

CHALLENGES

Indian municipalities are facing the challenges of acute water shortage, increasing population and rising power tariffs. Presently only about two-thirds of the urban population has direct access to clean, affordable and reliable water services. Lack of reliable water supply affects urban populations in multiple ways, having detrimental health impacts and significant social and economic costs. Energy costs constitute up to 60-70 percent of an Indian municipality's total cost of pumping water to its residents. This financial constraint, coupled with inadequate or antiquated infrastructure and the lack of adequate managerial and technical capacities, greatly limits the ability of municipalities to improve water services. More efficient water delivery systems can translate into measurable energy savings due to reduced pumping requirements. Yet, most municipalities are unaware of the benefits available through water and energy efficiency. These challenges are further compounded by the lack of state level policies to encourage municipalities to implement water and energy efficiency measures to improve service and reduce costs.

OBJECTIVES

The main objectives of the India Watergy Program are to:

- Raise awareness among municipalities of the tremendous cost savings resulting from simple water and energy efficiency measures.
- Build in-house technical and managerial capacity of municipalities to undertake energy audits and implement energy savings measures.
- Help municipalities become financially sustainable and improve the reliability of water services to urban households.

APPROACH

The Alliance to Save Energy, in partnership with the U.S. Agency for International Development is designing sustainable Watergy solutions for Indian

municipalities to take advantage of opportunities that reduce energy use, water waste and costs, while at the same time improving water services. The India Watergy Program is assisting municipalities in the states of Andhra Pradesh, Karnataka, Maharashtra and Tamil Nadu. The general approach of the Alliance in India is to enter into partnerships with state-level urban development agencies in all of the states, in parallel with interventions on the municipal level.

RESULTS

In May 2002, the Alliance launched its first statewide municipal water and energy efficiency outreach program in the state of Karnataka to disseminate Watergy concepts. As part of the institutional capacity building process, the Alliance established and trained an Energy Management Cell (EMC) at the Karnataka Urban Infrastructure Development Finance Corporation (KUIDFC), which now serves as a resource center on water and energy efficiency best practices for municipalities statewide.

The Alliance and KUIDFC selected four pilot municipalities of varying sizes in different state revenue divisions to demonstrate Watergy methodologies. These municipalities were Hubli-Dharwad, Mysore, Bellary City and Tiptur-Arasikere. The Alliance, along with its technical partner, facilitated energy audits of bulk water supply systems and efficiency assessments of street lighting systems. The audits found that huge energy savings could be realized with limited investments and rapid payback periods. The recommended energy efficiency measures were of two types: no and low cost, and high cost.

The no/low cost measures usually have a payback period of less than a year and involve measures such as surrendering of excess contracted electric demand, maintaining a good power factor, improving water flow distribution, rescheduling pump operation, and improving pumping efficiencies. These simple measures account for about 15-20% of the energy and financial savings. High cost measures include replacing inadequate pipelines, replacing impellers, installing

energy efficient motors and replacing inefficient pumps with energy efficient pumps that are better integrated to the system.

After the audit reports were finalized, each municipality committed to implement energy savings measures. These measures often have wide reaching impacts. Surrendering excess demand, for example, relieves the load on the electric utility and enables the supply of power to unconnected households. The simultaneous reductions in municipal water waste, through more effective supply and distribution, allows the municipalities to reach water to more homes. As a result of the Watergy successes in Karnataka, the Asian Development Bank and World Bank have funded the implementation other municipalities in the state.

The Alliance's sustained partnership with the State Government of Karnataka has also yielded two landmark policies unprecedented in India. This proposed statewide policies for Municipal Water and Energy Efficiency will oversee the devolution of central financial control, enabling 14 local municipal governments to account for their energy use, pay their own energy bills, and enter into public-private partnerships based on energy service performance contracting models. Vide these policies the Government has also appointed KUIDFC to be the nodal agency in state for implementation of Carbon Finance project for 6 municipalities. KUIDFC has signed a Letter of Intent with the World Bank for trading the carbon emission offsets as a result of energy efficiency implementation in 5 municipal water supply systems.

In Andhra Pradesh the Alliance was asked by the Andhra Pradesh Urban Services for Poor (APUSP) to implement Watergy in the towns of Vizianagaram and Karimnagar. APUSP is an extensive, statewide program of the British aid agency DFID that encompasses 118 municipal councils. The resulting demonstrations of potential water and energy savings in the two pilot towns were decisive in APUSP's plan to undertake a comprehensive study of water supply

systems in 32 other towns. They have commenced this initiative by putting out RFP for 15 towns and have already contracted with consultants for carrying out energy audits at 6 towns. So far APUSP has accrued cost savings of Rs. 4 Crores by implementing energy efficiency measures in various towns. Also as a result of the partnership with APUSP, a *Handbook on Energy Efficiency in Municipal Water Pumping Systems* was developed and distributed to all 118 municipalities in the state. The Vizianagaram Municipal Corporation issued an energy management tender incorporating the energy efficiency specifications as given in the handbook. The Alliance also established and trained an Energy Management Cell at APUSP to serve as a state resource.

The success of the state-wide approach used in Karnataka was replicated in the state of Maharashtra. There the Alliance worked with the Urban Development Department, the Maharashtra Energy Development Agency (MEDA) and the All India Institute of Local Self-Government (AIILSG) to develop a Statewide Road Map for Energy Efficiency in Municipalities. The Alliance coordinated a detailed energy audit of the bulk water supply system in Pune and conducted a training seminar on energy efficiency best practices for engineers at the Pune Municipal Corporation (PMC). Implementation of all applicable measures has been completed by PMC. The tracking of savings also revealed that PMC is pumping an additional 40 million liters per day of water as a result of the efficiency improvements, while at the same time reducing their overall total pumping energy cost by 5%.

The Alliance has also assisted Vishakapatnam Municipal Corporation (VMC) in Andhra Pradesh, and Delhi Jal Board (DJB), providing them timely technical assistance in making their bulk water supply systems energy efficient. Based on the Watergy concept, DJB has also established its own Energy Management Cell which provides energy efficiency assistance to DJB engineers.

Municipality, State	Annual Energy Savings (kVA & MWh)	Annual Cost Savings (US\$)	CO2 Emission Reduction (MT)
Karnataka (Bellary, Mysore, Hubli, Tiptur)	876 kVA + 8,845 MWh	713,514	8,846
Vishakhapatnam, Andhra Pradesh	150 kVA + 1436 MWh	58,644	1,436
Vizianagaram, Andhra Pradesh	920 kVA + 101 MWh	61,889	101
Karimnagar Municipal Council, Andhra Pradesh	180kVA + 15 MWh	16,300	15
Pune Municipal Corporation, Maharashtra	200 kVA + 3576 MWh	263,267	3,576
Delhi Jal Board, Delhi	9491 kVA + 6875 MWh	835,001	6,875
Total	11,617 kVA + 20,848 MWh	1,948,615	20,849

The Alliance is assisting Indian municipalities to access Carbon Finance to successfully implement energy efficiency projects.



The Alliance has prepared a “Manual for Development of Municipal Energy Efficiency Projects” with support from International Finance Corporation. The Manual was launched by Bureau of Energy Efficiency in March 2008 as a standard reference document for all stakeholders involved in Municipal Energy Efficiency Projects.

The Alliance has customized energy performance contracts for Tamil Nadu Urban Development Fund to undertake municipal water and energy efficiency in water pumping and street lighting in 45 towns in Tamil Nadu. The Alliance as a technical advisor to the Municipal Corporation of Greater Mumbai is providing guidance in undertaking energy efficiency projects in their water supply, waste water systems and municipal buildings such as Hospitals and Medical Colleges.

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