Asia • India

Water for All: New Tirupur Area Development Corporation Ltd. (NTADCL)

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Sector • Water & Sanitation
Enterprise Class • Large National
Summary

Water is essential to the survival of all humankind, and access to quality water is a daily fight for the many people living in developing economies where the poor often spend several hours and a major portion of their earnings on getting basic quantities of water. Compared to western economies, India had specified only a modest 55 litres per day (lpd) per person in rural areas and 110 lpd in urban areas. The Indian Prime Minister’s Council on Trade and Industry that dealt with infrastructure conceded that over 20 percent of urban households had no access to drinking water, while pointing out the large-scale inequalities in the distribution of water. The Council also pointed out an unacceptably high level of “unaccounted for water” (UFW) in India at 40 percent, compared with the global norm of around 15 percent. UFW and India’s efforts to expand water availability soon became too expensive to sustain. Thus, the Indian water problem boiled down to three causes: one, inadequate resources to subsidize water availability and distribution; two, failure of subsidy mechanisms in the water sector; and three, inefficient distribution and lack of responsible use. In the southern Indian state of Tamil Nadu, the government floated a company called New Tirupur Area Development Corporation (NTADCL) to tackle the water and sewerage problems of a large textile industry that depended on exports and the predominant emigrant labour community that lived in both townships and slums. The company, formed in 1995, first successfully launched distribution in early 2006.

Introduction: Water Supply in Tirupur

Tirupur is a town situated in the western part of Tamil Nadu, the southern-most state in India. Tirupur had a population of 351,501, according to the population census of 2001. In addition, it was estimated to have a floating population of 150,000. Tirupur has developed as a textile center, specializing in the manufacture and exportation of knitted garments and textiles. Tirupur’s revenue earning through exports was reported to be in the order of US$1 billion per annum in the year 2005. Tirupur is an industrial town in which 2,500 knitting units, 579 dyeing and bleaching units, 300 printing units, 150 embroidery units and nearly 200 other ancillary units were located in the mid-1990s. Water is a critical input for textile processing, particularly bleaching and dyeing. The survival and growth of the textile industry depends on the availability of an adequate supply of good quality water.

1 “Norms for giving drinking water to villages relaxed,” The Tribune, 26 June 2004
2 1 USD is approximately equal to 45 Indian rupees (Rs).
3 Unit is the term that refers to a production facility. A company may own or run more than one unit, but the infrastructure services like water and electricity are provided separately to each unit.
4 Source: ESA report
Historically, the water supply in Tirupur did not meet the needs of both industry and domestic households. There was an existing piped network that supplied households within Tirupur municipality, but it was far from adequate in meeting the household demand. The industries had to find other means to meet their water requirements. Moreover, the polluting nature of the bleaching and dyeing activities contaminated the groundwater resources, which resulted in the limited availability of usable groundwater in the vicinity. Industry procured water from private sources that extracted groundwater from locations within a 50-kilometer radius around Tirupur and transported the water in tankers for delivery at the door-steps of industrial clients. The water had to be further treated to make it fit for consumption, even for industrial purposes. These transactions resulted in severe supply constraints and increases in cost, in the order of Rs 75 to 80 (US$1.67 to $1.78) per kilolitre (KL). This cost is relatively high compared with the Rs 62 (US$1.37) per KL in Chennai and Rs 60 (US$1.33) per KL in Bangalore paid by industrial users.

The water supply to households was erratic. It was available only for a few hours at a time and only once in three or four days, sometimes as infrequent as once in seven days. Against the norm of 110 lpcd (litres per capita per day), prescribed by the Tamil Nadu government, the households could actually get only 50 lpcd. The Tirupur exporters, represented by Tirupur Exporters Association (TEA), also realized that, in order to meet the increasing demand for their products on the international market, their production activities had to become more efficient and had to overcome the severe constraints of water availability.

The Genesis of New Tirupur Area Development Corporation Limited

The Tamil Nadu government co-opted the services of Infrastructure Leasing & Financial Services Limited (IL&FS), a private sector organization involved in the financing of infrastructure projects. With IL&FS taking the lead, the idea of a public-private partnership to construct and operate the infrastructure required to provide an adequate supply of good quality water to the Tirupur industries was born. Given the political sensitivity surrounding private sector participation in water infrastructure, the government was keen to look at the issue from a broader perspective and ensure that the initiative resulted in benefits to a large cross section of people. Thus, a comprehensive Tirupur Area Development Program (TADP) was developed to upgrade the infrastructure in the Tirupur industrial cluster (See Figure 1 for Tirupur Water and Sewerage Project coverage).

The TADP examined many aspects of Tirupur’s infrastructure, including roads, telecommunications, electricity, effluent treatment, water supply, women’s working hostels, Research and Development Centers and logistics management systems. Through a process of extensive stakeholder consultation, the provision of a consistent supply of good quality water emerged as the top priority. Based on the consensus that emerged among the stakeholders, the

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6 The norm is as stated by the NTADCL. However, UNDP, in its Human Development Report (2006), states that every person should have a human right to at least 20 litres of water each day.
TADP included in its scope the implementation of water supply, a sewerage system (within the Tirupur municipal area), sewerage treatment and low-cost sanitation for slums with approximately 80,000 people (within the Tirupur municipal area).

The project was to be implemented in a commercial format, and the industries in the area agreed that the recovery of all investments would be made through user charges. The support of the government of Tamil Nadu and Tirupur municipality was enlisted for this initiative.

IL&FS was entrusted with the responsibility of planning out the detailed implementation of the project. IL&FS came up with an implementation structure for the project, based on a public-private partnership (PPP) model. Specifically, a Build Own Operate Transfer (BOOT) model was proposed and accepted by all stakeholders. Under this structure, a special purpose vehicle (SPV), called New Tirupur Area Development Corporation Limited (NTADCL), was set up in 1997 as a public limited company under the Indian Companies Act. The initial shareholders in NTADCL were the government of Tamil Nadu, Tirupur Exporters Association and IL&FS. A board of directors comprising representatives of all stakeholders was constituted to manage NTADCL, and a professional management team was hired to manage the projects undertaken by NTADCL (See Appendix A for Timelines).

**Scope of the Project and Role of NTADCL**

NTADCL was expected to lay a 55 KM long pipeline to bring a new source of water to Tirupur and distribute to the industrial units there. However, as an outcome of the extensive stakeholder consultation, the project scope was expanded to include the supply of water to households in Tirupur Municipality, as well as wayside villages. Also, improving the water distribution network in Tirupur Municipality, low cost sanitation system for slums, a comprehensive sewage collection and a treatment system were added to the scope. A mechanism to implement cross subsidies that would effectively support the overall investment was developed to ensure the commercial viability of the expanded scope (see Appendix B for the scope and beneficiaries of the project; see Appendix C for a projection of long-term impacts on the poor).

The government of Tamil Nadu offered a concession to NTADCL to draw water from the Cauvery River flowing nearby. As a BOOT agency, NTADCL’s role was two-fold: first, it had to build the infrastructure required to draw the water from the source and distribute water to Tirupur industries and households within Tirupur Municipality, as well as the wayside villages. In addition, NTADCL was also tasked with the creation of the infrastructure necessary for sewage collection and treatment. The second role was to operate and maintain the infrastructure for a 30-year period after commissioning and then hand it over to the government of Tamil Nadu.

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7 A Special Purpose Vehicle (SPV) is a legal entity created by the government for accomplishing a very specific purpose. In this case, it is a company incorporated under The Company’s Act, whose capital has been jointly subscribed to by the government and private entities.
IMPLEMENTATION STRATEGY
NTADCL divided its Phase 1 (water infrastructure) scope into three packages to be contracted out for execution through an international and competitive bidding process. The three contracts were divided in the following way:

1. Engineer Procure Construct (EPC) 1: build the water intake, the transmission line from the river to Tirupur and the master balancing reservoir
2. EPC 2: build the main feeder pipelines and distribution networks, overhead and ground level storage tanks and the sewerage network in the Tirupur town area
3. Operation and Maintenance: operate and maintain the finished facility over the stipulated period of thirty years.

The sewerage and sanitation side consisted of laying 118 KM of sewer line, building four sewerage pumping stations, one 30 MLD capacity waste treatment plant and 36 low-cost toilets. By the end of 2006, sewer lines had been laid, 90 percent of work on the sewerage pumping and treatment plants was complete, and the first few toilets in the slum areas had been commissioned. By early 2007, households were served notices by the municipality asking for deposits to connect the house to the sewer line. Community self-help groups were approached to run the low-cost toilets along the lines of some other successful government sponsored toilet schemes near the Tamil Nadu state Capital of Chennai.8

BASIC CHALLENGES AND BARRIERS
The Managing Director of NTADCL suggested that the most challenging aspect of the project had been the drawing up of various contracts and the enormous amount of time and effort spent on balancing the needs of all stakeholders. The outcome had to be a balance of sustainable structure, including roles and responsibilities that converge towards a viable initiative. The project required a lot of explaining on the part of the municipality to convince the poor of the net benefits. Finally, the private players had to be convinced to invest in a project where no safety net from the government side was forthcoming.

FINANCING OF THE PROJECT - AN INNOVATION
Once the scope of the project was delineated, the total capital cost of the project was estimated at INR 10,230 million (approximately US$250 million). NTADCL had to raise this money through financial institutions, banks and private equity funds on commercial terms. Apart from Tirupur Exporters Association and IL&FS, NTADCL attracted equity investments from a private equity fund and a consortium of private entities involved in the project as contractors. Similarly, loans were raised from leading banks in India, along with a USAID guaranteed debt from the international market. In addition, subordinated debt was provided by IL&FS. In terms of financial structures, the public-private partnership was designed to operate at two levels. A new entity, called Tamil Nadu Water Investment Corporation (TWIC), was set up as a joint venture between the government of Tamil Nadu and the IL&FS to pool the resources brought in by each entity. The pooled resources were then directed as equity by TWIC into NTADCL, which in turn raised further investments from other private

8 Interview with Commissioner of Tirupur Municipality on 16 March 2007
sources mentioned above (see Appendix D1 and D2 for the financial and shareholding structure of NTADCL).

COST RECOVERY, TARIFFS AND SUBSIDIES
The initial tariff, and the basis and procedure for subsequent revisions in tariffs, was specified in the concession agreement. The outcome was a tiered structure whereby the water tariff for industrial use was the highest. The tariff for households in Tirupur municipality is only a fraction of the tariff set for the industry, and the tariff set for rural households was even less than the Tirupur households. This graded tariff was determined by factoring in the purchasing power of the different consumers governed under each tariff rate. The water supply network was also designed to eventually supply directly to industries outside the Tirupur municipality. Within the Tirupur municipality plans are under way to separate out the industrial supply network from the household supply network.\footnote{This is primarily a technical issue. The industries do not want chlorinated water whereas the households do. Also, within the municipality a majority of the industrial customers are concentrated in one or two localities. Therefore, it is feasible and practical to supply to these industries directly.}

As per the concession agreement, the tariff for industry could be revised annually, while the tariff for households could be revised once every three years. The initial formula clearly specified the relationship between operational costs and published indices such as the consumer price index. All proposals for tariff revision are to be certified by an independent auditor and then submitted for approval to the tariff committee, a specially empowered body comprising a nominee from NTADCL, government of Tamil Nadu and a retired high court judge as the chairperson. Arbitration is possible in the event of a disagreement between the parties.

The tariff structure imposed a cross-subsidy on the industrial consumers of Rs 26.5/KL for rural households and Rs 25/KL for urban households. The annual subsidy borne in 2006 was Rs 650 million (US$16.25 million). The industry was motivated to cross-subsidize because the opportunity cost of water was put at Rs 80/KL. Apart from the cross-subsidy built into the tariff structure, there were no other subsidies (See Appendix E for tariff structure).

ALLOCATION OF RESPONSIBILITIES
Through the concession agreement, the government of Tamil Nadu assumed responsibility for making water available at the source: the river Cauvery. As a BOOT agency, NTADCL owned all the assets and was the primary manager for all service contracts, both EPC and operations and maintenance (O&M).

Tirupur municipality was also a party to the concession agreement. NTADCL purchased water under the concession agreement from the government and sold the water in bulk to the Tirupur municipality for distribution among its consumers within the Tirupur municipality area. The Tirupur Municipal Corporation was, in turn, responsible for the collection of tariffs and the distribution to individual consumers. The O&M contractor was responsible for the upkeep of the distribution network outside the Tirupur municipality area and was paid a fee
that included, apart from a basic fee, variable compensation linked to performance parameters such as efficiency, leakage and quality of water. Tirupur municipality was responsible for incremental capital expenses that were required for the expansion of the distribution network and its upkeep within the area.

NTADCL was also responsible for supplying water to the wayside villages around semi-urban areas, as earmarked in the project, and directly to the industrial consumers outside the Tirupur municipality area. NTADCL was also responsible for the incremental capital expenses required for the upkeep of the network. Operation and maintenance of the network was contracted out by NTADCL to a professional private agency, except within the Tirupur municipality area, where the municipality itself took care of these aspects. The staff of the municipality was specially trained by NTADCL to take on this responsibility.

**SHARING AND MANAGEMENT OF RISKS**

The project was designed to minimize risk on all fronts:

- The tariff fixing mechanism was designed for operating costs to be recovered and ROI targets met by incorporating all elements of cost, including the capital costs. By setting out a comprehensive basis for tariff revisions upfront, risks of undercharging of services were minimized.

- Risks of depriving water to those with limited purchasing power were addressed by building a cross-subsidy into the tariff structure.

- NTADCL used state-of-the-art technology to build the infrastructure, aiming for maximum efficiency in the water supply scheme. NTADCL has attempted to reduce the risks due to operational inefficiencies by placing the O&M responsibility in the hands of a competent private agency and contractually binding them through performance related payments.

- The project was seen to be demand-driven in the sense that the project itself was in response to the demands of the industrial users. The industrial customers accounted for a large portion of the demand in physical terms and an even greater share of the revenue associated with the projected demand, due to the tariff structure.

- It was not clear how the risk resulting from a shortfall in off-take of water was covered since the project was heavily dependent on industrial demand sustained over a thirty-year period. The same applied to the shortage in the availability of water due to climate changes, low rainfall and other vagaries of nature.

- However, the government of Tamil Nadu provided separate funds to deal with unforeseen financial risks. A debt service reserve fund of Rs 500 million and a Water Shortage Period Fund of Rs 710 million were set aside by the state government to deal with these risks.
MANAGING THE STAKE-HOLDING ENTITIES AND THE RELATIONSHIP BETWEEN THEM

The NTADCL is a board-managed company with all stakeholders represented: the government (representing all consumers including the poor), the private investors and the industrial consumers. The board structure was designed to ensure that the interests of all stakeholders were taken into consideration during decision making. Exhaustive legal contracts, such as the shareholders agreement, loan agreements, the concession agreement, the bulk water purchase agreement and O&M contract agreement (not a complete list), had been brought to the parties concerned to clearly lay down the rights, responsibilities and obligations of each stakeholder. In an interview to a website in May 2006, NTADCL Managing Director, Sameer Vyas, commented on the nature of conflicts that he came across while working on the project: “There has been no conflict whatsoever with either the residents of Tirupur or the local bodies. For us the very basic objective is that the project is there for the next 30 years. You don’t look at residents of Tirupur as the people on the other side of the table. This is their project, it is for them. We have tried to move forward on that collaborative basis. There have been absolutely no misunderstandings and no problems. On the other hand they make demands on us. We try to accommodate it. We look at it as a community sort of project and don’t approach it as a private infrastructure company. Water is a sensitive subject.”

Impact of the project: Current & Future

NTACDL started supplying water in July 2005, and the wastewater treatment plant was commissioned in February 2006. Subsequently, stakeholders experienced positive impacts, which are expected to increase.

IMPACT ON THE POOR

Prior to this project, on average, the Tirupur municipality was supplying water once every three to four days (during the worst times it was once every ten days, and it was every other day at best). People had to manage by buying water from private sources. However, the private suppliers depended on ground water, which was of very poor quality due to the industrial effluent. After the commencement of water supply by NTADCL, the Tirupur municipality was able to provide water supply every alternate day and are hopeful of starting daily supply soon.

Prior to NTADCL there were 43,000 household connections. The Tirupur municipality installed 8,000 new connections and has the capacity to add 17,000 more. With the increase in quantum of water available through the project, the municipality is seeking to extend the coverage of water supply to households by increasing the number of connections. The water tariff for households serviced by Tirupur Municipality increased from Rs 4 to Rs 6 per KL for households and from Rs 10 to Rs 15 for commercial establishments. And the initial deposit

10 Available at http://www.projectsmonitor.com/detailnews.asp?newsid=11171
payments for securing a new connection for households has been increased from Rs 2,000 to Rs 5,000 (approximately US$45 to $115) and for commercial premises from Rs 5,000 to Rs 10,000 (approximately from US$115 to $230). Appendix E provides a detailed comparison of before and after scenarios with regards to water supply and tariffs by NTADCL.

The municipality has also stopped servicing 600 public taps, which it was doing earlier, in those areas where new direct connections have been provided to houses. In all other areas where house connections have not been provided, and in the slum areas, water was being supplied free by the municipality through tankers as a temporary measure until the coverage can be extended.

The increased availability of water seemed to have quelled reservations, and the Tirupur municipality maintained that it had not been met with any serious resistance in terms of collection of deposits or tariffs. According to the Commissioner of Tirupur Municipality, water related agitations and protests by the poor residents, which used to be an almost daily occurrence at Tirupur, completely stopped once the water supply commenced because of this project. Through discussions with officials of the municipality, Tirupur Exporters Association confirmed that the problems relating to water in Tirupur had been one of inadequate availability and supply and not cost. The general impression was that people would pay for a reliable supply of good quality water. More importantly, even the households along the wayside villages and semi-urban areas will get access to good quality water through this PPP initiative. When the pipeline was being laid, some of these villages approached NTADCL with a request that they be provided with extensions from the main pipeline. Although not part of the project scope, NTADCL obliged.11 (See Appendix E1 and E2 for a before and after comparison)

GOVERNMENT OF TAMIL NADU
For the government of Tamil Nadu a world-class infrastructure asset was created and handed over to them at a fraction of the estimated cost to the government. The financial investment of the government was leveraged by almost nineteen times (as seen from the financial structure, which was made possible mainly due to the pooling of private and public resources under the PPP initiative).

TIRUPUR EXPORTERS
As prime beneficiaries, the Tirupur textile units started getting an adequate supply of good quality water, and the situation was likely to improve as the project moved towards full capacity. Further progress was anticipated as tariff-related issues were ironed out, and the infrastructure to deliver water directly to industries within the municipality area got put into place. In the absence of water related concerns, the exporters were free to concentrate on the expansion of their businesses and meeting their global competition.

11 Interview with Sameer Vyas, MD, NTADCL on 21 November 2006
However, since the middle of 2006, there has been increased enforcement of effluent pollution standards on dying units.\(^{12}\) They were now required to process the effluent before releasing it. This had increased their operating costs and several units had been forced to shut down. As a result, the actual water off-take decreased to 75 mld, an amount significantly less than the demand of 108 mld as NTADCL anticipated. NTADCL tried to enlist new industrial customers from those that still purchased water from private tanker trucks and other alternative sources.

NTADCL also slashed the industrial tariffs from Rs 45 (approximately US$1) to Rs 23 per 1,000 litres in July 2005. By February 2006, the tariff was increased to Rs 35. A ten percent discount was installed for users drawing beyond their declared amount.

**TIRUPUR MUNICIPALITY**

The Tirupur municipality received adequate water and an upgraded infrastructure to distribute the water to its household customers. Tirupur municipality was also getting a sewerage system that would cover 60 percent of the town, one of the highest coverage rates in India. Also, the slum areas in Tirupur were getting low-cost sanitation services through this initiative.

**Salient features of the NTADCL from the perspective of the public-private partnership**

The project was in response to an articulated demand from the industrial users, who were willing to pay for the services if they could be made available. The compelling economic need to sustain a highly productive and entrepreneurial industrial area has been turned into an opportunity to provide the basic water supply to the public at large in this and surrounding areas. This aspect of industrial demand triggering a water supply scheme that would serve consumers at the household level, including the poor, is quite different from the many cases of private participation in water supply discussed in standard economics and public policy literature with all the attendant issues of equity and viability.\(^{13}\)

The strongest and the most innovative part of the PPP was the institutional and financial structuring of the initiative (See Appendix F). The lead private sector partner, IL&FS, was a share-holder in the holding company (TWIC) through which the equity was held in the operating company, NTADCL. The operating company had other private and public entities...

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\(^{12}\) On 25 July 2005 the Tamil Nadu Pollution Control Board, under directive from the Madras High Court, ordered disconnection of electricity to 422 dyeing units in Tirupur that had failed to take steps to install specified effluent treatment equipment to treat waste water (http://www.hinduonnet.com/2005/07/26/stories/2005072614070100.htm)

\(^{13}\) In a PPP water project in Brazil, 67 percent of water was consumed by residential accounting for 57 percent of the revenue; whereas, in Tirupur, only 32 percent of the water went to households with 94 percent of the revenue coming from non-residential customers. Prices in Brazil were fixed by legislation, while in Tirupur there was an institutional process in place for price review (Available at http://siteresources.worldbank.org/INTMF/Resources/339747-1105651852282/Vyas.pdf)
as shareholders and lenders, and IL&FS was also one of the lenders. Thus, by embedding the involvement of the private and public entities at multiple levels, the spirit of public and private partnership was comprehensively reflected in this initiative. Such a structure had also imparted high credibility to the project and resulted in the project managing to pool together the required financial resources of the order of 10,230 million INR. All the beneficiaries of the project were also stakeholders in the operating company.

Criticism for the project, although muted, had been mainly restricted to the 600 public taps that had been closed in the town. However, as stated earlier, these closures were mainly in the areas where direct-to-house water connections had been provided under the project. In the slum areas, and wherever water connections to the houses had not been provided, water was being supplied free of cost by the municipality through tankers. The industry and the government had reasons to feel happy. For the investor and the operator, the tariff mechanism provided them with confidence. Only time will tell whether the investors realized the 20 percent targeted returns.

Conclusion

The journey, so far, has not been easy for the initiative. From the time the idea was conceived, it has taken twelve years to reach the current stage where the infrastructure has been created and distribution has commenced (see Appendix A). NTADCL has all of the ingredients of a successful public-private partnership. The planning and the first phase of execution, namely the creation of infrastructure, have been completed. The real impact has begun to unfold as the project celebrated one year in February 2007. Water privatization is a very sensitive issue in many parts of the world. In Tirupur, there were voices that were heard that were critical of the project. “However, when the beneficiaries actually saw water flowing in the pipes in early 2006, protests stopped,” explained one official of the Tirupur municipality.14 For many area residents, it was water at a price as opposed to having no water. Hence, in Tirupur, the NTADCL project was progressing without much of a public outcry over private participation in water distribution.

14 Interview with Municipal Commissioner of Tirupur on 16 March 2007
References


Interviews


Asokan, M. Commissioner of municipality of Tirupur. 9 January 2007.

Sakthivel, S. Executive Secretary, Tirupur Exporters Association. 9 January 2007.
Appendix A: NTADCL Project Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>Project Announced</td>
</tr>
<tr>
<td>1995</td>
<td>Tender Decided</td>
</tr>
<tr>
<td>1999</td>
<td>SPV Formed</td>
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<tr>
<td>2002</td>
<td>Civil/mechanical Work Completed</td>
</tr>
<tr>
<td>2004</td>
<td>March: Pipeline Testing</td>
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<tr>
<td></td>
<td>April: Treatment plant commissioned</td>
</tr>
<tr>
<td>2005</td>
<td>August: Tirupur received water</td>
</tr>
<tr>
<td>2006</td>
<td>Wastewater plant completed and project wins Global Water Award</td>
</tr>
</tbody>
</table>

Source: water-technology.net (http://www.water-technology.net/projects/tirupur/specs.html)

Appendix B: Scope and Beneficiaries of the Project

Scope of the Project: Under the project, facilities will be constructed to provide water supply access to the Tirupur Local Planning Area. This includes:

**Water Service Area**
- Urban Population: 346,551 (2001 Census figure)
- Rural/semi urban population: 400,266 (2001 Census figure)
- Industry: 730 units

**Water Consumption**
- Industrial Unit (total) (projected/revised/actual in Feb. 2006): 125 mld / 108 mld / 55 mld
- Domestic consumers (total) (projected/actual in Feb. 1, 2006): 60 mld/N.A.

**Sanitation Coverage**
- 60% of the households to be covered by piped sewer
- 88 slums within the municipality

## Appendix C: Projected Long-term Impact of the NTADCL Project

<table>
<thead>
<tr>
<th></th>
<th>Direct Income Impact</th>
<th>Employment Impact</th>
<th>Health Impact</th>
<th>Environmental Regeneration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Local GDP to increase by 100%</td>
<td>Additional 200,000 jobs*</td>
<td>Significant fall in water borne diseases*</td>
<td>Ground water contamination to be reversed</td>
</tr>
<tr>
<td></td>
<td>Below median income to increase by 200%*</td>
<td></td>
<td>Average health spends per family to fall by 60% for below median income families*</td>
<td>Establishment of water bodies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wasteland recovery of up to 200,000 hectares</td>
</tr>
</tbody>
</table>

* Denotes direct likely impact on the poor

Source: “Financing Export of services- A Perspective”. A presentation by Hari Sankaran of IL&FS, an NTADCL project partner and equity investor.

Appendix D1: Project Structure of NTADCL Water Project in Tirupur

Source: "Financing Export of services- A Perspective". A presentation by Hari Sankaran of IL&FS, an NTADCL project partner and equity investor. Available at:

Appendix D2: Financial and shareholding structure of NTADCL

(All figures in INR million)

<table>
<thead>
<tr>
<th>Cost of Project</th>
<th>10,230</th>
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<tr>
<td>(Capital) Financing Structure</td>
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<tr>
<td>Equity</td>
<td>3,227</td>
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<tr>
<td>Senior Debt</td>
<td>665</td>
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<tr>
<td>Subordinate Debt</td>
<td>6,138</td>
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<tr>
<td><strong>Total Financing</strong></td>
<td>10,230</td>
</tr>
</tbody>
</table>

Investors in NTADCL

**Equity Holders**

- TWIC (Holding Company of Go TN and IL&FS) 1,050
- AIDE Fund (Mauritius) 900
- Wilbur Smith/Mahindra & Mahindra/United Utilities Consortium 450
- Life Insurance Corporation 200
- General Insurance Corporation 150
- Tirupur Exporters Association 100
- Others (Underwritten by TWIC) 377

**Total Equity** 3,227

**Senior Lenders**

- Industrial Development Bank of India 750
- Small Industries Development Bank of India 600
- Life Insurance Corporation 400
- Central Bank of India 300
- IL&FS (USAID Line of Credit) 900
- IL&FS (Others) 900
- Indian Overseas Bank 250
- State Bank of India 500
- Punjab National Bank 150
- State Bank of Hyderabad 100
- Bank of Baroda 200
- General Insurance Corporation 150
- State Bank of Patiala 100
- Bank of India 100
- Canara Bank 488
- Oriental Bank of Commerce 250

**Total Debt** 6,138
Sub-Ordinate Debt

IL&FS 665
Others (Underwritten by TWIC) 200
Total Sub-ordinate debt 865

Total Financing 10,230

Capital Structure of TWIC

<table>
<thead>
<tr>
<th></th>
<th>Equity</th>
<th>S-Debt</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Government of Tamil Nadu</td>
<td>300</td>
<td>250</td>
<td>550</td>
</tr>
<tr>
<td>IL&amp;FS</td>
<td>350</td>
<td>150</td>
<td>500</td>
</tr>
<tr>
<td>Total</td>
<td>650</td>
<td>400</td>
<td>1,050</td>
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Appendix E1: Water Tariff of NTADCL (INR)

Impact on Deposits

<table>
<thead>
<tr>
<th>Establishment</th>
<th>Original Deposit</th>
<th>Revised Deposit</th>
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<tbody>
<tr>
<td>Households</td>
<td>2000</td>
<td>5000</td>
</tr>
<tr>
<td>Commercial</td>
<td>5000</td>
<td>10000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Old Price/KL</th>
<th>New Price/KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Households</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households in Tirupur Municipality</td>
<td>5 per KL</td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td></td>
<td>3.5 per KL</td>
</tr>
</tbody>
</table>

15 The price for industries was revised downward to Rs 23 on 1 July 2005; subsequently, it was revised upward to Rs 5 on 1 February 2007
## Appendix E2: Comparison of before and after scenarios with regard to water supply to Tirupur by NTADCL*

<table>
<thead>
<tr>
<th>Water</th>
<th>Before NTADCL</th>
<th>After NTADCL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of household connections</td>
<td>43,000 connections were in existence</td>
<td>Planning to add another 25,000 connections, out of which nearly 8,000 have already been added as of March 2007</td>
</tr>
<tr>
<td>Frequency of supply</td>
<td>Once in 7 days</td>
<td>Currently on alternate days and will soon move to daily supply</td>
</tr>
<tr>
<td>Monthly water tariff for households with water connection</td>
<td>Approximately Rs 350 per month (Please see note below)</td>
<td>Approximately Rs 85 per month (using the same assumptions as in the case of before NTADCL)</td>
</tr>
<tr>
<td>Access for poor people without household connection</td>
<td>600 public taps, with the same frequency of supply as the household connections.</td>
<td>The public taps closed, and supply through tankers every alternate day and expecting to move to everyday supply at the earliest possible time. The Tirupur municipality is also expecting progress in regularizing unauthorized layouts (many of the slums are said to come under this category), which legally prevents them from providing household connections in these areas</td>
</tr>
<tr>
<td>Cost for poor people without household connection</td>
<td>Given that the public taps were supplying only once per week, there could have been a very heavy dependence on private sources. The cost could be similar to household with water connections. Actual expenses would have been in line with their ability to source from and pay to private suppliers. It is likely that the per capita consumption could have been well below the 90lpcd mark. Precise estimates are difficult and would involve too many assumptions.</td>
<td>Given that there is free supply from municipality through tankers every alternate day, the dependence on private sources must have come down drastically, as evidenced by the near absence of water related agitations in the town after the commissioning of the project. Corresponding to these changes, the cost could have also come down, since the share of supply from private sources would have reduced. For the same reason, per capita consumption could have also improved. Precise estimates are difficult and would involve too many assumptions.</td>
</tr>
</tbody>
</table>

### Sewerage

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Before NTADCL</th>
<th>After NTADCL</th>
</tr>
</thead>
<tbody>
<tr>
<td>No sewerage system</td>
<td></td>
<td>60% of the population in Tirupur municipality targeted to be covered</td>
</tr>
</tbody>
</table>
**Explanatory note on the estimation of water cost before NTADCL**

**Assumptions**

Assumptions have been arrived at based on available data from published sources, both from the government and private entities. The basis of each assumption, along with the source of data, is explained in the footnotes at the bottom of this page.

**Details of estimation**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of connections (households)</td>
<td>43,000</td>
</tr>
<tr>
<td>Population served through household connections</td>
<td>231,034</td>
</tr>
<tr>
<td>Average number of persons per household (population/connections)</td>
<td>5 (rounded off)</td>
</tr>
<tr>
<td>Consumption per month of each household: 30<em>5</em>90lpcd</td>
<td>13,500 litres</td>
</tr>
<tr>
<td>Supply from Municipality: 30<em>5</em>50lpcd</td>
<td>7500 litres</td>
</tr>
<tr>
<td>Associated cost (paid to municipality)</td>
<td>Rs 50</td>
</tr>
<tr>
<td>Supply from other private sources to each household</td>
<td>6000 litres</td>
</tr>
<tr>
<td>Associated cost @ 50 per KL (NTADCL estimate)</td>
<td>Rs 300</td>
</tr>
<tr>
<td>Total water cost per household</td>
<td>Rs350</td>
</tr>
</tbody>
</table>

---

16 An article in the Frontline magazine (21 April 2006) estimates that one third of the population in Tirupur lives in unapproved layouts, including an estimated 60,000 people in the slums. Tirupur town recorded a population of 346,551 as per the 1991 census.

17 There are different norms being talked about in this case. A paper authored by NTADCL (“Addressing Urban Infrastructure Needs of the Poor: The Tamil Nadu Experience” by Sameer Vyas, MD, NTADCL) refers to an accepted level of supply of 110lpcd, whereas discussions with Tirupur municipality indicated that they were targeting 90lpcd. The lower of the two figures has been taken for this computation.

18 The NTADCL paper referred to above estimates that the residents received only 50lpcd before NTADCL.

19 The private supply of water is an unorganized market. While the NTADCL paper referred to above indicates a very high figure of Rs 1000/KL. The Frontline article claims that the price of water per “kodam” (a local measure approximating 20 litres) is anywhere between Rs 0.50 and –Rs 1.25, which was in line with the estimates obtained locally from Tirupur. So, based on an average price of Rs 1.00 per kodam, the price of water from private sources works out to be Rs 50 per KL, which has been used in this computation.
## Appendix E3: Water tariffs in Tirupur municipality

<table>
<thead>
<tr>
<th>Consumer category</th>
<th>Before NTADCL (Effective Financial year 2000-01 to 2005-06)</th>
<th>After NTADCL (Effective 2006-07)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic drinking water to houses without metered connections</td>
<td>Flat rate of Rs 50 per month (approx US$1.1)</td>
<td>All connections to be converted into metered connections. Until the meters are fixed, the flat rate is Rs 72 per month</td>
</tr>
<tr>
<td>Domestic drinking water to houses with metered connections</td>
<td>Minimum charge of Rs 50 per month, for free supply up to 12,000 litres. For consumption beyond 12,000 litres, additional charges payable at the rate of Rs 4 per 1,000 litres or parts thereof. Additional charges of Rs 2 per month for maintenance of meters.</td>
<td>Minimum charge of Rs 72 per month, for free supply up to 12,000 litres. For consumption beyond 12,000 litres, additional charges payable at the rate of Rs 6 per 1,000 litres or parts thereof. Additional charges of Rs 4 per month for maintenance of meters.</td>
</tr>
<tr>
<td>Drinking water to Non-Domestic and Industrial Connections</td>
<td>Rs 1.00 per 1,000 litres or parts thereof, minimum charges of Rs 100 per month, and Rs 2 per month for maintenance of meters. (All consumption will be metered and there is no free supply in return for minimum charges as in the case of other categories)</td>
<td>Rs 10.00 per 1,000 litres or parts thereof, minimum charges of Rs 150 per month, and Rs 4 per month for maintenance of meters. (All consumption will be metered and there is no free supply in return for minimum charges as in the case of other categories)</td>
</tr>
<tr>
<td>Drinking water to Non-Domestic and Commercial Connections</td>
<td>Minimum charge of Rs 100 per month, for usage up to 10,000 litres, with additional charges payable at the rate of Rs 7 per 1,000 litres or parts thereof. Additional charges of Rs 2 per month for maintenance of meters. (All consumption will be paid for and there is no free supply in return for minimum charges as in the case of other categories)</td>
<td>Minimum charge of Rs 150 per month, for usage up to 10,000 litres, with additional charges payable at the rate of Rs 4 per 1,000 litres or parts thereof. Additional charges of Rs 2 per month for maintenance of meters. (All consumption will be metered and there is no free supply in return for minimum charges as in the case of other categories)</td>
</tr>
<tr>
<td>Non-potable water to Industrial utility</td>
<td>None specified</td>
<td>Rs 60 per 1,000 litres, and supply subject to availability of water</td>
</tr>
</tbody>
</table>

Source: Notification of Tirupur municipality, dated 8 March 06
Appendix 6: Private and Public players in the PPP Model

[Diagram showing the relationships between different entities involved in the PPP model, including NTADCL (New Tirupur Area Development Corporation Ltd.), IL&FS, TWIC (Joint Venture), EPC1, EPC2, O&M, and other investors such as USAID and private equity fund.]
Figure 1: Coverage Map of Tirupur Water & Sewerage Project

Source: Tirupur Municipality
September 2007

The information presented in this case study has been reviewed and signed-off by the company to ensure its accuracy. The views expressed in the case study are the ones of the author and do not necessarily reflect those of the UN, UNDP or their Member States.

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