition, the Asian Development Bank through its private arm has a 27% stake in the project.

Although ownership of the project assets lay exclusively with NTADCL in its capacity as concessionaire, the consortium has an equity share in NTADCL. The return on equity amounts to 20% per annum, and the average cost of debt 17%. Most importantly for the government, implementation of the project leveraged its investment by about 100 times.

Financing structure

Item	Rs. (crores)	US\$ (millions)
Equity	322.7	69
Senior debt	613.8	132
Subordinate debt	86.5	18
Total	1023	219

Debt-to-equity (D/E) ratio = 1.5:1

Costs

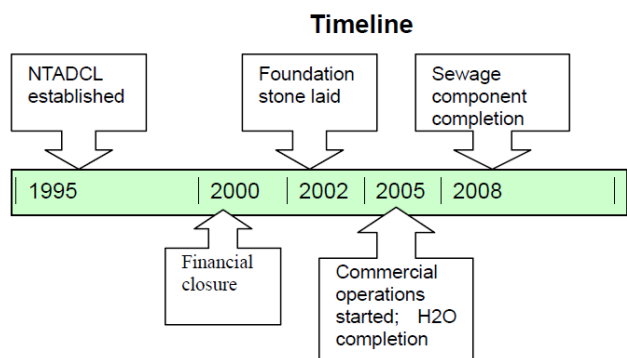
IL&FS, the Government of Tamil Nadu, and TEA formed a steering committee to push project development. IL&FS specifically was charged with undertaking studies, putting in place appropriate frameworks and procedures, achieving financial closure, and managing construction and operations.

The results of the Tirupur Water and Sewerage Project are impressive. The bulk of the water is supplied to industry, which is comprised of about 1900 textile firms. The population of residents served is 1.6 million. The consortium provides a total water supply of 185 million liters per day (MLD) at the fully operational level, of which 125 MLD goes to industry, 25 MLD to Tirupur residents, and 35 MLD to the region’s remaining rural towns and villages. This is expected to increase to a total of 250 MLD. Under the agreement, the consortium has the right to draw up to 250 MLD of water from the Cauvery River.

To allow investments to be recovered, operation and maintenance is funded through water and sewerage charges. Industries are charged Rs 45 per kilo-liter. This industry pricing was determined on the basis of its opportunity cost—the rates paid to private tankers. The textile owners actually ended up saving 20 to 30% on water costs. Meanwhile, Tirupur households are charged only Rs 5, and outlying village houses pay Rs 3.50. The tariff structure provides for an annual adjustment linked to indexation, and any unusual increases must be approved by the Price Review Committee.

Resettlement and rehabilitation packages minimized social risks, as well as providing revenue generating livelihood options. Directly and indirectly, the project created employment for 200,000 people. Not only has the partnership resulted in poverty alleviation, but health and environmental standards have improved. Stakeholder participation was thorough, and the municipality underwent institutional strengthening.

The Tirupur project took five years to develop. The water and sewerage components were to be completed within three and six years, respectively. Thanks to the reliable supply and treatment of water, workforce participation ratios have increased and the textile industry as a whole has grown. The Tirupur experience of tapping commercial funds and pushing through several stages of project development provides a benchmark for private initiatives in supplying an essential public commodity in India.



Financial Performance

- The main reason for lower-than-expected off-take is an order of the Madras High Court directing closure of the processing units in Tirupur during the weekends until installation of the effluent treatment system.
- Other problems during the initial phase of operation included exceptional heavy monsoons leading to surplus ground water in Tirupur, and lower exports due to appreciation of the rupee against US dollar, and currently the recession in the US.
- For FY2008, the water supply revenue of Rs768 million is approximately 68% of the budgeted revenue. However, the operating cost of Rs430 million is also about 67% of the budgeted cost.

Key Insights

- Support of key stakeholders, including industry, local government, and residents, was vital to the project’s innovative financing structure and ultimate success
- Reliable data, inflation-adjusted tariffs, and appropriate risk allocation greatly facilitated this PPP
- Government must play a major role as project enabler, and the financial health of local bodies must be addressed
- Suitable regulatory mechanisms must be put in place
- The formation of the public limited company, NTADCL, upfront in the process served as the platform for information exchange, conflict resolution, and facilitation of decision-making in a transparent way.

2) Visakhapatnam Industrial Water Supply Project

The Government of Andhra Pradesh (GoAP) has developed a master plan for industry-led economic growth in the Visakhapatnam region. On a broader canvas, the Visakhapatnam area is being developed to become a major investment location on the East Coast of India. Some of the recent initiatives for this vision include the development of SEZ, a Greenfield Port at Gangavaram, a Pharma City at Parwada, a Special Logistics Corridor, etc. The VIWSP is conceived to provide reliable water supplies for the industries and domestic consumers and incidentally providing an arrangement for meeting the irrigation demands.

PPP Features

VIWSP has been domiciled in a Special Purpose Entity, Visakhapatnam Industrial Water Supply Company Limited (VIWSPCo), for its implementation. VIWSPCo will acquire the required concession rights from the Government of Andhra Pradesh for construction, operation and maintenance of the project facilities including billing and collection for the water supply and waste water disposal services rendered by the company to various consumers. VIWSPCo will recover its investment and operation costs by the sale of water to consumers. The project was mainly funded by the public sector, though it was decided to transfer the majority equity in VIWSPCo to the L&T consortium on build own, operate and transfer (BOOT) basis.

Project Description

The Visakhapatnam Industrial Water Supply Project envisages the use of the existing 153 km long Yeleru Left Bank Canal (YLBC) system, which presently supplies water from Yeleru Reservoir to Visakhapatnam Steel Plant (VSP), to meet immediate future demand of about 300 Millions of Liters per Day (MLD) of various consumers including VSP. The water supply will be augmented from the Godavari River through a 56 km. long Godavari-YLBC conveyance system to serve an estimated demand of about 600 MLD in the year 2010.

APIIC proposed implementing this water supply project in two phases. In phase I, they will supply water to the IDA by reducing seepage losses in the YLBC from 70% to about 32%, without any extra release of water from the Yeleru reservoir. This will satisfy the current and anticipated demand for water in the immediate future and will demonstrate to industries, considering setting up factories at the IDA, that sufficient water will be available. Once the demand for water justifies it, phase II will be implemented. This will involve new construction of a system to take water from the Godavari River to YLBC.

The project which was designed to supply 264 million liters of water per day (MLD) from the Godavari River to the Vizag steel factory and Simhadri power project besides Vizag Municipal Corporation is almost completed.

Financing

The Rs.450 crores Visakhapatnam Industrial Water Supply Project executed by Larsen & Toubro's. Andhra Pradesh Industrial Infrastructure Corporation (APIIC) has 33 per cent stake in Visakhapatnam Industrial Water Supply Company Limited (VIWSCo). Rashtriya Ispah Nigam Limited (RINL) has the main beneficiary of the project, committed to invest Rs 240 crores in the project. The Vizag municipal corporation and NTPC are providing Rs 50 crores each. These advances are expected to be adjusted in water charges against the utilization of water.

1) Dewas Industrial Water Supply Project

Dewas Industrial Estate (DIE) a major industrial center in Madhya Pradesh located about 35 Kms. North of Indore on Agra-Mumbai NH-3. DIE is spread over an area of approximately 5 Kms. Nearly 460 big, medium and small industries located in DIE facing acute water shortage from last one decade. The DIE is receiving at the maximum 2.40 MLD water against the actual requirement of approximately 12 MLD water.

This quantity of 2.40 MLD is being received from Tube-wells, Shipra River and Tankers operated by the local residents. Thus the availability and actual demand is having a huge margin adversely affecting the growth of industries.

PPP Features

Dewas Industrial Water Supply Scheme provide water supply scheme with a capacity of 23 million liters per day (5 MGD). It involves laying down of 128 km pipeline from Nemavar on the banks of River Narmada to the Dewas Industrial Estate. The type of PPP is Build Operate and Transfer (BOT) –Toll model. The contract period is for 30 years (10957 days) commencing from the Commencement date. The contract period excludes 18 months construction period (from the date of signing of the Agreement), which includes 4 months for financial closure (extendable by 2 months). The developer will construct the project in a period of 2 years and will run and maintain it for a period of 30 years. After 30 years, the project will be transferred back to the State Government at Zero Cost.

Project Proponent

- Project Company / Developer / Operator: MSK Projects (India) Limited
- Legal Status of Project Company: Implemented on developer balance sheet
- EPC Contractor: MSK Projects (India) Limited
- O&M Contractor: MSK Projects (India) Limited

Project Description

Dewas Industrial Water Supply Project has been planned for supplying approximately 15MLD water initially and thereon gradually increasing up to 23MLD treated water for next 30 years. The supply of water from the proposed project will be made available to industries. The company will supply water to the Industries after treating it as per specifications of CPHEEO for drinking water. Almost 59 Large and Medium Scale Industries and 400 Small Scale Industries will be benefited and the development of Industrial Area especially at Dewas, Sia and Ujjain Road will get a big boost by this Project.

Project benefits and costs

The total project cost is Rs.77.58 crores. There is no government subsidy/grant envisaged for the project.

Legal Instruments

The PPP model is BOT-Toll. The Government of Madhya Pradesh (GoMP) or any Governmental Agency shall not supply water in the Project area. No ground water extraction shall be carried out in the project area. MPSIDC is administering the concession, contract and user fees. The Concessionaire shall pay to MPSIDC 1% of Revenue collected as Project Monitoring Fee.

Financial Structure

The total project cost is Rs.77.58 crores.

- Debt : Equity - 76% : 24%
- Government Equity - Private Equity - 0% : 100%

4. Ghaziabad Industrial Water Supply Project

Uttar Pradesh is one of the industrial states where the water management is at the critical stage and needs attention from the government. The Government of Uttar Pradesh has proposed various infrastructure projects under the PPP model. Ghaziabad is primarily an industrial city with manufacturers in railway coaches, diesel engines, electroplating, bicycles, picture tubes, tapestries, glassware, pottery, vegetable oil, paint and varnish, heavy chains, automobile pistons and rings, steel pharmaceuticals, liquor, etc. It is one of the most industrialized cities in Uttar Pradesh. The district Ghaziabad, a growing industrial city, has an important place in industrial development in Uttar Pradesh. Industries are divided into three categorized depending upon production, employment and turnover.

- Small Scale Industries
- Medium Scale Industries
- Large Scale / Heavy Industries

The industrial areas considered under the project are as follows:-

- Sahibabad Industrial Area
- Mohan Meakin Industrial Estate
- Loni Industrial Area
- Meerut Road industrial Area
- Bulandshahar Road industrial Area

Key Players in the Project

Uttar Pradesh State Industrial Development Corporation (UPSIDC) along with the Private Developer are the promoters of the project. They have jointly established a Special Purpose Vehicle (SPV), Ghaziabad Industrial Water Supply Corporation Limited (GIWSCL).

Funding Structure

- Government funding – 20%
- Private Developer – 80%

Private Developer-Funding Structure

- Debt – 70%
- Equity – 30%

The Operations and Maintenance of the project is the responsibility of the Private Developer. The concession agreement provides for recovering, over a period of time, the capital cost and the cost of operation and maintenance.

Cost of Project

Cost of project consists of broadly following components:

- Cost of Construction
- Preliminary expenses
- Preoperative expenses like Administration and establishment, legal and audit fees etc.. The Total Project Cost considered is Rs.500675000

Interest Rate for long term debts and Repayment

The interest rate considered for the debt is 12% per year and the repayment will be done in ten years.

Depreciation

The depreciation considered for the project is at the rate of 5% per year based on straight-line method.

Pricing and Cost recovery

Water will be supplied to the industries in Ghaziabad through the River Yamuna, which is a perennial source. The initial price charged by GIWSCL for the water supply to these industries is Rs.18 per kiloliter. The price will increase by Rs. 2, every five years starting in the year 2017 to the year 2032. The industries are required to provide bank guarantee of three months to GIWSCL, thus ensuring off take of water. Every year, the bank guarantee has to be renewed and it is linked to the amount of water drawn by each industry. The details are as follows:-

Year	Price per kiloliter
2013	Rs.18
2017	Rs.20
2022	Rs.22
2027	Rs.24
2032	Rs.26

The concession agreement provides for recovering, over a period of time, the capital cost and the cost of operation and maintenance.

Operations and Maintenance Cost

The following are the subheads in the Operations and Maintenance Cost and the assumption with respect to its increment per year is mentioned in the following table: -

	Abstract O & M Budget	Annual Increment
I)	Establishment Charges	5.00%
II)	Annual Electricity Charges	0.50%
III)	Repair and Maintenance	1.00%
IV)	Consumables	0.50%
V)	Transportation and communication	3.00%
VI)	Testing, Report generation and other stationery	2.00%

Recharge Cost: - The recharge cost considered is 1% of the Total Project cost per year i.e. Rs.5006750.

Revenues

The main components considered under revenues are:

- Revenues from the sale of water
- The connection Charges

Taxes

- The project has been exempted from tax on pipes used for carrying water from a water supply plant to a storage facility to be extended to all pipes of diameter exceeding 200 mm used in water supply systems.
- The tax rate considered is 33.99%.

Concession Agreement

- The agreement provides that GIWSCL shall abstract raw water from the River Yamuna up to a maximum of 20 MLD. The water supply will be dedicated to the various industries in the Industrial areas of Ghaziabad.
- The term of the agreement require the Empowered Authority (EA) formed by the Government of Uttar Pradesh and the Uttar Pradesh State Industrial Development Corporation (UPSIDC), specifying GIWSCL as the entity with exclusive rights to abstract raw water, develop, finance, design, construct, own, operate and maintain the Water Treatment Facility, pipelines and water work in order to provide Water Treatment and supply services within the Service area.
- The concession agreement provides for total cost recovery along with returns during the period (25 years) of the concession. If there is a shortfall, the Concession shall stand extended (to 28 years), so as to ensure recovery of the outstanding total cost of the project and return. Upon termination of the concession period, GIWSCL shall transfer the project back to the Uttar Pradesh State Industrial Development Corporation (UPSIDC) at Zero Cost. An extension of the concession period can be granted by the Empowered Authority (EA) if the total cost has not been recovered.

Analysis

We evaluated risk with changes in demand, tariff & construction cost, and equity.

SCENARIO ANALYSIS					
Scenario	Cost of Construction	Tariff Rate	Interest Rate	Project IRR	Equity IRR
	%	Rs./kl	%	%	%
Most Pessimistic	10.00%	15.00	13.00%	13.10%	3.35%
Base Case	0.00	18.00	12.00%	17.89%	8.62%
Most Optimistic	-10.00%	21.00	11.00%	23.71%	16.15%

Variation in cost of construction, tariff rate and interest rate have a negative impact in the Project IRR, decreasing it to 13.10% from 17.89% and the Equity IRR decreasing to 3.35% from 8.62% for project overruns.

How does equity change the risks and returns associated with PPP.

EQUITY SCENARIO ANALYSIS				
	Funding Options			
	Government funding	Business Developer	Equity IRR	Equity NPV
Scenario I	10%	90%	6.81%	45,131,646
Scenario II	20%	80%	8.62%	21,005,059
Scenario III	30%	70%	10.99%	87,141,763

Note:-	
Private Developer	Funding Option
Debt	70%
Equity	30%

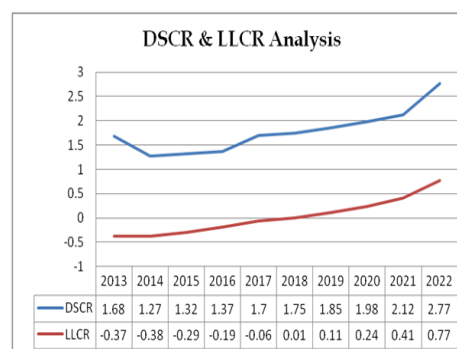
Variation in demand and demand mix can have a significant impact on the viability of the water PPP projects.

DEMAND SCENARIO ANALYSIS		
	Present Demand Scenario	Pessimistic Demand Scenario
	Positive Growth at the rate of 5% every 5 years till 2032	Negative Growth at the rate of 2.5% every 5 years till 2032
Project IRR	17.89%	16.02%
Equity IRR	8.62%	5.36%

From project finance perspective, following ratios are useful to evaluate the viability of the water PPP projects.

Loan life coverage ratio (LLCR): measures the cash flows available during the loan period that can service the outstanding debt obligations. Higher the ratio is better.

Project life coverage ratio (PLCR): measures the cash flows available during the life of the project that can service the outstanding debt obligations. For lenders this is a useful measure, higher the ratio better it is.



LLCR in the initial years are –ve indicating the highly geared nature of infrastructure projects with high capital investment and cash outflows and higher debt obligations to service. The cash inflows improve from 5th year onwards.

Bibliography

- Financing the boom in public-private partnerships in Indian infrastructure -<http://www.pppinindia.com/pdf/Gridlines-%20Financing%20PPPs%20India.pdf>
- Developing India's Infrastructure through Public Private Partnership -
www.muidcl.com/downloads/pppinitiatives.pdf
- India's Water Supply and Demand from 2025-2050 -
<http://www.iwmi.cgiar.org/publications/Other/PDF/NRLP%20Proceeding-2%20Paper%202.pdf>
- Public-Private Partnerships in Water Sector -
http://www.manthan-india.org/IMG/pdf/PPPs_In_Water_Sector_Final_Book.pdf
- PPP in water Sector - IIFM, Bhopal -
http://www.indiaurbanportal.in/bestpractice/books/ppp_watersector_bhopal.pdf
- Tirupur Water Supply Project -
http://www.ilfsindia.com/downloads/bus_rep/tirupur_watersupply_rep.pdf
- Visakhapatnam Industrial Water Supply Project -
http://www.ilfsindia.com/downloads/bus_rep/visakh_industrial_rep.pdf

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