- In 2012, protesters urged the city to cancel its agreement with Jusco. Their concerns centered on insufficient access to drinking water, unsatisfactory progress in the modernization project, and high water bills.

This project highlights the following:

- A well-structured PPP should ensure that both parties have appropriate incentives to ensure the long-term success of the project. In this case, the private company did not directly invest in the project and so had little incentive to protect and renegotiate the project contract after discovering the data discrepancies.
- If public employees will be transferred to management by the private partner, the municipality should closely engage with these stakeholders and carefully consider how best to facilitate this transition.
- Pricing must always be determined in an equitable and transparent manner, with due regard for the willingness and ability of end-users to pay Public opinion, in this case expressed through protest, was that the higher water bills were not justified by improved service levels, leading to dissatisfaction among the population.[51]

## Wastewater Treatment

### 24. Waste Water Treatment Plant, Udaipur, India

Photo Credit[52]

**Background**

Udaipur, a city located in the water-scarce Indian state of Rajasthan, is an economically dynamic city and a popular tourist destination. Before 2012 Udaipur city produced, on average, around 70 million liters of sewage per day. Due to the city's inadequate wastewater infrastructure, the city was struggling to maintain the cleanliness of its lakes, which were being contaminated by the raw residential sewage. In September 2012, a court order was issued to hotels and the municipality to deal with the problem. The local authority decided to pursue a PPP to deliver the infrastructure needed to comply with the court order.

**Project Structure**

In 2012, a 25-year PPP contract to develop the city's first Wastewater Treatment Plant (WWTP) was executed between Hindustan Zinc, a major corporate zinc mining company, and the local government authorities, including the Udaipur Municipal Corporation and Rajasthan State-Owned Urban Improvement Trust. From the publicly available sources, the project appears to have originated as an unsolicited proposal initiated by Hindustan Zinc, whose involvement in the project was apparently motivated primarily by its goal of finding options for additional water resources that would reduce its dependence on freshwater extraction, as well as its efforts to increase production and sustainability.

The private partner undertook to design, build, own, and operate the WWTP for the full term of the contract, after which it would be transferred to the Government of Rajasthan in 2039. The private partner was also responsible for fully financing the investment cost of the new WWTP (estimated at USD 27 million), land acquisition, and construction of the WWTP and the 78 km pipeline linking the WWTP with the industrial complex. The local government contributed 70 percent of the cost for the pipeline connecting the city's sewerage system with the WWTP. From the publicly available sources reviewed, it is unclear what entity contributed the remaining 30 percent of the cost of this pipeline or is responsible for its operation and maintenance. The WWTP was expected to have the capacity to

[51] The World Bank. 2013. "Karnataka: Three Towns Pilot 24/7 Water Supply." The World Bank. Accessed May 21, 2019. http://www.worldbank.org/en/news/feature/2013/01/01/karnataka-three-towns-pilot-water-supply;

Yousaf, Shamsheer. 2013. "Mysore's 24x7 water project falls short of targets." *Live Mint*, March 26, 2013. Accessed May 21, 2019. https://www.livemint.com/Politics/veuBt9zArpvuusyysCLntK/Mysores-24x7-water-project-falls-short-of-targets.html.

[52] TeshTesh (https://commons.wikimedia.org/wiki/File:Udaipur_views_Rajasthan_India_2015.jpg), https://creativecommons.org/licenses/by-sa/4.0/legalcode

treat 20 million liters of sewage per day, or about 30 percent of Udaipur's domestic sewage, using moving bed bio-reactor technology.

The treated effluent produced by the WWTP, amounting to 20,000 $m^3$ per day, would be used by Hindustan Zinc for its mining and smelting operations, specifically the beneficiation plant at the mine, during the smelting process, and the cooling towers of the captive power plant. However, the company's operations only required 9,500 $m^3$ of treated effluent per day, so the excess would be used in horticulture or released back into the river. In addition, the WWTP would produce treated manure, amounting to 120 tons per year, which would be sold by Udaipur Municipal Corporation to local farmers. Sales of the treated manure were expected to generate annual revenue of around USD 156,000.

**Lessons Learned**

During the construction period, the private partner encountered several challenges. Concerning land acquisition, the company had difficulty identifying a financially viable site for the WWTP and negotiating with local stakeholders. Further challenges arose in the process of laying pipe-network in busy areas and from operational difficulties at the Hindustan Zinc Industrial Complex. However, these problems were overcome through the continued effort of the private partner to communicate closely with neighboring communities and the local government to acquire necessary approvals and to obtain acceptance of marginal modifications to project scope and design.

Construction was completed in 2014 and the project has helped Hindustan Zinc reduce its water extraction by 60 percent, from 16,500 $m^3$ per day to 7,000 $m^3$ per day. It also improved the water quality of the Ahar River and Pichola and Udai Sagar lakes, increasing the appeal of the area as destinations for tourists. Based on this success, Hindustan Zinc has announced its intent to increase the project's capacity from 20 to 60 million liters per day.[53]

This project highlights the following:

- PPPs work best when both parties' interests are plainly aligned. In this case, the project company's aim of reducing its reliance on freshwater extraction aligned squarely with the municipality's need to improve wastewater management. Accordingly, this gave rise to an opportunity for a mutually beneficial project, which further encouraged the parties to work together to address the various problems encountered during the construction phase.

## 25. Integral Treatment of Wastewater and Bio-Solids, Municipality of Saltillo, Mexico

Photo Credit[54]

**Background**

The municipality of Saltillo was reportedly not complying with environmental laws on wastewater and was discharging its non-treated wastewater into regional bodies of water. In addition to incurring substantial fines for the municipality, the untreated discharge was contaminating local waters and presenting a growing health hazard for the surrounding inhabitants. Accordingly, construction of appropriate wastewater infrastructure was urgently needed.

**Project Structure**

The resulting PPP project is a 20-year concession for the design, construction, operation, and maintenance of a primary wastewater treatment plant with the capacity to treat 1,200 liters of wastewater per second, as well as an auxiliary plant with the capacity to treat 70 liters per second. In addition to these plants, the project entails construction of four emitters to carry wastewater to the primary plant and a treated water supply network serving five sites within the municipality of Saltillo. At the end of the 20-year contract, the developer would transfer the new infrastructure and its operation to the municipality.

The project was awarded to Frisco S.A de C.V. through a public national bidding process, in which 16 companies competed. IDEAL Saneamiento de Saltillo, S. A. de C. V., the special purpose vehicle created for this project, began construction in April 2006 and commenced operations in April 2008.

IDEAL took on the risks related to the design, financing, construction, commissioning, and operation of the project. It also assumed the permitting and licensing risks. Political, demand and inflation risks were retained by the municipality.

[53] Water Scarcity Solutions. 2016. "Innovative public-private partnership to improve water quality and availability, Udaipur, India." Water Scarcity Solutions. Accessed February 12, 2019. https://www.waterscarcitysolutions.org/wp-content/uploads/2016/02/A-Innovative-public-private-partnership.pdf;

India Sanitation Coalition. n.d. *Sewage Treatment Plant – Hindustan Zinc Limited*. India Sanitation Coalition. Accessed November 27, 2019. http://www.indiasanitationcoalition.org/resources/Case-Study-Hindustan-Zinc.pdf;

CSR Box. n.d. "CSR Project by: Hindustan Zinc Ltd." CSR Box. Accessed March 28, 2019. https://csrbox.org/India_CSR_Project_Hindustan-Zinc-Ltd-Sewage-Treatment-Plant-Rajasthan_7398.

[54] Rubén Mendoza Cabrera (https://commons.wikimedia.org/wiki/File:IMG_9872_Saltillo,_Coahuila,_México.jpg), https://creativecommons.org/licenses/by-sa/4.0/legalcode