

DATA CITY CHALLENGE

The City of Bengaluru has around 9.5L water meters. Collecting and communicating accurate water consumption data will help BWSSB in identifying illegal water consumption, water leakage, do predictive maintenance and more importantly, efficient water network planning.

Why we are interested?

Due to limited resources of water and exploding demand, water has become expensive and very important resource in the world. Water resources are rapidly running dry, thus creating a global crisis for every living being on the planet. It has become imperative for municipalities for efficient utilisation of water and water networks in general.

Following activities are very important for municipalities to maintain efficient water system:

- Water balance management
- Sufficient volume \ quantity to consumers
- Quality water with sufficient pressure
- Low tariff
- Low physical losses e.g. leaks, bursts etc.
- Low commercial losses
e.g. inaccurate meters, fraud, theft etc.

What are we looking for?

With every existing solution having limitations, many municipalities & utilities believe that innovation is the best way to go forward to identify new cost-effective solution specific to Indian context.

Collection

Low cost & reliable solution for data collection (hardware and / or software)
Cater diverse consumers like households, commercial, industrial, bulk etc.
Cater intermittent water supply scenarios (hardware and / or software)

Communicate & analysis

Information to consumers and other system (Software)
Derive analysis for improvements in efficiency (Software)
DataCity aims at solving the above urban challenges of citizens by leveraging the start-up power of the city.



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Current Solutions

Commonly used solutions for collecting water consumption data are:

1) Manual Meter Reading

Manual meter reading method is adopted in many Indian municipalities. This method involves a meter reader (MR) who personally visits every property to manually record consumption data on a hand book. This consumption data hand book is physically taken to central office and updated in central registry to generate bills.

In some municipalities, such as Bengaluru, data transmission part is automated i.e. data is manually entered in tab or mobile application which will automatically update data to central billing server.

Pros:

Low capital investment

Cons:

- Less data i.e. one data point per month
- Prone to human errors & fraud
- Need physical access to property (meter)
- High Manpower / Organisation
- Limited support to network operations
- Higher billing cycle e.g. 2 months
- Less cash flows

2) AMR (Automated meter Reading) - Walk-by / Drive-by system

With improvements in technology, new technology has been introduced to address some of the existing problem. Water meters will be equipped with RF transmission module with facility to transmit data to its master module. Meter reader are equipped with Hand Held Devices (HHD), supplied by vendors of transmission modules which will be able to retrieve data automatically from water meter once HHD is brought within the range of transmission unit e.g. 50 meters. When Meter reader personal walks or drives through the street, all meters will update data to HHD automatically. Further HHD will update data to server over internet (GPRS).

Pros:

- Automated reading (only collection / Not transmission)
- Accurate consumption data (no human intervention)
- No need to enter property
- Less meter reader manpower

Frequent billing
Reduces fraud

Cons:

- Data retrieval subject to reading cycle
- Limited support to network operations
- High Capital Investment
- Battery operated transmission modules
- High maintenance cost (hardware module + software)

3) AMI (Advanced Metering Infrastructure)

With improvements in communication technologies, some specific communication networks are designed to overcome challenges of urban utilities e.g. obstructions, chamber installations, high tariff, third party dependency etc. Some familiar solutions are LoRa (Long Range Low power), Sigfox, NB-IOT etc. These are specifically designed for low power consumption (long battery life) with long range for data transmission. A typical LoRa gateway can cater devices in a radius of 1.5 km in Indian urban Environnement. These communication protocols work on license free bands and completely private networks.

As the name suggests, a dedicated metering infrastructure like gateways and repeaters are required to be deployed to develop own private network. Once developed, water meters equipped with transmission modules will transmits data to fixed gateways at regular intervals. Further, these gateways transfer the data to servers over GPRS.

Pros:

- Accurate consumption data
- Daily data with hourly indexes of consumption
- Support operations teams for efficient networks
- Enables analysis of water balances and losses (supports leak detection)
- New services to customers e.g. Alarms to customers, consumption pattern etc
- Fraud detection
- No need to enter property
- No manpower for meter reading
- Frequent billing

Cons:

- Very High Capital Investment
- Complex communication network in dense urban cities
- Complex maintenance (modules + gateways + Software + updates)
- Very high maintenance cost (modules + gateways + Software)
- Battery operated transmission modules / communication gateways
- High operation cost (data transmission cost + software upgrades + licences)
- High replacement cost
- Vendor specific solutions

