

# 2007 Benchmarking and Data Book of Water Utilities in India



A partnership between Ministry of Urban Development Government of India  
and Asian Development Bank

ADB



सत्यमेव जयते



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भारत सरकार  
शहरी विकास मंत्रालय  
निर्माण भवन  
Ministry of Urban Development  
Government of India

## PREFACE

Water supply is crucial to addressing the challenge of urban development. It is one of the five urban basic services being addressed by the Government of India, under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), which is probably the single most important initiative in the history of our country in developing its urban areas. Reform in the urban water supply sector under the mission is about change to reach the ultimate objective of making water available on a 24 x 7 basis to everyone, especially to the urban poor.

The publication of the *2007 Benchmarking and Data Book of Water Utilities in India* is very timely as it is a first step in benchmarking service levels for the urban water supply sector. Reliable performance data for planning will be necessary to monitor and sustain the reforms under JNNURM over the 7-year period and beyond. Fifty percent of our cities do not have piped water supplies, and performance information on the 20 cities in the Data Book will help us plan for sustainable water supplies for them. Reforms that are mandated and incentivized under JNNURM are focused on service improvement, which is aimed at bringing more accountability and transparency in utility operations. Transparency and community participation in service delivery can go a long way in improving performance. The Data Book supports all these especially in helping bring financial discipline in water utility operations through public-private partnerships (PPP), which is an important element of the JNNURM program.

Recognizing the importance of benchmarking, the Ministry is encouraging utilities to mainstream benchmarking activities in their operations and annual business planning. The benchmarking project is showing the way for standardizing benchmarking for the five urban services under JNNURM. However, these benchmarking efforts should lead toward the vision of 24x7 water supplies for all. The results presented in the Data Book tell us that we have to make changes in our management practices, such as metering; applying appropriate user charges; reducing our water losses; and increasing water availability, coverage, and access in partnership with our customers, stakeholders, and development partners.

We would like to thank the Asian Development Bank, the members of the project team, and the 20 participating water utilities for preparing and publishing the Indian Water Utilities Data Book that should help us take the necessary first steps toward 24x7 water for all.

M. Rajamani  
Joint Secretary (UD) and  
Mission Director (JNNURM)  
Ministry of Urban Development  
Government of India



## FOREWORD

In December 2005, the Government of India (GOI) launched the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), which formally envisages central government investment of potentially up to US\$11 billion on basic urban infrastructure and services (water supply, waste management, public transportation, etc.) in 63 identified cities over the next 7 years.

The Asian Development Bank (ADB) and the GOI have agreed that information on selected JNNURM cities would be useful for their work in identifying projects in support of the JNNURM program. The Ministry of Urban Development (MoUD) with support from ADB embarked on a Benchmarking and Water Utilities Data Book Project for 20 selected water utilities in India. Benchmarking has long been proven to be an effective tool for improving an organization's performance. Data collected from the project will feed into the JNNURM and support utilities to better access MoUD assistance, with good information on their performance.

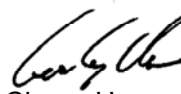
The *2007 Benchmarking and Data Book of Water Utilities in India* is a comprehensive compilation of information on the performance of Indian water utilities. It builds on ADB's experience from the two Water Utilities Data Books for the Asian and Pacific Region published in 1993 and 1997, and the more recent Water in Asian Cities in 2004, which were all well received by stakeholders and have served as useful reference documents. The *2007 Benchmarking and Data Book of Water Utilities in India* provides information from water utilities in 20 JNNURM cities and is based largely on 2005–2006 data. It comprises three parts. Part I is a summary of findings and brief comments thereon. Part II consists of comparison charts and tables of a number of important performance parameters. Part III gives the utility and city profiles.

Information for the Data Book was derived from questionnaires designed by ADB and agreed upon and completed by the participating utilities. Much effort has gone into confirming the accuracy and consistency of information provided by the utilities. Many clarifications were sought by the project team and much data is presented with footnotes which suggest explanations for apparent discrepancies.

Funding for the preparation of the Data Book was provided by the Cooperation Fund for the Water Sector, financed by the Government of The Netherlands and Norway, and administered by ADB. However, it may be noted that the views and analysis expressed herein do not necessarily reflect those of ADB.

The Data Book was prepared in ADB's Energy, Transport, and Water Division, Regional and Sustainable Development Department (RSDD), under the overall guidance of K. E. Seetharam, Principal Water Supply and Sanitation Specialist supported by Theresa Audrey O. Esteban, Sector Officer, RSDD, and staff of South Asia Department's Urban Development Division and India Resident Mission. The Project was executed and managed in India through a Project Team headed by Mr. M. Rajamani, Joint Secretary, Ministry of Urban Development, India with support from the following team members: Mr. Cesar E. Yñiguez, Benchmarking Adviser; Dr. K.N. Satyanarayana, IIT Madras, Technical Expert; and Mr. S. Krishnamurthy and Ms. Catherine Rose James, ICRA Management Consulting Services Ltd., Benchmarking Coordinators.

The provision of adequate, safe, and reliable water supplies on a 24x7 basis in the context of an increasing population and rapid urban development in India will be a major challenge to the Government of India and its development partners. We hope that this Data Book will contribute in understanding the challenge better, and in helping the stakeholders define the best ways of meeting it.



WooChong Um  
Director  
Energy, Transport and Water, RSDD  
Asian Development Bank

## ACKNOWLEDGMENTS

The Asian Development Bank and the Ministry of Urban Development, Government of India wish to thank the following urban local bodies and their water utilities for their cooperation in providing the information that made the publication of this data book possible.

City	Utility
<i>Ahmedabad</i>	Ahmedabad Municipal Corporation
<i>Amritsar</i>	Municipal Corporation, Amritsar
<i>Bangalore</i>	Bangalore Water Supply and Sewerage Board
<i>Bhopal</i>	Bhopal Municipal Corporation
<i>Chandigarh</i>	Municipal Corporation, Chandigarh
<i>Chennai</i>	Chennai Metropolitan Water Supply and Sewerage Board
<i>Coimbatore</i>	Coimbatore City Municipal Corporation
<i>Indore</i>	Indore Municipal Corporation
<i>Jabalpur</i>	Jabalpur Municipal Corporation
<i>Jamshedpur</i>	Jamshedpur Utilities and Services Company Limited
<i>Kolkata</i>	Kolkata Municipal Corporation
<i>Mathura</i>	Mathura Municipal Council
<i>Mumbai</i>	Municipal Corporation of Greater Mumbai
<i>Nagpur</i>	Nagpur Municipal Corporation
<i>Nashik</i>	Nashik Municipal Corporation
<i>Rajkot</i>	Rajkot Municipal Corporation
<i>Surat</i>	Surat Municipal Corporation
<i>Varanasi</i>	Varanasi Jal Sansthan
<i>Vijayawada</i>	Vijayawada Municipal Corporation
<i>Visakhapatnam</i>	Greater Visakhapatnam Municipal Corporation



## ABBREVIATIONS

### Abbreviations and Acronyms

ADB	Asian Development Bank
AMC	Ahmedabad Municipal Corporation
BMC	Bhopal Municipal Corporation
BOT	build–operate–transfer
BPL	below poverty line
BWSSB	Bangalore Water Supply and Sewerage Board
CCMC	Coimbatore City Municipal Corporation
CMWSSB	Chennai Metropolitan Water Supply and Sewerage Board
GIS	Geographic Information System
GOI	Government of India
GVMC	Greater Visakhapatnam Municipal Corporation
HC	house connection
HSC	house service connection
HUDCO	Housing and Urban Development Corporation
IIT	Indian Institute of Technology
IMC	Indore Municipal Corporation
JMC	Jabalpur Municipal Corporation
IVRS	Interactive Voice Response System
JNNURM	Jawaharlal Nehru Urban Renewal Mission
JUSCO	Jamshedpur Utilities and Services Company, Limited
KMC	Kolkata Municipal Corporation
MCA	Municipal Corporation, Amritsar
MCC	Municipal Corporation, Chandigarh
MCGM	Municipal Corporation of Greater Mumbai
MMC	Mathura Municipal Council
MoUD	Ministry of Urban Development
NMC	Nagpur Municipal Corporation
NMC	Nashik Municipal Corporation
NRW	nonrevenue water
O&M	operation and maintenance
PPP	Public–Private Partnerships
PT	public tap
RMC	Rajkot Municipal Corporation
Rs	Indian rupee
SCADA	Supervisory Control and Data Acquisition
SMC	Surat Municipal Corporation
SP	stand post
UFW	unaccounted for water
ULB	Urban Local Body
VJS	Varanasi Jal Sansthan
VMC	Vijayawada Municipal Corporation

## Measurement Units and Symbols

km	kilometer
km <sup>2</sup>	square kilometer
lpcd	liter per capita per day
m	meter
m <sup>3</sup>	cubic meter
m <sup>3</sup> /day	cubic meter per day
m <sup>3</sup> /day/c	cubic meter per day per capita
mm	millimeter
n.a.	not available or not applicable
sq km	square kilometer
%	percent
"	inch

## METHODOLOGY

The *2007 Benchmarking and Data Book of Water Utilities in India* examined the performance of water utilities in 20 cities in India, with service areas ranging from one city to several towns and cities. An inception workshop was held at the India Institute of Technology Madras, Chennai on 17–18 January 2007 to i) provide the participants an understanding of benchmarking as a tool for performance improvement, ii) select the most appropriate performance indicators to measure performance of water utilities, and iii) plan the implementation of the benchmarking and water utilities data book project.

The water utilities that provided data included 15 municipal corporations, two city boards, a municipal council, a local autonomous body, and a private operator. Data collected through a water utility questionnaire (shown in appendix 1) were for 2005–2006. For purposes of presentation and discussions, the name of the city or town served by the utility is used instead of the utility name, for example, Jamshedpur instead of Jamshedpur Utilities and Services Co., Ltd., or Varanasi instead of Varanasi Jal Sansthan.

Performance indicators were derived using basic data provided by the utilities and following various computations using the formulas in the following sections below. Almost all the data used in comparing the indicators in the tables, graphs, charts, and figures are found in each utility and area profile; hence, exact values can be extracted.

Many clarifications were sought on the data provided especially for consistency between the data and indicators; thus, the data finally presented are the best that could be obtained in the circumstances. Nevertheless, ADB is conscious that not all data are 100% reliable. In some instances, estimates were given in the absence of available measures, such as in cases where no total metering of production and consumption is available. This makes unaccounted for water or daily per capita consumption data estimates at best. If there are doubts on the reliability of some data presented, the reader is advised to verify the information from the utility whose contact details are provided in the utility profile.

The suggested evaluation criteria on utility performance are provided in appendix 2. This may be modified to suit the particular situation in India in measuring the overall utility performance in a particular given period.

The information presented in this book was either taken from the water utility questionnaire or was based on computations using data from the questionnaire. The formulas used for the computations are shown below.

1. Water supply coverage (%)  
= [(population served by HC) + (population served by PT)] x 100  
/ [total population in the area of responsibility]
2. Per capita consumption (lpcd)  
= [total annual domestic consumption (m<sup>3</sup>) x 1,000/365] / [number of people served]
3. Production/population (m<sup>3</sup>/day/c)  
= [annual production volume (m<sup>3</sup>) /365] / [number of people served]
4. Unaccounted for water (%)  
= [total annual production (m<sup>3</sup>) - total annual consumption (m<sup>3</sup>)] x 100  
/ [total annual production (m<sup>3</sup>)]

5. Average tariff (Rs/m<sup>3</sup>)  
= [total annual billing (Rs)] / [total annual consumption (m<sup>3</sup>)]
6. Unit production cost (Rs/m<sup>3</sup>)  
= [annual O&M cost (Rs)] / [total annual production (m<sup>3</sup>)]
7. Operating ratio  
= [annual O&M cost (Rs)] / [annual revenue (Rs)]
8. Revenue collection efficiency (%)  
= [total annual collections (Rs) / total annual billings (Rs)] x 100
9. Accounts receivable (month's equivalent)  
= [accounts receivable at end of the fiscal year] / [total annual billings/12]
10. Staff/1,000 connections ratio  
= [number of utility staff] / [number of utility connections/1,000]

Some utilities may have collection efficiency higher than 100%. This may indicate that total collections for the period included payment of bills for the previous period. Operating and maintenance costs used in the computations do not include depreciation and debt service.

Data on estimates of population served by house connections and by public taps were provided by the utilities. Normally, these two values are computed using the number of house connections and public taps multiplied by the corresponding average number of persons served by each type of connection. However, in a number of instances, the reliability of the average number of persons served became suspect when the resulting population served exceeded the total population in the area of responsibility.





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***PART I***  
***SUMMARY OF FINDINGS***



**Table 1a: Summary of Results**

	Ahmedabad	Amritsar	Bangalore	Bhopal	Chandigarh	Chennai	Coimbatore	Indore	Jabalpur	Jamshedpur	Average (20)
Water Coverage (%)	74.5	75.7	92.9	83.4	100.0	89.3	76.1	77.3	75.2	74.4	81.2
Water Availability (hours)	2.0	11.0	4.5	1.5	12.0	5.0	3.0	0.75	4.0	6.0	4.3
Consumption/Capita (lpcd)	171	86	74	72	147	87	109	87	139	203	123.3
Production/Population (m3/day/c)	0.168	0.213	0.185	0.182	0.332	0.131	0.286	0.108	0.222	0.808	0.244
Unaccounted for Water (%)	nd	57	45	nd	39	17	41	nd	14	13	31.8
Connections Metered (%)	3.0	4.0	95.5	0.0	79.0	3.5	100.0	0.1	0.0	0.9	24.5
Operating Ratio	1.43	1.36	0.80	2.82	1.36	0.44	0.82	5.33	1.68	0.62	1.63
Accounts Receivable (months)	8	5.6	7.1	3.6	nd	1.1	3	5.2	3	0.3	4.9
Revenue Collection Efficiency (%)	67	69	112	178	94	152	75	89	75	100	99.5
Average Tariff (Rs/m3)	1.39	9.34	20.55	0.60	5.04	10.87	3.66	2.79	1.50	4.51	4.91
New Connection Fee (Rs)	100	950	1,740	1,500	530	1,930	3,000	2,500	1,984	300	1,584
Capital Expenditure/Connection (Rs)	427	331	787	39	754	10,080	954	353	864	971	1,591
Staff/1,000 Connections (ratio)	2.2	4.8	5.2	20.7	8.6	13.3	4.0	18.7	0.4	5.6	7.4

**Table 1a: Summary of Results**

	Kolkata	Mathura	Mumbai	Nagpur	Nashik	Rajkot	Surat	Varanasi	Vijayawada	Visakhapatnam	Average (20)
Water Coverage (%)	79.0	70.0	100.0	91.5	92.6	98.1	77.4	77.7	70.5	49.2	81.2
Water Availability (hours)	8.3	2.0	4.0	5.0	3.5	0.3	2.5	7.0	3.0	1.0	4.3
Consumption/Capita (lpcd)	130	nd	191	100	93	101	nd	147	158	124	123.3
Production/Population (m3/day/c)	0.246	0.160	0.246	0.267	0.248	0.146	0.188	0.217	0.220	0.305	0.244
Unaccounted for Water (%)	35	nd	13	52	60	23	nd	30	24	14	31.8
Connections Metered (%)	0.1	0.0	75.0	40.0	80.0	0.4	1.9	0.0	6.0	1.3	24.5
Operating Ratio	4.73	3.05	0.49	0.76	1.18	1.61	1.01	1.30	1.14	0.78	1.63
Accounts Receivable (months)	2.4	12.3	11.8	9.6	0.03	6.6	3.1	4.9	1.6	3.3	4.9
Revenue Collection Efficiency (%)	100	106	189	80	92	45	100	64	114	86	99.5
Average Tariff (Rs/m3)	1.13	0.62	4.60	6.60	4.32	5.07	1.66	3.17	2.18	8.55	4.91
New Connection Fee (Rs)	1,000	500	660	1,675	1,250	1,850	345	2,375	5,500	2,000	1,584
Capital Expenditure/Connection (Rs)	2,247	712	3,790	719	1,268	817	1,102	112	nd	3,891	1,591
Staff/1,000 Connections (ratio)	14.7	6.5	17.2	3.2	3.4	1.1	1.7	5.9	5.7	5.4	7.4

## COMMENT AND ANALYSIS BY UTILITY

### Ahmedabad Municipal Corporation

Ahmedabad Municipal Corporation (AMC) provides water at 171 lpcd to its consumers at an average of 2 hours per day to 74.5% of the population in its area of responsibility. Production is not metered and only 3% of total connections are metered. Meters are being phased out. No reliable estimate of UFW can be obtained. While operating ratio at 0.96 shows billing can cover operations and maintenance costs, accounts receivable equivalent of 8 months require more efforts in collection. Average tariff of Rs1.39/m<sup>3</sup> is just about able to cover production cost of Rs1.34/m<sup>3</sup>. Staff/1,000 connections ratio is good at 2.2, the fourth lowest. AMC needs to improve water availability and collection of its receivables. It should take serious efforts in measuring its production and service connections to determine its losses and reduce them as well. Water bills should also be based on actual consumption as a means to conserve water.

### Municipal Corporation, Amritsar

Municipal Corporation Amritsar (MCA) provides water at 86 lpcd to its consumers at an average of 11 hours per day to 75.7% of the population in its area of responsibility. It has the second highest UFW at 57.4% among the utilities. Production is not metered and only 45% of commercial and industrial connections are metered, making UFW an estimate at best. Financial management needs improvement with operating ratio of 1.36 and accounts receivable of 5.6 months. Average tariff of Rs9.34/m<sup>3</sup> should easily cover production cost but is hindered by its high NRW. Staff/1,000 connections ratio is better than average at 4.8. MCA needs to reduce its NRW and improve on water availability and quantity. It also needs to improve on its collection efforts. The utility should meter production and further improve metering of connections to account for use.

### Bangalore Water Supply & Sewerage Board

Bangalore Water Supply and Sewerage Board (BWSSB) provides water at only 74 lpcd to its consumers at an average of 4–5 hours per day to 92.9% of the population in its area of responsibility. It has the fourth highest UFW at 45.1% among 14 utilities. Production is fully metered and 95.5% of total connections have functioning meters. Operating ratio is good at 0.8 but accounts receivable of 7.1 months are the fifth highest.

Average tariff of Rs20.55/m<sup>3</sup> is the highest; high UFW keeps the total revenues just enough to cover costs. Staff/1,000 connections ratio is just about the median at 5.2. BWSSB needs to reduce its NRW and improve on water availability. It also needs to improve on its collection efforts. It could further improve metering of connections to better account for use.

### Bhopal Municipal Corporation

Bhopal Municipal Corporation (BMC) provides water at an estimated 72 lpcd to its consumers at an average of 1–2 hours per day to 83.4% of the population in its area of responsibility. UFW could not be computed because of inconsistencies in the production and consumption estimates in the absence of metering for both. Bhopal has the fourth highest operating ratio at 2.82 although accounts receivable of 3.6 months is better than average. Average tariff of Rs0.60/m<sup>3</sup> is the lowest and could not cover production costs. Staff/1,000 connections ratio is the highest at 20.7. BMC needs to improve on water availability and staff productivity. It should consider charging the appropriate tariff to cover its expenses. Metering of production and connections are needed to better account for use.

### Municipal Corporation, Chandigarh

Municipal Corporation Chandigarh (MMC) provides water at 147 lpcd to its consumers at an average of 12 hours per day to all of the population in its area of responsibility. UFW is 38.9%, which is the sixth highest. Production is not metered while 79% of service connections are effectively metered. Operating ratio of 1.36 is the median and better than average. No data were given for accounts receivable. Average tariff of Rs5.04/m<sup>3</sup> is not enough to cover operating costs because of high UFW. Staff/1,000 connections ratio is also the sixth highest at 8.6. MMC is doing well in customer service but needs to reduce UFW to manageable levels. It should consider metering of production and connections to better account for use. The utility should also look into improving the productivity of its staff.

## **Chennai Metropolitan Water Supply & Sewerage Board**

Chennai Metropolitan Water Supply and Sewerage Board (CMWWSB) provides water at 87 lpcd to its consumers at an average of 5 hours per day to 89.3% of the population in its service area. It has the fifth lowest UFW at 17.0%. However, while production is fully metered, only 3.5% of total connections are metered making UFW figure an estimate at best. Financial management is good, with the lowest operating ratio at 0.44 and accounts receivable equivalent of 1.1 months, the third lowest. Average tariff of Rs10.87/m<sup>3</sup> can easily cover production cost. Staff/1,000 connections ratio is high at 13.3, the fifth highest. CMWSSB needs to increase water availability and staff productivity. It should also improve metering of service connections to account for use.

## **Coimbatore City Municipal Corporation**

Coimbatore City Municipal Corporation (CCMC) provides water at 109 lpcd to its consumers at an average of 3 hours per day to 76.1% of the population in its area of responsibility. UFW is the fifth highest at 41.3% with both production and consumption fully metered, which gives an accurate measure of its losses. Financial management is good, with an operating ratio of 0.82 and accounts receivable at 3.0 months, the sixth lowest but can still be reduced. Average tariff of Rs3.66/m<sup>3</sup> is enough to cover operating costs. Staff/1,000 connections ratio is fair at 4.0, which is about half of the average. CCMC needs to reduce its UFW and increase the available hours of its supply and coverage as well.

## **Indore Municipal Corporation**

Indore Municipal Corporation (IMC) provides water at 87 lpcd to its consumers at an average of 45 minutes per day to 77.3% of the population in its area of responsibility. With both production and connections not metered, available production and consumption estimates do not give a credible UFW value. Operating ratio is highest at 5.33. Accounts receivable are about average at 5.2 months. Average tariff of Rs2.79/m<sup>3</sup> is lower than the high production cost of Rs13.18/m<sup>3</sup> because of high-cost power most probably for pumping. Staff/1,000 connections ratio is the second highest at 18.7. IMC will need a lot of improvement starting with reducing its operating expenses and improving

collections. Water availability of less than 1 hour a day is not acceptable and should be improved. Staff productivity needs to be enhanced. Production and all connections need to be metered to allow billing based on use and to account for total use and losses.

## **Jabalpur Municipal Corporation**

Jabalpur Municipal Corporation (JMC) provides water at 139 lpcd to its consumers at an average of 4 hours per day to 75.2% of the population in its area of responsibility. With both production and service connections not metered, UFW of 14.3% is, at best, an estimate. Operating ratio is 1.68 and accounts receivable equivalent is 3 months. Average tariff of Rs1.50/m<sup>3</sup> is the fifth lowest and cannot cover operating expenses. Staff/1,000 connections ratio is lowest at 0.4. JMC needs to address its water availability, its low tariff, and operating ratio of more than 1. Production and all connections need to be metered to allow billing based on use and to account for total use and losses.

## **Jamshedpur Utilities and Services Company Limited**

Jamshedpur Utilities and Services Company (JUSCO) provides water at 203 lpcd to its consumers at an average of 6 hours per day to 74.4% of the population in its area of responsibility. While production is metered, less than 1% of service connections are metered. UFW of 12.8% is the lowest. Financial management is very good, with operating ratio of 0.62 and accounts receivable of 0.3 month. Average tariff of Rs4.51/m<sup>3</sup> is about average but covers expenses well. Staff/1,000 connections ratio is less than average at 5.6. JUSCO is operating well except for water availability. It can further improve by full metering of all service connections.

## **Kolkata Municipal Corporation**

Kolkata Municipal Corporation (KMC) provides water at 130 lpcd to its consumers at an average of 8 hours per day to 79.0% of the population in its area of responsibility. UFW is estimated at a high 35%, with production not metered and less than 1% of service connections metered. Financial management needs improvement with the second highest operating ratio of 4.73 and

accounts receivable of 2.4 months. Average tariff of Rs1.13/m<sup>3</sup> is the third lowest, which cannot cover expenses at all. Staff/1,000 connections ratio is the fourth highest at 14.7. KMC needs to cover its expenses through appropriate tariffs and by charging domestic users for their use. It also needs to improve collection and water availability, and reduce its high UFW. Staff productivity should also be enhanced. Metering is necessary to account for water use and to determine the extent of losses.

### **Mathura Municipal Council**

Mathura Municipal Council (MMC) provides water to its consumers at an average of 1–3 hours per day to 70% of the population in its area of responsibility. Both production and all service connections are not metered. Estimates given show consumption equal to production, giving unrealistic values for per capita consumption and UFW. Financial management needs improvement with the third highest operating ratio of 3.05 and accounts receivable of 12.3 months, which is the highest. Average tariff of Rs0.62/m<sup>3</sup> is the second lowest, which could not cover expenses at all. Staff/1,000 connections ratio is better than average at 6.5. MMC needs to cover its expenses through appropriate tariffs. It also needs to improve collection and water availability. Metering is necessary to account for water use and to determine the extent of losses.

### **Municipal Corporation of Greater Mumbai**

Municipal Corporation of Greater Mumbai (MCGM) provides water to its consumers at 191 lpcd at an average of 4 hours per day to all of the population in its area of responsibility. Production is metered and 75% of service connections have working meters. UFW of 13.6% is the second lowest. Financial management is mixed with very good operating ratio of 0.49 but accounts receivable of 11.8 months, which is the second highest. Average tariff of Rs4.60/m<sup>3</sup> covers expenses with low UFW. Staff/1,000 connections ratio is the third highest at 17.2. MCGM needs to improve collection and water availability. Full metering is necessary to account for water use and to determine the extent of losses. It also needs to address staff productivity.

### **Nagpur Municipal Corporation**

Nagpur Municipal Corporation (NMC) provides water to its consumers at 100 lpcd at an average of

5 hours per day to 91.5% of the population in its area of responsibility. Production is metered and 40% of service connections have working meters. UFW of 51.9% is the third highest and should be reduced. While operating ratio is good at 0.76, accounts receivable of 9.6 months are the third highest. Average tariff of Rs6.60/m<sup>3</sup> is the fifth highest and is covering expenses well. Staff/1,000 connections ratio is the fifth lowest at 3.2. NMC needs to exert efforts to reduce its UFW and improve collection and water availability. Full metering is necessary to account for water use and to determine the extent of losses if UFW is to be reduced.

### **Nashik Municipal Corporation**

Nashik Municipal Corporation (NMC) provides water at 93 lpcd to its consumers at an average of 3–4 hours per day to 92.6% of the population in its area of responsibility. It has the highest UFW at 59.5% among the utilities. However, while production is fully metered, only 80% of total connections are metered, making UFW still an estimate. Financial management is mixed with an operating ratio of 1.18 and accounts receivable equivalent of less than a week. Average tariff of Rs4.32/m<sup>3</sup> should be able to cover production cost but is hindered by its high NRW. Staff/1,000 connections ratio is good at 3.4 being the fifth lowest. NMC needs to reduce its NRW, and improve on water availability and its financial management, especially its operating ratio. It should meter production and further improve metering of service connections to account for use.

### **Rajkot Municipal Corporation**

Rajkot Municipal Corporation (RMC) provides water at 101 lpcd to its consumers at an average of 20 minutes per day to 98.1% of the population in its area of responsibility. UFW is 23.5% with practically no metering for both production and service connections, making the UFW an estimate. Financial management needs improvement with an operating ratio of 1.61 and accounts receivable equivalent of 6.6 months. Average tariff of Rs5.07/m<sup>3</sup> is not covering production cost. Staff/1,000 connections ratio is good at 1.1 being the second lowest. RMC needs to address its very low water availability, and high operating ratio and accounts receivable equivalent. It should meter production and



service connections to account for use and determine its losses to reduce UFW.

### **Surat Municipal Corporation**

Surat Municipal Corporation (SMC) provides water at an average of 2–3 hours per day to 77.4% of the population in its area of responsibility. With practically no metering for both production and service connections, no estimates of UFW and average per capita consumption was made. Financial management needs improvement with an operating ratio of 1.01 and accounts receivable equivalent of 3.1 months. Average tariff of Rs1.66/m<sup>3</sup> could not cover production cost. Staff/1,000 connections ratio is good at 1.7 being the third lowest. SMC needs to address its very low water availability and accounts receivable equivalent. It should meter production and service connections to account for use and determine its losses to reduce UFW.

### **Varanasi Jal Sansthan**

Varanasi Jal Sansthan (VJS) provides water at 147 lpcd to its consumers at an average of 7 hours per day to 77.7% of the population in its area of responsibility. UFW is 30.0%, which is about average. Production is not metered and while 69% of service connections are metered, none of them are working. Operating ratio of 1.30 and accounts receivable equivalent of 4.9 months need improvement. Average tariff of Rs3.17/m<sup>3</sup> seems not enough to cover production cost. Staff/1,000 connections ratio is better than average at 5.9. VJS needs to address its low water availability and further improve on its accounts receivable equivalent and operating ratio. It should meter production and service connections to account for use and determine its losses to reduce UFW. Lower-than-average coverage also needs to be addressed.

### **Vijayawada Municipal Corporation**

Vijayawada Municipal Corporation (VMC) provides water at 158 lpcd to its consumers at an average of 2–4 hours per day to 70.5% of the population in its area of responsibility. UFW is 23.8% but production is not metered and only 6.0% of service connections have working meters. Financial management is mixed with an operating ratio of 1.14 and accounts receivable equivalent of 1.60 months, which is the fourth lowest. Average tariff of Rs2.18/m<sup>3</sup> is not enough to cover production cost. Staff/1,000 connections ratio is fair at 5.70, which is at the median. VMC needs to address its low water availability and reduce its operating ratio to less than about 0.75. It should meter production and service connections to account for use and determine its losses to reduce UFW. Lower-than-average coverage also needs to be addressed.

### **Greater Visakhapatnam Municipal Corporation**

Greater Visakhapatnam Municipal Corporation (GVMC) provides water at 124 lpcd to its consumers at an average of only 1 hour per day to 49.2% of the population in its area of responsibility. UFW is 14.5% but production is not metered and only 1.3% of service connections have working meters. Financial management is good, with an operating ratio of 0.78 and accounts receivable equivalent of 3.3 months. Average tariff of Rs8.55/m<sup>3</sup> is enough to cover production cost. Staff/1,000 connections ratio is fair at 5.4, which is at the median. GVMC needs to address its low water availability and population coverage, which is the lowest among the utilities. It should meter production and service connections to account for use and determine its losses to reduce UFW further.

## COMMENT AND ANALYSIS BY INDICATOR

### **Water Supply Coverage** (Average – 81.2%)

Two of the 20 utilities (Chandigarh and Mumbai) have 100% coverage. Four others—Rajkot (98.1%), Bangalore (92.9%), Nashik (92.6%), and Nagpur (91.5%)—have more than 90%. Visakhapatnam (49.2%) has the lowest followed by Mathura (70%), Vijayawada (70.5%), Jamshedpur (74.4%), and Ahmedabad (74.5). The average is 81.2%, with 12 utilities falling below 80% coverage. It is no surprise that Visakhapatnam also has the third lowest availability at 1 hour (h) supply per day. It is noted that those with the highest coverage also have the highest tariffs, indicating that people are willing to pay for piped water.

### **Water Availability** (Average – 4.3 hours/day)

It is alarming that the longest available supply is only 12 hours a day, Chandigarh, followed by Amritsar (11 hours), Kolkata (8.3 hours), Varanasi (7 hours), and Jamshedpur (6 hours). Average for all utilities is only 4.3 h supply per day. The shortest supply duration per day belongs to Rajkot (0.33 hour), followed by Indore (0.75 hour), Visakhapatnam (1.0 hour), and Bhopal (1.5 hours). Supplies of less than 24 hours pose not only a risk to health but also affect metering and the ability to reduce UFW levels. The urban poor are the most affected as they cannot afford the cost of dual systems with individual storage and pumping systems in the home.

### **Consumption** (Average – 123.3 lpcd)

Consumption of about 100–120 liters per capita per day (lpcd) seems reasonable. It is high enough to provide for health and hygiene requirements and low enough to help conserve resources. The high-consumption areas are Jamshedpur (203 lpcd), Mumbai (191 lpcd), Ahmedabad (171 lpcd), and Vijayawada (158 lpcd). By contrast, there are a number of low-consumption areas, such as Bhopal (72 lpcd), Bangalore (74 lpcd), Amritsar (86 lpcd), and Indore and Chennai (87 lpcd). Indore and Chennai have source constraints. Amritsar and Bangalore have high levels of unaccounted for water (UFW).

### **Production Per Person** (Average – 0.244 m<sup>3</sup>/d/person)

This indicator measures overall efficiency of water resource use. The low figures of Indore (0.108 m<sup>3</sup>/day/c), Chennai (0.131 m<sup>3</sup>/day/c), Rajkot (0.146 m<sup>3</sup>/day/c), Mathura (0.160 m<sup>3</sup>/day/c), and Ahmedabad (0.168 m<sup>3</sup>/day/c) reflect a shortage of water resources. The high figures are in Jamshedpur (0.808 m<sup>3</sup>/day/c), Chandigarh (0.332 m<sup>3</sup>/day/c), Visakhapatnam (0.305 m<sup>3</sup>/day/c), Coimbatore (0.286 m<sup>3</sup>/day/c), Nagpur (0.267 m<sup>3</sup>/day/c), and Nashik (0.248 m<sup>3</sup>/day/c). Jamshedpur and Coimbatore have high demand for nondomestic water; Nashik and Nagpur both have high UFW.

### **Unaccounted For Water** (Average – 31.8%)

The best performers in terms of low UFW are Jamshedpur (12.8%), Mumbai (13.6%), Jabalpur (14.3%), Visakhapatnam (14.5%), and Chennai (17.0%). The worst performers are Nashik (59.6%), Amritsar (57.4%), Nagpur (51.9%), and Bangalore (45.1%). Metering is a critical component for determining UFW. Only Coimbatore claims to have both production and service connections fully metered. Bangalore and Mumbai have fully production metering but consumption metering are 95.5% and 75.0%, respectively. Four other utilities have fully metered production but virtually nil to only 40% consumption metering. Hence, UFW figures should be interpreted with caution. Given low coverage and low water availability in some utilities, more must be done to reduce UFW levels. This includes 100% metering of production and consumption, repair of visible leaks, elimination of illegal connections, and identification and repair of invisible leaks.

### **Connections Metered** (Average – 24.5%)

Metering is important to fully account for water production and consumption in reducing UFW. Consumption metering is also important for consumers to pay for what they are using, which could help in promoting prudent use of water. Those with high levels of consumption metering are Coimbatore (100%), Bangalore (95.5%),

Nashik (80%), Chandigarh (79%), and Mumbai (75%). Except for Nagpur (40%), the rest have less than 10% metering, with Bhopal, Jabalpur, Mathura, and Varanasi with no metering at all. For Indian water utilities, this is perhaps the single most important area requiring improvement.

### **Operating Ratio** (Average – 1.63)

A low operating ratio means revenues from tariffs cover the operation and maintenance costs comfortably. If we include debt service and depreciation, it will show whether the utility also has the capacity to expand coverage through tariffs without the grants given by most urban local bodies (ULBs). A ratio above 1 means they do not cover these costs. Only one third of the utilities, including Chennai (0.44), Mumbai (0.49), Jamshedpur (0.62), Nagpur (0.76), Visakhapatnam (0.78), Bangalore (0.80), and Coimbatore (0.82), are able to cover their costs. The worst performers requiring much improvement are Indore (5.33), Kolkata (4.73), Mathura (3.05), and Bhopal (2.82), together with nine others with operating ratios of more than 1.0.

### **Accounts Receivable** (Average – 4.9 months)

This indicator is a good measure of the effectiveness of a utility in collecting its receivables or bills. In this case, the receivables are expressed in equivalent of the utility's average monthly billing. For small utilities, accounts receivable representing less than 2 months of its average billing is manageable; for larger utilities, this could be 3 months. But when it has risen to 6 months or more, it has gone out of hand. Six utilities having accounts receivable of more than 6 months are Mathura (12.3 months), Mumbai (11.8 months), Nagpur (9.6 months), Ahmedabad (8.0 months), Bangalore (7.1 months), and Rajkot (6.6 months). The good performers include Nashik (0.03 month), Jamshedpur (0.3 month), Chennai (1.1 months), and Vijayawada (1.6 months).

### **Collection Efficiency** (Average – 99.5%)

This indicator, along with average tariff, operating ratio, and accounts receivable, impacts on the financial health of a utility. About nine of the utilities have collection efficiencies of 95% or higher. The worst performers (with less than 80% collection efficiencies) are Rajkot (45%), Varanasi (64%), Ahmedabad (67%), Amritsar (69%), and Coimbatore and Jabalpur (75%). Rajkot and Ahmedabad also have high accounts receivable.

These utilities should improve their collection effort and encourage consumers to pay their bills on time. Six utilities—Mumbai (189%), Bhopal (178%), Chennai (152%), Vijayawada (114%), Bangalore (112%), and Mathura (106%)—have collection efficiencies of more than 100%, suggesting that past years' arrears are being collected.

### **Average Tariff** (Average – Rs4.91/m<sup>3</sup>)

The average tariff is a good measure of the financial discipline of a utility and its ability to cover operational costs with revenues from tariffs. The water utilities with high average tariffs are Bangalore (Rs20.55/m<sup>3</sup>), Chennai (Rs10.87/m<sup>3</sup>), Amritsar (Rs9.34/m<sup>3</sup>), Visakhapatnam (Rs8.55/m<sup>3</sup>), Nagpur (Rs6.60/m<sup>3</sup>), Rajkot (Rs5.07/m<sup>3</sup>), and Chandigarh (Rs5.04/m<sup>3</sup>). Despite their high average tariffs, Amritsar and Chandigarh could not cover their operational costs because of high UFW. Those who charge the lowest tariffs are Bhopal (Rs0.60/m<sup>3</sup>), Mathura (Rs0.62/m<sup>3</sup>), Kolkata (Rs1.13/m<sup>3</sup>), Ahmedabad (Rs1.39/m<sup>3</sup>), and Jabalpur (Rs1.50/m<sup>3</sup>). Kolkata is not charging its domestic users, resulting in high operating ratio (as with Bhopal and Mathura).

### **New Connection Fee** (Average – Rs1,584)

Apart from reasonable connection fee, allowing payments by installment can assist lower-income households to gain access to direct connection to their homes with significant benefits to their welfare. During the workshop presenting the results of the study, participants from the utilities agreed that Rs2,500 is a reasonable average connection fee. Only Jabalpur and Vijayawada allowed payment by installment over 12 months while the rest required payment prior to connection. However, only Vijayawada (Rs5,500) and Coimbatore (Rs3,000) have connection fees above Rs2,500. Seven utilities have less than Rs1,000 connection fee starting with the lowest, Ahmedabad (Rs100), Jamshedpur (Rs300), Surat (Rs345), Mathura (Rs500), Chandigarh (Rs530), Mumbai (Rs660), and Amritsar (Rs950).

### **Average Capital Expenditure Per Connection**

(Average – Rs1,591)

Among the utilities with the highest average annual expenditure per connection for capital development are Chennai (Rs10,080), Visakhapatnam (Rs3,892), Mumbai (Rs3,791), Kolkata (Rs2,248), Nashik (Rs1,269), and Surat (Rs1,102). Mumbai, Nashik, and Chennai are among those with the highest coverage while Visakhapatnam has the lowest coverage and is just catching up. Bhopal (Rs39), Varanasi (Rs113), Amritsar (Rs332), Indore (Rs354), and Ahmedabad (Rs427) are five utilities that have invested less than Rs500 per connection per year over the last 5 years. It is not surprising that Amritsar and Ahmedabad, with their low level of capital investment, are among those with the lowest coverage.

### **Staff Per 1,000 Connections Ratio**

(Average – 7.4)

This indicator is generally used to measure the efficient use of human resources in a utility as manifested by low staff/1,000 connection ratio. However, two thirds of the utilities have contracted out some of its operations. Those with high staff/1,000 connections ratio are Bhopal (20.7), Indore (18.7), Mumbai (17.2), Kolkata (14.7), Chennai (13.3), and Chandigarh (8.6), with Kolkata and Chandigarh contracting out some services. The utilities with the lowest ratio are Jabalpur (0.4), Rajkot (1.1), Surat (1.7), Ahmedabad (2.2), Nagpur (3.2), and Nashik (3.4). Of this group, only Nagpur and Jabalpur have not contracted out services.

# ACHIEVING 24/7 SUPPLY – BEST PRACTICES IN WATER UTILITIES

## Introduction

Providing 24-hour water supply 7 days a week to India's growing urban population is possible with political will from the Government and support from the stakeholders, particularly the consumers and civil society. It will require solving chronic inefficiencies in the urban water supply and sanitation sector, which include limited coverage and poor service quality. Previous studies pointed to the underlying problems related to performance of water utilities, such as poor and inadequate investments, poor operation and maintenance (O&M) practices, high nonrevenue water, uneconomic tariff structure and levels, and poor financial management. Poor service delivery is ascribed to inefficient and financially weak utilities that continue to operate without sufficient autonomy, the right incentives, and the necessary accountability to consumers.

Less-than-24-hour water supply exposes consumers to high health risk from contamination entering distribution pipes during vacuum conditions created when water is absent. It makes accurate measurement of consumption impossible. There is evidence that more water is consumed with intermittent supply because people leave their taps open to fill storage, which can often then overflow to waste. The poor suffer the most as they cannot afford the dual system of individual storage and pumping that provides 24-hour supply to the home of the richer segment of the population.

A significant and sustainable improvement in the performance of water utilities is critical to improving services particularly in the areas of customer satisfaction, water resources management, and financial and human resources management.

## Customer Satisfaction

Customer satisfaction can be measured in

terms of coverage, water availability, and average daily consumption.

### *Coverage*

Many Indian water utilities provide water supply through house connections, public taps, wells with hand pumps, and tankers. The ideal should be provision through pipe connection, which minimizes the risks of contamination from fetching and handling from point sources. Coverage can be increased through appropriate tariffs to finance expansion, as well as through connection fees that can be paid in installments. The urban poor can be connected with lifeline rates and reduced connection fees. Schemes used by small-scale service providers in many parts of Asia for daily billing and collection and distribution for the urban poor should also be explored. Timely redressal of complaints is important in keeping customers satisfied.

### *Consumption*

The average daily consumption of 123 lpcd is sufficient for health requirements and low enough so as not to be wasteful. However, with less than 25% metering of service connections, assessing the actual amount consumed by users is difficult. This is further aggravated by the lack of information on the actual number of people that the utilities serve. While the number of connections is known, the average number of persons that each type of connection serves is not known. This information is not difficult to obtain considering that bill collectors have regular contact with consumers.

### *Availability*

The number of hours of supply per day is the most important service indicator to consumers along with average pressure which, together, determines how much consumers ultimately get from the distribution network. A 24-hour supply is possible regardless of the size of utilities. Many large utilities divide their areas into smaller business units for managers to operate at the lowest possible level and be held

accountable for the efficiency of their operations. The costs to the utility and to consumers are less with 24-hour supply. Hydraulics dictate that delivering 123 lpcd over 1 hour will require larger pipes compared to spreading this out over 24 hours. There are costs to wastage and health risks with intermittent supply. The total cost borne by households to get 24-hour supply in the home from intermittent supply by the utility will be more than enough to have the necessary infrastructure for providing 24-hour supply delivered to homes.

## **Water Resources Management**

### *Unaccounted For Water (UFW)*

The single most important parameter to indicate performance under water resources management is unaccounted for water (UFW). However, it is equally important that UFW is obtained through accurate measurement of production and consumption with no less than 100% metering of all sources of production and all service connections. Once the levels of UFW at the different areas of the distribution system are determined, the necessary measures can then be taken to reduce losses from all sources to reasonable levels. These include leak detection and control, flushing out illegal connections, meter calibration and replacement, meter protection, training on meter reading to minimize human error, proper supervision during construction, etc. The cost of reducing UFW and the resulting revenue water could be less than the cost of developing new sources for the same amount of recovered losses. At least, it could postpone the development of new sources.

## **Financial Management**

The most important measures or indicators of financial management are operating ratio, accounts receivable, and collection efficiency where Indian water utilities are performing poorly. Major factors include tariffs, operating expenses, revenues, and payment arrears.

### *Operating Ratio*

Operating ratio is defined by the operating expenses (excluding debt service and depreciation) and operating revenues. A

healthy utility should have an operating ratio of about 0.75. The average for Indian water utilities is 1.63, which requires huge subsidies from local governments or urban local bodies. A first step in getting the finances of a utility in order is to ring-fence the water utility operations. This will allow management of finances purely from the water utility's operations. It will require increasing its revenue base, meaning more connections. Tariff level is the most important component of revenues apart from the number of consumers. Reducing the operating ratio will also require reducing operating expenses, which means increasing staff productivity while reducing energy costs and other expenses. For utilities with high energy cost component, energy audits show that using variable-speed motors to suit supply to demand is a way of reducing electric bills. Timely leak interventions reduce costs and losses as well.

### *Accounts Receivable*

Accounts receivable equivalent in months is a measure of collection period or the time it takes to collect water bills. While 2–3 months is reasonable, the average for the Indian water utilities is 4.9 months, with 60% having it greater than 3.0 months. Efficient utilities resort to measures, such as strict disconnection policies against delinquent consumers, information campaigns, collection reminders, incentives and penalty systems for early or late payments, and providing more customer-friendly environment for receiving payments.

### *Tariffs*

In setting tariffs, the first consideration must be a consistent transparent tariff policy endorsed by the Government. Government subsidies to the sector, as well as so-called "cross-subsidies" within the sector, need to be clearly outlined. Demand management through higher rates for high consumption and a lifeline rate where there are urban poor should be considered in the tariff structure. Mechanism for tariff adjustment must be defined. Ideally, an independent regulatory authority to monitor and approve tariffs must be established. Water utilities need to generate from tariffs a cash flow that will cover O&M costs, debt servicing (both capital repayment and interest), and provide a contribution to capital development.

## Human Resources Management

### *Staff Productivity*

The most common measure for human resources management is staff/1,000 connections. The most important resources of a utility are its management and staff. The 7.4 staff ratio can still be improved to 5.0, which is the average ratio for developing countries in an earlier Water and Sanitation (WSP) World Bank study. This can be done through training of staff in different aspects of operations, such as pumping, treatment plant operations, billing and collection, leak control and management, etc. Staff training is a dilemma for small utilities that are left on their own upon turnover of new facilities. Problems normally start occurring once operations start, and this is when most new utilities are vulnerable. This is where they need technical assistance that is nowhere

available in most cases. Making regular training programs and advisory services available to utility operators would be ideal. Computerization and management information systems are required for more efficient operations and effective day-to-day management decisions.

### **Accountability**

Water utilities that are required to account for their performance will most likely perform better and seek ways to improve their operations. A simple, annual report (with audited financial statements and the performance indicators mentioned in this section) that is made available to the general public will be useful to both the water utility and its consumers, as well as other stakeholders. Such report should be published and made available within 6–12 months from the end of the fiscal year.

## General Conclusions

The data presented in this book give a comprehensive picture of the performance of 20 water utilities in India. The performance indicators were derived from information provided by the participating utilities. It should be emphasized that the reliability of a number of important indicators, such as per capita consumption, UFW, and finance indicators related to consumption and billing, are suspect in the absence of full metering and should be used with caution. Any performance improvement program will have to improve measurement and recording of operational information as a first step in getting a complete assessment of any water utility's overall performance. Benchmarking as a management tool to attain operational efficiency will work only with reliable and accurate information.

Overall, service to consumers is mixed with good coverage and reasonable consumption. Availability, however, is dismal, with consumers getting water supply at a daily average of about 4 hours only. While average UFW is reasonable, the figures derived are not reliable

in the absence of full metering of both production and service connections. Financial management needs improvement in collecting bills and collecting them on time, setting the appropriate tariffs, and reducing O&M costs. Staff productivity needs to be enhanced through capacity-building programs, including training in utility operations and management.

Attention needs to be focused on the following:

- Advocacy for more investment in the sector and greater coverage;
- 24-hour water supply;
- 100% metering of both production and consumption;
- Management of water losses by keeping UFW in check, appropriate pricing, and public awareness;
- Phasing out public taps that provide free water;
- Improved billing and collection efficiency;
- Appropriate tariffs to cover O&M costs and costs of expansion;

- Investment in capacity building for staff and management;
- Regular monitoring of performance through appropriate management information systems; and
- Support for services to the urban poor through lifeline rates and installment payment of connection fees.

Performance improvement for each utility will have to be based on the indicators and their operating environment as described in the utility and area profiles in this data book. Additional information will be required in developing performance improvement plans. Utilities are encouraged to learn from those who are performing well by identifying them and communicating with them using the contact details in this book.



***PART II***  
***UTILITIES COMPARISONS***  
***(Figures and Tables)***



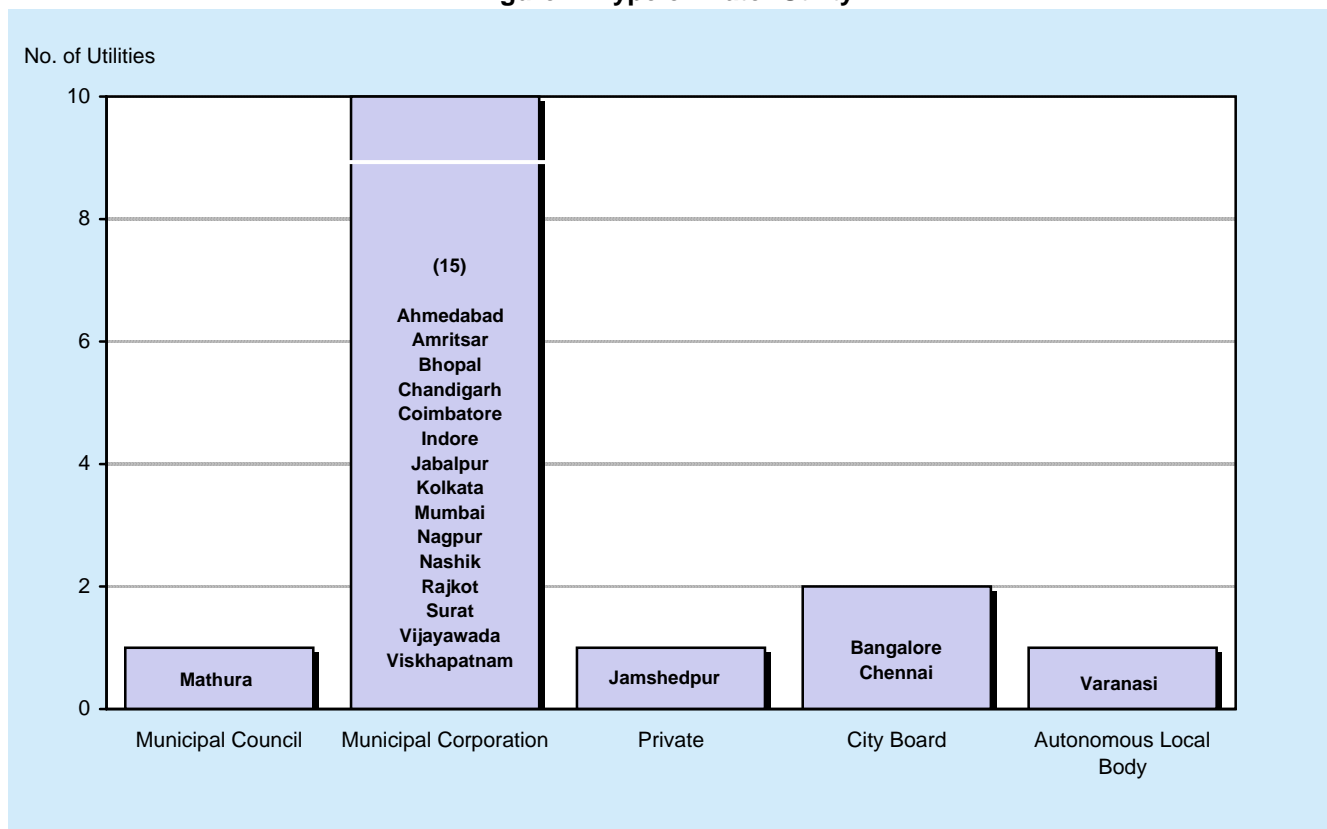
**Table 2: Names and Locations of Utilities**

City	State	Area Population	Year	Name of Utility
Ahmedabad	Gujarat	4,491,000	2005–2006	Ahmedabad Municipal Corporation
Amritsar	Punjab	804,455	2005–2006	Municipal Corporation, Amritsar
Bangalore	Karnataka	5,361,500	2005–2006	Bangalore Water Supply and Sewerage Board
Bhopal	Madhya Pradesh	1,437,000	2005–2006	Bhopal Municipal Corporation
Chandigarh	UT Chandigarh	1,150,000	2005–2006	Municipal Corporation, Chandigarh
Chennai	Tamil Nadu	5,320,000	2005–2006	Chennai Metropolitan Water Supply & Sewerage Board
Coimbatore	Tamil Nadu	994,000	2005–2006	Coimbatore City Municipal Corporation
Indore	Madhya Pradesh	2,200,000	2005–2006	Indore Municipal Corporation
Jabalpur	Madhya Pradesh	1,050,000	2005–2006	Jabalpur Municipal Corporation
Jamshedpur	Jharkhand	488,000	2005–2006	Jamshedpur Utilities & Services Company, Limited
Kolkata	West Bengal	3,998,000	2005–2006	Kolkata Municipal Corporation
Mathura	Uttar Pradesh	238,000	2005–2006	Mathura Municipal Council
Mumbai	Maharashtra	13,000,000	2005–2006	Municipal Corporation of Greater Mumbai
Nagpur	Maharashtra	2,302,990	2005–2006	Nagpur Municipal Corporation
Nashik	Maharashtra	1,350,000	2005–2006	Nashik Municipal Corporation
Rajkot	Gujarat	980,000	2005–2006	Rajkot Municipal Corporation
Surat	Gujarat	2,954,000	2005–2006	Surat Municipal Corporation
Varanasi	Uttar Pradesh	1,489,000	2005–2006	Varanasi Jal Sansthan
Vijayawada	Andhra Pradesh	675,000	2005–2006	Vijayawada Municipal Corporation
Visakhapatnam	Andhra Pradesh	920,000	2005–2006	Greater Visakhapatnam Municipal Corporation

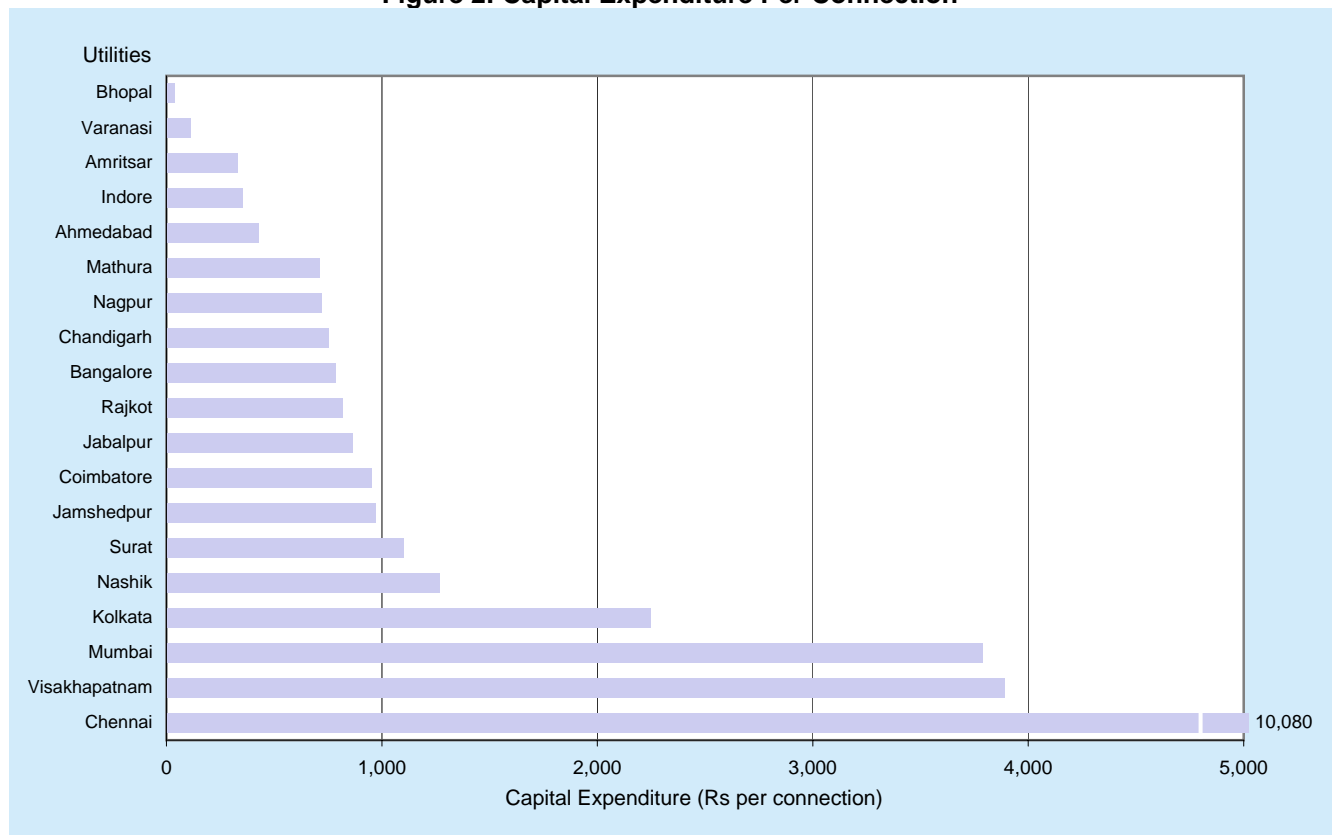
**Table 3: Size of Utilities**

Utility	Production (m <sup>3</sup> /day)	Utility	Number of Connections	Utility	Number of Staff	Utility	People Served
Mumbai	3,200,000	Ahmedabad	556,734	Mumbai	8,371	Mumbai	13,000,000
Kolkata	971,560	Bangalore	486,850	Chennai	4,578	Bangalore	4,978,330
Bangalore	923,090	Chennai	344,079	Kolkata	3,866	Kolkata	3,948,000
Ahmedabad	623,836	Surat	310,836	Indore	2,979	Ahmedabad	3,716,624
Chennai	623,836	Mumbai	309,226	Bangalore	2,510	Surat	2,954,000
Nagpur	608,220	Nagpur	265,231	Bhopal	2,171	Chennai	2,364,725
Surat	554,685	Kolkata	262,839	Ahmedabad	1,200	Nagpur	2,277,990
Chandigarh	381,280	Rajkot	193,879	Chandigarh	1,196	Indore	1,700,000
Jamshedpur	370,110	Indore	159,104	Nagpur	856	Bhopal	1,418,460
Nashik	310,000	Chandigarh	139,300	Varanasi	676	Nashik	1,250,000
Varanasi	270,000	Amritsar	127,786	Amritsar	617	Varanasi	1,243,000
Bhopal	258,000	Nashik	127,562	Surat	532	Chandigarh	1,150,000
Visakhapatnam	228,451	Varanasi	114,907	Visakhapatnam	466	Rajkot	983,000
Coimbatore	228,400	Coimbatore	113,762	Coimbatore	452	Amritsar	804,455
Indore	183,000	Bhopal	105,012	Vijayawada	445	Coimbatore	799,000
Jabalpur	175,115	Visakhapatnam	85,668	Nashik	440	Jabalpur	790,000
Amritsar	171,005	Vijayawada	78,298	Jamshedpur	298	Visakhapatnam	750,000
Rajkot	143,836	Jabalpur	46,260	Rajkot	211	Vijayawada	600,000
Vijayawada	131,833	Jamshedpur	38,800	Mathura	160	Jamshedpur	458,000
Mathura	38,172	Mathura	24,643	Jabalpur	17	Mathura	238,000

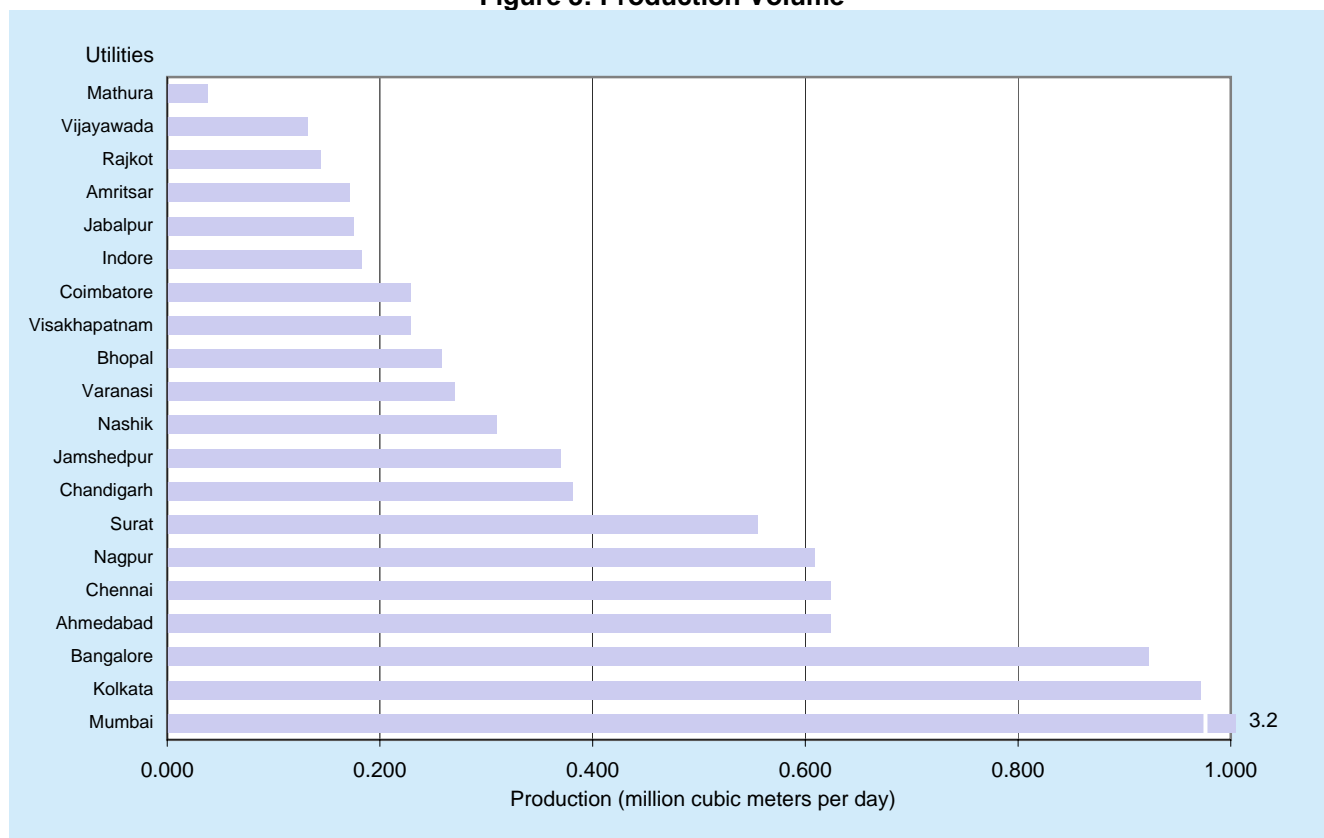
**Figure 1: Type of Water Utility**



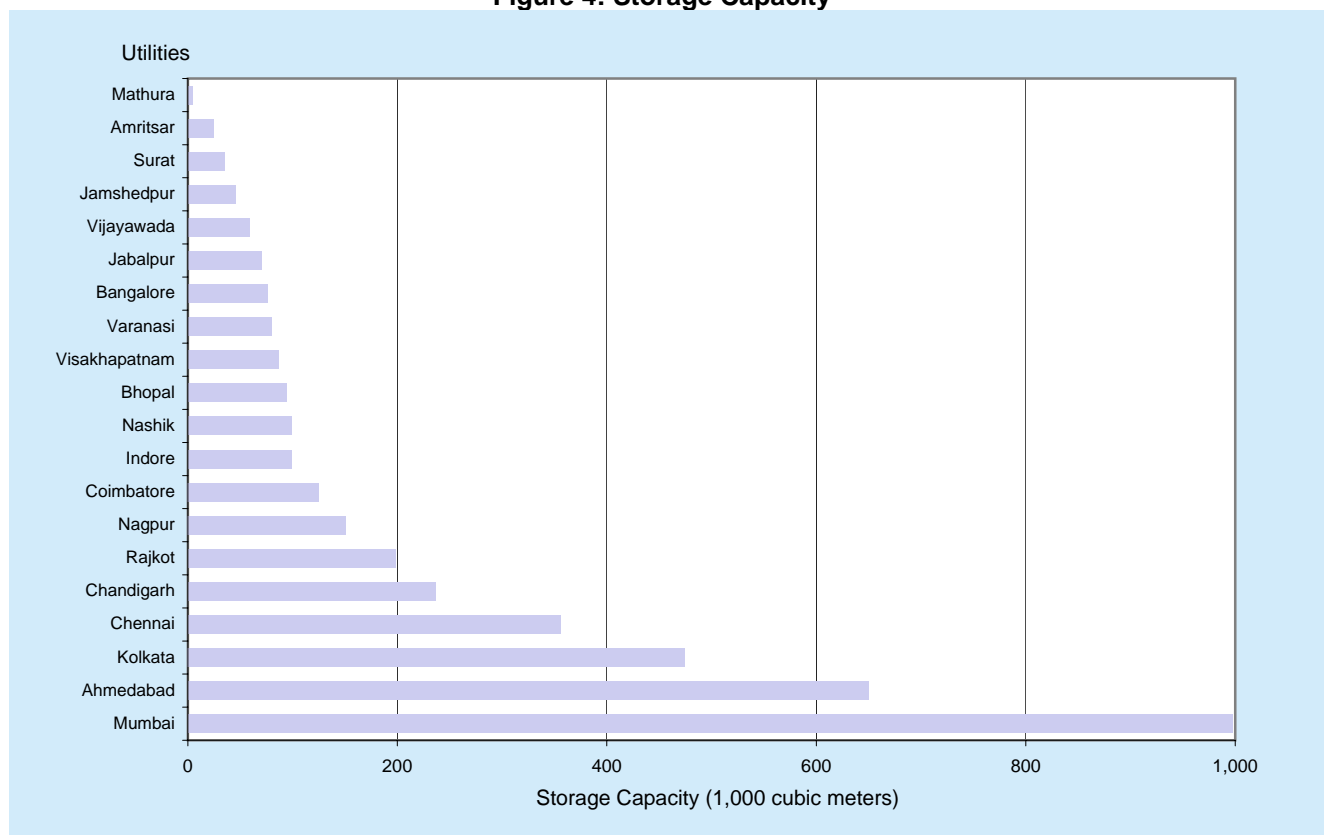
**Figure 2: Capital Expenditure Per Connection**



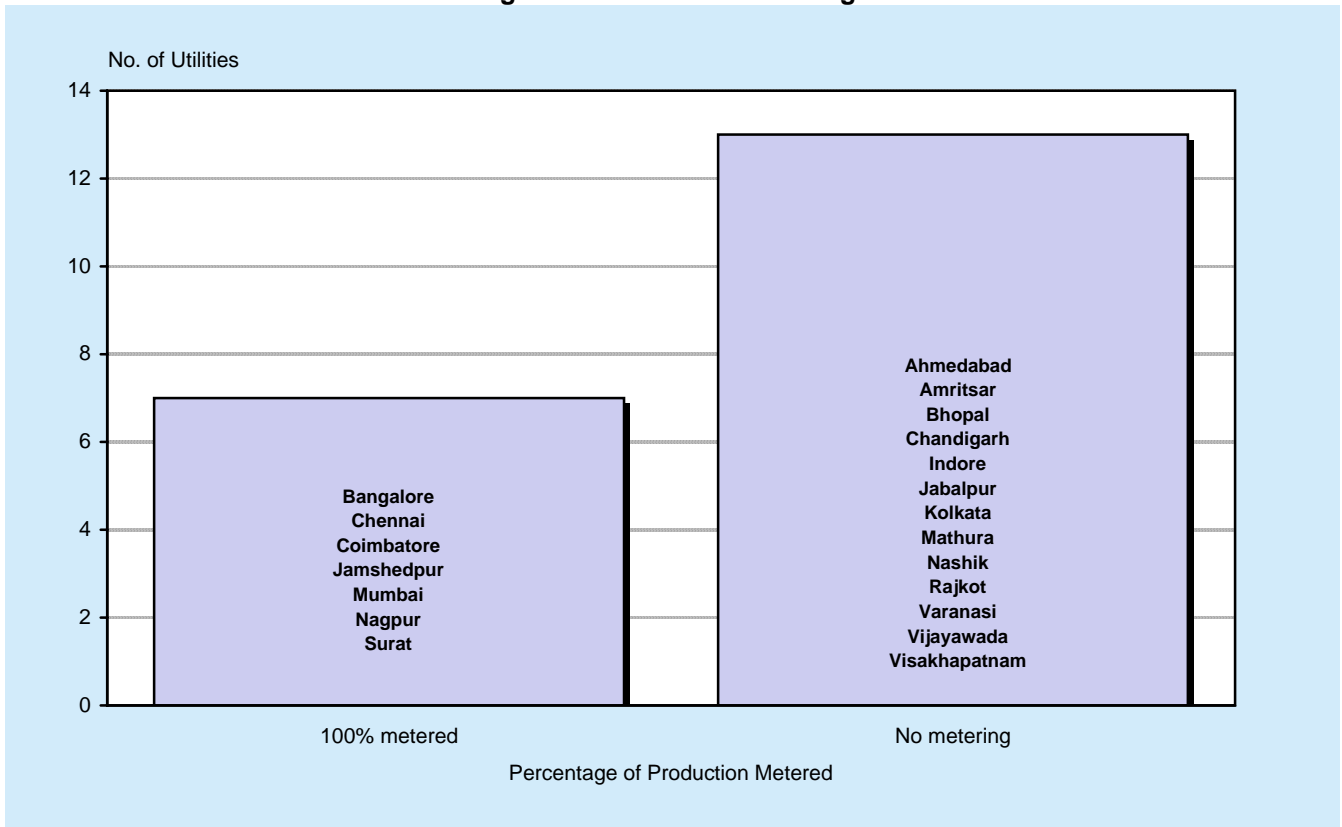
**Figure 3: Production Volume**



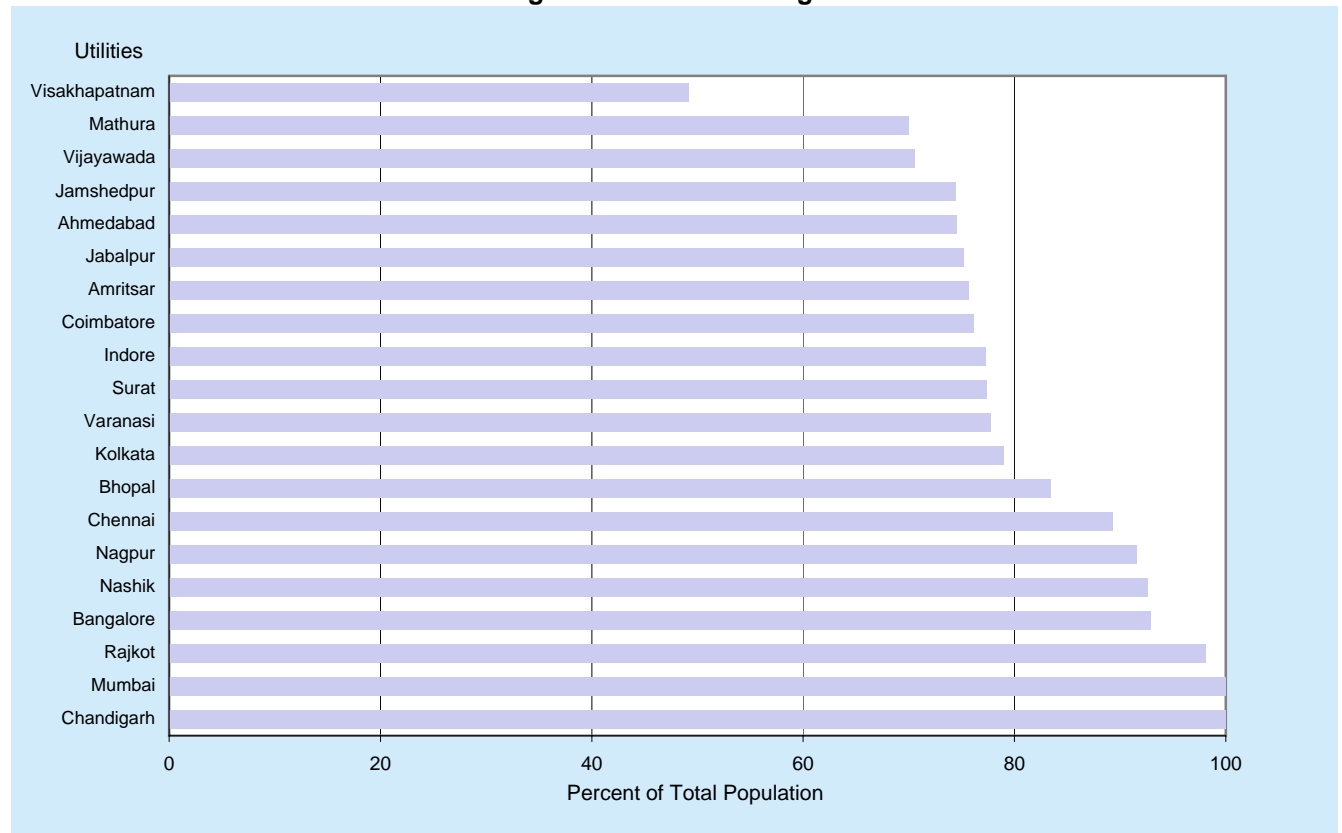
**Figure 4: Storage Capacity**



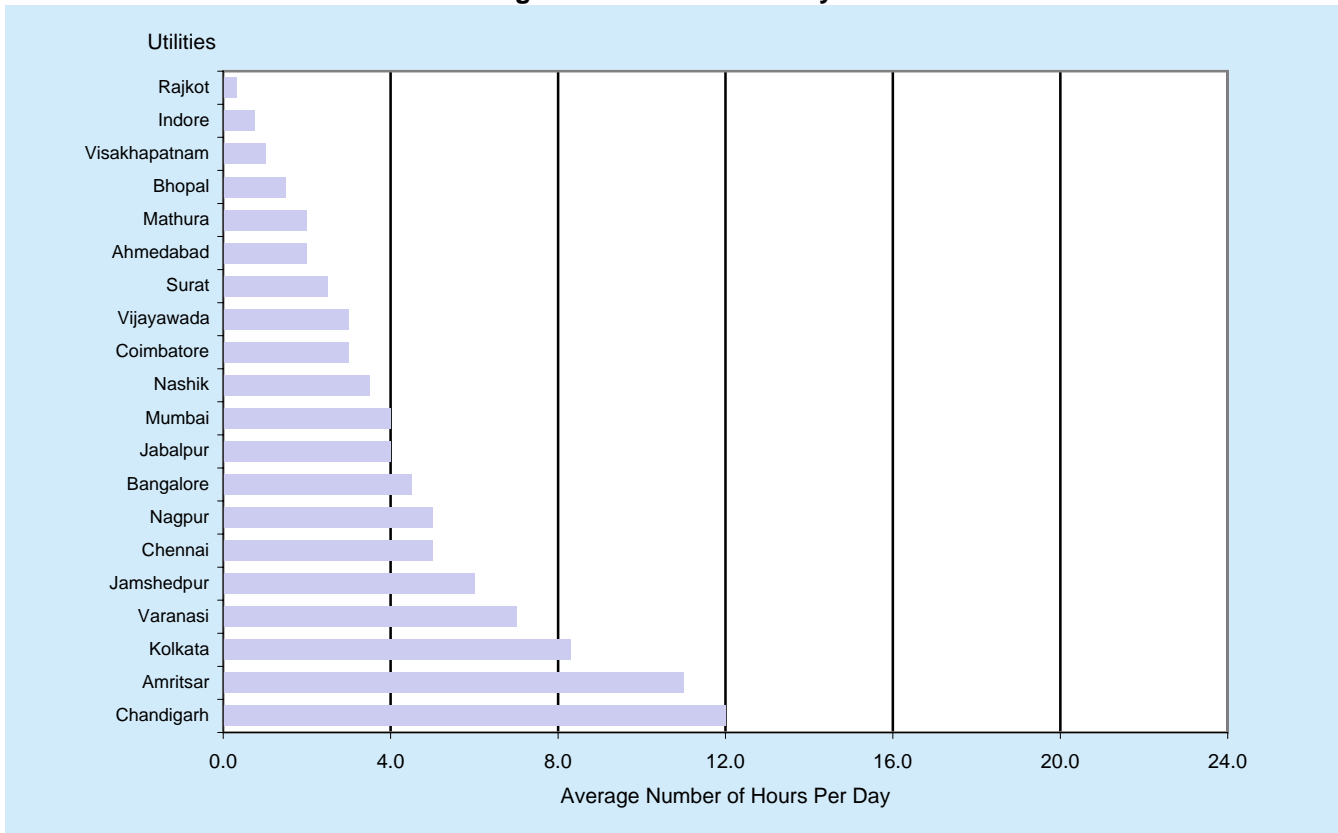
**Figure 5: Production Metering**



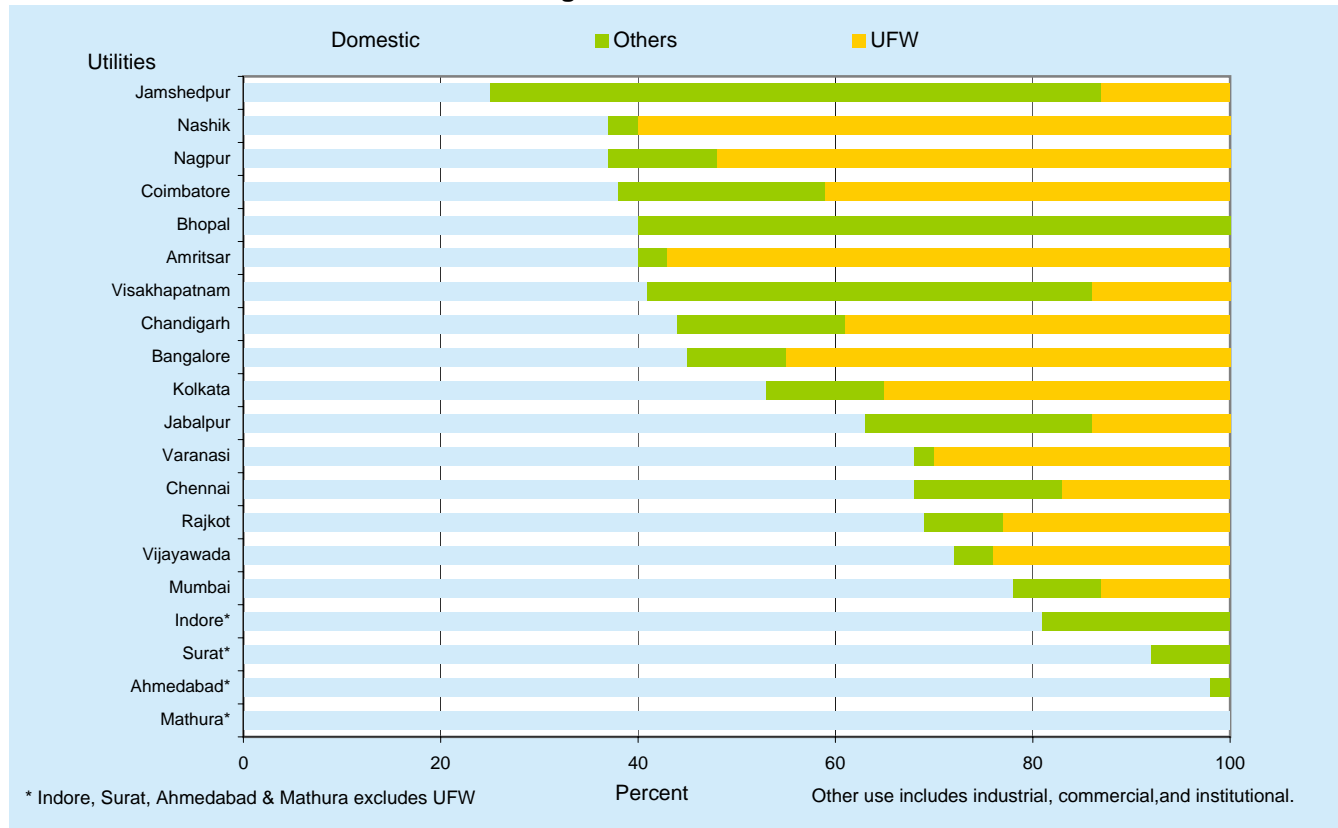
**Figure 6: Water Coverage**



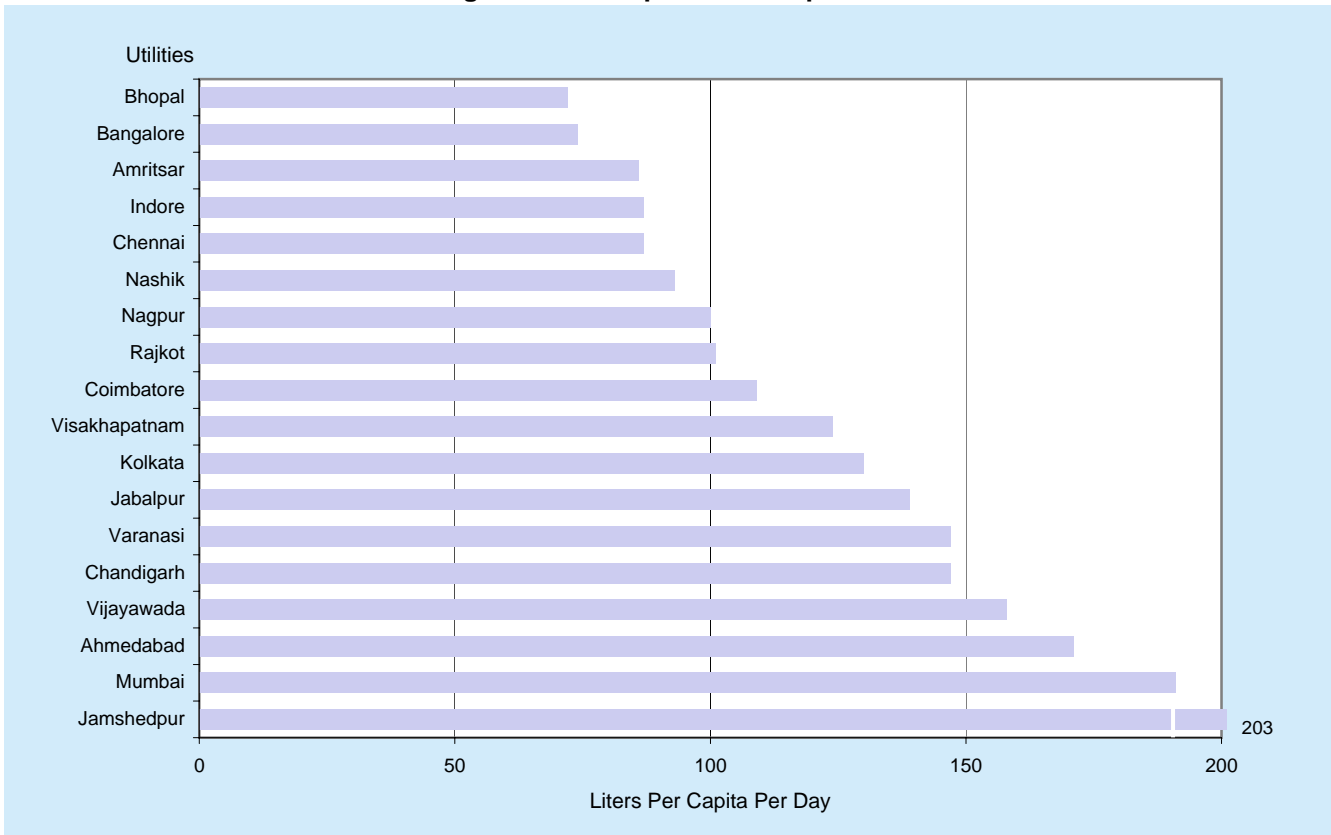
**Figure 7: Water Availability**



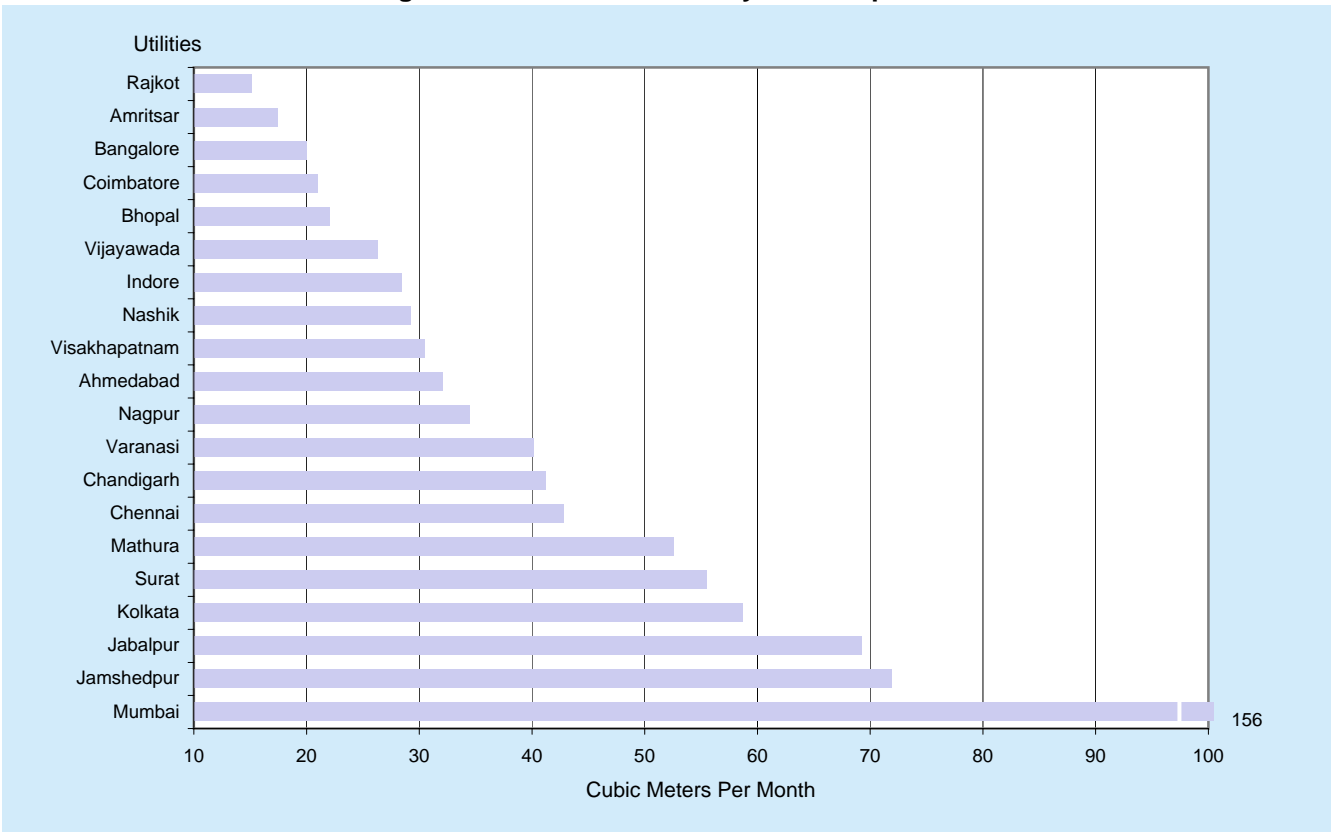
**Figure 8: Water Use**



**Figure 9: Per Capita Consumption**

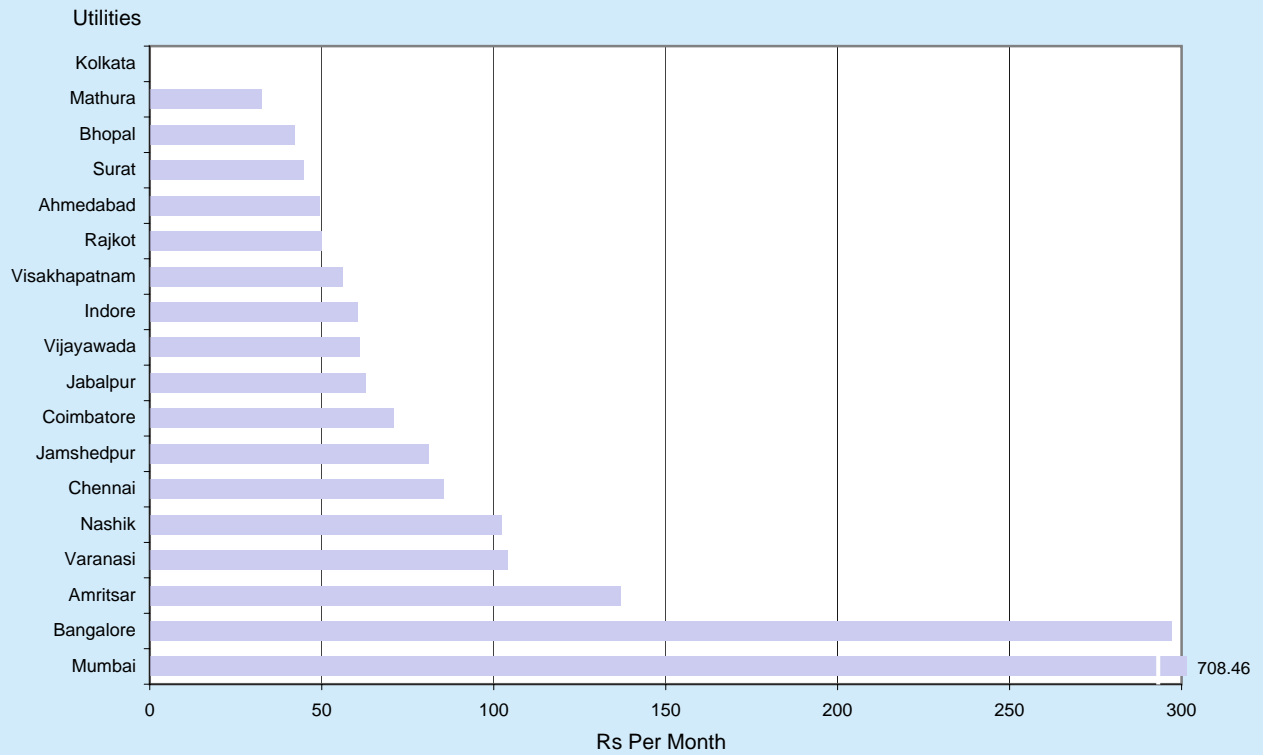


**Figure 10: Household Monthly Consumption**

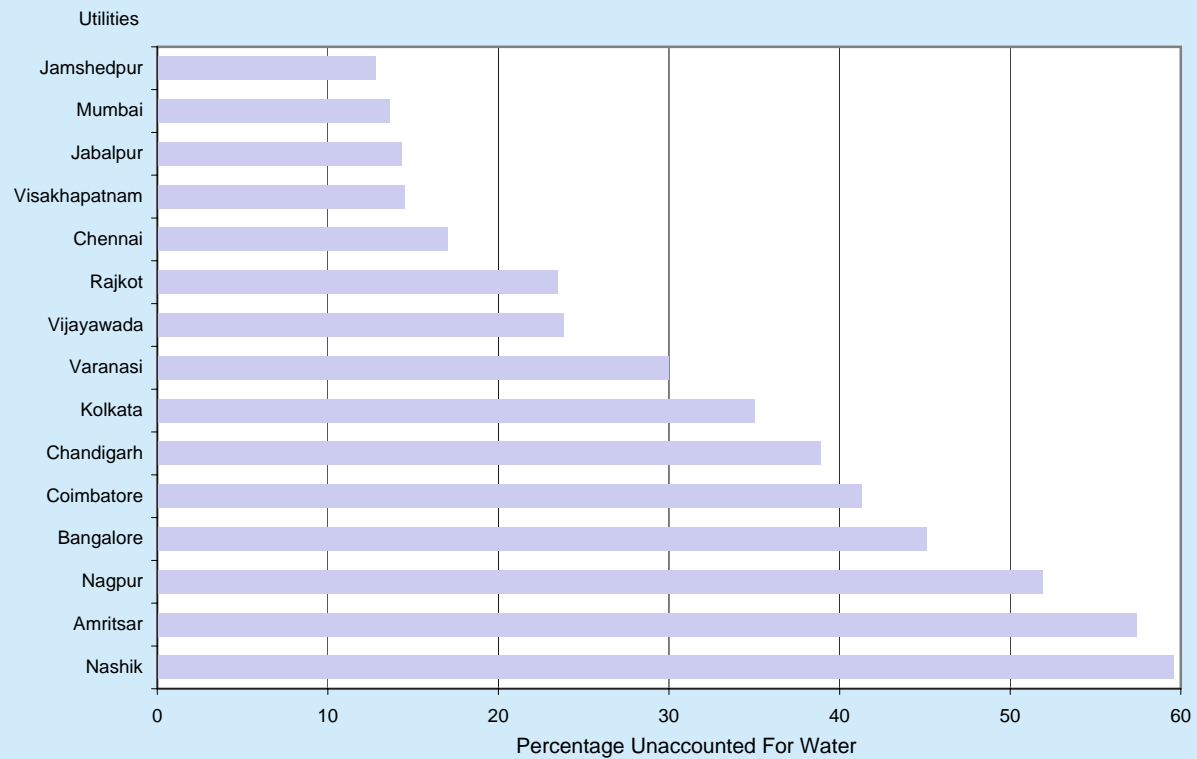




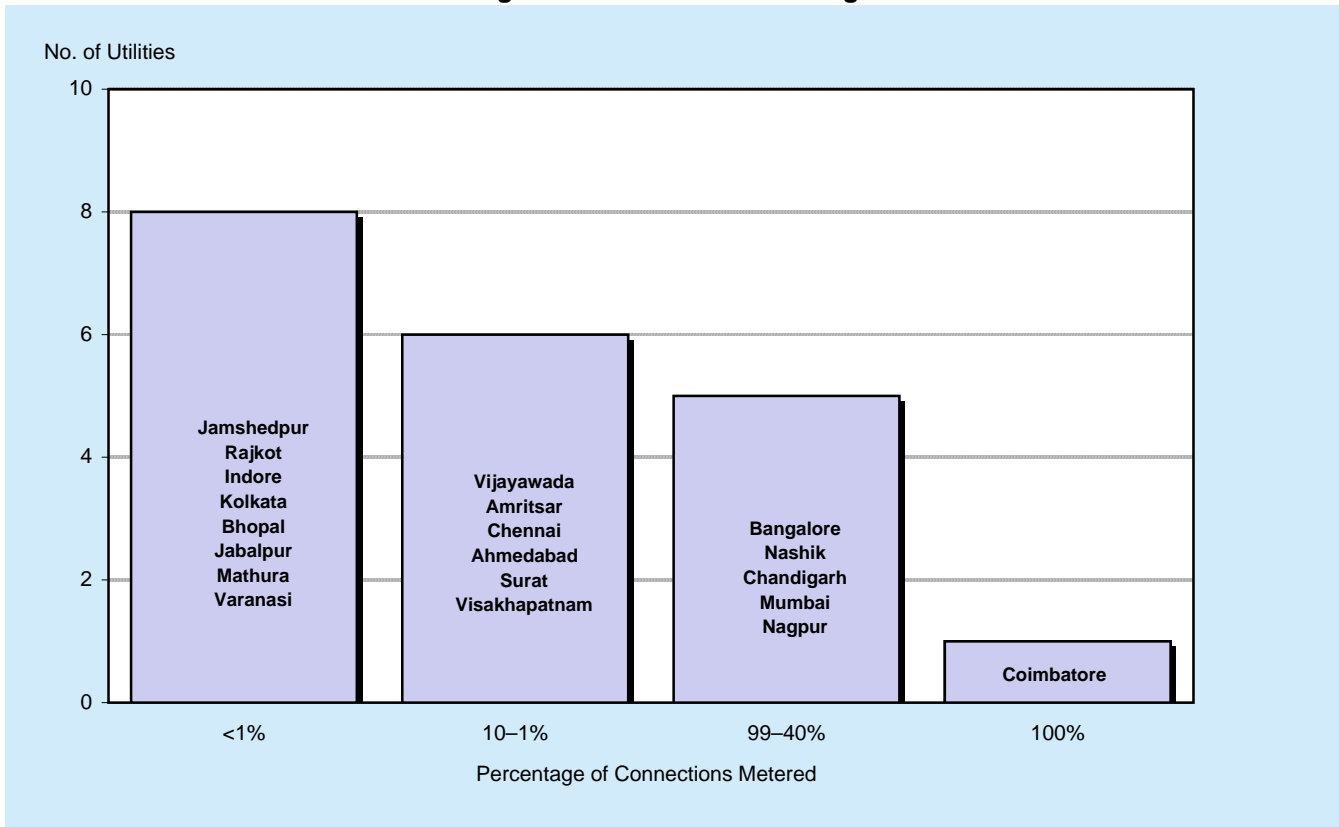
**Figure 11: Household Monthly Bill**



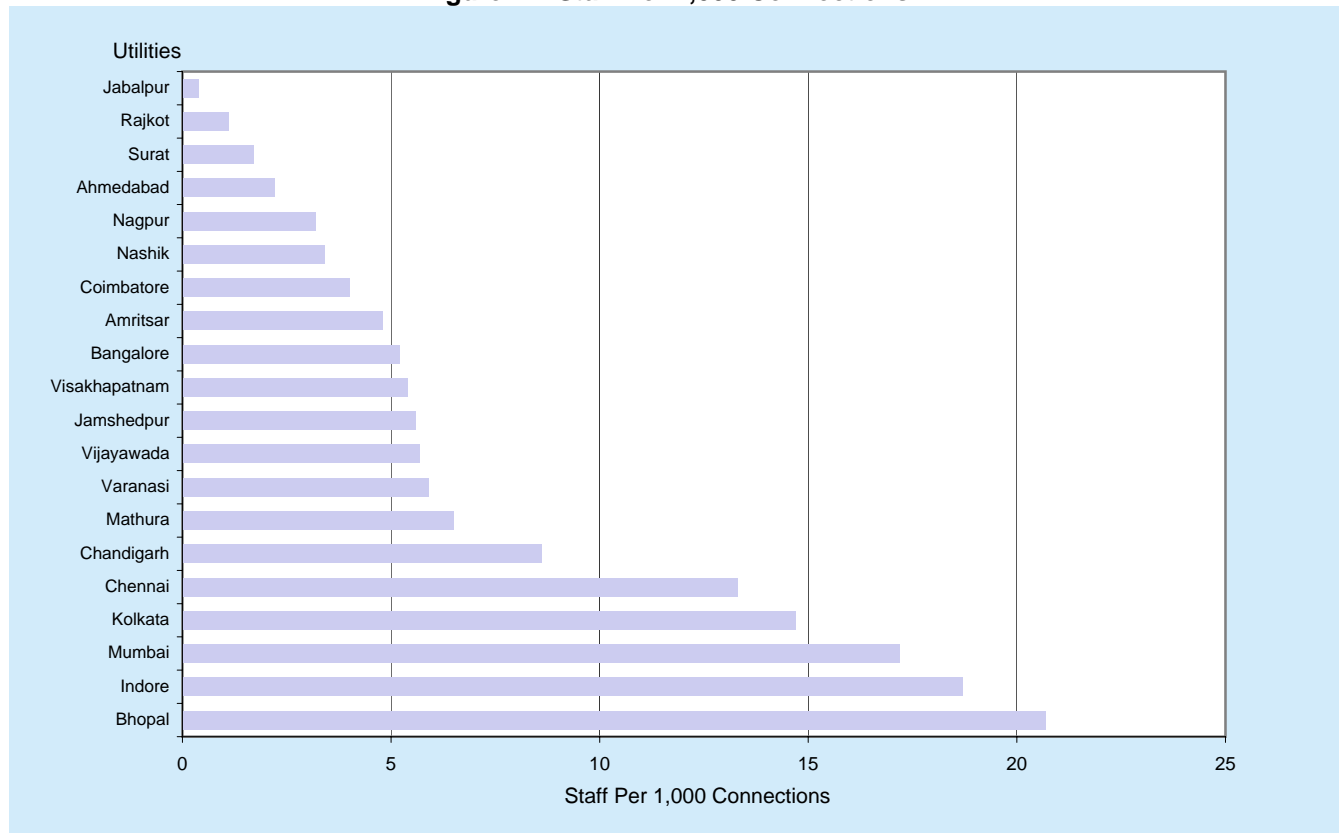
**Figure 12: Unaccounted For Water**



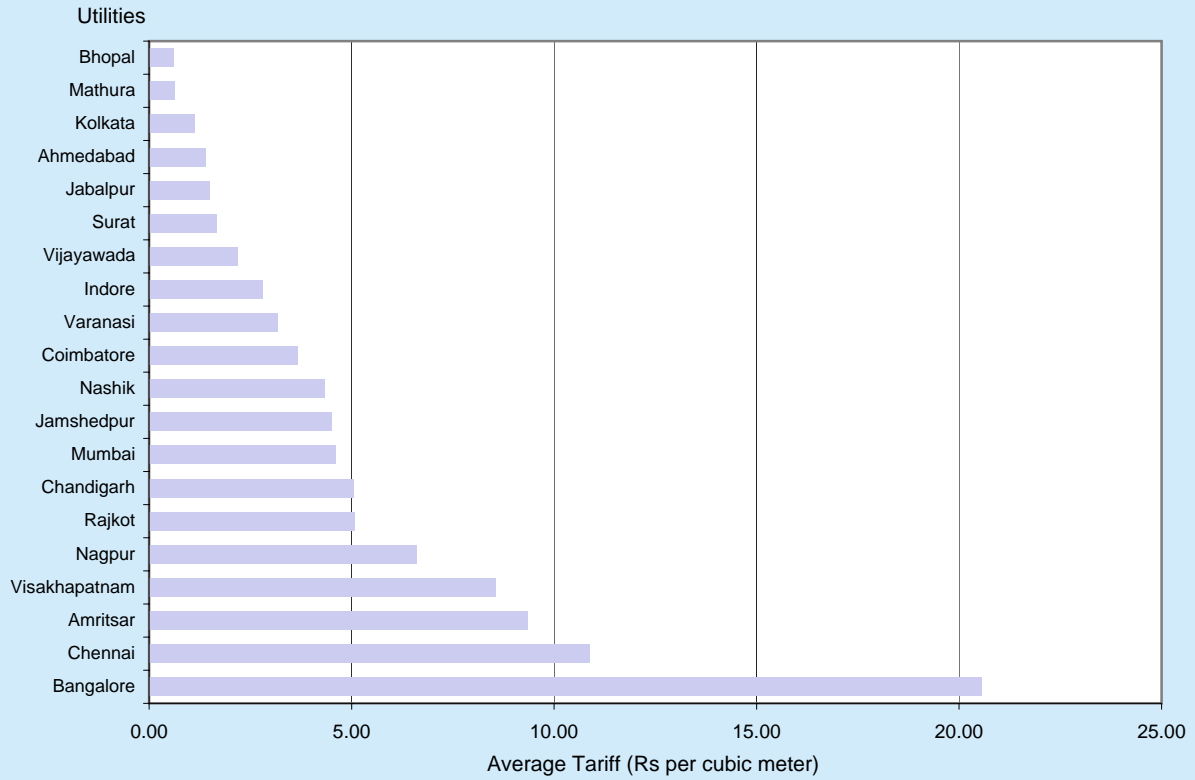
**Figure 13: Consumer Metering**



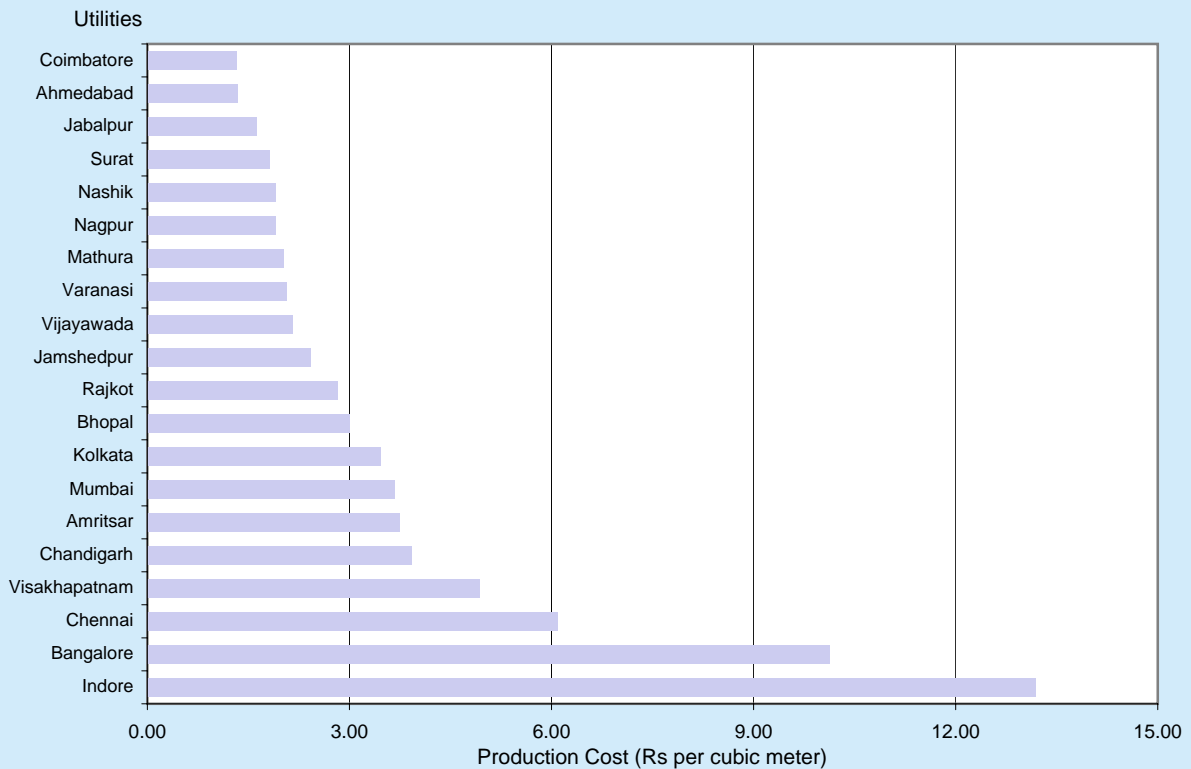
**Figure 14: Staff Per 1,000 Connections**



**Figure 15: Average Tariff**



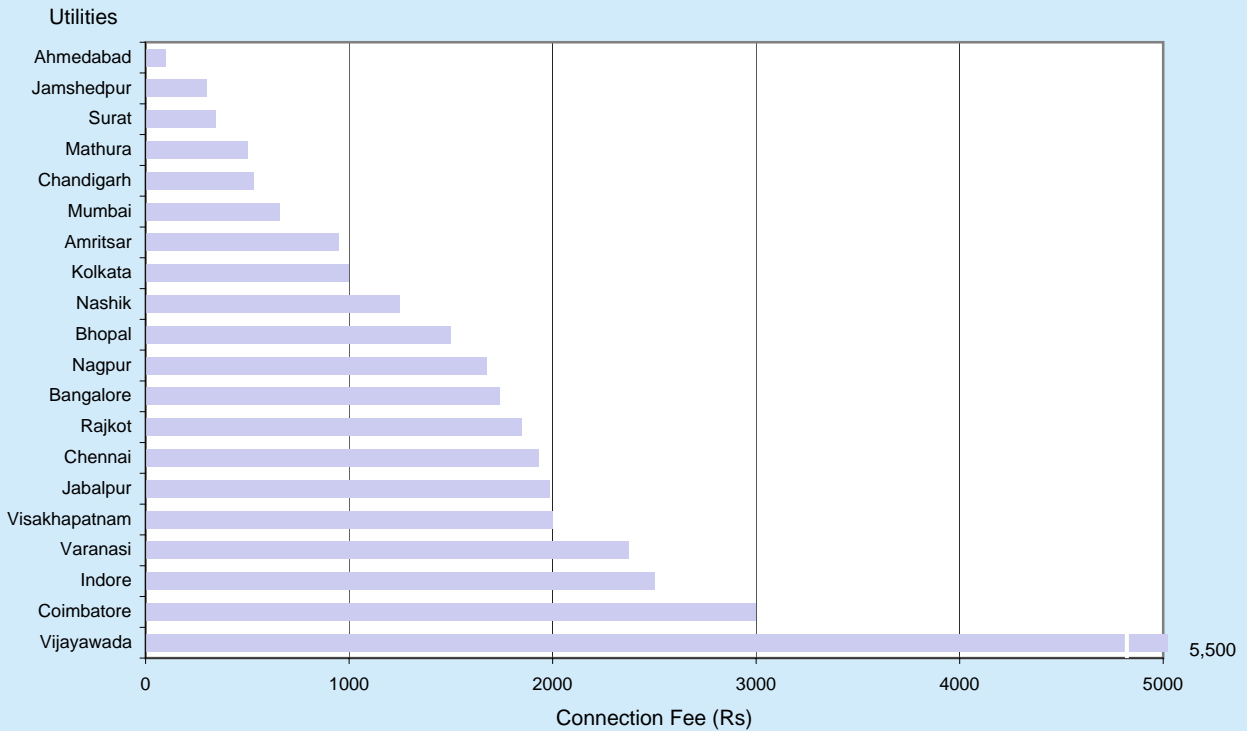
**Figure 16: Unit Production Cost**



**Figure 17: Management Salaries**



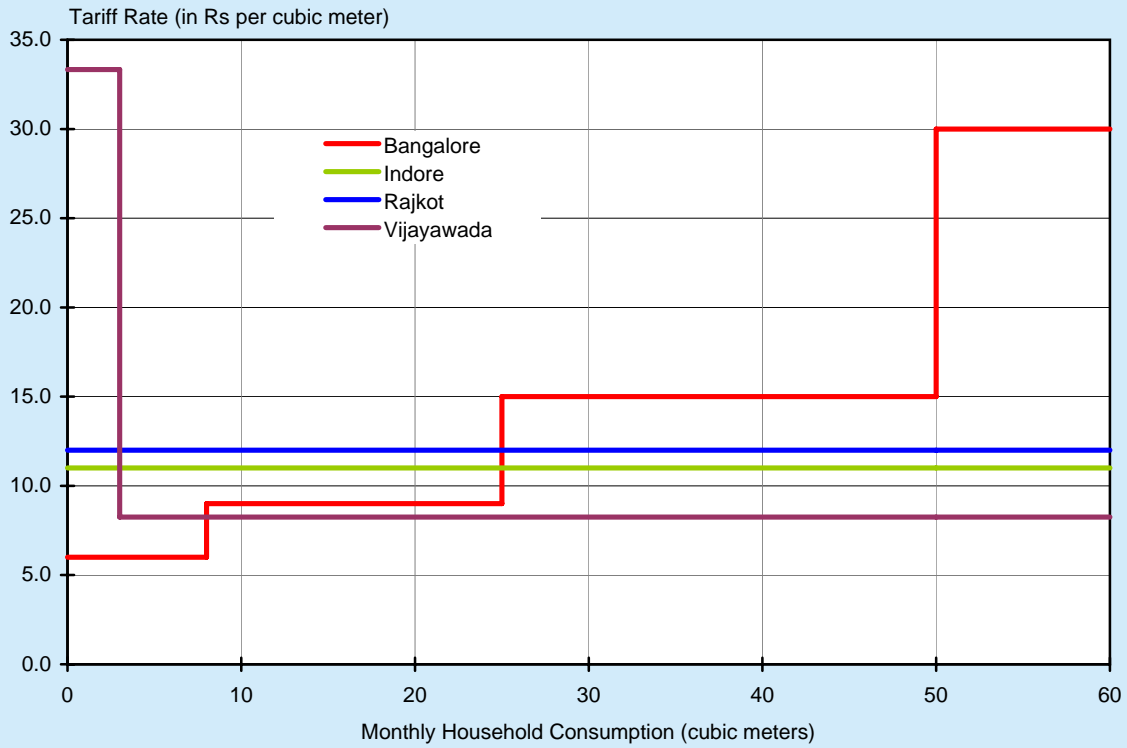
**Figure 18: Connection Fee for House Connection**



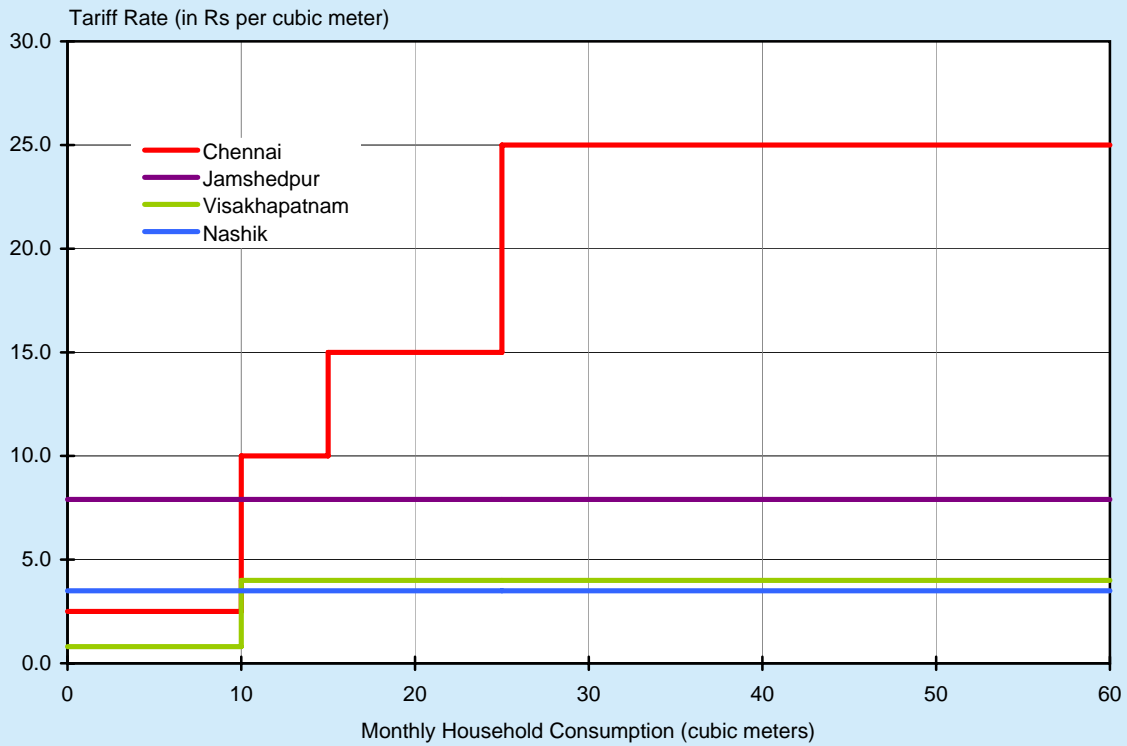
**Table 4: Priority Needs of Utility**

Utility		Priority Needs	
Ahmedabad	Regular, adequate, safe water supply to citizens	All water supplies must be surface water	Water audit
Amritsar	Institutional improvement	Access survey and management	Leak detection and control
Bangalore	Reduce unaccounted for water	Reuse water for potable uses and industries	Ensure no flow of sewage in storm water drains
Bhopal	24-hour water supply to all	Detect leak to control UFW	Meeting the future needs of growing population
Chandigarh	Water supply	Sewage treatment plant	Storm water drainage
Chennai	Water conservation	Safe disposal of sewage	Source identification and development
Coimbatore	Nonrevision of tariffs in nearly 10 years	Shortage of staff with ban on fresh recruitments	Limited role of private sector
Indore	Augmentation of water supply system capacity	Increase in revenue to make system sustainable	Upgrade existing distribution system
Jabalpur	Leakage control	Zoning of water distribution system	Collection improvement – realization of cess
Jamshedpur	Increase service coverage	24 x 7 supply with 100% metering	Reduction of nonrevenue water
Kolkata	Water supply network management	Management of UFW reduction	24 x 7 water supply with 100% metering
Mathura	Master plan for distribution system	Rehabilitation in core of city and expansion	Metering and computerization for billing and collection
Mumbai	Reduce UFW	Distribution management from service reservoir to consumer end	GIS-based network interlinked with SCADA
Nagpur	Reduce raw water losses	Rehabilitation and upgrade existing infrastructure	Upgrade and improvement of existing distribution network
Nashik	Full coverage in terms of population and area	Reduction in water losses	Augmentation of water supply systems for year 2026 requirement
Rajkot	Source augmentation	Minimize leaks	100% cost recovery
Surat	Reducing pollution of its present source of raw water	Exploring alternate sources of water	Rationalize water tariff for sustainability
Varanasi	Revenue – billing and collection	Regular supply of potable water to citizens	Upgrade, extension, and improved maintenance of existing water supply
Vijayawada	Every house to be provided with a tap	Accountability	Decrease in NRW
Visakhapatnam	Water supply improvement in quantity and quality	Refurbish and extend the distribution system at uniform service levels	100% coverage with 24 x 7 supply

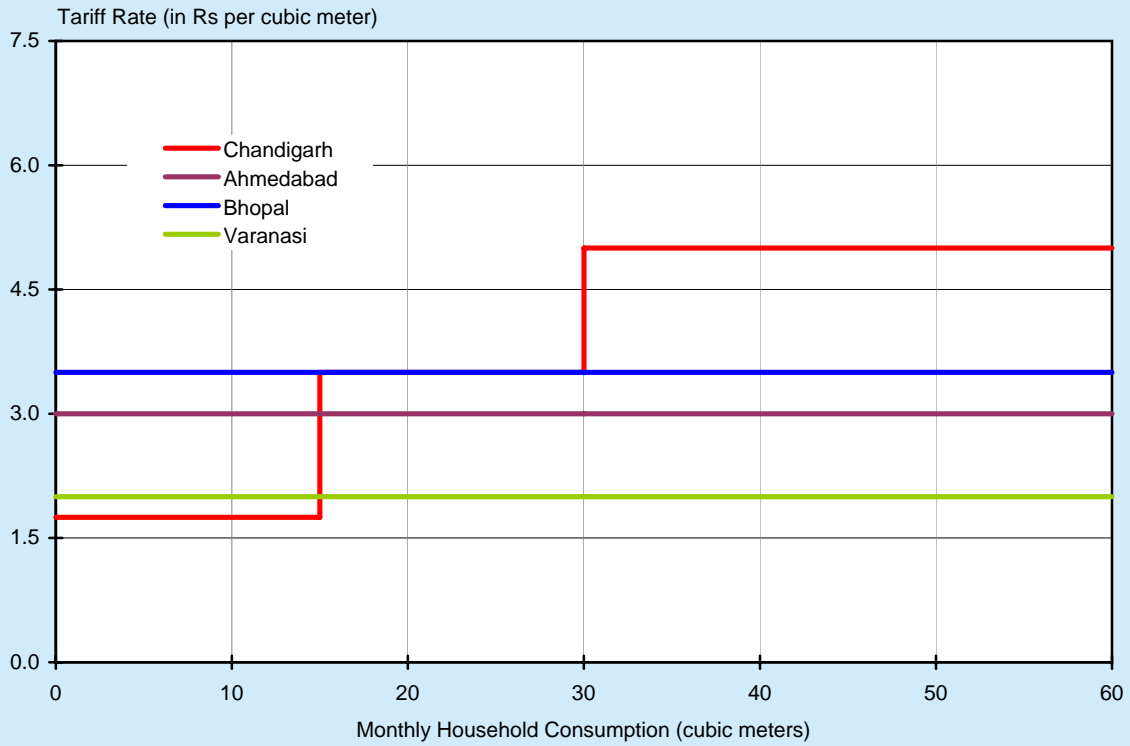
**Figure 19a: Domestic Tariff Structures**



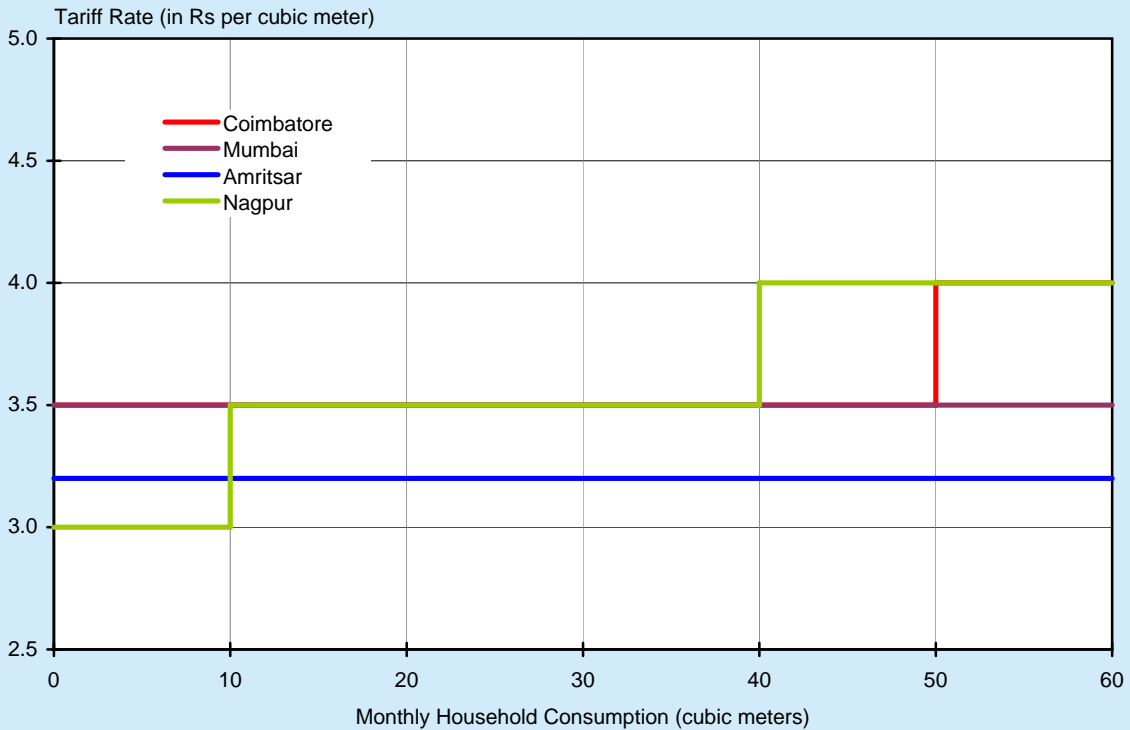
**Figure 19b: Domestic Tariff Structures**



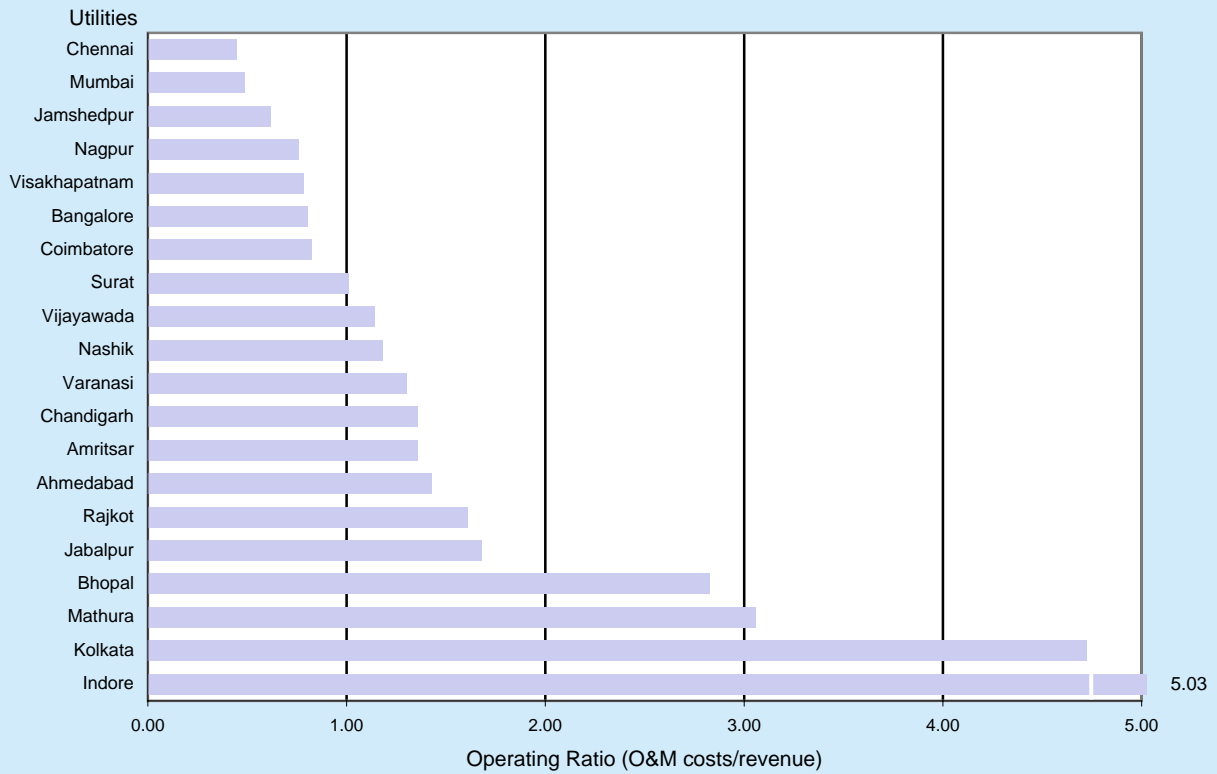
**Figure 19c: Domestic Tariff Structures**



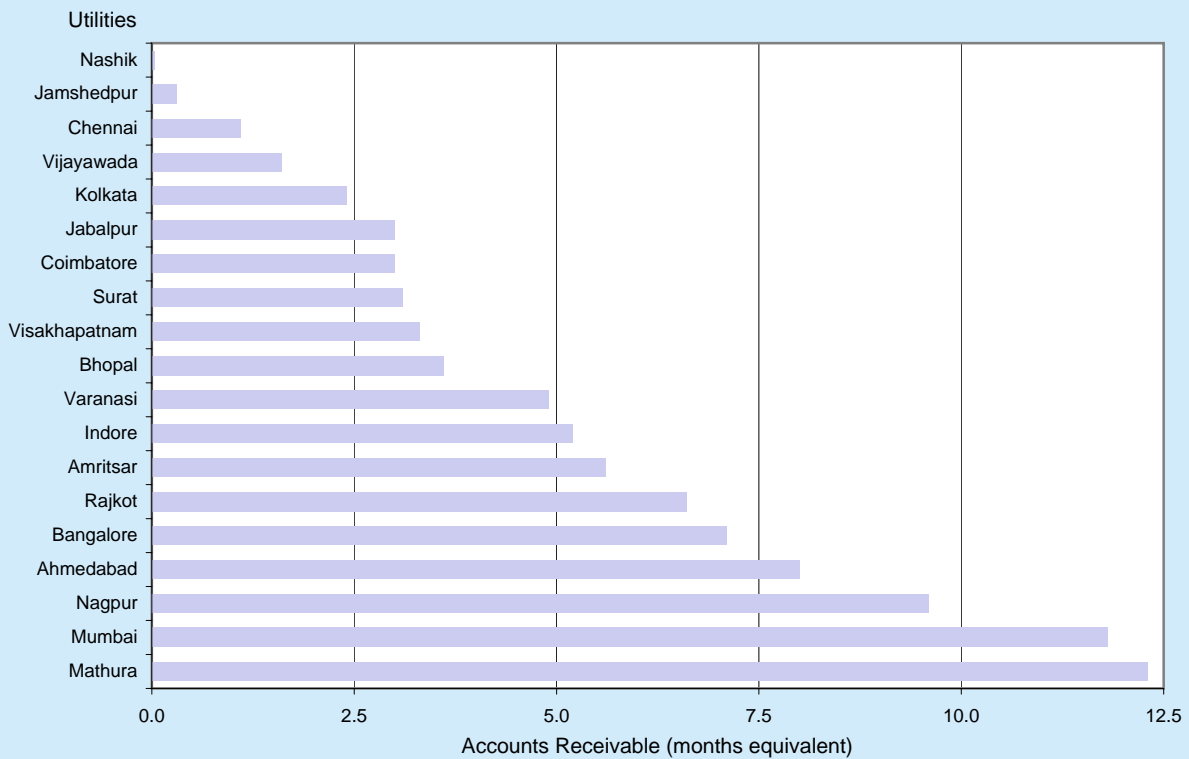
**Figure 19d: Domestic Tariff Structures**



**Figure 20: Operating Ratio**

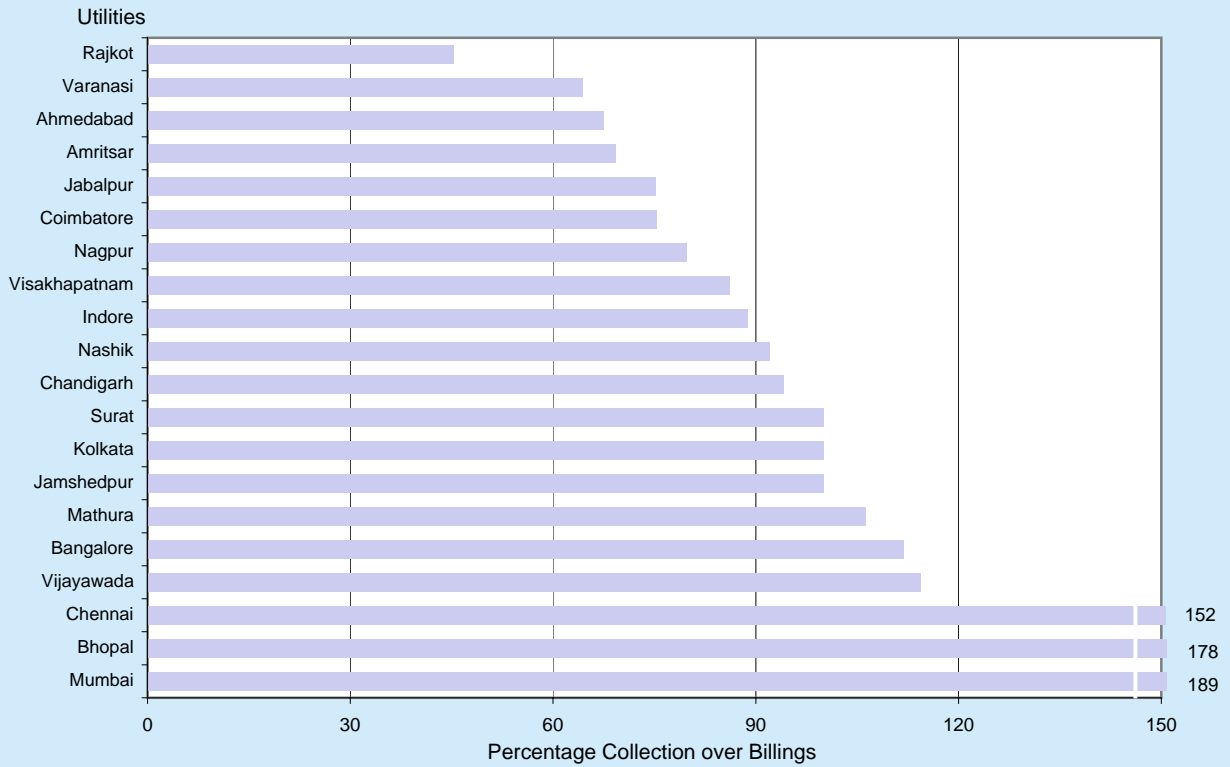


**Figure 21: Accounts Receivable**

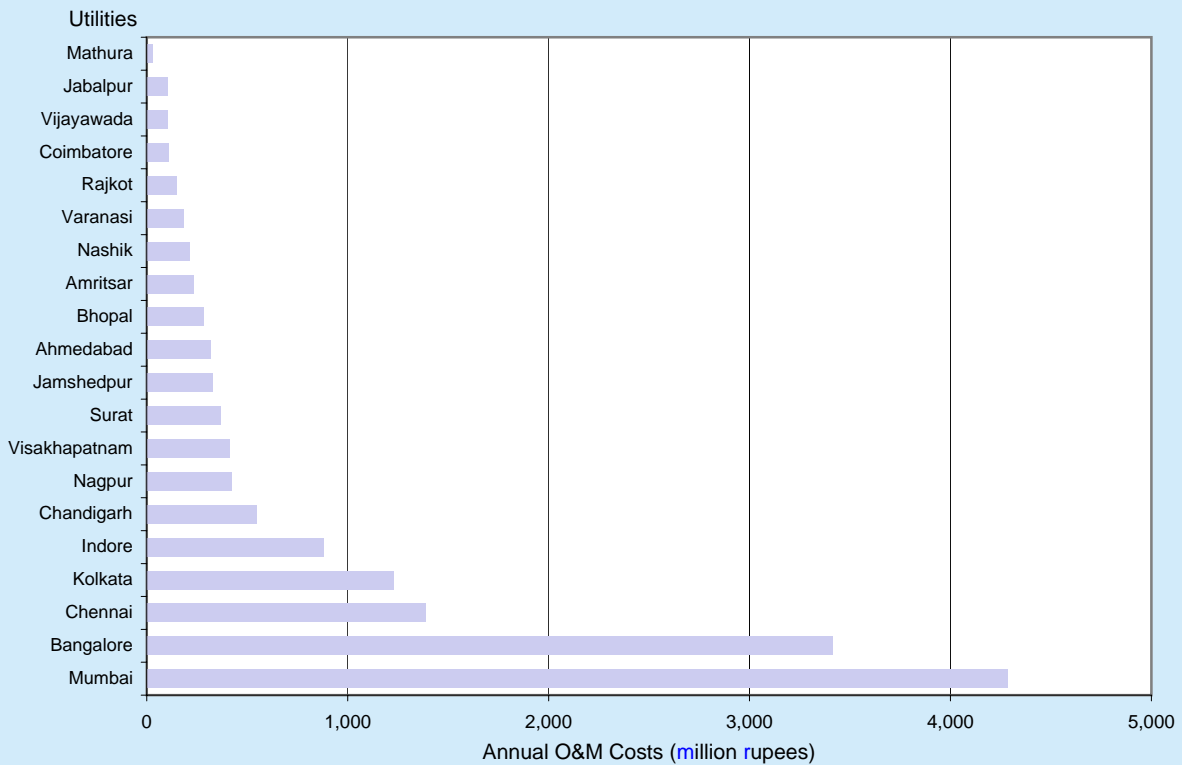




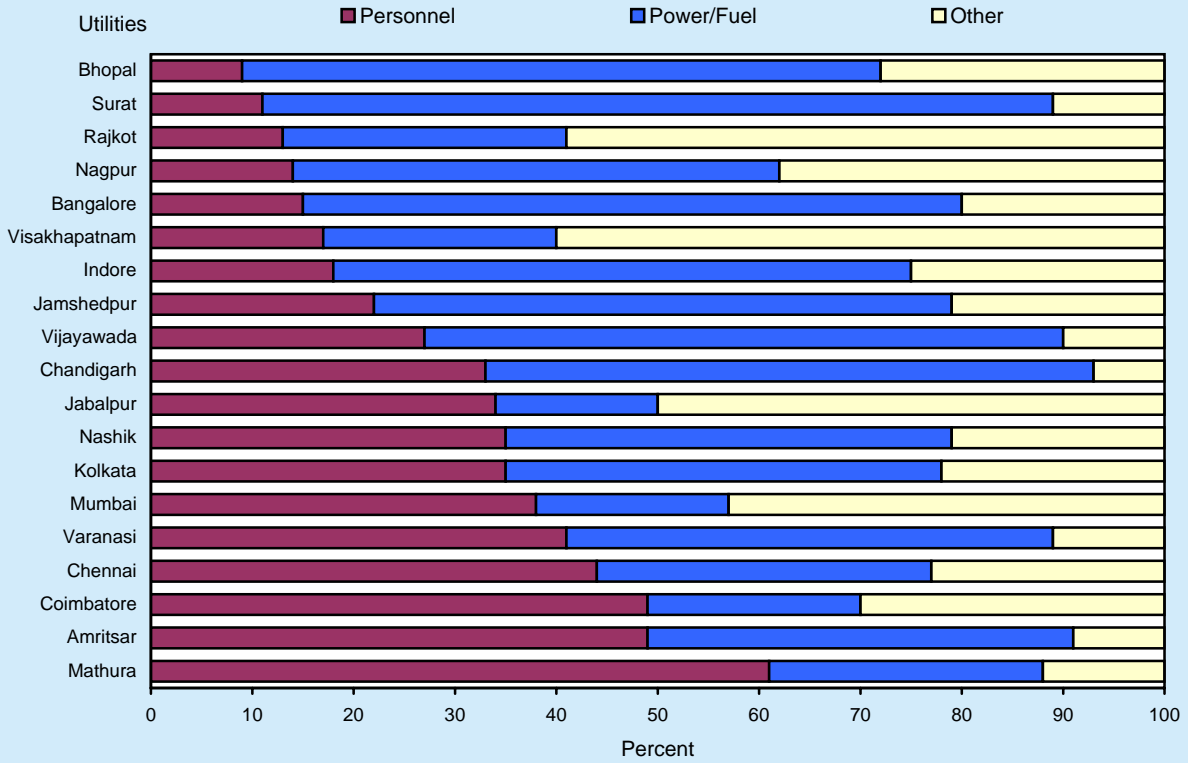
**Figure 22: Revenue Collection Efficiency**



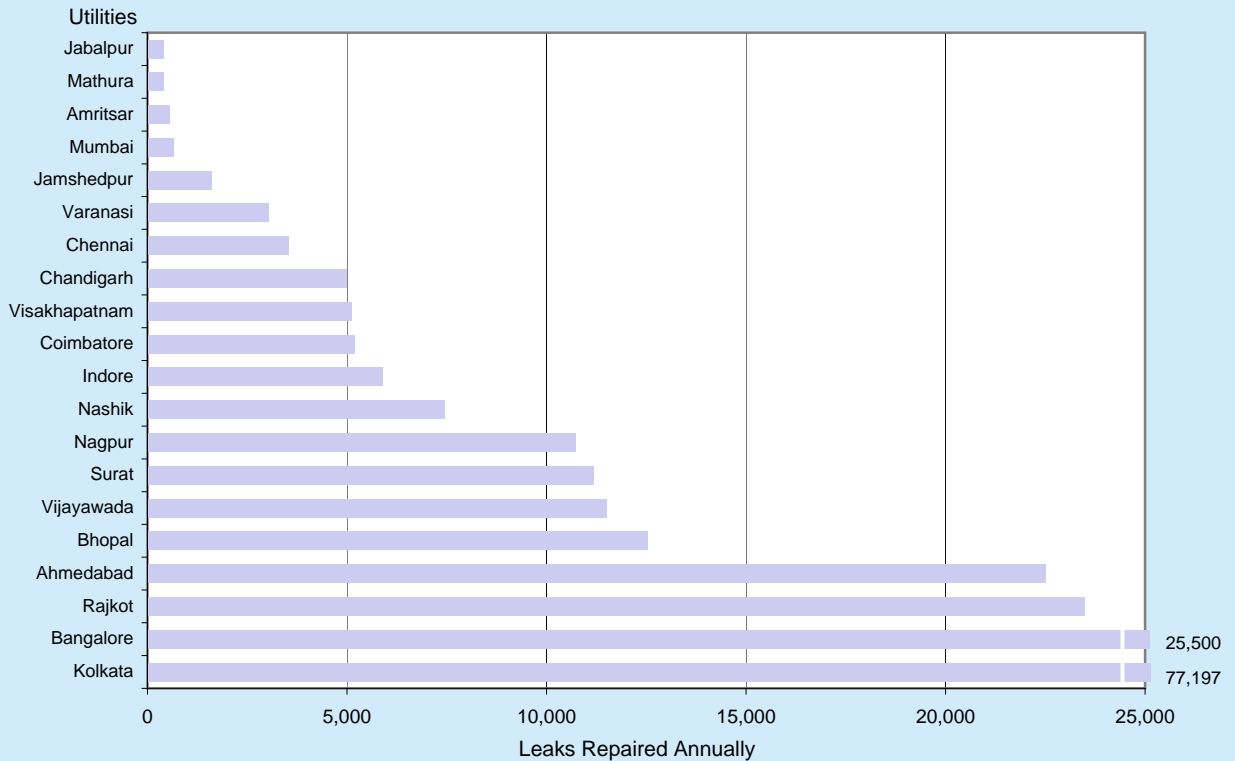
**Figure 23: Annual Operation and Maintenance Costs**



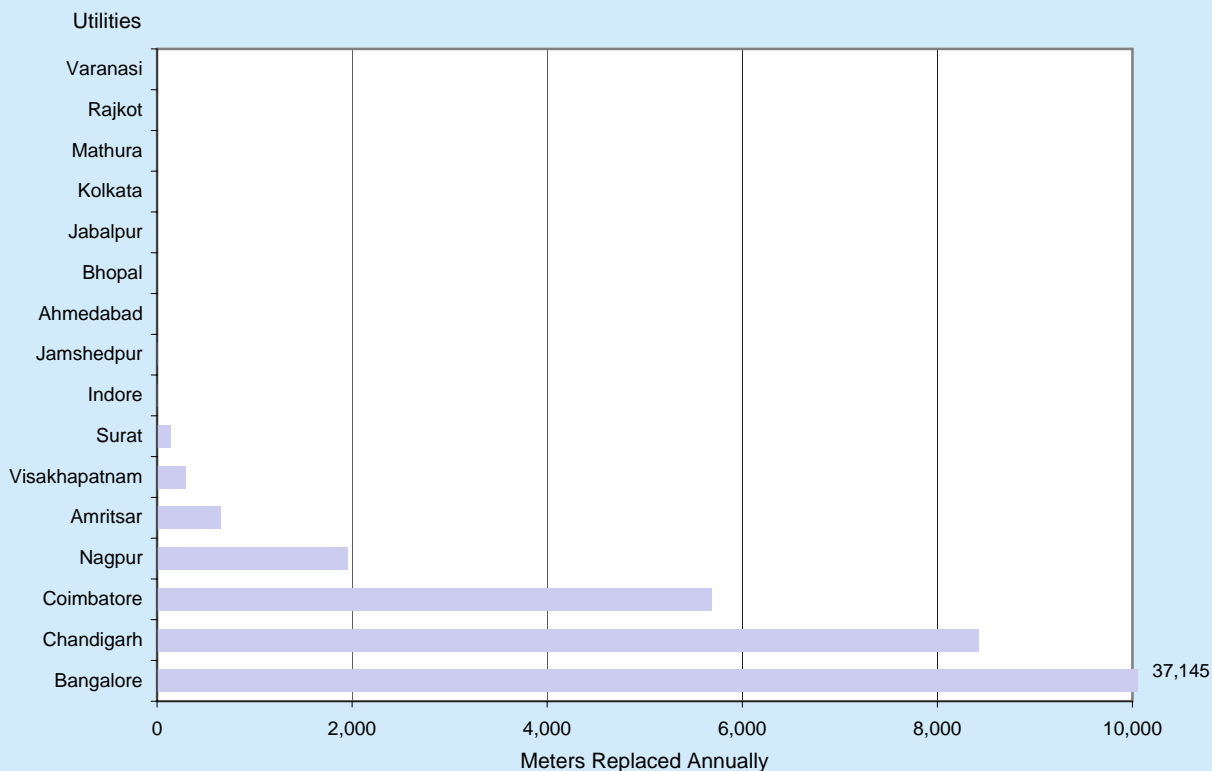
**Figure 24: O&M Cost Components**



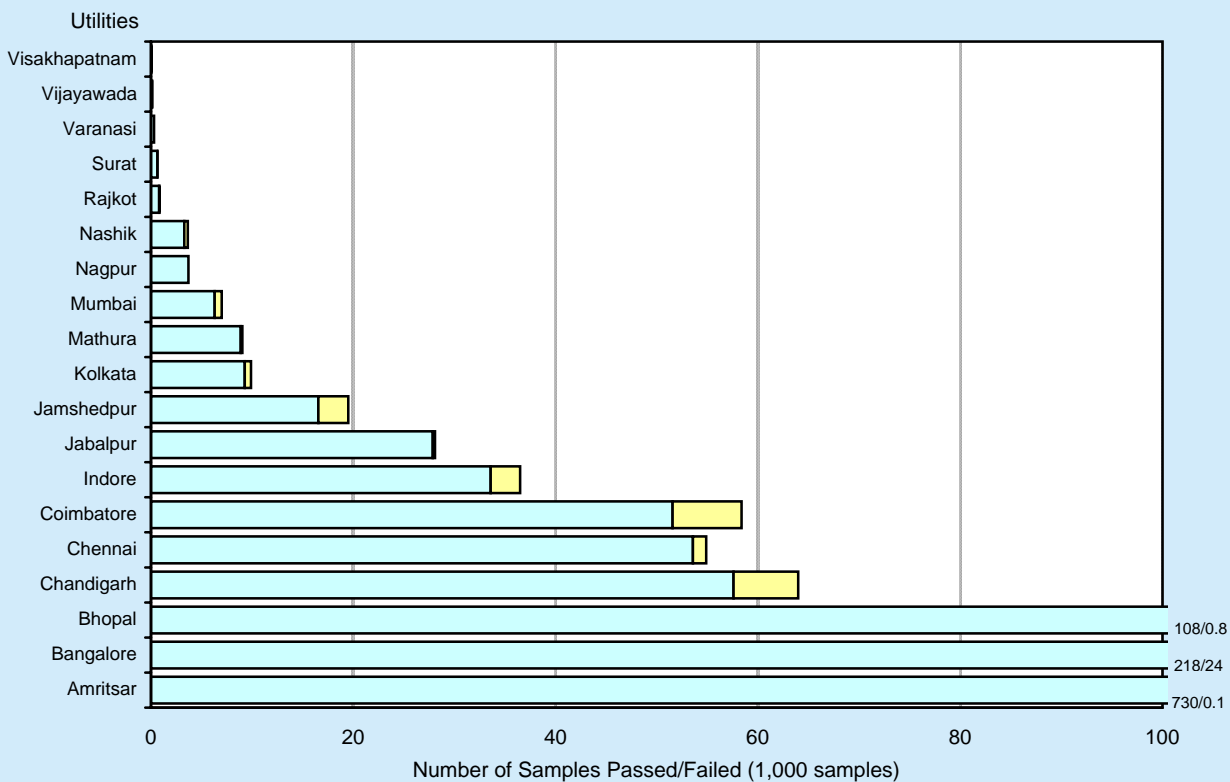
**Figure 25: Leaks Repaired Annually**



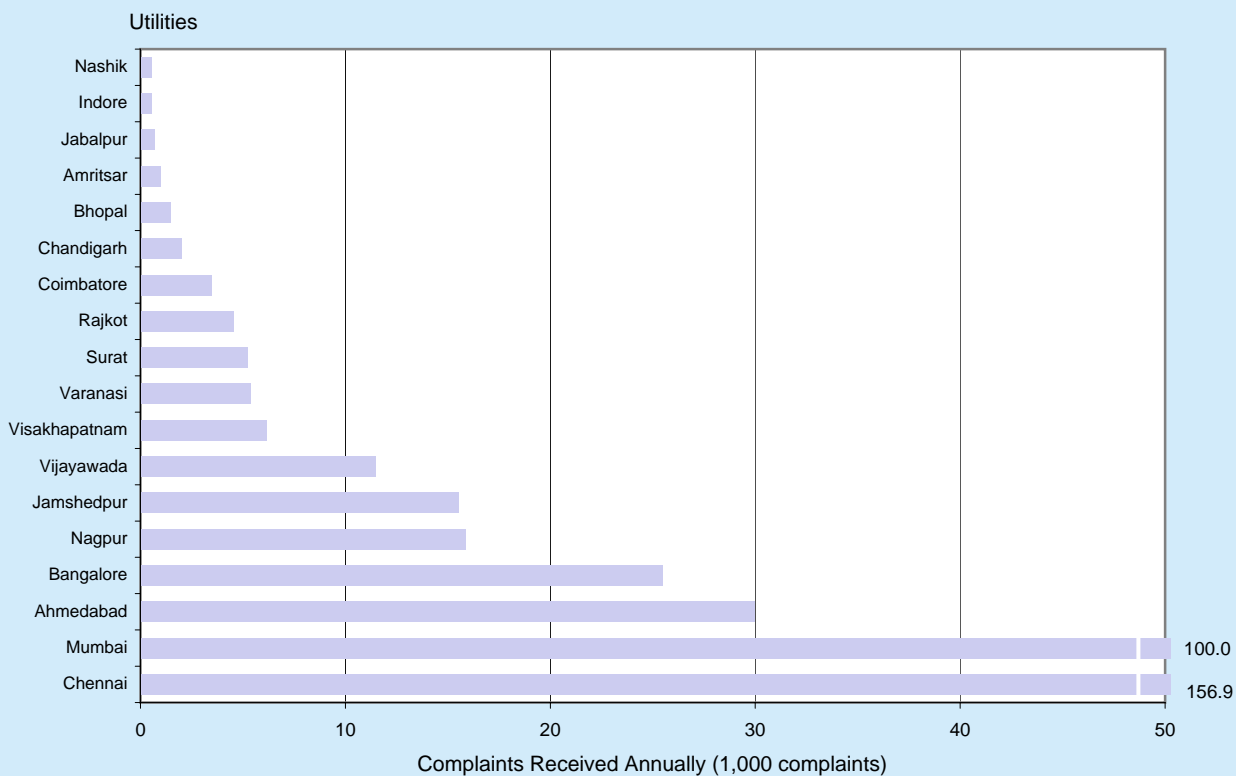
**Figure 26: Meters Replaced Annually**



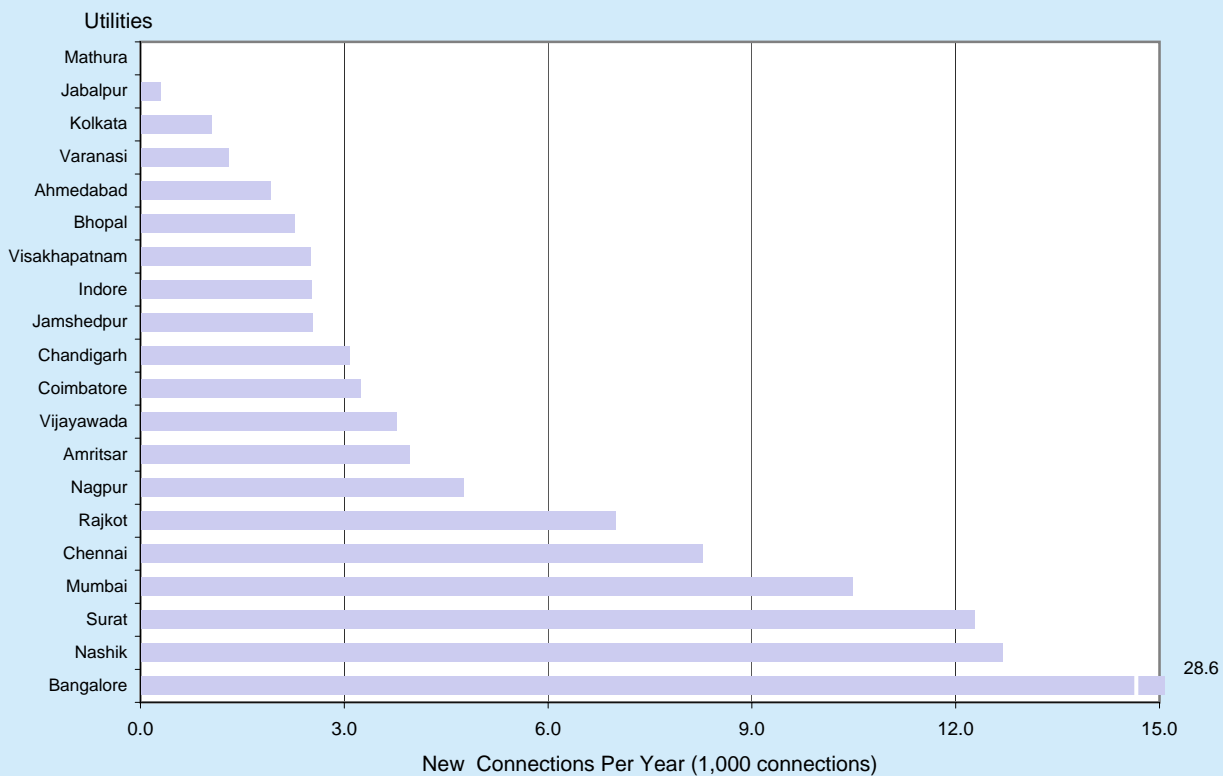
**Figure 27: Water Quality Sampling**



**Figure 28: Complaints Received Annually**



**Figure 29: New Connections Annually**



***PART III***

***WATER UTILITY AND AREA PROFILES***

<b>Water Utility</b>	<b>AHMEDABAD MUNICIPAL CORPORATION</b> Address : Water Project Division, 2 <sup>nd</sup> Floor, Sardar Patel Bhavan, Danapith, Ahmedabad – 380 001, India Telephone : 91 79 2539 1811 Fax : 91 79 2538 1746 E-mail : tmlad@egovamc.com Head : Mr. T. M. Lad, Special City Engineer																																																																						
	Ahmedabad Municipal Corporation (AMC) is a municipal corporation established in 1950. It provides water supply and sewerage services for the city of Ahmedabad, which has a total population of 4,990,000 people. The present service area of AMC has a population density of 26,110 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development and draws water from the River Sabarmati and Mahi River, as well as from 400 tube wells. The private sector is involved in water production and operations and maintenance through a management contract. The utility is following a development plan covering 2005–2021. Billing and pumping operations are computerized. The utility has a partly-developed management information system.																																																																						
<b>Mission Statement</b>	No mission statement																																																																						
<b>General Data About Water Utility</b>	Connections	: 556,734																																																																					
	Staff	: 1,200																																																																					
	Annual O&M Costs	: Rs318,086,000																																																																					
	Annual Revenue	: Rs222,600,000																																																																					
	Annual Billings	: Rs330,000,000																																																																					
	Total Capital Expenditure (Over the last 5 years)	: Rs1,189,330,000      Average capital expenditure/connection/year: Rs427.25																																																																					
	Source of Investment Funds	: No data																																																																					
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">METERED</th> <th style="width: 15%;">Residential</th> <th colspan="2" style="width: 30%;">Nonresidential</th> <th colspan="2" style="width: 30%;">FLAT RATE: Annual Water and Sewerage Charges</th> </tr> <tr> <th>Pipe Size (inch)</th> <th></th> <th>Commercial</th> <th>Aircon/Chantar</th> <th>Residential</th> <th>Annual Rates (Rs)</th> </tr> </thead> <tbody> <tr> <td>½", ¾", 1" dia.</td> <td>Rs3/m<sup>3</sup></td> <td>Rs8/m<sup>3</sup></td> <td>Rs20/m<sup>3</sup></td> <td>Chawls up to 25 m<sup>2</sup></td> <td>Free</td> </tr> <tr> <td colspan="4" style="text-align: center;"><b>ANNUAL PRORATA CHARGES (Rs/year) – 3" to 4" main</b></td> <td>25 – 50 m<sup>2</sup></td> <td>100</td> </tr> <tr> <td>½"</td> <td>879</td> <td>2,344</td> <td>5,860</td> <td>50 – 100 m<sup>2</sup></td> <td>200</td> </tr> <tr> <td>¾"</td> <td>2,424</td> <td>6,464</td> <td>16,160</td> <td>Above 100 m<sup>2</sup></td> <td>300</td> </tr> <tr> <td>1"</td> <td>4,986</td> <td>13,296</td> <td>33,240</td> <td>Above 200 m<sup>2</sup></td> <td>1,500</td> </tr> <tr> <td colspan="4" style="text-align: center;"><b>ANNUAL PRORATA CHARGES (Rs/year) – 4" to 9" main</b></td> <td><b>Nonresidential</b></td> <td><b>Annual Rates (Rs)</b></td> </tr> <tr> <td>½"</td> <td>1,065</td> <td>2,840</td> <td>7,100</td> <td>Buildings</td> <td>400</td> </tr> <tr> <td>¾"</td> <td>2,958</td> <td>7,888</td> <td>19,720</td> <td>Industrial/Factories</td> <td>600</td> </tr> <tr> <td>1"</td> <td>6,105</td> <td>16,280</td> <td>40,700</td> <td>Buildings &gt; 150 m<sup>2</sup></td> <td>1,500</td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>Almost all consumers pay on flat rate annually with the property tax bill. Annual prorata charges are based on the connecting pipe size and the size of the water main to which it connects ranging from 3" to 12".</li> <li>There were 1,919 new connections in 2005–2006. Prices of new domestic water connection are Rs100 for ½" diameter pipe; Rs600 for ¾"; and Rs1,200 for 1" payable prior to connection.</li> </ol>					METERED	Residential	Nonresidential		FLAT RATE: Annual Water and Sewerage Charges		Pipe Size (inch)		Commercial	Aircon/Chantar	Residential	Annual Rates (Rs)	½", ¾", 1" dia.	Rs3/m <sup>3</sup>	Rs8/m <sup>3</sup>	Rs20/m <sup>3</sup>	Chawls up to 25 m <sup>2</sup>	Free	<b>ANNUAL PRORATA CHARGES (Rs/year) – 3" to 4" main</b>				25 – 50 m <sup>2</sup>	100	½"	879	2,344	5,860	50 – 100 m <sup>2</sup>	200	¾"	2,424	6,464	16,160	Above 100 m <sup>2</sup>	300	1"	4,986	13,296	33,240	Above 200 m <sup>2</sup>	1,500	<b>ANNUAL PRORATA CHARGES (Rs/year) – 4" to 9" main</b>				<b>Nonresidential</b>	<b>Annual Rates (Rs)</b>	½"	1,065	2,840	7,100	Buildings	400	¾"	2,958	7,888	19,720	Industrial/Factories	600	1"	6,105	16,280	40,700	Buildings > 150 m <sup>2</sup>	1,500
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<b>Priority Needs of Utility</b>	1. Regular, adequate, safe water supply to citizens      2. All water supplies must be surface water      3. Water audit																																																																						
<b>Consumer Service</b>	Average monthly consumption is about 32.1 m <sup>3</sup> per connection. The water bill averages Rs49.40 per month per connection. Water is available on an average of 2 hours a day to most users at average pressure of 1.5 meters. Applicants have to wait for about a week for a new connection to be made. The utility claims that sampling for chlorine residual is done daily and most pass the test. There were 30,000 consumers complaints recorded in 2005–2006. Consumers can complain in person at the water utility office or by telephone or letter. The urban poor are provided with free water.																																																																						
<b>Performance Highlights</b>	AMC provides water at 171 lpcd to its consumers at an average of 2 hours per day to 74.5% of the population in its area of responsibility. Production is not metered and only 3% of total connections are metered. Meters are being phased out. No reliable estimate of UFW can be obtained. While operating ratio at 0.96 shows billing can cover operations and maintenance costs, accounts receivable equivalent of 8 months require more efforts in collection. Average tariff of Rs1.39/m <sup>3</sup> is just about able to cover production cost of Rs1.34/m <sup>3</sup> . Staff/1,000 connections ratio is good at 2.2, the fourth lowest. AMC needs to improve water availability and collection of its receivables. It should take serious efforts in measuring its production and service connections to determine its losses and reduce them as well. Water bills should also be based on actual consumption as a means to conserve water.																																																																						

## AHMEDABAD WATER SUPPLY

Population: 4,491,000<sup>1</sup>

### Production/Distribution

Average Daily Production	623,836 m <sup>3</sup>
Groundwater	7%
Surface Water	93%
Treatment Type <sup>2</sup>	Conventional
Storage	650,000 m <sup>3</sup>
Service Area <sup>3</sup>	172 sq km
Distribution Length	2,747 km

### Service Connections

House (5 persons/HC)	546,734
Public Tap (— persons/PT)	Nil
Commercial	10,000
Industrial	Nil
Institutional	Nil
Bulk	Nil
Other	Nil
<b>Total</b>	<b>556,734</b>

### Service Indicators

Service Coverage <sup>4</sup>	74.5%
Water Availability <sup>5</sup>	2 hours/day
Per Capita Consumption	171 l/c/d
Average Tariff	Rs1.39/m <sup>3</sup>

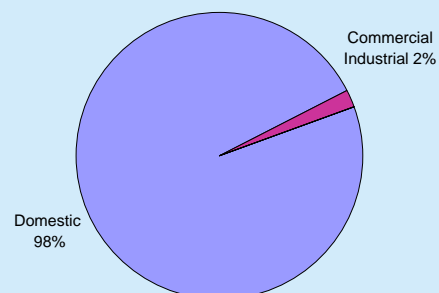
### Efficiency Indicators

Unaccounted Water <sup>6</sup>	no data
Unit Production Cost	Rs1.34/m <sup>3</sup>
Operating Ratio	0.96
Accounts Receivable	8.0 months
Staff/1,000 Connections	2.2

Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> Residual chlorine test samples are claimed to be taken daily and mostly all pass the test.
- <sup>3</sup> The total area of responsibility is 449 sq km.
- <sup>4</sup> This is the percentage of population served by house connections and public taps. Those not served by the utility use tube wells. The urban poor comprise 35% of the population.
- <sup>5</sup> About 30,000 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is not metered. Only 3% of connections are metered but meters are being phased out. Realistic UFW estimate cannot be determined with figures given. About 20,000–25,000 pipe breaks and leaks repaired during the year.
- <sup>7</sup> This is the breakdown of consumption only.

Data as of 2005–2006.



**Annual Water Use<sup>7</sup>**  
237,250,000 m<sup>3</sup>

No breakdown given

**Annual Water Billings**  
Rs330,000,000

No breakdown given

**Annual O&M Costs**  
Rs318,086,000

<b>Water Utility</b>	<p><b>MUNICIPAL CORPORATION, AMRITSAR</b></p> <p>Address : Town Hall, Amritsar, India          Telephone : 91 183 255 2528          Fax : 91 183 254 5155          E-mail : amardeep.dhaliwal@rediffmail.com          Head : Mr. Amardeep S. Dhaliwal, Superintending Engineer (O&amp;M Cell)</p> <p>Municipal Corporation, Amritsar (MCA) is a municipal corporation established in 1976. It provides water supply and sewerage services for the city, which has a total population of 1,058,500 people. The present service area of MCA has a population density of 7,810 persons/km<sup>2</sup>. The utility is responsible for water production and distribution. It draws water from groundwater sources through 260 tube wells. The private sector is not involved in the utility's operations nor does it have a master development plan. MCA has a computerized billing system and so are the house tax and pension cell. The utility has a partly developed management information system.</p>																
<b>Mission Statement</b>	<p>No mission statement.</p>																
<b>General Data About Water Utility</b>	<p>Connections : 127,786          Staff : 617          Annual O&amp;M Costs : Rs233,666,000          Annual Revenue : Rs171,980,000          Annual Billings : Rs248,270,000          Total Capital Expenditure : Rs211,867,000      Average capital expenditure/connection/year: Rs331.60          (Over the last 5 years)          Source of Investment Funds : Internally generated reserves and government loan from HUDCO</p>																
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">UNMETERED CONNECTIONS (Domestic)</th> </tr> <tr> <th style="width: 50%;">Plot Size</th> <th style="width: 50%;">Rate (Rs/month)</th> </tr> </thead> <tbody> <tr> <td>Up to 5 marla*</td> <td style="text-align: center;">60.00</td> </tr> <tr> <td>Above 5 marla &amp; up to 10 marla</td> <td style="text-align: center;">90.00</td> </tr> <tr> <td>Above 10 marla but less than 1 kanal</td> <td style="text-align: center;">120.00</td> </tr> <tr> <th colspan="2" style="text-align: center;">METERED CONNECTIONS (Rs/m<sup>3</sup>)</th> </tr> <tr> <td>Domestic</td> <td style="text-align: center;">3.20</td> </tr> <tr> <td>Commercial</td> <td style="text-align: center;">6.40</td> </tr> </tbody> </table> <p>* Waived as of 11 July 2006.    5 marla = 125 sq yards, 1 kanal = 500 sq yards.          Domestic metered connections are residences with plots of 1 kanal and above.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>Institutional and commercial consumers pay on metered use. Domestic users pay a flat rate based on plot sizes with 5 marla domestic connections exempted from payments as of 11 July 2006. All consumers are billed every 3 months.</li> <li>Water bills are paid at the water utility office.</li> <li>There were 3,970 new connections in 2005–2006. The price of a new domestic connection is Rs950 payable prior to connection.</li> </ol>	UNMETERED CONNECTIONS (Domestic)		Plot Size	Rate (Rs/month)	Up to 5 marla*	60.00	Above 5 marla & up to 10 marla	90.00	Above 10 marla but less than 1 kanal	120.00	METERED CONNECTIONS (Rs/m <sup>3</sup> )		Domestic	3.20	Commercial	6.40
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<b>Priority Needs of Utility</b>	<p>1. Institutional improvement                      2. Access survey and management                      3. Leak detection and control</p>																
<b>Consumer Service</b>	<p>Average monthly consumption is about 17.4 m<sup>3</sup> per house connection. The water bill averages Rs136.86 per month per house connection. Water is available on an average of 11 hours a day to most users, the second longest to Chandigarh's 12 hours, and at an average pressure of 2 meters. Applicants have to wait for about 2–3 days for a new connection to be made. A connection fee has to be paid prior to connection. Water quality is good, with 92% of 125 water samples taken during the year passing the residual chlorine test. There were 1,000 consumers complaints recorded and 550 leaks repaired during the year. Consumers can complain in person at the water utility office or by telephone, e-mail, and letter. The urban poor use public taps.</p>																
<b>Performance Highlights</b>	<p>MCA provides water at 86 lpcd to its consumers at an average of 11 hours per day to 75.7% of the population in its area of responsibility. It has the second highest UFW at 57.4% among the utilities. Production is not metered and only 45% of commercial and industrial connections are metered, making UFW an estimate at best. Financial management needs improvement with operating ratio of 1.36 and accounts receivable of 5.6 months. Average tariff of Rs9.34/m<sup>3</sup> should easily cover production cost but is hindered by its high NRW. Staff/1,000 connections ratio is better than average at 4.8. MCA needs to reduce its NRW and improve on water availability and quantity. It also needs to improve on its collection efforts. The utility should meter production and further improve metering of connections to account for use.</p>																



## AMRITSAR WATER SUPPLY

Population: 804,455 <sup>1</sup>

### Production/Distribution

Average Daily Production	171,005 m <sup>3</sup>
Groundwater	100%
Surface Water	Nil
Treatment Type <sup>2</sup>	Disinfection
Storage	24,000 m <sup>3</sup>
Service Area <sup>3</sup>	103 sq km
Distribution Length	952 km

### Service Connections

House (6–7 persons/HC)	115,275
Public Tap (100 persons/PT)	747
Commercial	10,834
Industrial	930
Institutional	Nil
Bulk	Nil
Other	Nil
<b>Total</b>	<b>127,786</b>

### Service Indicators

Service Coverage <sup>4</sup>	75.7%
Water Availability <sup>5</sup>	11 hours/day
Per Capita Consumption	86 l/c/d
Average Tariff	Rs9.34/m <sup>3</sup>

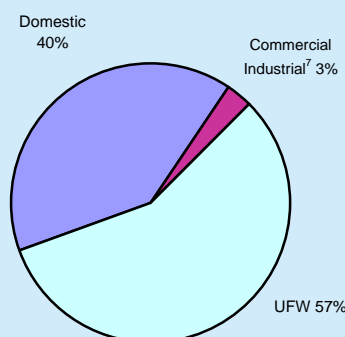
### Efficiency Indicators

Unaccounted Water <sup>6</sup>	57.4%
Unit Production Cost	Rs3.74/m <sup>3</sup>
Operating Ratio	1.36
Accounts Receivable	5.6 months
Staff/1,000 Connections	4.8

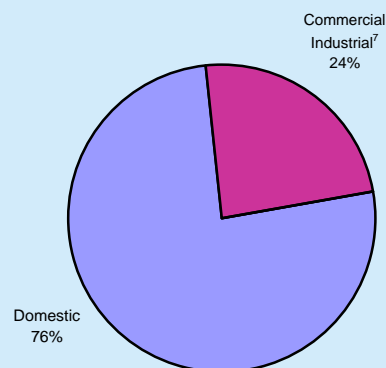
#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 92% of 125 samples taken passed the residual chlorine test.
- <sup>3</sup> The total area of responsibility is 136 sq m.
- <sup>4</sup> This is the percentage of population served by house connections and public taps. Those not served by the utility use tube wells and tankers. The urban poor comprise 36% of the population.
- <sup>5</sup> About 1,000 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is not metered and only 45% of the total commercial and industrial connections are metered. About 550 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport and chemicals.

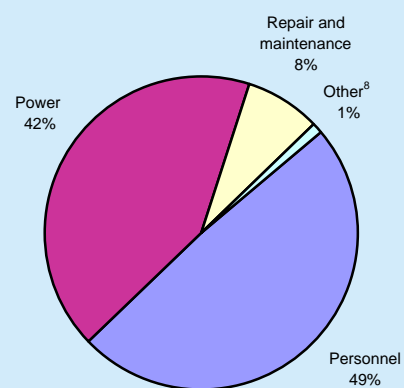
Data as of 2005–2006.



**Annual Water Use**  
62,416,685 m<sup>3</sup>



**Annual Water Billings**  
Rs248,270,000



**Annual O&M Costs**  
Rs233,666,000

<b>Water Utility</b>	<b>BANGALORE WATER SUPPLY AND SEWERAGE BOARD</b> Address : Cauvery Bhavan. K. G. Road, Bangalore – 560 009, India Telephone : 91 80 2294 5100 Fax : 91 80 2294 5100 E-mail : chairman@bwssb.org Head : Mr. N. C. Muniyappa, Chairman of the Board Bangalore Water Supply and Sewerage Board (BWSSB) is a city board established in 1964. It provides water supply and sewerage services for Bangalore Mahanagara Palike and surrounding areas developed by the Bangalore Development Authority, which has a total population of 5,361,500 people. The present service area of BWSSB has a population density of 23,311 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water from surface water sources, with 90% coming from the Cauvery River and the rest from the Arkavathi River. The private sector is involved in the operation and maintenance of the water treatment plant and pumping stations and the wastewater treatment plant through service contracts. BWSSB has a computerized billing system and accounting system, as well as the operation of the sewage treatment plant. It has an annual report for 2005–2006 that is available to the public. BWSSB follows a master development plan covering the period 2000–2025. The utility has a partly developed management information system.																																																					
<b>Mission Statement</b>	No mission statement.																																																					
<b>General Data About Water Utility</b>	Connections : 486,850 Staff : 2,510 Annual O&M Costs : Rs3,413,551,100 Annual Revenue : Rs4,254,635,200 Annual Billings : Rs3,800,407,300 Total Capital Expenditure (Over the last 5 years) : Rs1,918,000,000      Average capital expenditure/connection/year: Rs787.92 Source of Investment Funds : All from internally generated reserves																																																					
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">DOMESTIC</th> <th colspan="2">NONDOMESTIC</th> <th colspan="2">OTHERS</th> </tr> <tr> <th>Consumption (m<sup>3</sup>)</th> <th>Rate (Rs/m<sup>3</sup>)</th> <th>Consumption (m<sup>3</sup>)</th> <th>Rate (Rs/m<sup>3</sup>)</th> <th>Category</th> <th>Rate (Rs/m<sup>3</sup>)</th> </tr> </thead> <tbody> <tr> <td>0 – 8*</td> <td>6.00</td> <td>0 – 10</td> <td>36.00</td> <td>Industries</td> <td>60.00</td> </tr> <tr> <td>8 – 25</td> <td>9.00</td> <td>10 – 20</td> <td>39.00</td> <td>BIDADI Industrial Area</td> <td>51.00</td> </tr> <tr> <td>25 – 50</td> <td>15.00</td> <td>20 – 40</td> <td>44.00</td> <td>Lorry loads (per load)</td> <td>250.00</td> </tr> <tr> <td>50 – 75</td> <td>30.00</td> <td>40 – 60</td> <td>51.00</td> <td>Swimming pool</td> <td>60.00</td> </tr> <tr> <td>75 – 100</td> <td>36.00</td> <td>60 – 100</td> <td>57.00</td> <td>Public taps</td> <td>3,000.00</td> </tr> <tr> <td>Above 100</td> <td>36.00</td> <td>Above 100</td> <td>60.00</td> <td></td> <td></td> </tr> </tbody> </table> <p>* There is a minimum charge of Rs48.00 for domestic consumers.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>All consumers pay on metered use as 95.5% of service connections have functioning meters. Consumers are billed monthly.</li> <li>Water bills are paid at banks and automated teller machines (ATMs).</li> <li>There were 28,570 new connections in 2005–2006. The price of a new domestic connection is Rs1,740 payable prior to connection.</li> </ol>						DOMESTIC		NONDOMESTIC		OTHERS		Consumption (m <sup>3</sup> )	Rate (Rs/m <sup>3</sup> )	Consumption (m <sup>3</sup> )	Rate (Rs/m <sup>3</sup> )	Category	Rate (Rs/m <sup>3</sup> )	0 – 8*	6.00	0 – 10	36.00	Industries	60.00	8 – 25	9.00	10 – 20	39.00	BIDADI Industrial Area	51.00	25 – 50	15.00	20 – 40	44.00	Lorry loads (per load)	250.00	50 – 75	30.00	40 – 60	51.00	Swimming pool	60.00	75 – 100	36.00	60 – 100	57.00	Public taps	3,000.00	Above 100	36.00	Above 100	60.00		
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<b>Priority Needs of Utility</b>	1. Reduce unaccounted for water.      2. Reuse of water for potable uses and industries.      3. Ensure no flow of sewage in storm drains.																																																					
<b>Consumer Service</b>	Average monthly consumption is about 20 m <sup>3</sup> per house connection. The water bill averages Rs297 per month per house connection. Water is available on an average of 4–5 hours a day to most users, which is just below the average and at an average pressure of 10 meters. Applicants have to wait for about 3–7 days for a new connection to be made. A connection fee of Rs1,740 has to be paid prior to connection. Water quality can still be improved, with only 85% of 19,523 water samples taken during the year passing the residual chlorine test. There were 25,500 consumers complaints recorded and the same number of leaks repaired during the year. Consumers can complain in person at the water utility office or by e-mail, letter, or via IVRS. The urban poor pay only Rs500 for connection fee and Rs6/m <sup>3</sup> for up to 8 m <sup>3</sup> per month.																																																					
<b>Performance Highlights</b>	BWSSB provides water at only 74 lpcd to its consumers at an average of 4–5 hours per day to 92.9% of the population in its area of responsibility. It has the fourth highest UFW at 45.1% among 14 utilities. Production is fully metered and 95.5% of total connections have functioning meters. Operating ratio is good at 0.8 but accounts receivable of 7.1 months are the fifth highest. Average tariff of Rs20.55/m <sup>3</sup> is the highest; high UFW keeps the total revenues just enough to cover costs. Staff/1,000 connections ratio is just about the median at 5.2. BWSSB needs to reduce its NRW and improve on water availability. It also needs to improve on its collection efforts. It could further improve metering of connections to better account for use.																																																					

## BANGALORE WATER SUPPLY

Population: 5,361,500<sup>1</sup>

### Production/Distribution

Average Daily Production	923,090 m <sup>3</sup>
Groundwater	Nil
Surface Water	100%
Treatment Type <sup>2</sup>	Conventional
Storage	75,655 m <sup>3</sup>
Service Area <sup>3</sup>	230 sq km
Distribution Length	4,873 km

### Service Connections

House (9.5 persons/HC)	448,940
Public Tap (100 persons/PT)	7,134
Commercial	23,985
Industrial	104
Institutional	1,310
Bulk	5,377
Other	Nil
<b>Total</b>	<b>486,850</b>

### Service Indicators

Service Coverage <sup>4</sup>	92.9%
Water Availability <sup>5</sup>	4-5 hours/day
Per Capita Consumption	74 l/c/d
Average Tariff	Rs20.55/m <sup>3</sup>

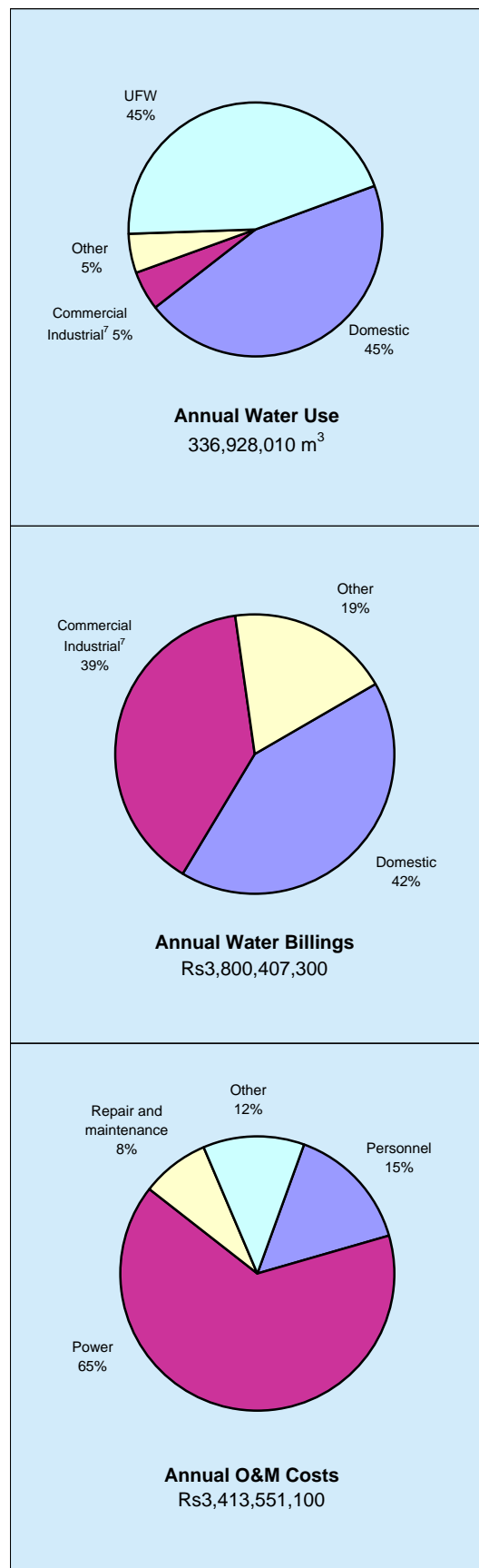
### Efficiency Indicators

Unaccounted Water <sup>6</sup>	45.1%
Unit Production Cost	Rs10.13/m <sup>3</sup>
Operating Ratio	0.80
Accounts Receivable	7.1 months
Staff/1,000 Connections	5.2

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 85% of 19,523 samples taken passed the residual chlorine test.
- <sup>3</sup> The total area of responsibility is 245 sq m.
- <sup>4</sup> This is the percentage of population served by house connections and public taps. Those not served by piped supply are served by tube wells and tankers. The urban poor comprise 19% of the population.
- <sup>5</sup> About 25,500 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is fully metered and 95.5% of total connections have operating meters. There were 25,500 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport and chemicals.

Data as of 2005–2006.



<b>Water Utility</b>	<p><b>BHOPAL MUNICIPAL CORPORATION</b></p> <p>Address : Sadar Manzil, Bhopal – 462 001, India          Telephone : 91 755 254 2070          Fax : 91 755 253 9806          E-mail : bmcbl@sancharnet.in          Head : Mr. Manish Singh, Municipal Commissioner</p> <p>Bhopal Municipal Corporation (BMC) was established as a municipal corporation in 1952. It provides water supply and sewerage services to the city of Bhopal, which has a total population of 1,437,000 people. The present service area of BMC has a population density of 5,024 persons/km<sup>2</sup>. The utility is responsible for water production, distribution, and source development. It draws water from the Upper Lake fed by the Kolans River, from Kolar Dam fed by the Kolar River, as well as from 642 tube wells. There is no private sector involvement in the utility's operations. It has a computerized billing and accounting systems, as well as its complaints-handling system. BMC has an annual report for 2004–2005 that is available to the public; it does not have a master development plan. The utility has a partly developed management information system.</p>																								
<b>Mission Statement</b>	No mission statement.																								
<b>General Data About Water Utility</b>	<p>Connections : 105,012          Staff : 2,171          Annual O&amp;M Costs : Rs282,299,000          Annual Revenue : Rs100,000,000          Annual Billings : Rs56,120,900          Total Capital Expenditure (Over the last 5 years) : Rs20,600,000      Average capital expenditure/connection/year: Rs39.23          Source of Investment Funds : Government loan from HUDCO</p>																								
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4">FLAT RATES (Rs/month)</th> </tr> <tr> <th>Size (inch)</th> <th>Domestic</th> <th>Commercial*</th> <th>Industrial</th> </tr> </thead> <tbody> <tr> <td>1/2</td> <td>60.00</td> <td>500.00</td> <td>600.00</td> </tr> <tr> <td>3/4</td> <td>400.00</td> <td>1,000.00</td> <td>1,000.00</td> </tr> <tr> <td>1</td> <td>600.00</td> <td>1,500.00</td> <td>1,500.00</td> </tr> <tr> <td colspan="4">Tariff for metered domestic connection is Rs3.50/m<sup>3</sup></td> </tr> </tbody> </table> <p>* Commercial includes hotels, restaurants, beauty parlors, nursing homes, and others.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>None of the service connections are metered. Tariffs are based on size of connection and category of user to be paid monthly.</li> <li>Water bills are paid at the water utility office.</li> <li>There were 2,273 new connections in 2005–2006. The price of a new domestic connection is Rs1,500 payable prior to connection.</li> </ol>	FLAT RATES (Rs/month)				Size (inch)	Domestic	Commercial*	Industrial	1/2	60.00	500.00	600.00	3/4	400.00	1,000.00	1,000.00	1	600.00	1,500.00	1,500.00	Tariff for metered domestic connection is Rs3.50/m <sup>3</sup>			
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1	600.00	1,500.00	1,500.00																						
Tariff for metered domestic connection is Rs3.50/m <sup>3</sup>																									
<b>Priority Needs of Utility</b>	<p>1. 24-hour water supply to all      2. Leak detection to control UFW      3. Meeting the future needs of growing population</p>																								
<b>Consumer Service</b>	<p>Average monthly consumption is about 22 m<sup>3</sup> per house connection. The water bill averages Rs42 per month per house connection. Water is available on an average of 1–2 hours a day to most users, which is the fourth lowest with an average pressure of 5 meters. Applicants have to wait for a month for a new connection to be made. A connection fee of Rs1,500 has to be paid prior to connection. Water quality is good, with 95% of water samples taken during the year passing the residual chlorine test but from a limited sample size. Monitoring of leaks and complaints started only in January 2006, and 608 complaints and 93 leaks were recorded up to May 2006. Consumers can complain in person at the water utility office or by e-mail, letter, and telephone. Connection charges for the urban poor are only one third of the normal fee, or Rs500.</p>																								
<b>Performance Highlights</b>	<p>BMC provides water at an estimated 72 lpcd to its consumers at an average of 1–2 hours per day to 83.4% of the population in its area of responsibility. UFW could not be computed because of inconsistencies in the production and consumption estimates in the absence of metering for both. Bhopal has the fourth highest operating ratio at 2.82 although accounts receivable of 3.6 months is better than average. Average tariff of Rs0.60/m<sup>3</sup> is the lowest and could not cover production costs. Staff/1,000 connections ratio is the highest at 20.7. BMC needs to improve on water availability and staff productivity. It should consider charging the appropriate tariff to cover its expenses. Metering of production and connections are needed to better account for use.</p>																								

## BHOPAL WATER SUPPLY

Population: 1,437,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	258,000 m <sup>3</sup>
Groundwater	7%
Surface Water	93%
Treatment Type <sup>2</sup>	Conventional
Storage	94,000 m <sup>3</sup>
Service Area <sup>3</sup>	286 sq km
Distribution Length	968 km

### Service Connections

House (10 persons/HC)	95,666
Public Tap (100 persons/PT)	4,618
Commercial	1,284
Industrial	130
Institutional	3,310
Bulk	4
Other	Nil
<b>Total</b>	<b>105,012</b>

### Service Indicators

Service Coverage <sup>4</sup>	83.4%
Water Availability <sup>5</sup>	1 to 2 hours/day
Per Capita Consumption	72 l/c/d
Average Tariff	Rs0.60/m <sup>3</sup>

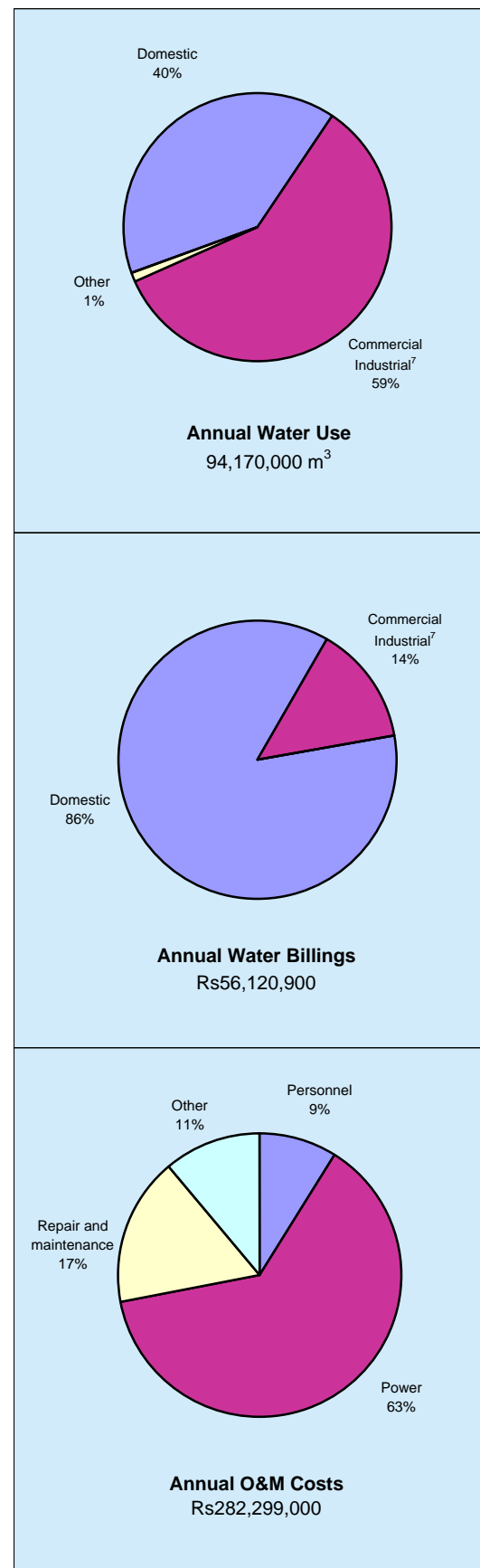
### Efficiency Indicators

Unaccounted Water <sup>6</sup>	no data
Unit Production Cost	Rs3.00/m <sup>3</sup>
Operating Ratio	2.82
Accounts Receivable	3.6 months
Staff/1,000 Connections	20.7

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 95% of 50 samples taken passed the residual chlorine test.
- <sup>3</sup> This is also the total area of responsibility.
- <sup>4</sup> This is the percentage of population served by house connections and public taps. About 13% of the population are served by tube wells and tankers from the utility. The urban poor comprise 23% of the population.
- <sup>5</sup> An estimated 1,460 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Both production and connections are not metered. UFW cannot be computed reliably. An estimated 12,550 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport and chemicals.

Data as of 2005–2006.





## CHANDIGARH WATER SUPPLY

Population: 1,150,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	381,280 m <sup>3</sup>
Groundwater	26%
Surface Water	74%
Treatment Type <sup>2</sup>	Conventional
Storage	236,080 m <sup>3</sup>
Service Area <sup>3</sup>	79.3 sq km
Distribution Length	1,500 km

### Service Connections

House (10 persons/HC)	124,227
Public Tap (150 persons/PT)	900
Commercial	11,793
Industrial	1,850
Institutional	530
Bulk	Nil
Other	Nil
<b>Total</b>	<b>139,300</b>

### Service Indicators

Service Coverage <sup>4</sup>	100.0%
Water Availability <sup>5</sup>	12 hours/day
Per Capita Consumption	147 l/c/d
Average Tariff	Rs5.04/m <sup>3</sup>

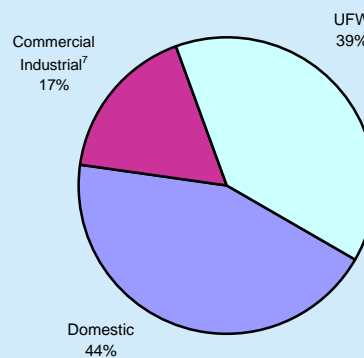
### Efficiency Indicators

Unaccounted Water <sup>6</sup>	38.9%
Unit Production Cost	Rs3.93/m <sup>3</sup>
Operating Ratio	1.36
Accounts Receivable	no data
Staff/1,000 Connections	8.6

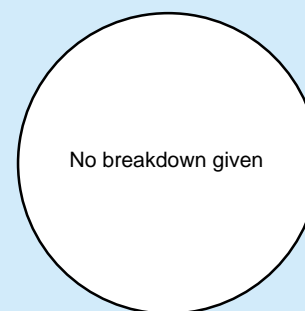
#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> All 3,700 samples taken passed the residual chlorine test.
- <sup>3</sup> This is also the total area of responsibility.
- <sup>4</sup> This is the percentage of population served by house connections and public taps. The utility claims all the population are connected to the water system.
- <sup>5</sup> About 2,000 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is not metered while 79% of service connections are metered.
- <sup>7</sup> About 1,500 pipe breaks and 5,000 leaks were repaired during the year.
- <sup>8</sup> Commercial and industrial include institutional use.
- <sup>8</sup> Other cost includes transport and chemicals.

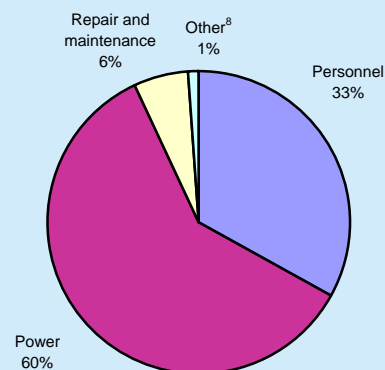
Data as of 2005–2006.



**Annual Water Use**  
139,167,200 m<sup>3</sup>



**Annual Water Billings**  
Rs428,942,660



**Annual O&M Costs**  
Rs547,526,000

<b>Water Utility</b>	<b>CHENNAI METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD</b> Address : No.1, Pumping Station Road, Chintadripet, Chennai – 2, India Telephone : 91 44 2845 1300 to 1322 Fax : 91 44 2845 8181 E-mail : cmwssb@md2.vsnl.net.in Head : Mr. Shiv Das Meena, Managing Director Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB) is a city board established in 1978. It provides water supply and sewerage services for the city of Chennai, which has a total population of 5,320,000 people. The present service area of CMWSSB has a population density of 29,062 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development and draws water from Viranam Lake and Krishna River, as well as from 11 tube wells. The private sector is involved in water production and distribution through service, management, and build–operate–transfer (BOT) contracts. The utility is following a development plan covering up to 2021. CMWSSB has an annual report for 2005–2006 that is available to the public. CMWSSB has computerized billing and accounting, as well as three water treatment plants and transmission systems. The utility has a partly developed management information system.																																																
<b>Mission Statement</b>	"Our mission is to enhance the health and quality of life for the citizens in Chennai City by providing them with adequate supply of clean and good quality water and safe disposal of sewage/waste water at reasonable price."																																																
<b>General Data About Water Utility</b>	Connections : 344,079 Staff : 4,578 Annual O&M Costs : Rs1,387,623,200 Annual Revenue : Rs3,127,162,600 Annual Billings : Rs2,053,389,600 Total Capital Expenditure (Over the last 5 years) : Rs17,342,500,000 Average capital expenditure/connection/year: Rs10,080.53 Source of Investment Funds : Government grants and loans																																																
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">METERED* (Rs/m<sup>3</sup>)</th> <th colspan="2">UNMETERED (Rs/month)</th> </tr> <tr> <th>Consumption (m<sup>3</sup>)</th> <th>Domestic</th> <th>Partly Commercial</th> <th>Domestic</th> <th>Partly Commercial</th> </tr> </thead> <tbody> <tr> <td>0 – 10</td> <td>2.50</td> <td>5.00</td> <td>50.00</td> <td>150.00</td> </tr> <tr> <td>11 – 15</td> <td>10.00</td> <td>15.00</td> <td><b>Commercial</b></td> <td><b>Institutional</b></td> </tr> <tr> <td>16 – 25</td> <td>15.00</td> <td>25.00</td> <td>Others – 400.00</td> <td>Govt hospital – 200.00</td> </tr> <tr> <td>Above 25</td> <td>25.00</td> <td>25.00</td> <td>Private hospital – 800.00</td> <td>Private school – 400.00</td> </tr> <tr> <th colspan="2">Commercial (Rs/m<sup>3</sup>)</th> <th>Institutional (Rs/m<sup>3</sup>)</th> <th>Public TW Supply</th> <th>w/ Sewerage Charge</th> </tr> <tr> <td colspan="2">Others – Rs35 up to 500 m<sup>3</sup>, Rs60 beyond 500 m<sup>3</sup></td> <td>Govt hospital – 20.00</td> <td>40.00</td> <td>10.00</td> </tr> <tr> <td colspan="2">Private hospital – Rs50 up to 500 m<sup>3</sup>, Rs80 beyond 500 m<sup>3</sup></td> <td>Private school – 40.00</td> <td></td> <td></td> </tr> </tbody> </table> <p>*Minimum charges/month, including sewerage charges: Domestic – Rs50/dwelling or flat; Commercial – Rs400 (nonwater intensive), Rs800 (water intensive); Partly commercial – Rs150; Institutional – Rs200 (government hospital), Rs400 (private school).</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>Industrial and bulk consumers are metered and are billed monthly. Unmetered consumers are billed half yearly. Water bills are paid at the water utility office, banks, and through bill collectors.</li> <li>There were 8,279 new connections in 2005–2006. Price of new domestic water connection is Rs1,930 payable prior to connection. Sewerage connection charge is Rs3,395.</li> </ol>				METERED* (Rs/m <sup>3</sup> )			UNMETERED (Rs/month)		Consumption (m <sup>3</sup> )	Domestic	Partly Commercial	Domestic	Partly Commercial	0 – 10	2.50	5.00	50.00	150.00	11 – 15	10.00	15.00	<b>Commercial</b>	<b>Institutional</b>	16 – 25	15.00	25.00	Others – 400.00	Govt hospital – 200.00	Above 25	25.00	25.00	Private hospital – 800.00	Private school – 400.00	Commercial (Rs/m <sup>3</sup> )		Institutional (Rs/m <sup>3</sup> )	Public TW Supply	w/ Sewerage Charge	Others – Rs35 up to 500 m <sup>3</sup> , Rs60 beyond 500 m <sup>3</sup>		Govt hospital – 20.00	40.00	10.00	Private hospital – Rs50 up to 500 m <sup>3</sup> , Rs80 beyond 500 m <sup>3</sup>		Private school – 40.00		
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<b>Priority Need of Utility</b>	1. Water conservation			2. Safe disposal of sewage	3. Source identification and development																																												
<b>Consumer Service</b>	Average monthly consumption is about 42.8 m <sup>3</sup> per house connection. The water bill averages Rs85.55 per month per house connection. Water is available on an average of 4–6 hours a day to most users with an average pressure of 2 meters. Applicants have to wait for about a month for a new connection to be made. Water quality is good, with 99% of 28,086 water samples taken during the year passing the chlorine residual test. There were 156,984 consumers complaints recorded in 2005–2006. Consumers can complain in person at the water utility office or by telephone, letter, and e-mail. The urban poor are provided with free water from sintex tanks and public fountains. They pay a minimal sewerage connection charge of Rs100.																																																
<b>Performance Highlights</b>	CMWWSB provides water at 87 lpcd to its consumers at an average of 5 hours per day to 89.3% of the population in its service area. It has the fifth lowest UFW at 17.0%. However, while production is fully metered, only 3.5% of total connections are metered making UFW figure an estimate at best. Financial management is good, with the lowest operating ratio at 0.44 and accounts receivable equivalent of 1.1 months, the third lowest. Average tariff of Rs10.87/m <sup>3</sup> can easily cover production cost. Staff/1,000 connections ratio is high at 13.3, the fifth highest. CMWSSB needs to increase water availability and staff productivity. It should also improve metering of service connections to account for use.																																																



## CHENNAI WATER SUPPLY

Population: 5,320,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	623,836 m <sup>3</sup>
Groundwater	9%
Surface Water	91%
Treatment Type <sup>2</sup>	Filtration
Storage	355,480 m <sup>3</sup>
Service Area <sup>3</sup>	183.1 sq km
Distribution Length	2,600 km

### Service Connections

House (13.8 persons/HC)	284,965
Public Tap (87 persons/PT)	9,399
Commercial	48,958
Industrial	56
Institutional	693
Bulk	8
Other	Nil
<b>Total</b>	<b>344,079</b>

### Service Indicators

Service Coverage <sup>4</sup>	89.3%
Water Availability <sup>5</sup>	5 hours/day
Per Capita Consumption	87 l/c/d
Average Tariff	Rs10.87/m <sup>3</sup>

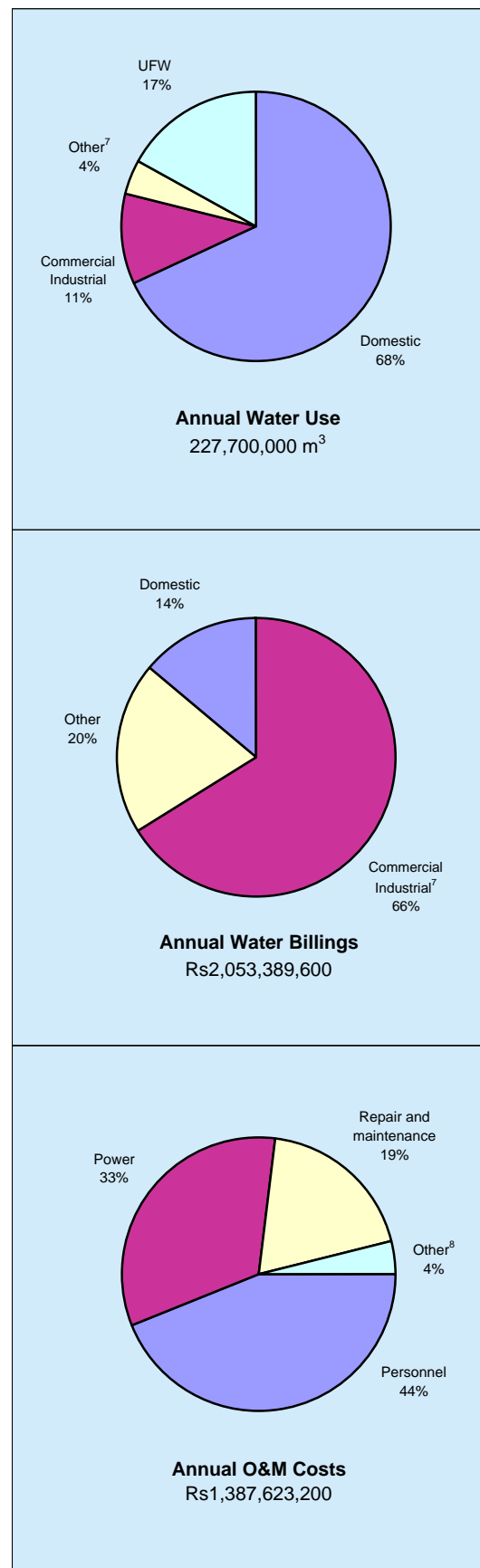
### Efficiency Indicators

Unaccounted Water <sup>6</sup>	17.0%
Unit Production Cost	Rs6.09/m <sup>3</sup>
Operating Ratio	0.44
Accounts Receivable	1.1 months
Staff/1,000 Connections	13.3

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 99% of 28,086 samples taken passed the residual chlorine test.
- <sup>3</sup> This is also the total area of responsibility.
- <sup>4</sup> This is the percentage of population served by house connections and public taps. About 1% of the population are served by tankers. The urban poor comprise 10% of the population.
- <sup>5</sup> About 156,984 consumer complaints were registered in 2005–2006.
- <sup>6</sup> While production is fully metered, only 3.5% of total connections is metered. There were 494 pipe breaks and 3,538 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport and chemicals.

Data as of 2005–2006.



<b>Water Utility</b>	<b>COIMBATORE CITY MUNICIPAL CORPORATION</b> Address : Big Bazaar Street, Coimbatore – 641 001, India Telephone : 91 422 231 0261 to 63 Fax : 91 422 239 8702 E-mail : cbecorp@gmail.com Head : Mr. Muthu Veran, Municipal Commissioner  Coimbatore City Municipal Corporation (CCMC) is a municipal corporation operating the city water system that dates back to 1931 as the Siruvani System. CCMC provides water supply and sewerage services to the city of Coimbatore, which has a total population of 1,050,000 people. The present service area of CCMC has a population density of 9,413 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water from the Pattiyar River and several spring sources. The private sector is not involved in the utility's operations. CCMC has computerized billing and accounting systems. It recently completed a 5-year master development plan covering the period 2001–2006. It has an annual report for 2006–2007 that is available to the public. The utility also has a well-developed management information system.																																					
<b>Mission Statement</b>	"To provide drinking water supply to all areas in the corporation's limits."																																					
<b>General Data About Water Utility</b>	Connections : 113,762 Staff : 452 Annual O&M Costs : Rs111,000,000 Annual Revenue : Rs135,000,000 Annual Billings : Rs179,200,000 Total Capital Expenditure (Over the last 5 years) : Rs543,202,000 Source of Investment Funds : Internally generated reserves Average capital expenditure/connection/year: Rs954.98																																					
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="5">METERED CONNECTIONS (Rs/m<sup>3</sup>)</th> </tr> <tr> <th>Consumption (m<sup>3</sup>)</th> <th>Domestic</th> <th>Nondomestic</th> <th>Bulk – Domestic</th> <th>Bulk – Nondomestic</th> </tr> </thead> <tbody> <tr> <td>1 – 50</td> <td>3.50</td> <td>7.00</td> <td>3.50</td> <td>7.00</td> </tr> <tr> <td>50 – 100</td> <td>4.00</td> <td>9.00</td> <td>4.00</td> <td>9.00</td> </tr> <tr> <td>100 – 150</td> <td>5.00</td> <td>12.00</td> <td>5.00</td> <td>12.00</td> </tr> <tr> <td>Above 150</td> <td>6.50</td> <td>15.00</td> <td>6.50</td> <td>15.00</td> </tr> <tr> <td>Bimonthly minimum</td> <td>Rs80.00</td> <td>Rs600.00</td> <td>Rs350.00</td> <td>Rs900.00</td> </tr> </tbody> </table> <p>Domestic users are allowed a free allowance of 100 liters per day.</p> <p>Supply on a per-tap basis is allowed at Rs50 per tap connection per month.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>All connections are metered and consumers are billed every 2 months.</li> <li>Water bills are paid at the water utility office, at banks, through bill collectors, and at CCMC collection centers.</li> <li>There were 3,240 new connections in 2005–2006. The price of a new domestic connection is Rs3,000 payable prior to connection.</li> </ol>			METERED CONNECTIONS (Rs/m <sup>3</sup> )					Consumption (m <sup>3</sup> )	Domestic	Nondomestic	Bulk – Domestic	Bulk – Nondomestic	1 – 50	3.50	7.00	3.50	7.00	50 – 100	4.00	9.00	4.00	9.00	100 – 150	5.00	12.00	5.00	12.00	Above 150	6.50	15.00	6.50	15.00	Bimonthly minimum	Rs80.00	Rs600.00	Rs350.00	Rs900.00
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<b>Priority Needs of Utility</b>	1. Nonrevision of tariffs in nearly 10 years 2. Shortage of staff with ban on fresh recruitments 3. Limited role of private sector																																					
<b>Consumer Service</b>	Average monthly consumption is about 21.0 m <sup>3</sup> per house connection. The water bill averages Rs70.95 per month per house connection. Water is available on an average of 3 hours a day only to most users with an average pressure of 3 meters. Applicants have to wait for a month for a new connection to be made. A connection fee of Rs3,000 has to be paid prior to connection. Water quality is good, with 90% of 3,650 water samples taken during the year passing the residual chlorine test. About 3,460 complaints were recorded, and only 30 pipe breaks and 5,200 leaks were repaired in 2005–2006. Consumers can complain in person at the water utility office, by letter or telephone. The utility sees to it that those living below the poverty line are supplied with drinking water.																																					
<b>Performance Highlights</b>	CCMC provides water at 109 lpcd to its consumers at an average of 3 hours per day to 76.1% of the population in its area of responsibility. UFW is the fifth highest at 41.3% with both production and consumption fully metered, which gives an accurate measure of its losses. Financial management is good, with an operating ratio of 0.82 and accounts receivable at 3.0 months, the sixth lowest but can still be reduced. Average tariff of Rs3.66/m <sup>3</sup> is enough to cover operating costs. Staff/1,000 connections ratio is fair at 4.0, which is about half of the average. CCMC needs to reduce its UFW and increase the available hours of its supply and coverage as well.																																					

## COIMBATORE WATER SUPPLY

Population: 994,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	228,400 m <sup>3</sup>
Groundwater	1%
Surface Water	99%
Treatment Type <sup>2</sup>	Conventional
Storage	125,000 m <sup>3</sup>
Service Area <sup>3</sup>	105.6 sq km
Distribution Length	1,205 km

### Service Connections

House (5 persons/HC)	107,000
Public Tap (150 persons/PT)	2,811
Commercial	3,523
Industrial	Nil
Institutional	Nil
Bulk	428
Others	Nil
<b>Total</b>	<b>113,762</b>

### Service Indicators

Service Coverage <sup>4</sup>	76.1%
Water Availability <sup>5</sup>	3 hours/day
Per Capita Consumption	109 lpcd
Average Tariff	Rs3.66/m <sup>3</sup>

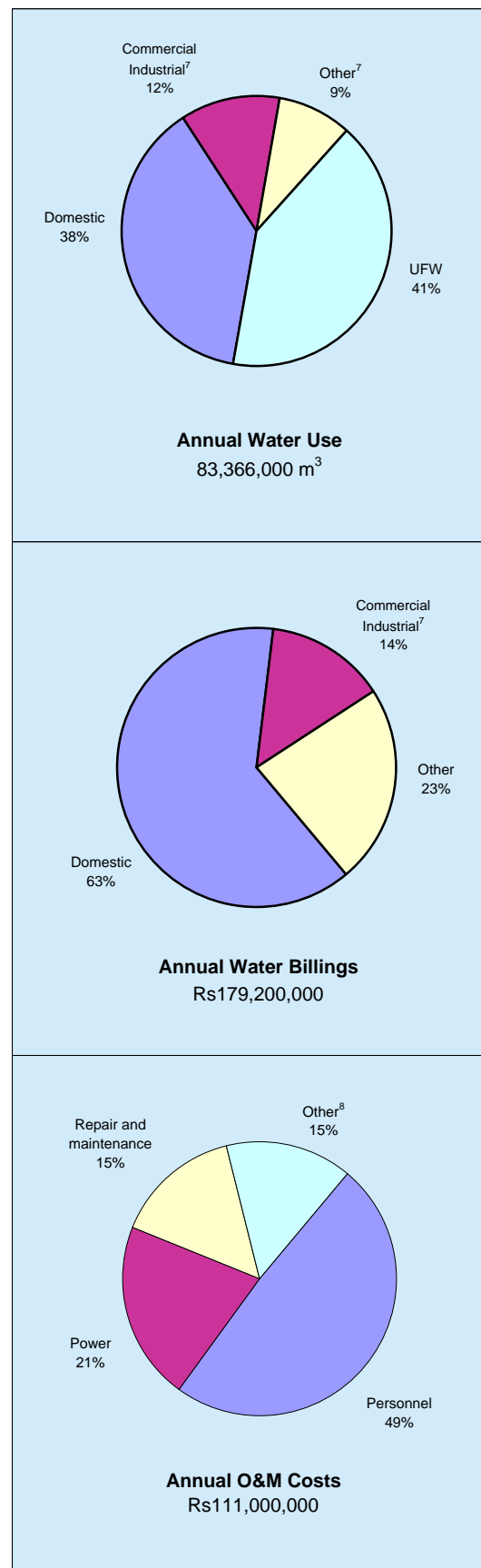
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	41.3%
Unit Production Cost	Rs1.33/m <sup>3</sup>
Operating Ratio	0.82
Accounts Receivable	3.0 months
Staff/1,000 Connections	4.0

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 90% of 3,650 samples taken passed the residual chlorine test.
- <sup>3</sup> This is also the total area of responsibility.
- <sup>4</sup> This is the percentage of population served by house connections and public taps. About 19% of the population draw water from tankers provided by the utility. The urban poor comprise 25% of the population.
- <sup>5</sup> About 3,460 consumer complaints registered in 2005–2006.
- <sup>6</sup> Both production and service connections are fully metered.
- <sup>7</sup> About 30 pipe breaks and 5,200 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport and chemicals.

Data as of 2005–2006.



<b>Water Utility</b>	<b>INDORE MUNICIPAL CORPORATION</b> Address : M. G. Road, Indore – 452 004, M. P., India Telephone : 91 731 243 1610; 271 0695 Fax : 91 731 243 4489 E-mail : piuindore@hotmail.com Head : Mr. Vinod Sharma, Municipal Commissioner  Indore Municipal Corporation (IMC) is a municipal corporation established in 1977. It provides water supply and sewerage services to the cities of Indore, Mhow, and Dewas, which have a total population of 2,200,000 people. The present service area of IMC has a population density of 12,222 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water from the Narmada and Gambhir Rivers and from 2,960 tube wells with pump sets. The private sector is not involved in the utility's operations. IMC has computerized billing and accounting systems. It does not have an annual report nor does it have a master development plan. The utility has a partly developed management information system.																																																		
<b>Mission Statement</b>	No mission statement.																																																		
<b>General Data About Water Utility</b>	Connections : 159,104 Staff : 2,979 Annual O&M Costs : Rs880,616,080 Annual Revenue : Rs165,264,590 Annual Billings : Rs186,038,400 Total Capital Expenditure (Over the last 5 years) : Rs543,202,000      Average capital expenditure/connection/year: Rs353.95 Source of Investment Funds : 30% internally generated reserves; 70% commercial loan (State Bank of Indore)																																																		
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4">FLAT RATE (Rs/month)</th> </tr> <tr> <th>Size (inch)</th> <th>Domestic</th> <th>Commercial</th> <th>Industrial</th> </tr> </thead> <tbody> <tr><td>1/2</td><td>150</td><td>300</td><td>600</td></tr> <tr><td>3/4</td><td>250</td><td>600</td><td>1,200</td></tr> <tr><td>1</td><td>500</td><td>1,400</td><td>2,400</td></tr> <tr><td>1 – 1/2</td><td>1,000</td><td>2,400</td><td>5,000</td></tr> <tr><td>2</td><td>2,000</td><td>5,000</td><td>10,000</td></tr> <tr><td>3</td><td>4,000</td><td>10,000</td><td>20,000</td></tr> <tr><td>4</td><td>8,000</td><td>20,000</td><td>35,000</td></tr> <tr><td>6</td><td>14,000</td><td>38,000</td><td>76,000</td></tr> <tr> <th colspan="4">METERED CONNECTIONS – Bulk Rates (Rs/m<sup>3</sup>)</th> </tr> <tr> <td>Bulk rates</td> <td>11.00/m<sup>3</sup></td> <td>14.00/m<sup>3</sup></td> <td>24.00/m<sup>3</sup></td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>Only 59 bulk connections are metered and not all are working. Most connections are on flat rate. The metered connections are billed monthly and the flat rates are billed quarterly.</li> <li>Water bills are paid at the water utility office and through bill collectors.</li> <li>There were 2,524 new connections in 2005–2006. The price of a new domestic connection is Rs2,500 payable prior to connection.</li> </ol>			FLAT RATE (Rs/month)				Size (inch)	Domestic	Commercial	Industrial	1/2	150	300	600	3/4	250	600	1,200	1	500	1,400	2,400	1 – 1/2	1,000	2,400	5,000	2	2,000	5,000	10,000	3	4,000	10,000	20,000	4	8,000	20,000	35,000	6	14,000	38,000	76,000	METERED CONNECTIONS – Bulk Rates (Rs/m <sup>3</sup> )				Bulk rates	11.00/m <sup>3</sup>	14.00/m <sup>3</sup>	24.00/m <sup>3</sup>
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<b>Priority Needs of Utility</b>	1. Augmentation of water supply system capacity	2. Increase in revenue to make system sustainable	3. Upgrade of existing distribution system																																																
<b>Consumer Service</b>	Average monthly consumption is about 28.4 m <sup>3</sup> per house connection. The water bill averages Rs60.36 per month per house connection. Water is available on an average of 45 minutes a day only to most users with an average pressure of 1 meter. Applicants have to wait for 2–4 weeks for a new connection to be made. A connection fee of Rs2,500 has to be paid prior to connection. Water quality is good, with 98% of about 54,900 water samples taken during the year passing the residual chlorine test. About 550 complaints were recorded, and 5,886 pipe breaks and leaks were repaired in 2005–2006. Consumers can complain in person at the water utility office, by letter, e-mail, or telephone. The urban poor are provided with free water through public taps, tube wells with pumps, and tankers.																																																		
<b>Performance Highlights</b>	IMC provides water at 87 lpcd to its consumers at an average of 45 minutes per day to 77.3% of the population in its area of responsibility. With both production and connections not metered, available production and consumption estimates do not give a credible UFW value. Operating ratio is highest at 5.33. Accounts receivable are about average at 5.2 months. Average tariff of Rs2.79/m <sup>3</sup> is lower than the high production cost of Rs13.18/m <sup>3</sup> because of high-cost power most probably for pumping. Staff/1,000 connections ratio is the second highest at 18.7. IMC will need a lot of improvement starting with reducing its operating expenses and improving collections. Water availability of less than 1 hour a day is not acceptable and should be improved. Staff productivity needs to be enhanced. Production and all connections need to be metered to allow billing based on use and to account for total use and losses.																																																		

## INDORE WATER SUPPLY

Population: 2,200,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	183,000 m <sup>3</sup>
Groundwater	7%
Surface Water	93%
Treatment Type <sup>2</sup>	Conventional
Storage	99,000 m <sup>3</sup>
Service Area <sup>3</sup>	180 sq km
Distribution Length	2,040 km

### Service Connections

House (7 persons/HC)	156,634
Public Tap (2,000 persons/PT)	93
Commercial	1,257
Industrial	1,024
Institutional	20
Bulk	72
Others	4
<b>Total</b>	<b>159,104</b>

### Service Indicators

Service Coverage <sup>4</sup>	77.3%
Water Availability <sup>5</sup>	0.75 hours/day
Per Capita Consumption	87 lpcd
Average Tariff	Rs2.79/m <sup>3</sup>

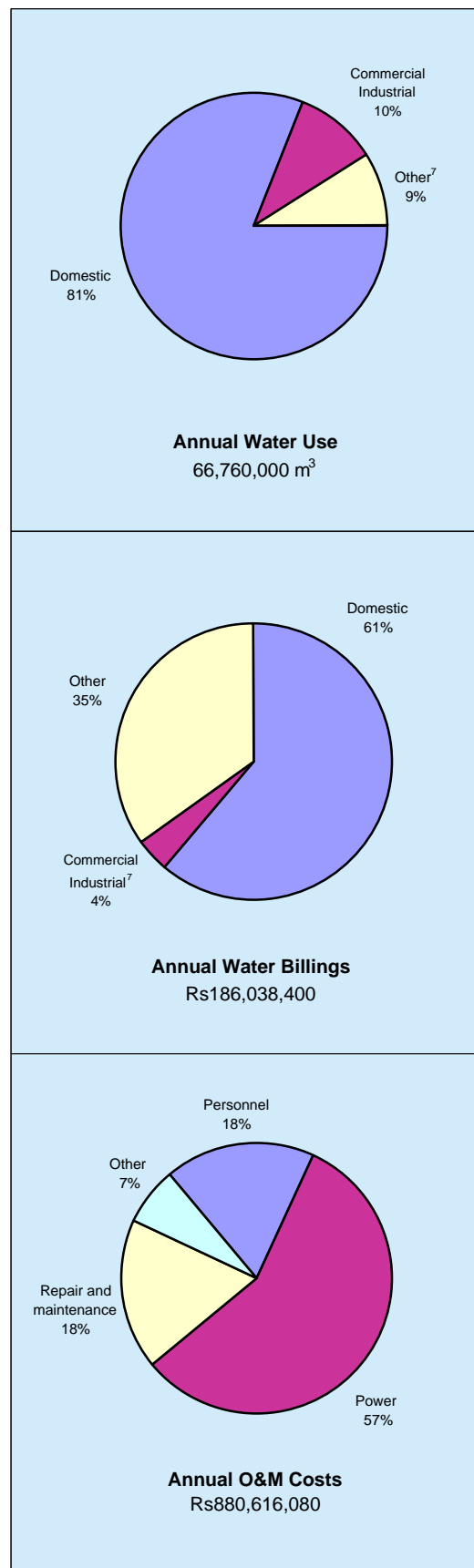
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	no data
Unit Production Cost	Rs13.18/m <sup>3</sup>
Operating Ratio	5.33
Accounts Receivable	5.2 months
Staff/1,000 Connections	18.7

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 98% of 54,897 samples taken passed the residual chlorine test.
- <sup>3</sup> This is also the total area of responsibility.
- <sup>4</sup> This is the percentage of population served by house connections and public taps.  
About 9% of the population draw water from tube wells and tankers provided by the utility.  
The urban poor comprise 10% of the population.
- <sup>5</sup> About 550 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Both production and all service connections except for 59 connections are not metered.  
About 5,886 pipe breaks and leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport and chemicals.

### Data as of 2005–2006.



<b>Water Utility</b>	<b>JABALPUR MUNICIPAL CORPORATION</b> Address : Water Works Department, Jabalpur Municipal Corporation, Jabalpur, M. P., India Telephone : 91 761 240 3020 to 22 Fax : 91 761 241 0892 E-mail : commrjmc@yahoo.com.in Head : Mr. Adjay Sharma, Executive Engineer (Water Works)  Jabalpur Municipal Corporation (JMC) was established as a municipal corporation in 1956. Its Water Works Department provides only water supply services to the city of Jabalpur, which has a total population of 1,050,000 people. The present service area of JMC has a population density of 8,753 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water from the Narmada, Khandari-Gour, and Pariyat Rivers and from 175 tube wells with pump sets. The private sector is not involved in the utility's operations. None of its operations is computerized nor does it have an annual report or a master development plan. The utility neither has a management information system.																						
<b>Mission Statement</b>	No mission statement.																						
<b>General Data About Water Utility</b>	Connections	: 46,260																					
	Staff	: 17																					
	Annual O&M Costs	: Rs104,014,350																					
	Annual Revenue	: Rs61,923,800																					
	Annual Billings	: Rs82,277,000																					
	Total Capital Expenditure (Over the last 5 years)	: Rs200,000,000	Average capital expenditure/connection/year: Rs864.68																				
	Source of Investment Funds	: 32% internally generated reserves; 64% government grant; 4% commercial loan and other sources																					
<b>Tariff Structure</b>	<table border="1" style="width: 100%; text-align: center;"> <tr><td colspan="2"> </td></tr> <tr><td colspan="2"> </td></tr> <tr><td colspan="2"><b>No tariff structure submitted.</b></td></tr> <tr><td colspan="2"> </td></tr> <tr><td colspan="2"> </td></tr> <tr><td colspan="2"> </td></tr> <tr><td colspan="2"> </td></tr> <tr><td colspan="2"> </td></tr> <tr><td colspan="2"> </td></tr> <tr><td colspan="2"> </td></tr> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>None of the service connections are metered. All consumers pay on flat rate and are billed annually.</li> <li>Water bills are paid at the water utility office and through bill collectors.</li> <li>There were only 300 new connections in 2005–2006. The price of a new domestic connection is Rs1,984 payable prior to connection but may also be paid in installment over 12 months.</li> </ol>							<b>No tariff structure submitted.</b>															
<b>No tariff structure submitted.</b>																							
<b>Priority Needs of Utility</b>	1. Leakage control	2. Zoning of water distribution system	3. Collection improvement – realization of cess																				
<b>Consumer Service</b>	Average monthly consumption is about 69.2 m <sup>3</sup> per house connection. The water bill averages Rs62.74 per month per house connection. Water is available on an average of 4 hours a day only to most users. Applicants have to wait for about 2 weeks for a new connection to be made. A domestic connection fee of Rs1,984 is paid prior to connection but can also be paid over a 12-month period. Water quality is good, with 96% of 650 water samples taken during the year passing the residual chlorine test. About 700 complaints were recorded, and 400 pipe breaks and leaks were repaired in 2005–2006. Consumers can complain in person at the water utility office, or by letter or telephone. The urban poor pay low monthly charges of Rs30 and connection charge of Rs300 only.																						
<b>Performance Highlights</b>	JMC provides water at 139 lpcd to its consumers at an average of 4 hours per day to 75.2% of the population in its area of responsibility. With both production and service connections not metered, UFW of 14.3% is, at best, an estimate. Operating ratio is 1.68 and accounts receivable equivalent is 3 months. Average tariff of Rs1.50/m <sup>3</sup> is the fifth lowest and cannot cover operating expenses. Staff/1,000 connections ratio is lowest at 0.4. JMC needs to address its water availability, its low tariff, and operating ratio of more than 1. Production and all connections need to be metered to allow billing based on use and to account for total use and losses.																						

## JABALPUR WATER SUPPLY

Population: 1,050,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	175,115 m <sup>3</sup>
Groundwater	9%
Surface Water	91%
Treatment Type <sup>2</sup>	Conventional
Storage	70,000 m <sup>3</sup>
Service Area <sup>3</sup>	123 sq km
Distribution Length	162 km

### Service Connections

House (5 persons/HC)	44,000
Public Tap (100 persons/PT)	1,600
Commercial	648
Industrial	8
Institutional	2
Bulk	2
Others	Nil
<b>Total</b>	<b>46,260</b>

### Service Indicators

Service Coverage <sup>4</sup>	75.2%
Water Availability <sup>5</sup>	4 hours/day
Per Capita Consumption	139 lpcd
Average Tariff	Rs1.50/m <sup>3</sup>

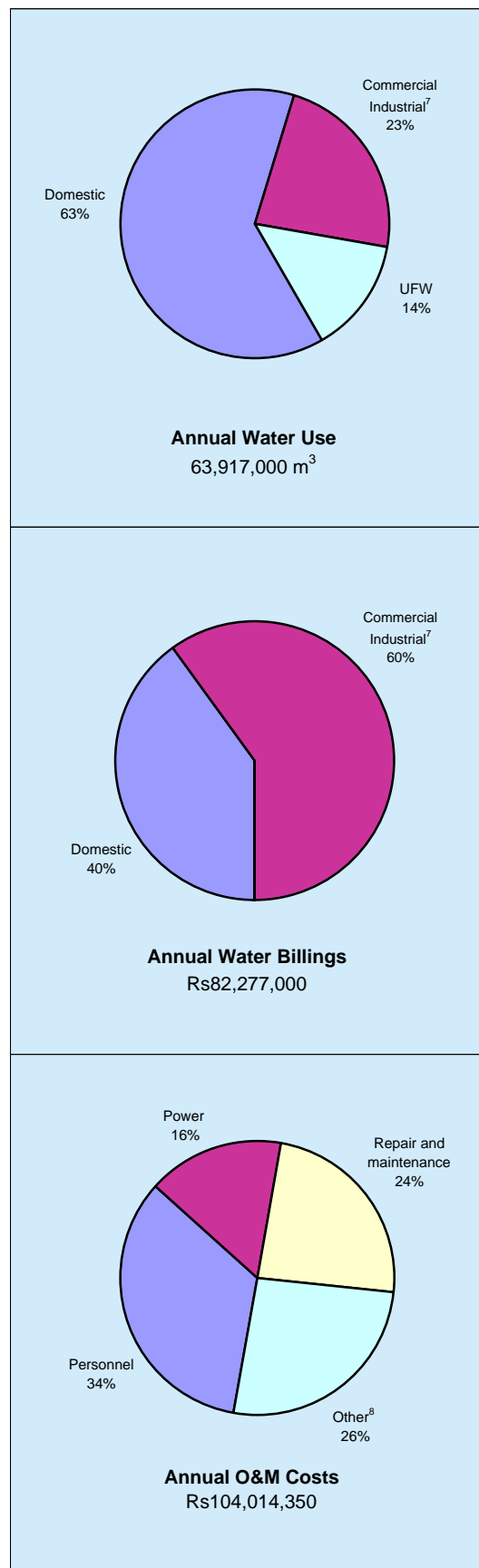
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	14.3%
Unit Production Cost	Rs1.63/m <sup>3</sup>
Operating Ratio	1.68
Accounts Receivable	3.0 months
Staff/1,000 Connections	0.4

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 96% of 650 samples taken passed the residual chlorine test.
- <sup>3</sup> This is also the total area of responsibility.
- <sup>4</sup> This is the percentage of population served by house connections and public taps. About 25% of the population draw water from tube wells and tankers provided by the utility. The urban poor comprise 35% of the population.
- <sup>5</sup> About 700 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production and service connections are not metered. UFW is at best an estimate. About 400 pipe breaks and leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport and chemicals.

Data as of 2005–2006.



<b>Water Utility</b>	<b>JAMSHEDPUR UTILITIES &amp; SERVICES COMPANY, LIMITED</b> Address : Sakchi Boulevard Road, Northern Town, Bituspur, Jamshedpur – 831 001, India Telephone : 91 657 214 3507 Fax : 91 657 242 4219 E-mail : gsbasu@tatasteel.com Head : Mr. G. S. Basu, General Manager – Water Management  Jamshedpur Utilities & Services Co., Ltd. (JUSCO), formerly Towns Division of Tata Steel, is a private company that was spun off in 2003. The entity has been operating the water supply system and other municipal services since 1919. JUSCO provides water supply and sewerage services to the city of Jamshedpur, which has a total population of 615,500 people. The present service area of JUSCO has a population density of 9,959 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water mainly from the River Subernarekha and from the Dimna Lake for contingency only. All of the utility's operations are done by the private sector. Billing and accounting are computerized together with industrial water treatment, customer complaint management, network management, and flow meter data handling and UFW analysis. JUSCO has a well-developed management information system. JUSCO follows a master development plan for the period 1986–2010. Its annual report is available in its website																																																												
<b>Mission Statement</b>	"Quality services for life. We will be the preferred provider of civic and allied services and a national leader in the water and sanitation business. Guided by Tata values, we will continuously strive to delight our customers through a team of happy and empowered employees."																																																												
<b>General Data About Water Utility</b>	Connections : 38,800 Staff : 218 Annual O&M Costs : Rs328,300,000 Annual Revenue : Rs531,669,000 Annual Billings : Rs531,669,000 Total Capital Expenditure (Over the last 5 years) : Rs188,400,000      Average capital expenditure/connection/year: Rs971.13 Source of Investment Funds : All from internally generated reserves																																																												
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">METERED</th> <th colspan="4">UNMETERED (Monthly Flat Rate)</th> </tr> <tr> <th>Type of User</th> <th>Rate (Rs/m<sup>3</sup>)</th> <th>Plot Size</th> <th colspan="2">Domestic (Rs)</th> <th colspan="2">Nondomestic (Rs)</th> </tr> <tr> <td></td> <td></td> <td>(Sq ft)</td> <td>Single Storey</td> <td>Add'l Floor</td> <td>Single Storey</td> <td>Add'l Floor</td> </tr> </thead> <tbody> <tr> <td>Domestic</td> <td>7.90</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Educational</td> <td>4.40</td> <td>Up to 1,600</td> <td>120</td> <td>110</td> <td>450</td> <td>350</td> </tr> <tr> <td>Commercial</td> <td>7.90</td> <td>Up to 2,500</td> <td>240</td> <td>180</td> <td>540</td> <td>360</td> </tr> <tr> <td>Industrial</td> <td>9.90</td> <td>2,500 – 4,000</td> <td>450</td> <td>300</td> <td>600</td> <td>400</td> </tr> <tr> <td></td> <td></td> <td>4,000 – above</td> <td>540</td> <td>360</td> <td>600</td> <td>400</td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>Only 335 connections are metered with a mix of industrial, commercial, institutional, domestic, and bulk connections. The rest pay on flat rate monthly based on plot size.</li> <li>Water bills are paid at the water utility office.</li> <li>There were 2,538 new connections in 2005–2006. The price of a new domestic connection is Rs300–Rs500 within an existing network payable prior to connection. For new network, new connection costs Rs3,000–Rs9,000.</li> </ol>						METERED		UNMETERED (Monthly Flat Rate)				Type of User	Rate (Rs/m <sup>3</sup> )	Plot Size	Domestic (Rs)		Nondomestic (Rs)				(Sq ft)	Single Storey	Add'l Floor	Single Storey	Add'l Floor	Domestic	7.90						Educational	4.40	Up to 1,600	120	110	450	350	Commercial	7.90	Up to 2,500	240	180	540	360	Industrial	9.90	2,500 – 4,000	450	300	600	400			4,000 – above	540	360	600	400
METERED		UNMETERED (Monthly Flat Rate)																																																											
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		4,000 – above	540	360	600	400																																																							
<b>Priority Needs of Utility</b>	1. Increase service coverage      2. 24 x 7 supply with 100% metering      3. Reduction of nonrevenue water																																																												
<b>Consumer Service</b>	Average monthly consumption is about 71.9 m <sup>3</sup> per house connection. The water bill averages Rs81.08 per month per house connection. Water is available on an average of 6 hours a day only to most users with an average pressure of 5 meters. Applicants have to wait for about a month for a new connection to be made. A domestic connection fee of Rs300–Rs500 is paid prior to connection but can also be paid over a 12-month period. Water quality is good, with 96% of 840 water samples taken during the year passing the residual chlorine test. About 15,516 complaints were recorded, and 1,189 pipe breaks and 1,604 leaks were repaired in 2005–2006. Consumers can complain in person at the water utility office, by letter, or by telephone. The urban poor are provided with free water from 552 public stand posts and subsidized tariffs for those connected. Outside the network, bore wells with hand pumps provide free water.																																																												
<b>Performance Highlights</b>	JUSCO provides water at 203 lpcd to its consumers at an average of 6 hours per day to 74.4% of the population in its area of responsibility. While production is metered, less than 1% of service connections are metered. UFW of 12.8% is the lowest. Financial management is very good, with operating ratio of 0.62 and accounts receivable of 0.3 month. Average tariff of Rs4.51/m <sup>3</sup> is about average but covers expenses well. Staff/1,000 connections ratio is less than average at 5.6. JUSCO is operating well except for water availability. It can further improve by full metering of all service connections.																																																												



## JAMSHEDPUR WATER SUPPLY

Population: 488,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	370,110 m <sup>3</sup>
Groundwater	Nil
Surface Water	100%
Treatment Type <sup>2</sup>	Conventional
Storage	45,650 m <sup>3</sup>
Service Area <sup>3</sup>	49 sq km
Distribution Length	513 km

### Service Connections

House (9.4 persons/HC)	36,195
Public Tap (140 persons/PT)	552
Commercial	1,572
Industrial	35
Institutional	178
Bulk (total of 3,965 housing units)	101
Others	167
<b>Total</b>	<b>38,800</b>

### Service Indicators

Service Coverage <sup>4</sup>	74.4%
Water Availability <sup>5</sup>	6 hours/day
Per Capita Consumption	203 lpcd
Average Tariff	Rs4.51/m <sup>3</sup>

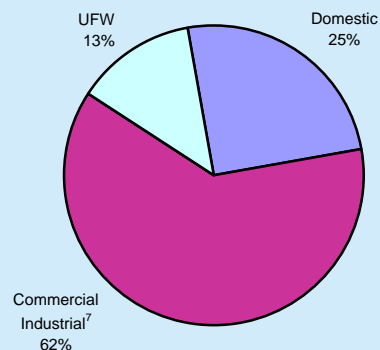
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	12.8%
Unit Production Cost	Rs2.43/m <sup>3</sup>
Operating Ratio	0.62
Accounts Receivable	0.3 month
Staff/1,000 Connections	5.6

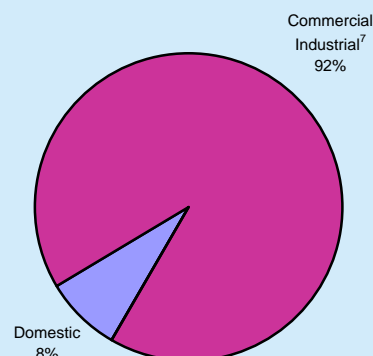
#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 96% of 840 samples taken passed the residual chlorine test.
- <sup>3</sup> The total area of responsibility is 64 sq m (km<sup>2</sup>).
- <sup>4</sup> This is the percentage of population served by house connections, public taps, and apartment units with bulk connections. About 5% of the population draw water from utility tankers during emergencies. The urban poor comprise 20% of the population.
- <sup>5</sup> About 15,516 consumer complaints were registered in 2005–2006.
- <sup>6</sup> While production is metered, only 335 service connections (less than 1%) are metered. About 1,189 pipe breaks and 1,604 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport, chemicals, and payment for raw water.

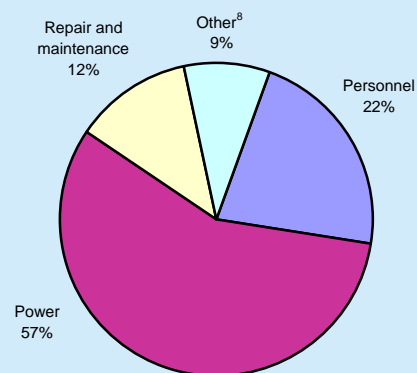
Data as of 2005–2006.



**Annual Water Use**  
135,090,000 m<sup>3</sup>



**Annual Water Billings**  
Rs531,669,000



**Annual O&M Costs**  
Rs328,300,000

<b>Water Utility</b>	<b>KOLKATA MUNICIPAL CORPORATION</b> Address : 5, S. N. Bannerjee Road, Kolkata – 700 013, India Telephone : 91 33 2286 1293 Fax : 91 33 2286 1234 E-mail : dgws@rediffmail.com Head : Mr. Bibhas Kumar Maity, Director General (Water Supply)																														
	Kolkata Municipal Corporation (KMC) was established as a municipal corporation in 1924. KMC provides water supply and sewerage services to the city of Kolkata and five other cities and towns, which together have a total population of 4,998,000 people. The present service area of KMC has a population density of 27,014 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water mainly from the River Hooghly and from 260 tube wells. The private sector is involved in source development, production, management, leak repair, and potable water tanker service through service and management contracts. Billing, part of pumping, fund management, record keeping, and network mapping are computerized. The utility has a partly developed management information system. No annual report is available. It has a 20-year master development plan covering 2006–2026.																														
<b>Mission Statement</b>	"Water for all, the effort continues."																														
<b>General Data About Water Utility</b>	Connections : 262,839 Staff : 3,866 Annual O&M Costs : Rs1,228,500,000 Annual Revenue : Rs260,000,000 Annual Billings : Rs260,000,000 Total Capital Expenditure (Over the last 5 years) : Rs2,953,800,000      Average capital expenditure/connection/year: Rs2,247.61 Source of Investment Funds : Internally generated reserves and grant from the Government of West Bengal																														
<b>Tariff Structure</b>	<table border="1"> <thead> <tr> <th colspan="4">NONDOMESTIC CONNECTIONS</th> </tr> <tr> <th>Ferrule Size (inch)</th> <th>Monthly Rate (Rs)</th> <th>Ferrule Size (inch)</th> <th>Monthly Rate (Rs)</th> </tr> </thead> <tbody> <tr> <td>1/8</td> <td>200</td> <td>1/2</td> <td>700</td> </tr> <tr> <td>3/16</td> <td>250</td> <td>Above 1/2</td> <td>1,100</td> </tr> <tr> <td>1/4</td> <td>300</td> <td>3/4</td> <td>1,800</td> </tr> <tr> <td>3/8</td> <td>500</td> <td>1</td> <td>2,700</td> </tr> <tr> <td>7/16</td> <td>600</td> <td>–</td> <td>–</td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>Water supplied for domestic consumption is not charged at all and is supplied free of cost. Only bulk supply for domestic uses is charged. Only 175 bulk connections are metered, of which 84 are for domestic purposes and 91 are industrial, commercial, and institutional connections.</li> <li>Water bills are paid at the water utility office.</li> <li>There were 1,052 new connections in 2005–2006, mostly domestic ferrule connection. The price of a new domestic connection is Rs1,000 for a 10-mm ferrule connection payable prior to connection.</li> </ol>			NONDOMESTIC CONNECTIONS				Ferrule Size (inch)	Monthly Rate (Rs)	Ferrule Size (inch)	Monthly Rate (Rs)	1/8	200	1/2	700	3/16	250	Above 1/2	1,100	1/4	300	3/4	1,800	3/8	500	1	2,700	7/16	600	–	–
NONDOMESTIC CONNECTIONS																															
Ferrule Size (inch)	Monthly Rate (Rs)	Ferrule Size (inch)	Monthly Rate (Rs)																												
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1/4	300	3/4	1,800																												
3/8	500	1	2,700																												
7/16	600	–	–																												
<b>Priority Needs of Utility</b>	1. Water supply network management      2. Management of UFW reduction      3. 24/7 water supply with 100% metering																														
<b>Consumer Service</b>	Average monthly consumption is about 58.6 m <sup>3</sup> per house connection. Domestic consumption is not billed. Water is available on an average of 8 hours a day with an average pressure of 3 meters to most users. Applicants have to wait for about 3–7 days for a new connection to be made. A domestic connection fee of Rs1,000 is paid prior to connection. Water quality is good, with 90% of 7,000 water samples taken during the year passing the residual chlorine test. Records of complaints are available at the ward level only. About 8,000 pipe breaks and 77,197 leaks were repaired in 2005–2006. Consumers can complain in person at the water utility office or by letter, e-mail, or telephone. The urban poor are provided with free water from public stand posts.																														
<b>Performance Highlights</b>	KMC provides water at 130 lpcd to its consumers at an average of 8 hours per day to 79.0% of the population in its area of responsibility. UFW is estimated at a high 35%, with production not metered and less than 1% of service connections metered. Financial management needs improvement with the second highest operating ratio of 4.73 and accounts receivable of 2.4 months. Average tariff of Rs1.13/m <sup>3</sup> is the third lowest, which cannot cover expenses at all. Staff/1,000 connections ratio is the fourth highest at 14.7. KMC needs to cover its expenses through appropriate tariffs and by charging domestic users for their use. It also needs to improve collection and water availability, and reduce its high UFW. Staff productivity should also be enhanced. Metering is necessary to account for water use and to determine the extent of losses.																														

## KOLKATA WATER SUPPLY

Population: 3,998,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	971,560 m <sup>3</sup>
Groundwater	12%
Surface Water	88%
Treatment Type <sup>2</sup>	Conventional
Storage	474,430 m <sup>3</sup>
Service Area <sup>3</sup>	148 sq km
Distribution Length	5,800 km

### Service Connections

House (9.4 persons/HC)	237,912
Public Tap (140 persons/PT)	17,000
Commercial	Nil
Industrial	7,752
Institutional	Nil
Bulk	175
Others	Nil
<b>Total</b>	<b>262,839</b>

### Service Indicators

Service Coverage <sup>4</sup>	79.0%
Water Availability <sup>5</sup>	8 hours/day
Per Capita Consumption	130 lpcd
Average Tariff	Rs1.13/m <sup>3</sup>

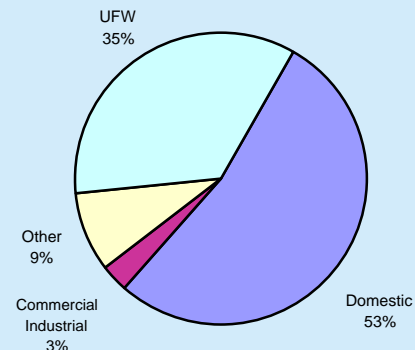
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	35.0%
Unit Production Cost	Rs3.46/m <sup>3</sup>
Operating Ratio	4.73
Accounts Receivable	2.4 months
Staff/1,000 Connections	14.7

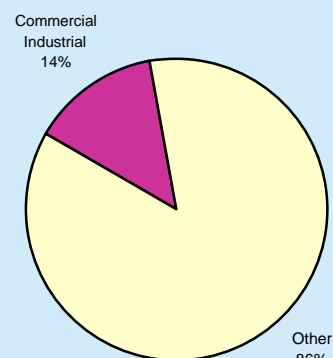
#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 90% of 7,000 samples taken passed the residual chlorine test.
- <sup>3</sup> The total area of responsibility is 185 sq km (km<sup>2</sup>).
- <sup>4</sup> This is the percentage of population served by house connections and public taps. The rest of the population draw water from tube wells and tankers. The urban poor comprise 35% of the population.
- <sup>5</sup> No record of consumer complaints are kept at the central level but are at the wards.
- <sup>6</sup> Production is not metered and only 175 bulk connections (less than 1%) are metered. About 8,000 pipe breaks and 77,197 leaks were repaired during the year.
- <sup>7</sup> Domestic consumption are not billed. Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport and chemicals.

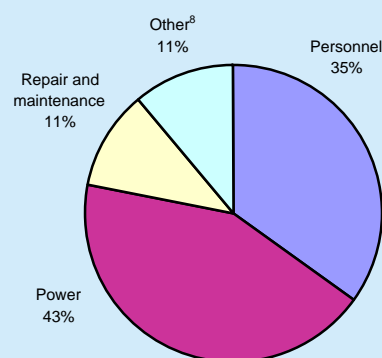
Data as of 2005–2006.



**Annual Water Use**  
354,619,400 m<sup>3</sup>



**Annual Water Billings**<sup>7</sup>  
Rs260,000,000



**Annual O&M Costs**  
Rs1,228,500,000

<b>Water Utility</b>	<b>MATHURA MUNICIPAL COUNCIL</b> Address : Water Works, near Fire Station, Bhuteshwar, Mathura, U. P., India Telephone : 91 565 290 0987 Fax : 91 565 250 5070 E-mail : npp_mtr@yahoo.com Head : Mr. Sumit Kumar, Chief Executive Officer		
	Mathura Municipal Council (MMC) was established as a municipal council in 1916 although the water supply network was laid just before 1950. MMC provides water supply and sewerage services to the city of Mathura, which has a total population of 340,000 people. The present service area of MMC has a population density of 12,124 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water from groundwater and surface water sources. The private sector is involved in leak repair and tube well operation through service contracts. Billing and accounting are computerized. The utility has no management information system nor does it have an annual report or a master development plan.		
<b>Mission Statement</b>	No mission statement.		
<b>General Data About Water Utility</b>	Connections : 24,643 Staff : 160 Annual O&M Costs : Rs28,123,000 Annual Revenue : Rs9,205,690 Annual Billings : Rs8,662,000 Total Capital Expenditure (Over the last 5 years) : Rs87,829,000 Source of Investment Funds : 15% internally generated reserves; 85% government grant	Average capital expenditure/connection/year: Rs712.81	
<b>Tariff Structure</b>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>ALL CONNECTIONS ARE UNMETERED</b> </div> <p>A uniform water tax is levied for all users, which is 12.5% of annual rental value. This is collected as part of the property tax. Different types of consumers pay according to this tariff structure with industrial users paying more since their annual rental values are higher.</p>		
	Notes:  1. Water tariff is paid annually with the property tax.  2. There were only 12 new connections reported for 2005–2006. The price of a new domestic connection is Rs500 payable prior to connection.		
<b>Priority Needs of Utility</b>	1. Master plan for distribution system	2. Rehabilitation in core of city and expansion	3. Metering and computerization for billing and collection
<b>Consumer Service</b>	Average monthly consumption is about 52.5 m <sup>3</sup> per house connection. The water bill averages Rs32.66 per month per house connection. Water is available on an average of 1–3 hours a day at an average pressure of 5 meters to most users. Applicants have to wait for about 7 days for a new connection to be made. A domestic connection fee of Rs500 is paid prior to connection. Water quality is good, with 97% of 308 water samples taken during the year passing the residual chlorine test. Complaints are not recorded. About 402 pipe breaks and leaks were repaired in 2005–2006. Consumers can complain in person at the water utility office or by letter or telephone. The urban poor are treated no differently from other consumers except that slum dwellers pay lower water tax as their annual rental value is low.		
<b>Performance Highlights</b>	MMC provides water to its consumers at an average of 1–3 hours per day to 70% of the population in its area of responsibility. Both production and all service connections are not metered. Estimates given show consumption equal to production, giving unrealistic values for per capita consumption and UFW. Financial management needs improvement with the third highest operating ratio of 3.05 and accounts receivable of 12.3 months, which is the highest. Average tariff of Rs0.62/m <sup>3</sup> is the second lowest, which could not cover expenses at all. Staff/1,000 connections ratio is better than average at 6.5. MMC needs to cover its expenses through appropriate tariffs. It also needs to improve collection and water availability. Metering is necessary to account for water use and to determine the extent of losses.		

## MATHURA WATER SUPPLY

Population: 238,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	38,172 m <sup>3</sup>
Groundwater	69%
Surface Water	31%
Treatment Type <sup>2</sup>	Conventional
Storage	4,500 m <sup>3</sup>
Service Area <sup>3</sup>	19.6 sq km
Distribution Length	254 km

### Service Connections

House (6 persons/HC)	22,103
Public Tap (200 persons/PT)	980
Commercial	1,560
Industrial	Nil
Institutional	Nil
Bulk	Nil
Others	Nil
<b>Total</b>	<b>24,643</b>

### Service Indicators

Service Coverage <sup>4</sup>	70.0%
Water Availability <sup>5</sup>	1 to 3 hours/day
Per Capita Consumption <sup>6</sup>	no data
Average Tariff	Rs0.62/m <sup>3</sup>

### Efficiency Indicators

Unaccounted for Water <sup>7</sup>	no data
Unit Production Cost	Rs2.02/m <sup>3</sup>
Operating Ratio	3.05
Accounts Receivable	12.3 months
Staff/1,000 Connections	6.5

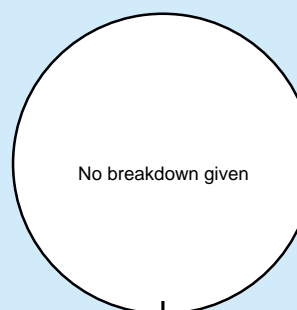
#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 97% of 308 samples taken passed the residual chlorine test.
- <sup>3</sup> The total area of responsibility is 28.1 sq m (km<sup>2</sup>).
- <sup>4</sup> This is the percentage of population served by house connections and public taps. About 10% of the population draw water from tube wells provided by the utility. The urban poor comprise 40% of the population.
- <sup>5</sup> No record of consumer complaints were kept by the utility.
- <sup>6</sup> Consumption data given were questionable; hence, per capita use and UFW could not be determined.
- <sup>7</sup> Both production and all service connections are not metered. About 402 pipe breaks and leaks were repaired during the year.
- <sup>8</sup> Other cost includes transport and chemicals.

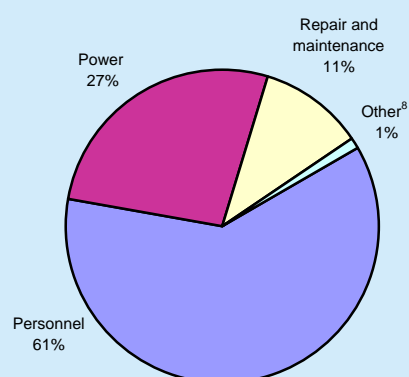
Data as of 2005–2006.



**Annual Water Use**  
13,932,780 m<sup>3</sup>



**Annual Water Billings**  
Rs8,662,000



**Annual O&M Costs**  
Rs28,123,000

<b>Water Utility</b>	<p><b>MUNICIPAL CORPORATION OF GREATER MUMBAI</b></p> <p>Address : Municipal Head Office, Fort, Mumbai – 400 001, India          Telephone : 91 22 2262 0025          Fax : 91 22 2263 4329          E-mail : bmcbaicum@rediffmail.com, hebmc@mtnl.net.in          Head : Mr. R. R. Hariname, Hydraulic Engineer</p> <p>Municipal Corporation of Greater Mumbai (MCGM) was established in 1888. MCGM has separate departments providing water supply and sewerage services to the city of Mumbai, which has a total population of 13,000,000 people. The present service area of MCGM has a population density of 29,613 persons/km<sup>2</sup>. The utility is responsible for water production, distribution, and source development. It draws water mainly from the following surface water sources: Vaitarna, Tansa, and Bhatsa Rivers, and Lakes Vihar and Tushi. There is no private sector involvement in the utility's operations. Billing, accounting, and part of pumping and treatment operations are computerized. The utility has a partly developed management information system. It publishes an annual report that is available to the public. MCGM has no current master development plan.</p>																
<b>Mission Statement</b>	<p>"To provide all users in Mumbai City with continuous, uninterrupted, reliable water treatment services to provide good quality supply of clean water in a safe, environmentally sound, and cost-effective manner."</p>																
<b>General Data About Water Utility</b>	<p>Connections : 400,000          Staff : 6,865          Annual O&amp;M Costs : Rs4,284,060,400          Annual Revenue : Rs8,789,400,000          Annual Billings : Rs4,640,300,000          Total Capital Expenditure : Rs7,581,173,100          (Over the last 5 years) Average capital expenditure/connection/year: Rs3,790.59          Source of Investment Funds : All from government grant</p>																
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">UNMETERED CONNECTIONS</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">Unmetered connections are charged an annual amount equal to 12.5% of annual rental value of the property, which is collected as part of property tax.</td> </tr> <tr> <th colspan="2" style="text-align: center;">METERED CONNECTIONS (Rs/m<sup>3</sup>)</th> </tr> <tr> <td>Slums, including chawls</td> <td style="text-align: center;">Rs2.25/m<sup>3</sup></td> </tr> <tr> <td>Nonslum domestic users, schools</td> <td style="text-align: center;">Rs3.50/m<sup>3</sup></td> </tr> <tr> <td>Dispensaries, municipal swimming pools, halls</td> <td style="text-align: center;">Rs10.50/m<sup>3</sup></td> </tr> <tr> <td>Small hotels</td> <td style="text-align: center;">Rs18.00/m<sup>3</sup></td> </tr> <tr> <td>Commercial establishments</td> <td style="text-align: center;">Rs25.00/m<sup>3</sup></td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>About 75% of service connections have working meters. Unmetered connections are charged at 12.5% of annual rental value of the property. Domestic users are billed quarterly while all the others are billed monthly.</li> <li>Water bills are paid at the water utility office.</li> <li>There were 10,485 new connections in 2005–2006. The price of a new domestic connection is Rs660 plus Rs250/m beyond 1 meter service pipe length payable prior to connection.</li> </ol>	UNMETERED CONNECTIONS		Unmetered connections are charged an annual amount equal to 12.5% of annual rental value of the property, which is collected as part of property tax.		METERED CONNECTIONS (Rs/m <sup>3</sup> )		Slums, including chawls	Rs2.25/m <sup>3</sup>	Nonslum domestic users, schools	Rs3.50/m <sup>3</sup>	Dispensaries, municipal swimming pools, halls	Rs10.50/m <sup>3</sup>	Small hotels	Rs18.00/m <sup>3</sup>	Commercial establishments	Rs25.00/m <sup>3</sup>
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<b>Priority Needs of Utility</b>	<ol style="list-style-type: none"> <li>UFW reduction</li> <li>Distribution management from service reservoir to consumers</li> <li>GIS-based network interlinked with SCADA</li> </ol>																
<b>Consumer Service</b>	<p>Average monthly consumption is about 156.3 m<sup>3</sup> per house connection. The water bill averages Rs708.46 per month per house connection. Water is available at an average of 4 hours a day with an average pressure of 7 meters to most users. Applicants have to wait for about a month for a new connection to be made. A domestic connection fee is paid prior to connection. Water quality is good, with 90% of 64,000 water samples taken during the year passing the residual chlorine test. About 100,000 consumer complaints were recorded during the year. About 680 pipe breaks and 650 leaks were repaired in 2005–2006. Consumers can complain in person at the water utility office, or by letter or telephone. The urban poor are provided with stand post connection in general washing place for groups of five families at subsidized rates.</p>																
<b>Performance Highlights</b>	<p>MCGM provides water to its consumers at 191 lpcd at an average of 4 hours per day to all of the population in its area of responsibility. Production is metered and 75% of service connections have working meters. UFW of 13.6% is the second lowest. Financial management is mixed with very good operating ratio of 0.49 but accounts receivable of 11.8 months, which is the second highest. Average tariff of Rs4.60/m<sup>3</sup> covers expenses with low UFW. Staff/1,000 connections ratio is the third highest at 17.2. MCGM needs to improve collection and water availability. Full metering is necessary to account for water use and to determine the extent of losses. It also needs to address staff productivity.</p>																

## MUMBAI WATER SUPPLY

Population: 13,000,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	3,200,000 m <sup>3</sup>
Groundwater	Nil
Surface Water	100%
Treatment Type <sup>2</sup>	Conventional
Storage	997,180 m <sup>3</sup>
Service Area <sup>3</sup>	439 sq km
Distribution Length	4,000 km

### Service Connections

House (37 persons/HC)	255,897
Public Tap	Nil
Commercial	48,113
Industrial	5,216
Institutional	Nil
Bulk	Nil
Others (unmetered)	90,774
<b>Total</b>	<b>400,000</b>

### Service Indicators

Service Coverage <sup>4</sup>	100.0%
Water Availability <sup>5</sup>	4 hours/day
Per Capita Consumption <sup>6</sup>	191 lpcd
Average Tariff	Rs4.60/m <sup>3</sup>

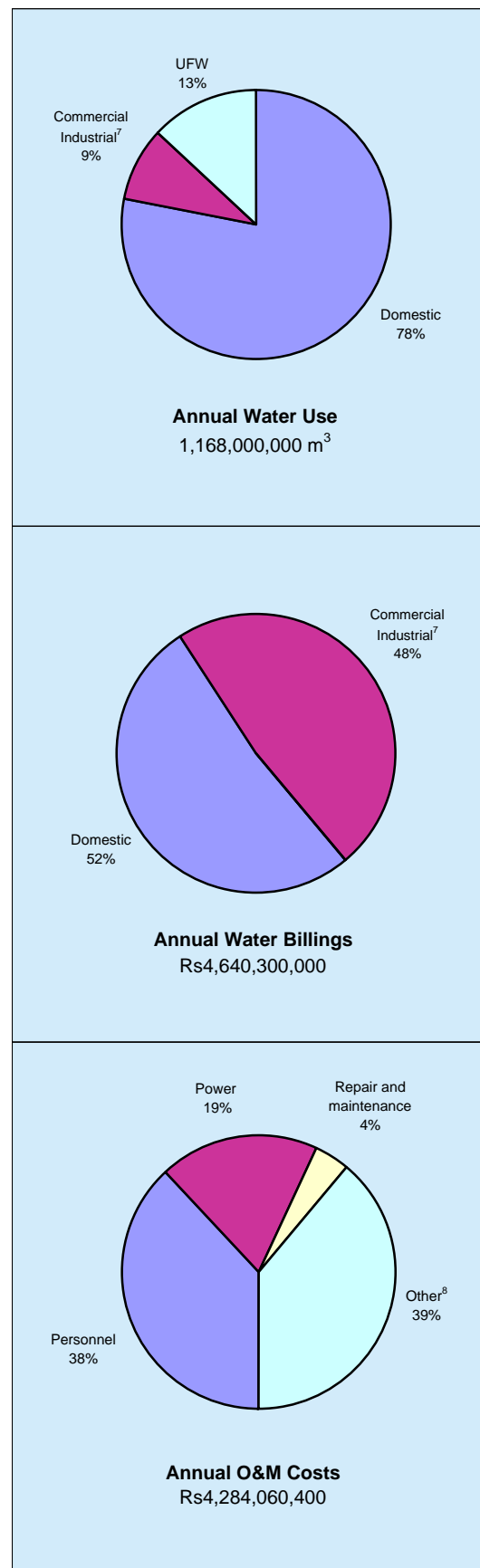
### Efficiency Indicators

Unaccounted for Water <sup>7</sup>	13.6%
Unit Production Cost	Rs3.67/m <sup>3</sup>
Operating Ratio	0.49
Accounts Receivable	11.8 months
Staff/1,000 Connections	17.2

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 90% of 64,000 samples taken passed the residual chlorine test.
- <sup>3</sup> This is also the total area of responsibility.
- <sup>4</sup> The city is totally covered by the utility. The urban poor comprise 35% of the population.
- <sup>5</sup> About 100,000 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is metered and 75% of service connections have working meters. About 680 pipe breaks and 650 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport and chemicals expenses and purchase of raw water.

Data as of 2005–2006.



<b>Water Utility</b>	<b>NAGPUR MUNICIPAL CORPORATION</b> Address : Water Works Department, Pandit Jawaharlal Nehru Marg, Sitabuldi, Nagpur – 12, India Telephone : 91 712 256 7041 to 44 Fax : 91 712 256 1584 E-mail : nmcnagpur@sify.com Head : Mr. S. S. Hastak, Executive Engineer (WWD) Nagpur Municipal Corporation (NMC) was established as a municipal corporation in 1952. It provides water supply services to the city of Nagpur, which has a total population of 2,490,000 people. The present service area of NMC has a population density of 12,454 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water mainly from the Pench and Kanhan Rivers. Billing and collection are handled by the private sector through a management contract; billing is computerized. The utility has a partly developed management information system. It publishes an annual report but it is not available to the public. NMC has a 25-year master development plan covering the period 2005–2031.																																																																																																		
<b>Mission Statement</b>	"Water for all and 24/7 supply, 100% coverage in water supply and improved service levels."																																																																																																		
<b>General Data About Water Utility</b>	Connections : 265,231 Staff : 856 Annual O&M Costs : Rs424,413,000 Annual Revenue : Rs561,500,000 Annual Billings : Rs704,300,000 Total Capital Expenditure (Over the last 5 years) : Rs953,231,000      Average capital expenditure/connection/year: Rs719.06 Source of Investment Funds : All from internally generated reserves																																																																																																		
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="8" style="text-align: center;">METERED CONNECTIONS</th> </tr> <tr> <th colspan="4" style="text-align: center;">Residential and Small Shops</th> <th colspan="4" style="text-align: center;">Nonresidential (Hospitals, Institutions, and Colonies)</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;">1<sup>st</sup> 10 m<sup>3</sup> – Rs3.00/m<sup>3</sup>; next 30 m<sup>3</sup> – Rs3.50/m<sup>3</sup>; and Rs4.00 above 30 m<sup>3</sup> with minimum monthly charges below</td> <td colspan="4" style="text-align: center;">Rs12.00/m<sup>3</sup> subject to minimum monthly charges below</td> </tr> <tr> <td>15 mm</td> <td>Rs 50</td> <td>80 mm</td> <td>Rs8,000</td> <td>15 mm</td> <td>Rs500</td> <td>80 mm</td> <td>Rs11,000</td> </tr> <tr> <td>20 mm</td> <td>Rs200</td> <td>100 mm</td> <td>Rs9,000</td> <td>20 mm</td> <td>Rs800</td> <td>100 mm</td> <td>Rs19,000</td> </tr> <tr> <td>25 mm</td> <td>Rs500</td> <td>150 mm</td> <td>Rs15,000</td> <td>25 mm</td> <td>Rs3,500</td> <td>150 mm</td> <td>Rs23,000</td> </tr> <tr> <td>40 mm</td> <td>Rs1,000</td> <td>200 mm</td> <td>Rs30,000</td> <td>40 mm</td> <td>Rs4,500</td> <td>200 mm</td> <td>Rs45,000</td> </tr> <tr> <td>50 mm</td> <td>Rs2,500</td> <td>250 mm</td> <td>Rs50,000</td> <td>50 mm</td> <td>Rs9,000</td> <td>250 mm</td> <td>Rs70,000</td> </tr> <tr> <th colspan="4" style="text-align: center;">UNMETERED RESIDENTIAL (Rs/month)</th> <th colspan="4" style="text-align: center;">UNMETERED NONRESIDENTIAL (Rs/month)</th> </tr> <tr> <td colspan="2" style="text-align: center;">15 mm*</td> <td colspan="2" style="text-align: center;">75</td> <td colspan="2" style="text-align: center;">15 mm</td> <td colspan="2" style="text-align: center;">300</td> </tr> <tr> <td colspan="2" style="text-align: center;">20 mm</td> <td colspan="2" style="text-align: center;">150</td> <td colspan="2" style="text-align: center;">20 mm</td> <td colspan="2" style="text-align: center;">600</td> </tr> <tr> <td colspan="2" style="text-align: center;">25 mm</td> <td colspan="2" style="text-align: center;">350</td> <td colspan="2" style="text-align: center;">25 mm</td> <td colspan="2" style="text-align: center;">2,000</td> </tr> </tbody> </table> <p>* In notified slums, rate for 15" diameter connection is charged Rs25/month for houses whose roof has no slab and Rs50/month for those whose roof is with slab.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>About 40% of service connections are metered. Public stand-post users pay on flat rate basis. Billing is done quarterly.</li> <li>Water bills are paid at the water utility office and in banks.</li> <li>There were 4,766 new connections in 2005–2006. The price of a new domestic connection is Rs1,675 payable prior to connection.</li> </ol>			METERED CONNECTIONS								Residential and Small Shops				Nonresidential (Hospitals, Institutions, and Colonies)				1 <sup>st</sup> 10 m <sup>3</sup> – Rs3.00/m <sup>3</sup> ; next 30 m <sup>3</sup> – Rs3.50/m <sup>3</sup> ; and Rs4.00 above 30 m <sup>3</sup> with minimum monthly charges below				Rs12.00/m <sup>3</sup> subject to minimum monthly charges below				15 mm	Rs 50	80 mm	Rs8,000	15 mm	Rs500	80 mm	Rs11,000	20 mm	Rs200	100 mm	Rs9,000	20 mm	Rs800	100 mm	Rs19,000	25 mm	Rs500	150 mm	Rs15,000	25 mm	Rs3,500	150 mm	Rs23,000	40 mm	Rs1,000	200 mm	Rs30,000	40 mm	Rs4,500	200 mm	Rs45,000	50 mm	Rs2,500	250 mm	Rs50,000	50 mm	Rs9,000	250 mm	Rs70,000	UNMETERED RESIDENTIAL (Rs/month)				UNMETERED NONRESIDENTIAL (Rs/month)				15 mm*		75		15 mm		300		20 mm		150		20 mm		600		25 mm		350		25 mm		2,000	
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<b>Priority Needs of Utility</b>	1. Reduce raw water losses	2. Rehabilitation and upgrade of existing infrastructure	3. Upgrade and improvement of existing distribution network																																																																																																
<b>Consumer Service</b>	Average monthly consumption is about 34.4 m <sup>3</sup> per house connection. Water is available at an average pressure of 15 meters to most users. Applicants have to wait for 15 days for a new connection to be made. A domestic connection fee of Rs1,675 is paid prior to connection. Water quality is good, with 92% of 36,500 water samples taken during the year passing the residual chlorine test. About 15,900 consumer complaints were recorded during the year. About 100 pipe breaks and 10,745 leaks were repaired in 2005–2006. Consumers can complain in person at the water utility office, or by letter or telephone. The urban poor are provided with house and public stand-post connections with flat rate monthly charges based on the type of house.																																																																																																		
<b>Performance Highlights</b>	NMC provides water to its consumers at 100 lpcd at an average of 5 hours per day to 91.5% of the population in its area of responsibility. Production is metered and 40% of service connections have working meters. UFW of 51.9% is the third highest and should be reduced. While operating ratio is good at 0.76, accounts receivable of 9.6 months are the third highest. Average tariff of Rs6.60/m <sup>3</sup> is the fifth highest and is covering expenses well. Staff/1,000 connections ratio is the fifth lowest at 3.2. NMC needs to exert efforts to reduce its UFW and improve collection and water availability. Full metering is necessary to account for water use and to determine the extent of losses if UFW is to be reduced.																																																																																																		



## NAGPUR WATER SUPPLY

Population: 2,302,990 <sup>1</sup>

### Production/Distribution

Average Daily Production	608,220 m <sup>3</sup>
Groundwater	Nil
Surface Water	100%
Treatment Type <sup>2</sup>	Conventional
Storage	150,790 m <sup>3</sup>
Service Area <sup>3</sup>	184.9 sq km
Distribution Length	1,700 km

### Service Connections

House (10.5 persons/HC)	201,051
Public Tap (75 persons/PT)	3,500
Commercial	7,084
Industrial	Nil
Institutional	Nil
Bulk	Nil
Others	53,596
<b>Total</b>	<b>265,231</b>

### Service Indicators

Service Coverage <sup>4</sup>	91.5%
Water Availability <sup>5</sup>	5 hours/day
Per Capita Consumption	100 lpcd
Average Tariff	Rs6.60/m <sup>3</sup>

### Efficiency Indicators

Unaccounted [for] Water <sup>6</sup>	51.9%
Unit Production Cost	Rs1.91/m <sup>3</sup>
Operating Ratio	0.76
Accounts Receivable	9.6 months
Staff/1,000 Connections	3.2

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 92% of 36,500 samples taken passed the residual chlorine test.
- <sup>3</sup> The total area of responsibility is 217.6 sq km (km<sup>2</sup>).
- <sup>4</sup> This is the percentage of the population served by house connections and public taps.  
About 8.5% of the population draw water from tube wells and tankers provided by the utility.
- <sup>5</sup> About 15,900 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is metered and 40% of service connections have working meters.  
About 100 pipe breaks and 10,745 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport, chemicals, and purchase of raw water.

Data as of 2005–2006.



<b>Water Utility</b>	<p><b>NASHIK MUNICIPAL CORPORATION</b></p> <p>Address : Rajiv Gandhi Bhavan, Sharanpur Road, Nashik – 422 002, India          Telephone : 91 253 258 1252; 257 3151          Fax : 91 253 258 1252          E-mail : eeplanning@dataone.com          Head : Mr. S. V. Khune, Superintending Engineer</p> <p>Nashik Municipal Corporation (NMC) is a municipal corporation established in 1982. It provides water supply and sewerage services for the municipality of Nashik, which has a total population of 1,350,000 people. The present service area of NMC has a population density of 5,610 persons/km<sup>2</sup>. The utility is responsible for water production, distribution, and source development and draws water from the Darna River and the Gangapur Dam fed by the Godavari River. There is no private sector involvement in the utility's operations. The utility is following a development plan covering the period 1993–2013. NMC has an annual report for 2005–2006 that is available to the public. Its billing system is computerized. The utility has a partly developed management information system.</p>																		
<b>Mission Statement</b>	<p>"To provide basic services and adequate, potable water to all."</p>																		
<b>General Data About Water Utility</b>	<p>Connections : 127,562          Staff : 440          Annual O&amp;M Costs : Rs214,585,000          Annual Revenue : Rs182,091,000          Annual Billings : Rs197,748,900          Total Capital Expenditure : Rs809,180,000          (Over the last 5 years) Average capital expenditure/connection/year: Rs1,268.69          Source of Investment Funds : Internally generated reserves</p>																		
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="3">METERED</th> </tr> <tr> <th>Domestic</th> <th>Nondomestic</th> <th>Commercial</th> </tr> </thead> <tbody> <tr> <td>Rs3.50/m<sup>3</sup></td> <td>Rs13.50/m<sup>3</sup></td> <td>Rs18.00/m<sup>3</sup></td> </tr> <tr> <th colspan="3">FLAT RATE (Based on total time of supply)</th> </tr> <tr> <th>Two Time</th> <th>One Time</th> <th>Rural Water Supply</th> </tr> <tr> <td>Rs1,080/year</td> <td>Rs810/year</td> <td>Rs540/year</td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>Institutional, commercial, and domestic consumers are metered, but some house connections pay on flat rate based on the duration of supply. Institutional and commercial connections are billed every 2 months. House connections are billed every 3 months.</li> <li>Water bills are paid at the water utility office.</li> <li>There were 12,688 new connections in 2005–2006. The price of a new domestic connection is Rs1,250 payable prior to connection.</li> </ol>	METERED			Domestic	Nondomestic	Commercial	Rs3.50/m <sup>3</sup>	Rs13.50/m <sup>3</sup>	Rs18.00/m <sup>3</sup>	FLAT RATE (Based on total time of supply)			Two Time	One Time	Rural Water Supply	Rs1,080/year	Rs810/year	Rs540/year
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Two Time	One Time	Rural Water Supply																	
Rs1,080/year	Rs810/year	Rs540/year																	
<b>Priority Needs of Utility</b>	<ol style="list-style-type: none"> <li>1. Full coverage in terms of population and area</li> <li>2. Reduction in water losses</li> <li>3. Augmentation of water supply systems for year 2026 requirement</li> </ol>																		
<b>Consumer Service</b>	<p>Average monthly consumption is about 29.2 m<sup>3</sup> per house connection. The water bill averages Rs102.19 per month per house connection. Water is available on an average of 3–4 hours a day with an average pressure of 3 meters to most users. Applicants have to wait for about 15 days for a new connection to be made. A connection fee of Rs1,250 has to be paid prior to connection. Water quality is good, with 98% of 9,043 water samples taken during the year passing the residual chlorine test. There were 543 consumers complaints recorded and 7,460 leaks repaired during the year. Consumers can complain in person at the water utility office or by telephone and letter. The urban poor are provided with group connections in tenements. Water supplied through public taps, tankers, and hand pumps are provided free of cost.</p>																		
<b>Performance Highlights</b>	<p>NMC provides water at 93 lpcd to its consumers at an average of 3–4 hours per day to 92.6% of the population in its area of responsibility. It has the highest UFW at 59.5% among the utilities. However, while production is fully metered, only 80% of total connections are metered, making UFW still an estimate. Financial management is mixed with an operating ratio of 1.18 and accounts receivable equivalent of less than a week. Average tariff of Rs4.32/m<sup>3</sup> should be able to cover production cost but is hindered by its high NRW. Staff/1,000 connections ratio is good at 3.4 being the fifth lowest. NMC needs to reduce its NRW, and improve on water availability and its financial management, especially its operating ratio. It should meter production and further improve metering of service connections to account for use.</p>																		

## NASHIK WATER SUPPLY

Population: 1,350,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	310,000 m <sup>3</sup>
Groundwater	Nil
Surface Water	100%
Treatment Type <sup>2</sup>	Conventional
Storage	98,500 m <sup>3</sup>
Service Area <sup>3</sup>	240.6 sq km
Distribution Length	1,440 km

### Service Connections

House (9.25 persons/HC)	121,072
Public Tap (185 persons/PT)	700
Commercial	2,797
Industrial	Nil
Institutional	2,993
Bulk	Nil
Others	Nil
<b>Total</b>	<b>127,562</b>

### Service Indicators

Service Coverage <sup>4</sup>	92.6%
Water Availability <sup>5</sup>	3 to 4 hours/day
Per Capita Consumption	93 lpcd
Average Tariff	Rs4.32/m <sup>3</sup>

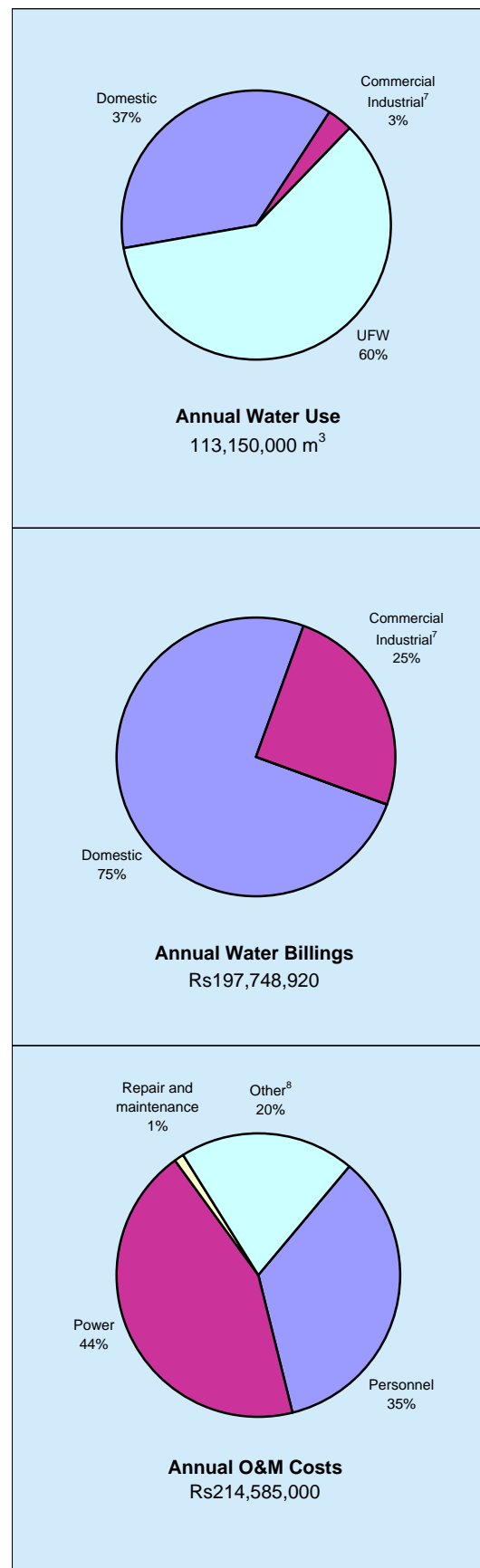
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	59.5%
Unit Production Cost	Rs1.90/m <sup>3</sup>
Operating Ratio	1.18
Accounts Receivable	0.03 month
Staff/1,000 Connections	3.4

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 98% of 9,043 samples taken passed the residual chlorine test.
- <sup>3</sup> This is also the total area of responsibility.
- <sup>4</sup> This is the percentage of the population served by house connections and public taps. About 2% of the population draw water from tube wells and tankers provided by the utility. The urban poor comprise 15% of the population.
- <sup>5</sup> About 543 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is not metered and only 80% of service connections have working meters. About 5,135 pipe breaks and 7,460 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other cost includes transport, chemicals, and purchase of raw water.

Data as of 2005–2006.





## RAJKOT WATER SUPPLY

Population: 980,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	143,836 m <sup>3</sup>
Groundwater	Nil
Surface Water	100%
Treatment Type <sup>2</sup>	Conventional
Storage	198,000 m <sup>3</sup>
Service Area <sup>3</sup>	104.9 sq km
Distribution Length	1,850 km

### Service Connections

House (5 persons/HC)	192,000
Public Tap (20 persons/PT)	1,150
Commercial	300
Industrial	180
Institutional	85
Bulk	150
Others	14
<b>Total</b>	<b>193,879</b>

### Service Indicators

Service Coverage <sup>4</sup>	98.1%
Water Availability <sup>5</sup>	0.33 hour/day
Per Capita Consumption	101 lpcd
Average Tariff	Rs5.07/m <sup>3</sup>

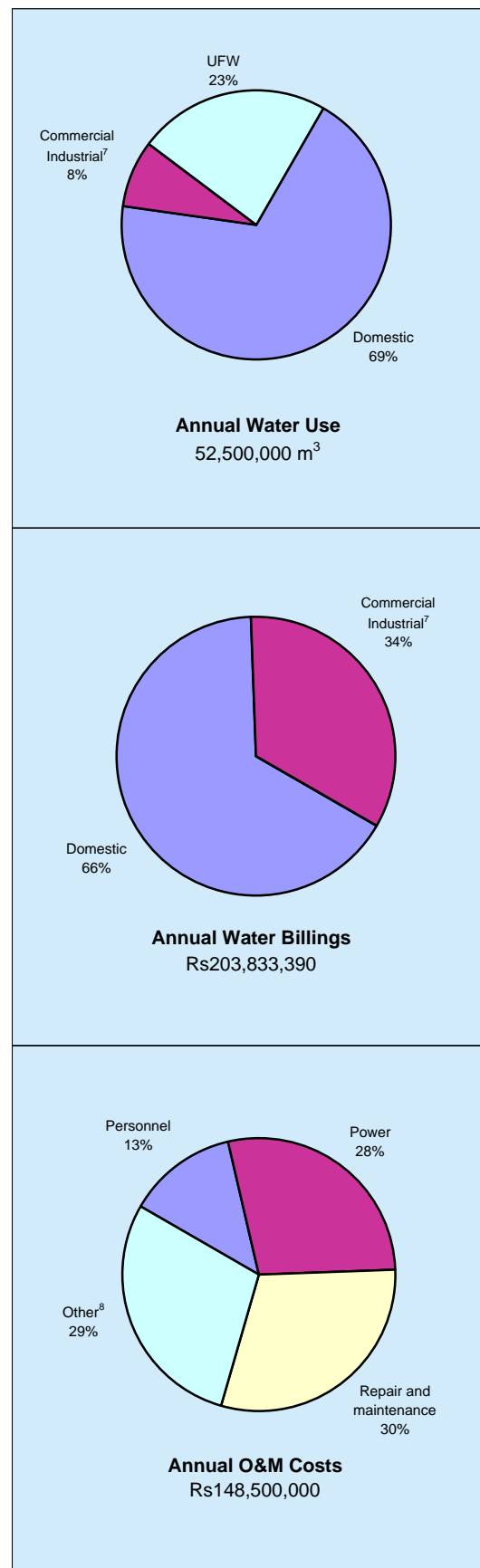
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	23.5%
Unit Production Cost	Rs2.83/m <sup>3</sup>
Operating Ratio	1.61
Accounts Receivable	6.6 months
Staff/1,000 Connections	1.1

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 8% of 58,400 samples taken passed the residual chlorine test.
- <sup>3</sup> This is also the total area of responsibility.
- <sup>4</sup> This is the percentage of population served by house connections and public taps. Those not served by the utility draw water from tube wells. The urban poor comprise 2% of the population.
- <sup>5</sup> About 4,568 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is not metered and only 0.4 % of service connections have working meters.
- <sup>7</sup> About 23,500 pipe breaks and leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other includes costs of transport, chemicals, and purchase of raw water.

Data as of 2005–2006.



<b>Water Utility</b>	<b>SURAT MUNICIPAL CORPORATION</b> Address : Hydraulic Department, Surat Municipal Corporation, Muglisara, Surat – 395 003, India Telephone : 91 261 245 3750 to 56 Fax : 91 261 245 1935; 242 2110 E-mail : hydeng@suratmunicipal.gov.in Head : Mr. B. I. Dalal, Hydraulic Engineer																	
	Surat Municipal Corporation (SMC) is a municipal corporation established in 1966. Its Hydraulic Department provides water supply services for the city of Surat, which now has a total population of 3,817,000 people with the recent merging of 8 nagarpalikas and 27 gram panchayats. The present service area of SMC has a population density of 26,305 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. SMC draws water mainly from the River Tapi and from two radial wells near the river. The private sector is involved in the operation and maintenance of water treatment plants and valve operation, as well as leak repair through service contracts. The utility is following a 25-year master development plan covering the period 1995–2021. The latest annual report is for 2005–2006 and is available to the public. Its billing, accounting, and water treatment operations are computerized. The utility has a partly developed management information system.																	
<b>Mission Statement</b>	“To provide safe and potable water with sufficient pressure to every citizen of Surat at his doorstep by water supply pipeline network.”																	
<b>General Data About Water Utility</b>	Connections : 310,836 Staff : 532 Annual O&M Costs : Rs368,228,000 Annual Revenue : Rs365,414,000 Annual Billings : Rs365,414,000 Total Capital Expenditure (Over the last 5 years) : Rs1,712,854,000      Average capital expenditure/connection/year: Rs1,102.09 Source of Investment Funds : All from internally generated reserves																	
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">METERED</th> </tr> </thead> <tbody> <tr> <td>Hospitals, dispensaries, nursing homes, nonwater-based industries, social halls</td> <td style="text-align: right;">Rs8/m<sup>3</sup></td> </tr> <tr> <td>Temporary connection for construction, photo studios, restaurants/canteens</td> <td style="text-align: right;">Rs10/m<sup>3</sup></td> </tr> <tr> <td>Industrial, manufacturing, sports clubs, guesthouses, hotels (up to 3 star)</td> <td style="text-align: right;">Rs15/m<sup>3</sup></td> </tr> <tr> <td>Hotels (4 star–5 star), water/amusement park, dyeing/printing houses</td> <td style="text-align: right;">Rs16/m<sup>3</sup></td> </tr> <tr> <th colspan="2" style="text-align: center;">UNMETERED</th> </tr> <tr> <td>Domestic unmetered connections</td> <td style="text-align: right;">Rs240/annum</td> </tr> <tr> <td>Religious/educational unmetered connections up to 1-1/2" connection</td> <td style="text-align: right;">Rs240/annum</td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>Only commercial, industrial, and institutional connections are metered, comprising less than 2% of total connections. Domestic connections pay annually as part of municipal tax. Metered connections pay monthly.</li> <li>Water bills are paid at the water utility office and city civic centers.</li> <li>There were 12,288 new connections in 2005–2006. The price of a new domestic connection is Rs50 for application form plus Rs100 for boring charges plus Rs195 per meter of service pipe.</li> </ol>		METERED		Hospitals, dispensaries, nursing homes, nonwater-based industries, social halls	Rs8/m <sup>3</sup>	Temporary connection for construction, photo studios, restaurants/canteens	Rs10/m <sup>3</sup>	Industrial, manufacturing, sports clubs, guesthouses, hotels (up to 3 star)	Rs15/m <sup>3</sup>	Hotels (4 star–5 star), water/amusement park, dyeing/printing houses	Rs16/m <sup>3</sup>	UNMETERED		Domestic unmetered connections	Rs240/annum	Religious/educational unmetered connections up to 1-1/2" connection	Rs240/annum
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<b>Priority Needs of Utility</b>	1. Reducing pollution of River Tapi, its present source of raw water                      2. Exploring alternate sources of water                      3. Rationalization of water tariff for sustainability																	
<b>Consumer Service</b>	Average monthly consumption is about 55.5 m <sup>3</sup> per house connection. The water bill averages Rs44.70 per month per house connection. Water is available on an average of 2–3 hours a day with an average pressure of 2 meters to most users. Applicants have to wait for about 7 days for a new connection to be made. A connection fee of Rs150 (plus Rs195 per meter of service pipe length) has to be paid prior to connection. Water quality is good, with 99% of 109,500 water samples taken during the year passing the residual chlorine test. There were 5,127 consumer complaints recorded, and 11,180 pipe breaks and leaks repaired during the year. Consumers can complain in person at the water utility office or by telephone, letter, and e-mail. The urban poor are provided with free water supplied through public stand posts and tankers.																	
<b>Performance Highlights</b>	SMC provides water at an average of 2–3 hours per day to 77.4% of the population in its area of responsibility. With practically no metering for both production and service connections, no estimates of UFW and average per capita consumption was made. Financial management needs improvement with an operating ratio of 1.01 and accounts receivable equivalent of 3.1 months. Average tariff of Rs1.66/m <sup>3</sup> could not cover production cost. Staff/1,000 connections ratio is good at 1.7 being the third lowest. SMC needs to address its very low water availability and accounts receivable equivalent. It should meter production and service connections to account for use and determine its losses to reduce UFW.																	

## SURAT WATER SUPPLY

Population: 2,954,000<sup>1</sup>

### Production/Distribution

Average Daily Production	554,685 m <sup>3</sup>
Groundwater	7%
Surface Water	93%
Treatment Type <sup>2</sup>	Conventional
Storage	34,620 m <sup>3</sup>
Service Area <sup>3</sup>	112.3 sq km
Distribution Length	2,550 km

### Service Connections

House (10 persons/HC)	303,930
Public Tap (125 persons/PT)	916
Commercial	3,583
Industrial	2,250
Institutional	157
Bulk	Nil
Others	Nil
<b>Total</b>	<b>310,836</b>

### Service Indicators

Service Coverage <sup>4</sup>	77.4%
Water Availability <sup>5</sup>	2--3 hours/day
Per Capita Consumption	no data
Average Tariff	Rs1.66/m <sup>3</sup>

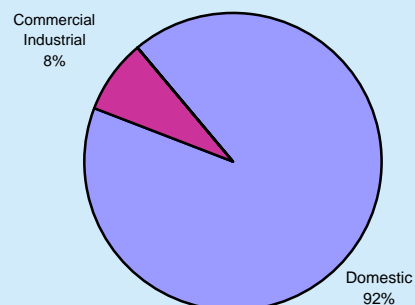
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	no data
Unit Production Cost	Rs1.82/m <sup>3</sup>
Operating Ratio	1.01
Accounts Receivable	3.1 months
Staff/1,000 Connections	1.7

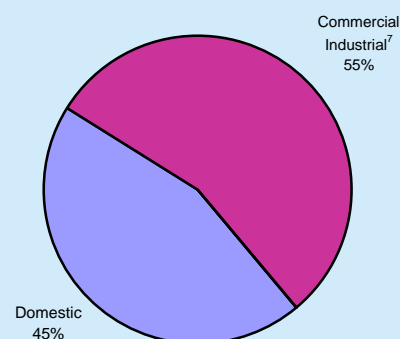
#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 99% of 109,500 samples taken passed the residual chlorine test.
- <sup>3</sup> The total area of responsibility is 334.3 sq km (km<sup>2</sup>).
- <sup>4</sup> This is the percentage of population served by house connections and public taps. Those not served by the utility draw water from tube wells. The urban poor comprise 4% of the population.
- <sup>5</sup> About 5,217 consumer complaints were registered in 2005–2006.
- <sup>6</sup> While production is metered only 2% of service connections have working meters. About 11,180 pipe breaks and leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing. Data provided for consumption exceeded total production; hence, UFW could not be computed.
- <sup>8</sup> Other includes costs of transport and chemicals.

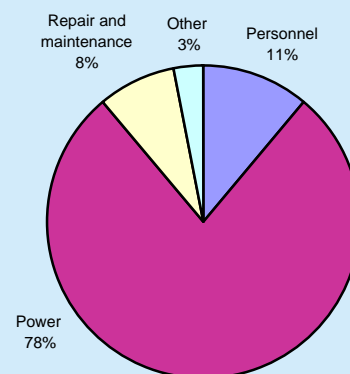
Data as of 2005–2006.



**Annual Water Use<sup>7</sup>**  
220,314,650 m<sup>3</sup>



**Annual Water Billings**  
Rs365,414,000



**Annual O&M Costs**  
Rs368,228,000

<b>Water Utility</b>	<b>VARANASI JAL SANSTHAN</b> Address : Varanasi Jal Sansthan, Bhelupura, Varanasi, India Telephone : 91 542 227 6339 Fax : 91 542 227 5827 E-mail : gm@varanasijalsansthan.com Head : Mr. R. K. Tripathi, General Manager  Varanasi Jal Sansthan (VJS) is an autonomous local body for water supply services formed in 1982. It supplies water to the city of Varanasi, which has a total population of 1,600,000 people. The present service area of VJS has a population density of 20,681 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water from the Ganga River and from 167 tube wells. The private sector is involved in the operation and maintenance of the tube wells and vehicles, and cleaning works of campus through service contracts. The utility has no master development plan nor does it have an annual report or a management information system. Its billing system is computerized.																										
<b>Mission Statement</b>	"24 x 7 water supply"																										
<b>General Data About Water Utility</b>	Connections : 114,907 Staff : 676 Annual O&M Costs : Rs182,856,000 Annual Revenue : Rs140,678,000 Annual Billings : Rs218,700,000 Total Capital Expenditure : Rs64,741,000      Average capital expenditure/connection/year: Rs112.68 (Over the last 5 years) Source of Investment Funds : 72% internally generated reserves; 6% government grant; 22% from members of parliament and District Urban Development Agency																										
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="3">METERED</th> </tr> <tr> <th>Category</th> <th>Rate (Rs/m<sup>3</sup>)</th> <th>Minimum (Rs)</th> </tr> </thead> <tbody> <tr> <td>Domestic</td> <td>2.00</td> <td>Rs360/year</td> </tr> <tr> <td>Municipal work</td> <td>2.00</td> <td>Rs60/month</td> </tr> <tr> <td>Cantonment Board</td> <td>3.00</td> <td>Rs75/month</td> </tr> <tr> <td>Government</td> <td>4.00</td> <td>Rs100/month</td> </tr> <tr> <td>Commercial</td> <td>6.00</td> <td>Rs300/month</td> </tr> <tr> <td>Industrial</td> <td>10.00</td> <td>Rs400/month</td> </tr> </tbody> </table> <p>Notes: Above rates are for 15-millimeter connections and increases according to pipe size.</p> <ol style="list-style-type: none"> <li>Institutional and commercial connections are metered but none are working. Most unmetered house connections pay on flat rate based on annual rental value starting at Rs480/annum. Institutional and commercial connections are billed every 2 months. House connections are billed annually.</li> <li>Water bills are paid at the water utility office and ward counters.</li> <li>There were 1,303 new connections in 2005–2006. The price of a new domestic connection is Rs2,375 payable prior to connection.</li> </ol>			METERED			Category	Rate (Rs/m <sup>3</sup> )	Minimum (Rs)	Domestic	2.00	Rs360/year	Municipal work	2.00	Rs60/month	Cantonment Board	3.00	Rs75/month	Government	4.00	Rs100/month	Commercial	6.00	Rs300/month	Industrial	10.00	Rs400/month
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<b>Priority Needs of Utility</b>	1. Revenue – billing and collection	2. Regular supply of potable water to citizens	3. Upgrade, extension, and improved maintenance of existing water supply																								
<b>Consumer Service</b>	Average monthly consumption is about 40.1 m <sup>3</sup> per house connection. The water bill averages Rs104.05 per month per house connection. Water is available on an average of 7 hours a day with an average pressure of 3 meters to most users. Applicants have to wait for about a week for a new connection to be made. A connection fee of Rs2,375 has to be paid prior to connection. Water quality is good, with 94% of 9,900 water samples taken during the year passing the residual chlorine test. There were 5,370 consumer complaints recorded, and 3,042 pipe breaks and leaks repaired during the year. Consumers can complain in person at the water utility office or by telephone and letter. The utility has no specific policy for providing water supply to the urban poor communities.																										
<b>Performance Highlights</b>	VJS provides water at 147 lpcd to its consumers at an average of 7 hours per day to 77.7% of the population in its area of responsibility. UFW is 30.0%, which is about average. Production is not metered and while 69% of service connections are metered, none of them are working. Operating ratio of 1.30 and accounts receivable equivalent of 4.9 months need improvement. Average tariff of Rs3.17/m <sup>3</sup> seems not enough to cover production cost. Staff/1,000 connections ratio is better than average at 5.9. VJS needs to address its low water availability and further improve on its accounts receivable equivalent and operating ratio. It should meter production and service connections to account for use and determine its losses to reduce UFW. Lower-than-average coverage also needs to be addressed.																										



## VARANASI WATER SUPPLY

Population: 1,489,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	270,000 m <sup>3</sup>
Groundwater	54%
Surface Water	46%
Treatment Type <sup>2</sup>	Conventional
Storage	79,800 m <sup>3</sup>
Service Area <sup>3</sup>	72 sq km
Distribution Length	590 km

### Service Connections

House (10 persons/HC)	110,344
Public Tap (100 persons/PT)	1,402
Commercial	3,161
Industrial	Nil
Institutional	Nil
Bulk	Nil
Others	Nil
<b>Total</b>	<b>114,907</b>

### Service Indicators

Service Coverage <sup>4</sup>	77.7%
Water Availability <sup>5</sup>	7 hours/day
Per Capita Consumption	147 lpcd
Average Tariff	Rs3.17/m <sup>3</sup>

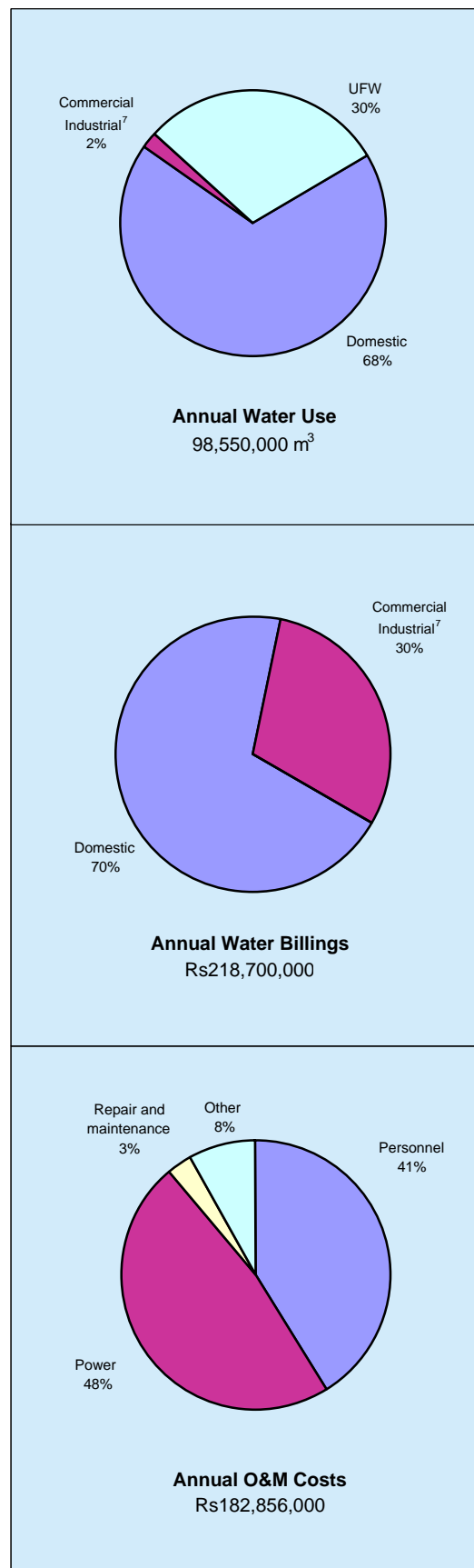
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	30.0%
Unit Production Cost	Rs2.07/m <sup>3</sup>
Operating Ratio	1.30
Accounts Receivable	4.9 months
Staff/1,000 Connections	5.9

#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 94% of 9,900 samples taken passed the residual chlorine test.
- <sup>3</sup> The total area of responsibility is 80 sq km (km<sup>2</sup>).
- <sup>4</sup> This is the percentage of population served by house connections and public taps.
- <sup>5</sup> About 15% of the population draw water from tube wells with hand pumps provided by the utility.
- <sup>6</sup> About 5,370 consumer complaints were registered in 2005–2006.
- <sup>7</sup> Production is not metered and while 69% of service connections are metered, none are working.
- <sup>8</sup> About 3,042 pipe breaks and leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other includes costs of transport and chemicals.

Data as of 2005–2006.



<b>Water Utility</b>	<b>VIJAYAWADA MUNICIPAL CORPORATION</b> Address : Jawaharlal Nehru Buildings, Vijayawada – 520 001, India Telephone : 91 866 242 2400 Fax : 91 866 242 4338 E-mail : ourvmc@yahoo.com Head : Mr. N. Gulzar, Municipal Commissioner  Vijayawada Municipal Corporation (VMC) was established as a municipal corporation in 1983. It supplies water and sewerage services to the city of Vijayawada, which has a total population of 851,000 people. The present service area of VMC has a population density of 16,875 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water solely from the Krishna River. The private sector is involved in billing and collection through a service contract. The utility follows a 15-year master development plan from 2006 to 2020. It does not have an annual report nor a management information system. Its billing and accounting systems are computerized.																																						
<b>Mission Statement</b>	"To provide 100% coverage by 2015, access to the poor by 2020. To achieve 24 hours supply for the city by 2015 and for the poor by 2020. To reduce NRW to 30% in 2010, 20% in 2015, and 10% in 2020. To achieve 80% cost recovery in 2010 and 100% in 2015."																																						
<b>General Data About Water Utility</b>	<table border="0"> <tr> <td>Connections</td> <td>: 78,298</td> <td></td> <td></td> </tr> <tr> <td>Staff</td> <td>: 445</td> <td></td> <td></td> </tr> <tr> <td>Annual O&amp;M Costs</td> <td>: Rs104,076,190</td> <td></td> <td></td> </tr> <tr> <td>Annual Revenue</td> <td>: Rs91,283,640</td> <td></td> <td></td> </tr> <tr> <td>Annual Billings</td> <td>: Rs79,784,020</td> <td></td> <td></td> </tr> <tr> <td>Total Capital Expenditure (Over the last 5 years)</td> <td>: No data</td> <td>Average capital expenditure/connection/year:</td> <td>No data</td> </tr> <tr> <td>Source of Investment Funds</td> <td>: No data</td> <td></td> <td></td> </tr> </table>			Connections	: 78,298			Staff	: 445			Annual O&M Costs	: Rs104,076,190			Annual Revenue	: Rs91,283,640			Annual Billings	: Rs79,784,020			Total Capital Expenditure (Over the last 5 years)	: No data	Average capital expenditure/connection/year:	No data	Source of Investment Funds	: No data										
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<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4">METERED</th> </tr> <tr> <th colspan="2">Domestic</th> <th colspan="2">Nondomestic</th> </tr> </thead> <tbody> <tr> <td>1<sup>st</sup> 3 m<sup>3</sup></td> <td>Rs100 minimum</td> <td>1<sup>st</sup> 3 m<sup>3</sup></td> <td>Rs100 minimum</td> </tr> <tr> <td>Above 3 m<sup>3</sup></td> <td>Rs100 + Rs8.25/m<sup>3</sup></td> <td>3 m<sup>3</sup> – 25 m<sup>3</sup></td> <td>Rs100 + Rs15.75/m<sup>3</sup></td> </tr> <tr> <td></td> <td></td> <td>25 m<sup>3</sup> – 50 m<sup>3</sup></td> <td>Rs100 + Rs18.40/m<sup>3</sup></td> </tr> <tr> <td></td> <td></td> <td>50 m<sup>3</sup> – above</td> <td>Rs100 + Rs21.00/m<sup>3</sup></td> </tr> <tr> <th colspan="4">FLAT RATE</th> </tr> <tr> <th colspan="2">Residential HSC (Regular)</th> <th colspan="2">HSC (NSDP &amp; BPL Card Holders)</th> </tr> <tr> <td colspan="2">Rs80.00/month</td> <td colspan="2">Rs50.00/month</td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>Metered connections are billed monthly while unmetered connections paying flat rates are billed every 6 months.</li> <li>Water bills are paid at E-Seva where residents pay their taxes.</li> <li>There were 3,769 new connections in 2005–2006. The price of a new domestic connection is Rs5,500 payable prior to connection. The poor pays Rs1,200 payable over 12 months.</li> </ol>			METERED				Domestic		Nondomestic		1 <sup>st</sup> 3 m <sup>3</sup>	Rs100 minimum	1 <sup>st</sup> 3 m <sup>3</sup>	Rs100 minimum	Above 3 m <sup>3</sup>	Rs100 + Rs8.25/m <sup>3</sup>	3 m <sup>3</sup> – 25 m <sup>3</sup>	Rs100 + Rs15.75/m <sup>3</sup>			25 m <sup>3</sup> – 50 m <sup>3</sup>	Rs100 + Rs18.40/m <sup>3</sup>			50 m <sup>3</sup> – above	Rs100 + Rs21.00/m <sup>3</sup>	FLAT RATE				Residential HSC (Regular)		HSC (NSDP & BPL Card Holders)		Rs80.00/month		Rs50.00/month	
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Rs80.00/month		Rs50.00/month																																					
<b>Priority Needs of Utility</b>	1. Every house to be provided with a tap      2. Accountability      3. Decrease in NRW																																						
<b>Consumer Service</b>	Average monthly consumption is about 26.3 m <sup>3</sup> per house connection. The water bill averages Rs61.09 per month per house connection. Water is available on an average of 2–4 hours a day with an average pressure of 1–6 meters to most users. Applicants have to wait for about 7 days for a new connection to be made. A connection fee of Rs5,500 has to be paid prior to connection. Water quality is good, with 90% of 242,600 water samples taken during the year passing the residual chlorine test. There were 11,500 consumers complaints recorded, and 8,900 pipe breaks and 11,500 leaks repaired during the year. Consumers can complain in person at the water utility office or by telephone and letter. The utility collects lower connection and monthly charges for the urban poor.																																						
<b>Performance Highlights</b>	VMC provides water at 158 lpcd to its consumers at an average of 2–4 hours per day to 70.5% of the population in its area of responsibility. UFW is 23.8% but production is not metered and only 6.0% of service connections have working meters. Financial management is mixed with an operating ratio of 1.14 and accounts receivable equivalent of 1.60 months, which is the fourth lowest. Average tariff of Rs2.18/m <sup>3</sup> is not enough to cover production cost. Staff/1,000 connections ratio is fair at 5.70, which is at the median. VMC needs to address its low water availability and reduce its operating ratio to less than about 0.75. It should meter production and service connections to account for use and determine its losses to reduce UFW. Lower-than-average coverage also needs to be addressed.																																						

## VIJAYAWADA WATER SUPPLY

Population: 675,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	131,833 m <sup>3</sup>
Groundwater	Nil
Surface Water	100%
Treatment Type <sup>2</sup>	Conventional
Storage	58,560 m <sup>3</sup>
Service Area <sup>3</sup>	40 sq km
Distribution Length	400 km

### Service Connections

House (8 persons/HC)	67,323
Public Tap (55 persons/PT)	4,700
Commercial	2,437
Industrial	43
Institutional	60
Bulk	2,774
Others	961
<b>Total</b>	<b>78,298</b>

### Service Indicators

Service Coverage <sup>4</sup>	70.5%
Water Availability <sup>5</sup>	2 to 4 hours/day
Per Capita Consumption	158 lpcd
Average Tariff	Rs2.18/m <sup>3</sup>

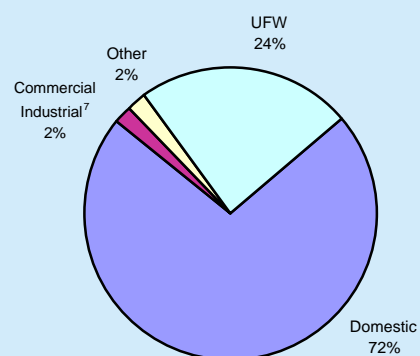
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	23.8%
Unit Production Cost	Rs2.16/m <sup>3</sup>
Operating Ratio	1.14
Accounts Receivable	1.6 months
Staff/1,000 Connections	5.7

#### Notes:

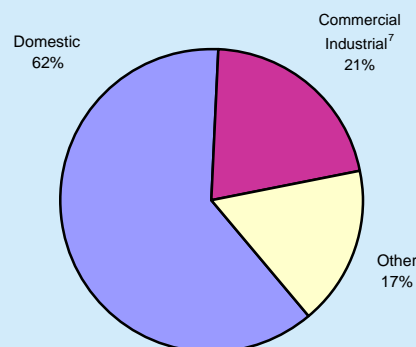
- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> About 90% of 242,600 samples taken passed the residual chlorine test.
- <sup>3</sup> The total area of responsibility is 60 sq km (km<sup>2</sup>).
- <sup>4</sup> This is the percentage of population served by house connections and public taps. About 9% of the population draw water from tube wells and tankers provided by the utility. The urban poor comprise 30% of the population.
- <sup>5</sup> About 11,500 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is not metered and only 6% of service connections have working meters. About 11,500 pipe breaks and leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other includes costs of transport and chemicals.

Data as of 2005–2006.



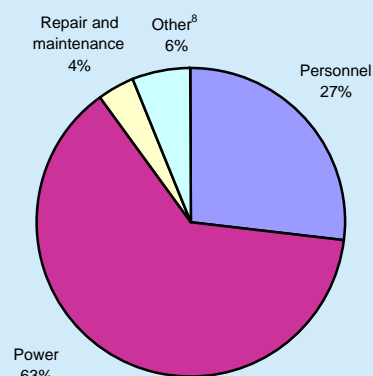
### Annual Water Use

48,119,000 m<sup>3</sup>



### Annual Water Billings

Rs79,784,020



### Annual O&M Costs

Rs104,076,190

<b>Water Utility</b>	<b>GREATER VISAKHAPATNAM MUNICIPAL CORPORATION</b> Address : Tenneti Bhavan, Asilmetta, Visakhapatnam – 02, India Telephone : 91 891 274 6300 Fax : 91 891 256 8545 E-mail : cemcv@rediffmail.com Head : Mr. Mukhesh Kumar Meena, Municipal Commissioner																							
	Greater Visakhapatnam Municipal Corporation (GVMC) was established as a municipal corporation in 1901. It provides water supply and sewerage services to the Greater Visakhapatnam area, which has a total population of 1,523,000 people. The present service area of GVMC has a population density of 5,750 persons/km <sup>2</sup> . The utility is responsible for water production, distribution, and source development. It draws water from the Gostani, Godavari, Sarada, and Yeluru Rivers and from 5,053 tube wells. There is no private sector involvement in the utility's operations. The utility follows a 15-year master development plan covering 2006–2020. It has an annual report for 2005–2006 that is available to the public and a partly developed management information system. Its billing and accounting systems, as well as the handling and monitoring of complaints and grievances, are computerized.																							
<b>Mission Statement</b>	"To provide wholesome round-the-clock water supply to every household at affordable cost even to the poor."																							
<b>General Data About Water Utility</b>	Connections : 85,668 Staff : 466 Annual O&M Costs : Rs411,600,000 Annual Revenue : Rs525,000,000 Annual Billings : Rs609,700,000 Total Capital Expenditure (Over the last 5 years) : Rs1,667,000,000      Average capital expenditure/connection/year: Rs3,891.77 Source of Investment Funds : 60% internally generated reserves; 40% bonds																							
<b>Tariff Structure</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">METERED</th> </tr> <tr> <th style="width: 20%;">Category</th> <th style="width: 30%;">Minimum</th> <th style="width: 50%;">Rates (beyond minimum)</th> </tr> </thead> <tbody> <tr> <td>Residential</td> <td>Rs4.00 up to 5 m<sup>3</sup></td> <td>Rs4.00/m<sup>3</sup> beyond 5 m<sup>3</sup></td> </tr> <tr> <td>Apartments</td> <td>Rs4.00 up to 5 m<sup>3</sup></td> <td>Rs4.00/m<sup>3</sup> for 5 m<sup>3</sup> – 20 m<sup>3</sup></td> </tr> <tr> <td></td> <td></td> <td>Rs8.00/m<sup>3</sup> beyond 20 m<sup>3</sup></td> </tr> <tr> <td>Bulk water</td> <td colspan="2">Rs30.00/m<sup>3</sup> up to agreed limit; Rs60.00/m<sup>3</sup> beyond limit</td> </tr> <tr> <td colspan="2"><b>UNMETERED (Flat rate)</b></td> <td>Rs80.00/tap/month</td> </tr> </tbody> </table> <p>Notes:</p> <ol style="list-style-type: none"> <li>House connections pay on flat rate and are billed every 3 months. The rest are metered, with bulk supplies billed monthly and commercial apartments every 3 months.</li> <li>Water bills are paid at the bank and E-seva centers.</li> <li>There were 2,500 new connections in 2005–2006. The price of a new domestic connection is Rs2,000 payable prior to connection.</li> </ol>			METERED			Category	Minimum	Rates (beyond minimum)	Residential	Rs4.00 up to 5 m <sup>3</sup>	Rs4.00/m <sup>3</sup> beyond 5 m <sup>3</sup>	Apartments	Rs4.00 up to 5 m <sup>3</sup>	Rs4.00/m <sup>3</sup> for 5 m <sup>3</sup> – 20 m <sup>3</sup>			Rs8.00/m <sup>3</sup> beyond 20 m <sup>3</sup>	Bulk water	Rs30.00/m <sup>3</sup> up to agreed limit; Rs60.00/m <sup>3</sup> beyond limit		<b>UNMETERED (Flat rate)</b>		Rs80.00/tap/month
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<b>UNMETERED (Flat rate)</b>		Rs80.00/tap/month																						
<b>Priority Needs of Utility</b>	1. Water supply improvement in quantity and quality      2. Refurbish and extend the distribution system at uniform service levels.      3. 100% coverage with 24/7 supply																							
<b>Consumer Service</b>	Average monthly consumption is about 30.4 m <sup>3</sup> per house connection. The water bill averages Rs56.12 per month per house connection. Water is available on an average of 1 hour a day with an average pressure of 4.0 meters to most users. Applicants have to wait for about a week for a new connection to be made. A connection fee of Rs2,000 has to be paid prior to connection. Water quality is good, with practically all of 730,000 water samples taken during the year passing the residual chlorine test. There were 6,180 consumer complaints recorded, and 5,000 pipe breaks and 5,112 leaks repaired during the year. Consumers can complain in person at the water utility office or by telephone, e-mail, SMS text messaging, and letter. The utility allows the urban poor to pay only Rs1,200 for connection fee payable in 12 monthly installments.																							
<b>Performance Highlights</b>	GVMC provides water at 124 lpcd to its consumers at an average of only 1 hour per day to 49.2% of the population in its area of responsibility. UFW is 14.5% but production is not metered and only 1.3% of service connections have working meters. Financial management is good, with an operating ratio of 0.78 and accounts receivable equivalent of 3.3 months. Average tariff of Rs8.55/m <sup>3</sup> is enough to cover production cost. Staff/1,000 connections ratio is fair at 5.4, which is at the median. GVMC needs to address its low water availability and population coverage, which is the lowest among the utilities. It should meter production and service connections to account for use and determine its losses to reduce UFW further.																							

## VISAKHAPATNAM WATER SUPPLY

Population: 920,000 <sup>1</sup>

### Production/Distribution

Average Daily Production	228,451 m <sup>3</sup>
Groundwater	20%
Surface Water	80%
Treatment Type <sup>2</sup>	Conventional
Storage	86,420 m <sup>3</sup>
Service Area <sup>3</sup>	160 sq km
Distribution Length	1,035 km

### Service Connections

House (5 persons/HC)	76,468
Public Tap (50 persons/PT)	8,122
Commercial	134
Industrial	63
Institutional	62
Bulk	818
Others	1
<b>Total</b>	<b>85,668</b>

### Service Indicators

Service Coverage <sup>4</sup>	49.2%
Water Availability <sup>5</sup>	1 hour/day
Per Capita Consumption	124 lpcd
Average Tariff	Rs8.55/m <sup>3</sup>

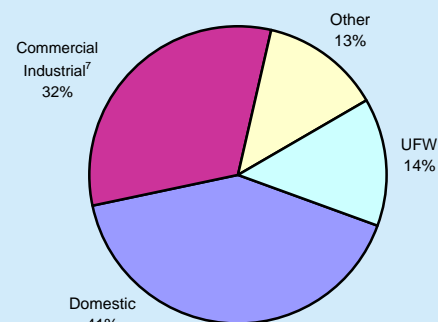
### Efficiency Indicators

Unaccounted for Water <sup>6</sup>	14.5%
Unit Production Cost	Rs4.94/m <sup>3</sup>
Operating Ratio	0.78
Accounts Receivable	3.3 months
Staff/1,000 Connections	5.4

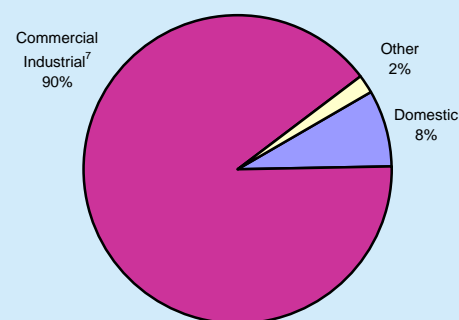
#### Notes:

- <sup>1</sup> The population is for the present area served by the utility.
- <sup>2</sup> Almost all 730,000 samples taken, except for 83 samples, passed the residual chlorine test.
- <sup>3</sup> Total area of responsibility is 533 sq km (km<sup>2</sup>).
- <sup>4</sup> This is the percentage of population served by house connections and public taps.  
About 13% of the population draw water from tube wells and tankers provided by the utility.  
The urban poor comprise 7% of the population.
- <sup>5</sup> About 6,180 consumer complaints were registered in 2005–2006.
- <sup>6</sup> Production is not metered and only 1.3% of service connections have working meters.  
About 5,000 pipe breaks and 5,112 leaks were repaired during the year.
- <sup>7</sup> Commercial and industrial include institutional use and billing.
- <sup>8</sup> Other includes costs of transport, chemicals, and water cess payment.

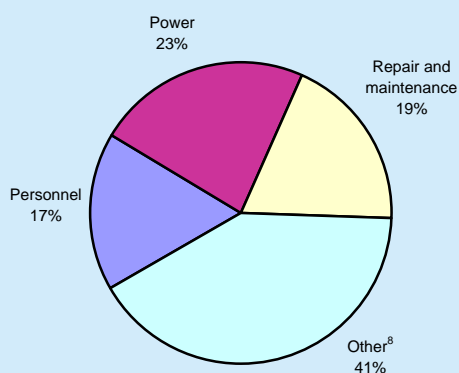
Data as of 2005–2006.



**Annual Water Use**  
83,384,670 m<sup>3</sup>



**Annual Water Billings**  
Rs609,700,000



**Annual O&M Costs**  
Rs411,600,000



# *APPENDICES*





## APPENDIX 1

### Indian Water Utilities Data Book WATER UTILITY QUESTIONNAIRE

Date: \_\_\_\_\_

#### GENERAL UTILITY INFORMATION

1.1 Name of Water Utility: \_\_\_\_\_  
Short Name/Acronym: \_\_\_\_\_

1.2 Address: \_\_\_\_\_

1.3 Telephone Number(s): \_\_\_\_\_ 1.4 Fax Number(s): \_\_\_\_\_

1.5 E-mail address: \_\_\_\_\_

1.6 Head of the Water Utility: Name : \_\_\_\_\_  
Title : \_\_\_\_\_

1.7 Year utility was formed: \_\_\_\_\_

1.8 Type of water utility:

- Municipal Corporation/Council
- State Board
- City Board
- Statewide agency
- Private water utility
- Municipal Corporation/Council (ring-fenced operations)
- Others (Please specify) \_\_\_\_\_

1.9 Type of services provided by utility:

- Water supply services
- Wastewater and sewerage services
- Others (Please specify) \_\_\_\_\_

1.10 Is there Private Sector Involvement in the Water Utility?  Yes  No

If Yes, in what aspect(s)?  Source Development  Production  
 Distribution  Management  
 Billing & Collection  Leak Repair  
 Other (Please specify) \_\_\_\_\_

1.11 Type of private sector involvement:

- Service contract  Mangement contract
- Lease contract  Concession contract
- BOT, BOOT contract  Full private ownership

1.12 Latest annual report available  none \_\_\_\_\_ (indicate year if available)

1.13 Is the annual report available to the general public?  Yes  No

- 1.14 Management information system:  well developed  
 partly developed  
 non-existent
- 1.15 What aspects of the water utility's operation are computerized or automated?  
 None  Billing  Accounting  Pumping  Treatment  
 Others \_\_\_\_\_
- 1.16 Does the utility have a Master Development Plan?  Yes  No  
 If Yes, indicate period covered. Year \_\_\_\_\_ to Year \_\_\_\_\_
- 1.17 Does the utility have a mission statement?  Yes  No  
 If Yes, please provide the mission statement.

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- 1.18 Top three (3) priority needs of the utility: 1. \_\_\_\_\_  
 (As seen by management) 2. \_\_\_\_\_  
 3. \_\_\_\_\_

## SERVICE AREA

### 2.0 Water Utility Responsibility:

- 2.1 Number of cities/towns served by utility \_\_\_\_\_
- 2.2 Name of cities/towns served \_\_\_\_\_
- 2.3 Nature of service area  urban  rural  urban & rural
- 2.4 Province/state where utility is located \_\_\_\_\_
- 2.5 Size of utility's area of responsibility \_\_\_\_\_ sq. km.
- 2.6 Size of utility's present service area \_\_\_\_\_ sq. km.
- 2.7 Population of utility's area of responsibility \_\_\_\_\_
- 2.8 Population of utility's present service area \_\_\_\_\_
- 2.9 Population served with house connections \_\_\_\_\_  
 Population served with public taps \_\_\_\_\_  
 Population served by tankers \_\_\_\_\_  
 Population served by hand pumps \_\_\_\_\_
- 2.10 Where do households not connected to or served by your utility get their water supply?  
 Other piped water service providers  
 Tube wells  
 Dug wells  
 Ponds  
 Rain collectors  
 Others (please specify) \_\_\_\_\_

## PRODUCTION

3.0 Utility is responsible for  Production  Distribution  Source Development

3.1 Sources of Water: Annual production volume (cu m/year)

Surface water \_\_\_\_\_

Groundwater \_\_\_\_\_

Other (please specify) \_\_\_\_\_

Total production: \_\_\_\_\_

3.2 Is total production all metered? (ex treatment plant)  Yes  No

If No, what proportion is metered? \_\_\_\_\_ % How is unmetered volume estimated?

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3.3 Do you buy bulk water for distribution? Raw Water  Yes  No  
Treated Water  Yes  No

3.4 Main methods of treatment used:

none  disinfection

filtration  sedimentation

aeration  desalination

other (please specify) \_\_\_\_\_

3.5 Total production capacity: \_\_\_\_\_ cu m /day

3.6 Storage capacity in network: \_\_\_\_\_ cu m

## DISTRIBUTION AND CONSUMPTION

4.10 Total Service Connections \_\_\_\_\_

4.11 Number of House Connections (HC) \_\_\_\_\_  
Average number of people per HC \_\_\_\_\_

4.12 Number of Public Taps (PT) \_\_\_\_\_  
Average number of people per PT \_\_\_\_\_

4.13 Number of Commercial Connections \_\_\_\_\_

4.14 Number of Industrial Connections \_\_\_\_\_

4.15 Number of Institutional Connections \_\_\_\_\_

4.16 Number of Bulk Connections \_\_\_\_\_  
(Apartments/condominiums)

4.17 Number of Bulk Connections (Others) \_\_\_\_\_

4.18 Number of other Connections \_\_\_\_\_  
(accounts served by tankers or handpumps)

4.19 Number of connections metered \_\_\_\_\_

4.20 Proportion of metered connections with operating meters: \_\_\_\_\_ %

- 4.30 Total length of distribution network: \_\_\_\_\_ km
- 4.31 Average age of distribution pipes: \_\_\_\_\_ years

**5.0 Water Consumption** (annual volume of water billed/sold in 2006)

	Metered (cu.m.)	Estimated* (cu.m.)	Total (cu.m.)
5.1 Total for all HC	_____	_____	_____
5.2 Total for all PT/SP	_____	_____	_____
5.3 Total for all commercial use	_____	_____	_____
5.4 Total for all industrial use	_____	_____	_____
5.5 Total for all institutional use	_____	_____	_____
5.6 Total for all bulk use (apt)	_____	_____	_____
5.7 Total for all bulk use (others)	_____	_____	_____
5.8 Total for all other use	_____	_____	_____
5.9 Grand Total	_____	_____	_____

\* Estimated consumption refer to unmetered consumption (normally flat rate connections)

**WATER SERVICE PERFORMANCE** (annual values for 2006)

- 6.1 Number of connections with intermittent supply: \_\_\_\_\_ connections
- 6.2 Typical duration of supply: \_\_\_\_\_ hours/day
- 6.3 Average mains water pressure at consumer points: \_\_\_\_\_ meters
- 6.4 Number of pipe breaks in the distribution network \_\_\_\_\_
- 6.5 Number of meters replaced/repaired \_\_\_\_\_
- 6.6 Required number of samples for residual chlorine: \_\_\_\_\_
- 6.7 Number of samples for residual chlorine test taken: \_\_\_\_\_
- 6.8 Number of samples passing residual chlorine test: \_\_\_\_\_

**STAFF INFORMATION**

- 7.1 Number of staff (in full-time equivalent – FTE)
- Corporate services (management, admin., finance, technical, etc) \_\_\_\_\_
  - Water supply operations (O&M, customer service, support services) \_\_\_\_\_
  - Other non-water supply services (wastewater, sewerage, drainage) \_\_\_\_\_
- Total number of staff: \_\_\_\_\_
- 7.2 Number of personnel in contracted out services: \_\_\_\_\_
- 7.3 Number of staff attending training in 2006: \_\_\_\_\_
- 7.4 Total number of training days (sum of staff x training days attended): \_\_\_\_\_
- 7.5 Proportion of operating budget spent for training and human resources development: \_\_\_\_\_ %
- 7.6 Average annual salary of the three highest paid full-time management personnel:  
Rs \_\_\_\_\_

**CUSTOMER SERVICE**

- 8.11 Number of new connections installed in 2006: \_\_\_\_\_

- 8.12 Average waiting time for a new connection \_\_\_\_\_
- 8.13 Number of connections disconnected in 2006 \_\_\_\_\_
- 8.14 Number of leaks reported/number of leaks repaired in 2006 \_\_\_\_\_/\_\_\_\_\_
- 8.15 Number of customer complaints recorded in 2006: \_\_\_\_\_
- 8.16 Means of making complaints: \_\_\_ Letter \_\_\_ Telephone \_\_\_ In person  
 \_\_\_ E-mail \_\_\_ SMS (txt msg) \_\_\_ Other \_\_\_\_\_
- 8.17 How much are the typical connection charges for new customers?  
 • Domestic Rs. \_\_\_\_\_
- 8.18 How are new domestic connection charges paid?  
 \_\_\_ all at the start \_\_\_ over 12 months or less \_\_\_ over more than 12 months
- 8.19 Does your water utility have a policy for providing water supply to the urban poor?  
 \_\_\_ Yes \_\_\_ No If Yes, briefly state the policy.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- 8.20 What percentage of the population in the service comprise the urban poor? \_\_\_\_\_
- 8.21 Does the ULB have a citizen charter? \_\_\_ Yes \_\_\_ No  
 If yes, what does the charter say about water supply services? \_\_\_\_\_  
 \_\_\_\_\_
- 8.22 Does the ULB carry out citizen satisfaction surveys? \_\_\_ Yes \_\_\_ No  
 If yes, how often? \_\_\_\_\_. When was the last survey done? \_\_\_\_\_
- 8.23 Does the ULB have a time frame for grievance redressal? \_\_\_ Yes \_\_\_ No  
 If yes, what is the maximum time a grievance should be redressed? \_\_\_\_\_
- 8.24 Does the ULB have community participation in its water supply services?  
 \_\_\_ Yes \_\_\_ No If yes, describe how it is done. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- 8.25 Does the ULB have a RWA feedback mechanism in place? \_\_\_ Yes \_\_\_ No

## FINANCIAL DATA

- 9.11 Water billing/sales (annual for year 2006)  
 (Rupees)
- Total for all HC Rs. \_\_\_\_\_
  - Total for all PT/SP Rs. \_\_\_\_\_
  - Total for all commercial use Rs. \_\_\_\_\_
  - Total for all industrial use Rs. \_\_\_\_\_
  - Total for all institutional use Rs. \_\_\_\_\_
  - Total for all bulk use (apartments) Rs. \_\_\_\_\_
  - Total for all bulk use (others) Rs. \_\_\_\_\_
  - Total for all other use Rs. \_\_\_\_\_

- Grand Total Rs. \_\_\_\_\_
- 9.12 Basis for Billing for Water  
 Consumers Pay on: \_\_\_ Metered Use \_\_\_ Flat Rate
- 9.13 How frequent are consumers billed?  
 \_\_\_ Monthly \_\_\_ Every 2 months \_\_\_ Others \_\_\_\_\_
- 9.14 Methods of Payment  
 Water bills are paid through \_\_\_ Bill Collector \_\_\_ Water Utility Office  
   \_\_\_ Bank \_\_\_ Automated Teller Machine  
   \_\_\_ Post Office \_\_\_ Others \_\_\_\_\_
- 9.15 Water supply revenue in 2006
- Water sales (consumption charges, connection, etc):Rs. \_\_\_\_\_
  - Other revenues (materials sales, construction, etc.): Rs. \_\_\_\_\_
  - Subsidies/grants (government and other sources): Rs. \_\_\_\_\_
- 9.16 Year end accounts receivable (water billing & all other outstanding invoices):  
 Rs. \_\_\_\_\_
- 9.17 Water supply O & M expenses in 2006:
- Purchase of Bulk Supply (raw water or treated water) Rs. \_\_\_\_\_
  - Personnel Rs. \_\_\_\_\_
  - Power/Fuel Rs. \_\_\_\_\_
  - Chemicals and materials Rs. \_\_\_\_\_
  - Repair and maintenance Rs. \_\_\_\_\_
  - Transport Rs. \_\_\_\_\_
  - Depreciation Rs. \_\_\_\_\_
  - Other (Identify) \_\_\_\_\_ Rs. \_\_\_\_\_
- Total O&M Cost Rs. \_\_\_\_\_
- The cost of contracted services (cost of services provided by private firms) may be placed under Other.
- 9.18 Total debt service (interest and principal) in 2006: Rs. \_\_\_\_\_
- 9.19 Annual capital development expenses in 2006: Rs. \_\_\_\_\_
- 9.20 Total Capital Expenditure in the last 5 years: Rs. \_\_\_\_\_
- Funded by: \_\_\_ internally generated reserves \_\_\_\_\_ %  
                   \_\_\_ government grant \_\_\_\_\_ %  
                   \_\_\_ government loan \_\_\_\_\_ %  
                   \_\_\_ commercial loan \_\_\_\_\_ %  
                   \_\_\_ other \_\_\_\_\_ %
- Total: 100 %
- 9.21 Gross fixed asset value including works in progress: Rs. \_\_\_\_\_

## TARIFF STRUCTURE

- 10.0 Please submit a copy of the tariff structure/rates used in 2006.
- 11.0 What data/information on water supply services are reported or disclosed by the ULB to the general public? Please enumerate/indicate \_\_\_\_\_
- 

### PLEASE FORWARD COMPLETED QUESTIONNAIRE PLUS:

- 1) Copy of latest annual report
- 2) Copy of current Tariff Structure \*

\* Give details of when it was approved or became effective

### BY COURIER SERVICE OR MAIL TO:

**Mr. S. Krishnamurthy**  
Benchmarking Coordinator  
[Mailing Address in India](#)

This questionnaire may also be sent:

- a) by fax to Fax No. **xxx xxxx**, or
- b) as an attachment by e-mail to: [sk.murthy@imacs.in](mailto:sk.murthy@imacs.in) with copy to [satyakn@iitm.ac.in](mailto:satyakn@iitm.ac.in) and [cyniguez@info.com.ph](mailto:cyniguez@info.com.ph). (You may request for electronic copies of the questionnaire and guide.)

*This Questionnaire was completed by:*

Name : \_\_\_\_\_  
Designation : \_\_\_\_\_  
Address : \_\_\_\_\_  
Telephone : \_\_\_\_\_  
Fax : \_\_\_\_\_  
Mobile phone : \_\_\_\_\_  
E-mail : \_\_\_\_\_

## APPENDIX 2

### SUGGESTED EVALUATION CRITERIA FOR UTILITIES

<b>Consumer Satisfaction</b>		<b>40%</b>
Coverage	10%	
Water Availability	10%	
Service Level	10%	
New Connection Fee	10%	
<b>Water Resources Management</b>		<b>20%</b>
Water Production/Population	5%	
UFW/Metering	10%	
Consumption	5%	
<b>Financial Resource Management</b>		<b>20%</b>
Grant Financing	5%	
Operating Ratio	10%	
Accounts Receivable	5%	
<b>Human Resource Management</b>		<b>10%</b>
Staff/1,000 Connections	5%	
Management Salaries	5%	
<b>Accountability</b>		<b>10%</b>
Annual Report	10%	
<b>Total</b>	<b>100%</b>	<b>100%</b>

*Notes*

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<b>Coverage (House Connections)</b>		<b>10%</b>
100%	10%	
>50%	5%	
<50%	0%	
<b>Water Availability</b>		<b>10%</b>
24 hours	10%	
>12 hours	5%	
<12 hours	0%	
<b>Service Level</b>		<b>10%</b>
(a) No public Taps	5%	
Public Taps	0%	
(b) 100-200 l/c/d	5%	
<100 l/c/d or >200 l/c/d	0%	



<b>New Connection Fee<sup>1</sup></b>		<b>10%</b>
Reasonable Cost	5%	
High Cost	0%	
Installments to Pay	5%	
Total Fee upfront	0%	
<b>Water Production/Population</b>		<b>5%</b>
<0.5 m <sup>3</sup> /day/person	5%	
>0.5 m <sup>3</sup> /day/person	0%	
<b>UFW/Metering</b>		<b>10%</b>
Full Metering	5%	
Partial Metering	0%	
UFW < 25%	5%	
UFW > 25%	0%	
<b>Consumption</b>		<b>5%</b>
<200 l/c/d	5%	
>200 l/c/d	0%	
<b>Grant Financing</b>		<b>5%</b>
Nil	5%	
Any	0%	
<b>Operating Ratio</b>		<b>10%</b>
<0.75	10%	
0.75 - 1.00	5%	
> 1.00	0%	
<b>Accounts Receivable</b>		<b>5%</b>
<3 months	5%	
>3 months	0%	
<b>Staff/1,000 Connections</b>		<b>5%</b>
<10	5%	
>10	0%	
<b>Management Salaries<sup>2</sup></b>		<b>5%</b>
Above Government Level	5%	
Government Level	0%	
<b>Accountability</b>		<b>10%</b>
Annual Report Available to Public	5%	
Annual Report Unavailable	0%	
Timely Report (within 12 months)	5%	
Reporting after 12 months	0%	

During the Results Dissemination Workshop, the participating utilities agreed on the following:

<sup>1</sup> Reasonable connection fee : Rs2,500

<sup>2</sup> Government level salary : Rs30,000/month

## 2007 Benchmarking and Data Book of Water Utilities in India

Benchmarking is an effective tool to improve performance. The *2007 Benchmarking and Data Book of Water Utilities in India* provides information on water utilities in 20 cities of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). The analysis and profiles in this data book would be useful in identifying new JNNURM projects to improve water utility performance.

### About the Ministry of Urban Development Government of India

In the federal structure of the Indian polity, matters pertaining to housing and urban development have been assigned by the Constitution of India to the state governments. The Constitution (74<sup>th</sup> Amendment) Act has further cast the responsibility of devolving more functions, finances, and functionaries on urban local bodies to the states. The Ministry of Urban Development, Government of India, is the apex authority at the national level to formulate policies; sponsor and support programs; coordinate the activities of various central ministries, state governments, and other nodal authority; and monitor the programs concerning all urban development and housing issues in the country.

Recognizing the importance of benchmarking the water services, the Ministry is encouraging utilities to mainstream benchmarking activities in their operations. This exercise should lead to cities institutionalizing this process and making it a part of their annual business planning to make it sustainable in the long run.

This data book will help planners and policy makers review and monitor the improvement in water utilities with reference to benchmarks and achieve the targets envisaged by the planners within the time frame.

### About the Asian Development Bank

ADB aims to improve the welfare of the people in the Asia and Pacific region, particularly the nearly 1.9 billion who live on less than \$2 a day. Despite many success stories, the region remains home to two thirds of the world's poor. ADB is a multilateral development finance institution owned by 67 members, 48 from the region and 19 from other parts of the globe. ADB's vision is a region free of poverty. Its mission is to help its developing member countries reduce poverty and improve their quality of life.

ADB's main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

ADB's headquarters is in Manila. It has 26 offices around the world and more than 2,000 employees from over 50 countries.

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