

# Strengthening Audit Oversight of Public Private Partnerships

Case Study Based Training Programme for Officials  
of the Comptroller and Auditor General of India

Anand Jalakam

Indian Institute of Management Mumbai

# Anand Jalakam



## Education

—B.Tech, Civil Engineering, SV University, India

—ME (PH) Sanitary Engineering Calcutta University, India

## Contact

+91-997-200-1819

anandk@jalakamsolutions.com

Anand is a water utility management professional with over 43 years of experience in water services both in public and European private water utilities. His initial professional career in public water utility gave him a good exposure into sector policy, strategy, institutional capacity, procurement, contract management, construction supervision, monitoring, and evaluation of water services.

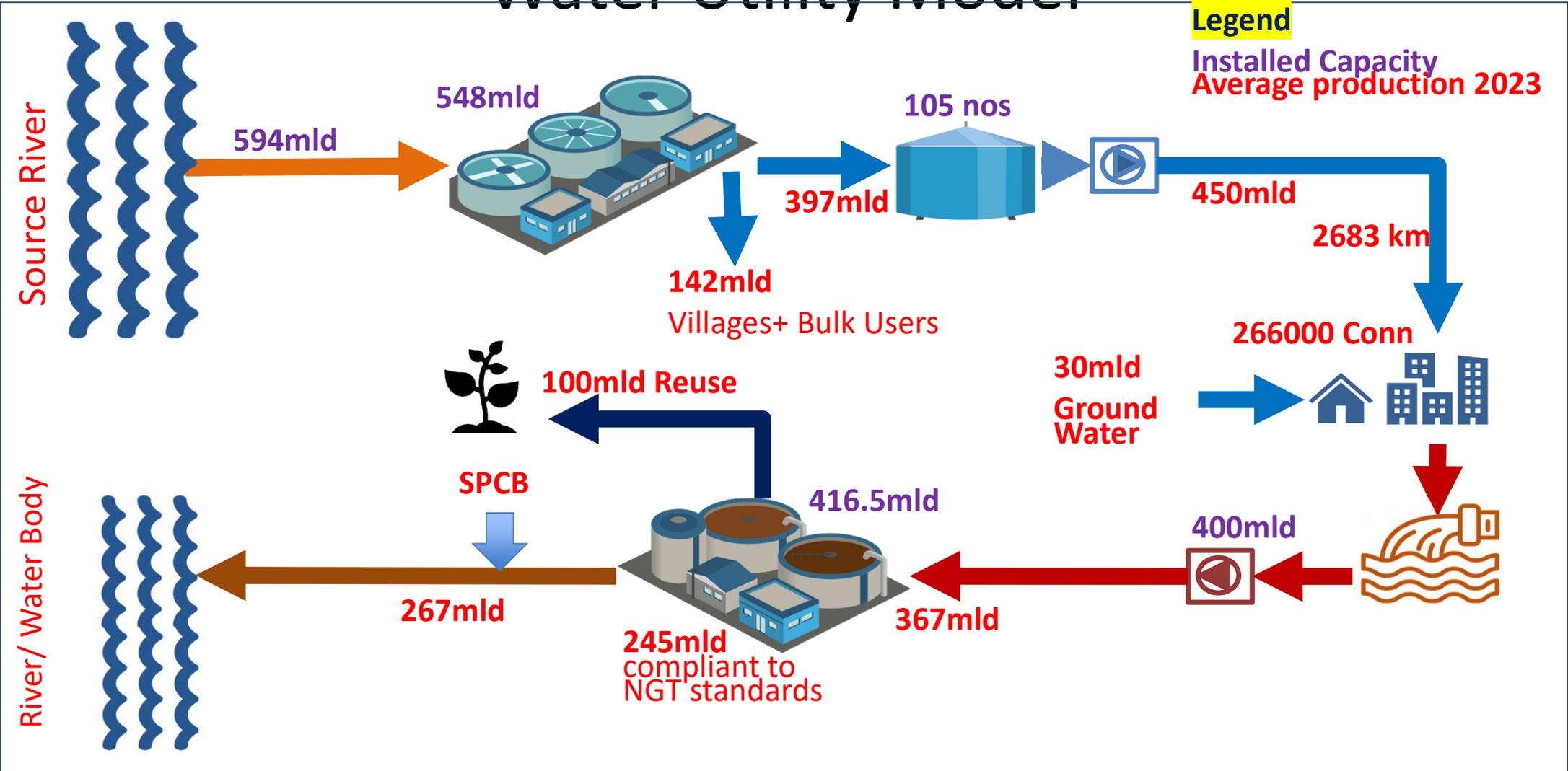
Moving into leading private water utilities enriched his skills in the best practices for improving the customer services, optimizing the performance of existing assets, improving operational efficiency, asset management, reducing non-revenue water, water reuse, tariff reform and financial sustainability. Heading the operations in Central Water Authority, Mauritius, he led the operational improvement initiatives including implementing an EU funded non-revenue water reduction program.

His work experience spans several cities in India and international projects in Abu-Dhabi, Bangladesh, Georgia, Kazakhstan, Kiribati, Mauritius, Mozambique, Nepal, Nigeria, Sharjah, South Africa. He was National Technical Advisor on Service Level Benchmarking to Government of India. He co-authored publications “24x7 Water Supply is Achievable”; and “Running Water in India’s Cities: A Review of Five Recent Public-Private Partnership Initiatives”

# Sector Context

- Water services in India are characterized by limited and scarce water resources, intermittent water supplies, and low-cost recovery
- In the last two decades, substantial investments are being made both in urban and rural water sector to enhance capacity, coverage, and service quality
- With multiple institutional structures for asset development and service delivery, Indian water utilities, local and state governments are enhancing involvement of private sector through various contracting mechanisms
- Although private investment in the water sector is negligible, the asset development, operations, maintenance and service delivery are being outsourced on performance-based PPP contracts

# Water Utility Model



# Water Utility Characteristics

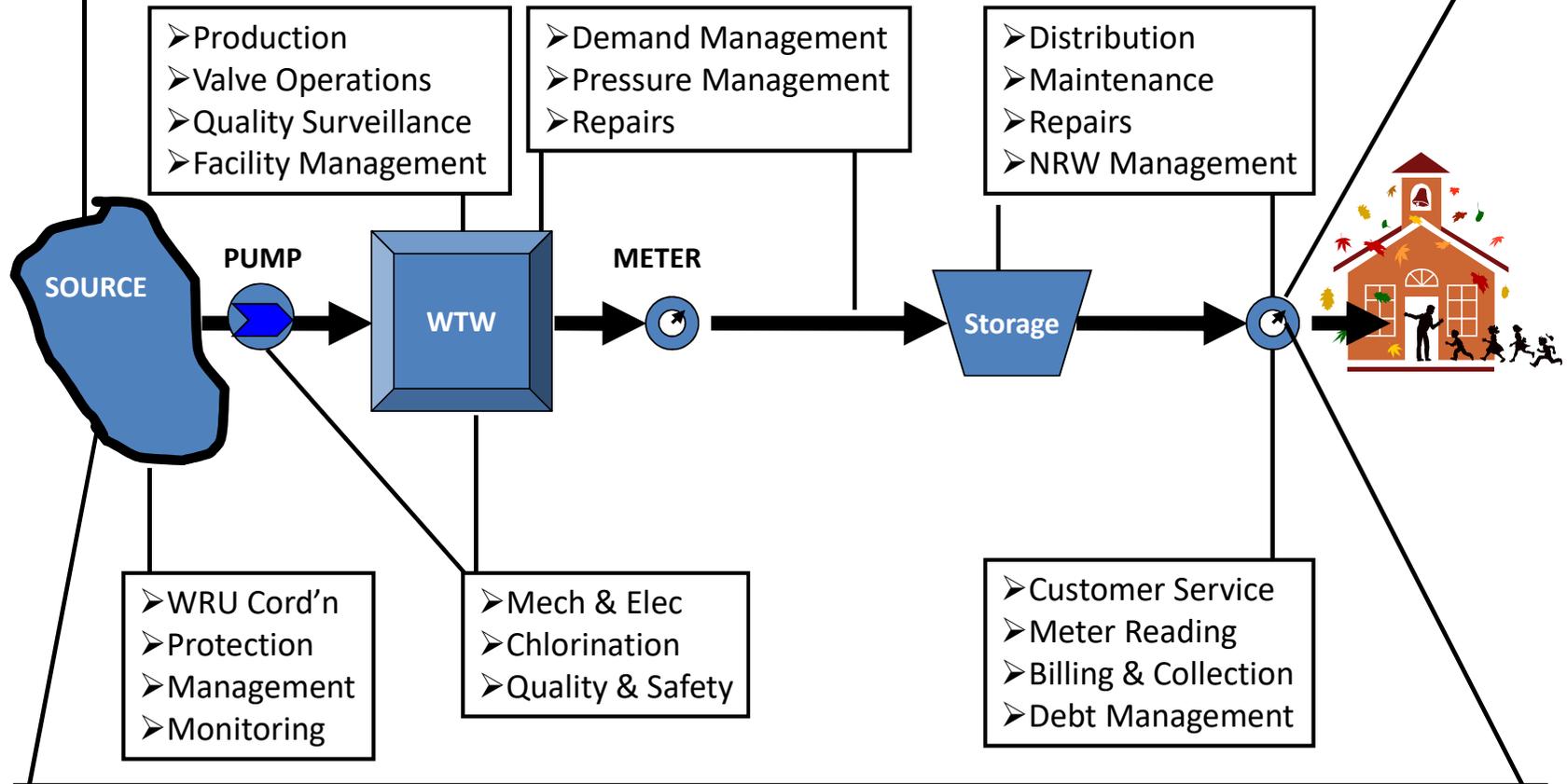
- Natural monopoly – no choice for customer
- > 90% public ownership State owns resources and State or City owns the infrastructure
- Intermittent water supply – general norm except few towns like Puri in Odisha
- Low tariffs – high political control and often at highest level in the State
- High customer investment in local ground water supplies, own treatment systems, pumps, storage leading to high coping costs
- Least measured leading to lack of performance data
- Almost no regulation except discharge monitoring by PCBs and expenditure audit by CAG

# Water Utility Key Functions

Central Functions

Decentralized/Local Functions

Planning, Water Safety, Hydraulic Modeling, Design Engineering, Construction, Asset Management

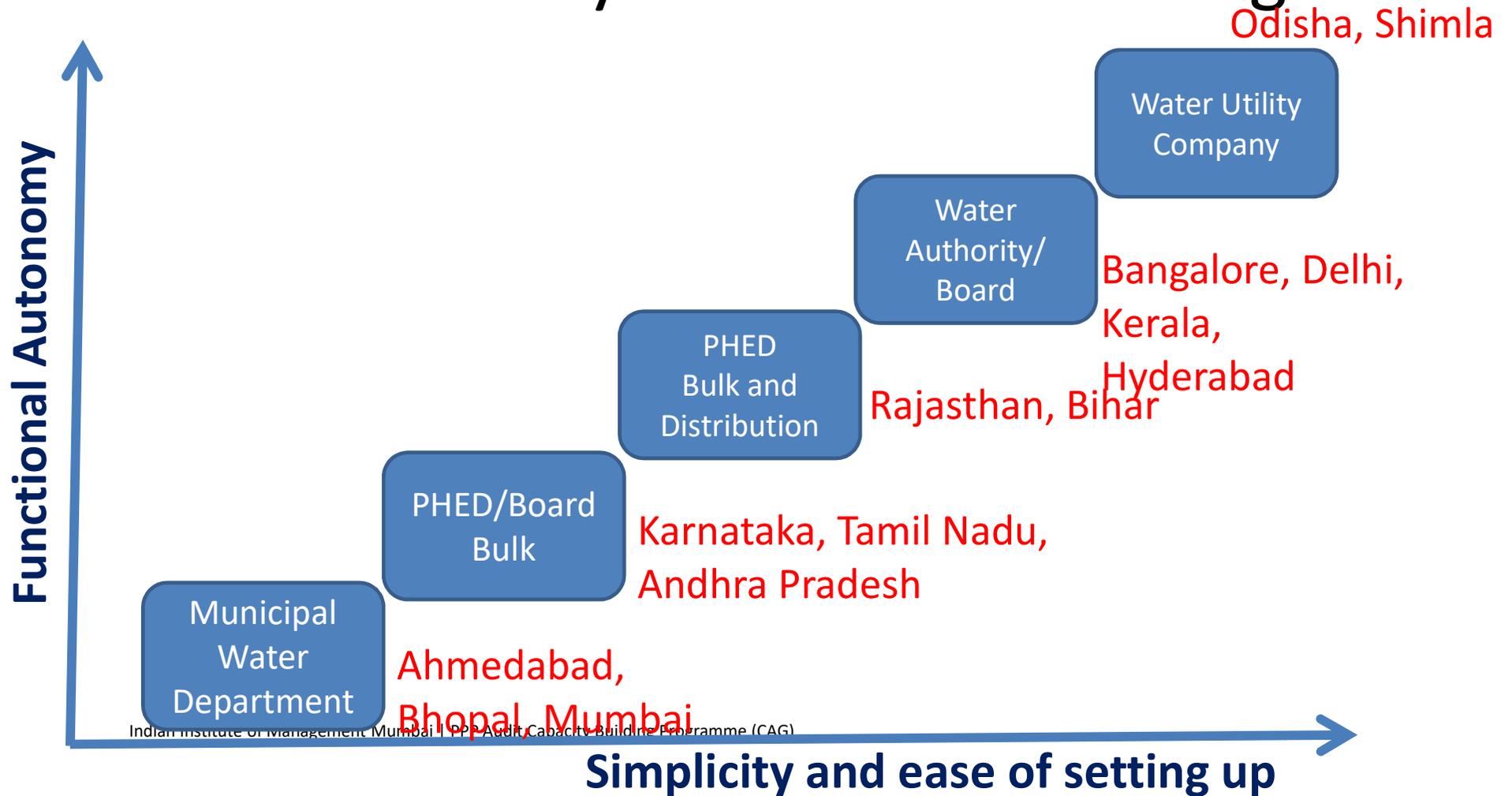


Accounts, Financial Control, Human Resources, Procurement, IT, Safety, Audit, Legal

# KPI for Service Delivery

Key Performance Indicators	Unit of Measurement	Target
Connections with continuous water supply	Number of connections	100%
Predictability of supply hours	Number of connections	75%
Continuity of pressurized water supply	Number of connections	100%
Non-Revenue Water	%	20%
Non-Revenue Water	Litres/connection/day/ meter pressure	12 – 20 litres
Resolution of customer complaints	%	95%
Revenue billing and collection efficiency	%	90%
In continuous water supply areas	%	95%
In intermittent water supply areas	%	80%
Treated Water Quality at WTP outlet	%	100%
Treated Water Quality at customer taps	%	95%

# Service Delivery Models - Insourcing



# Insourcing – Merits and Risks

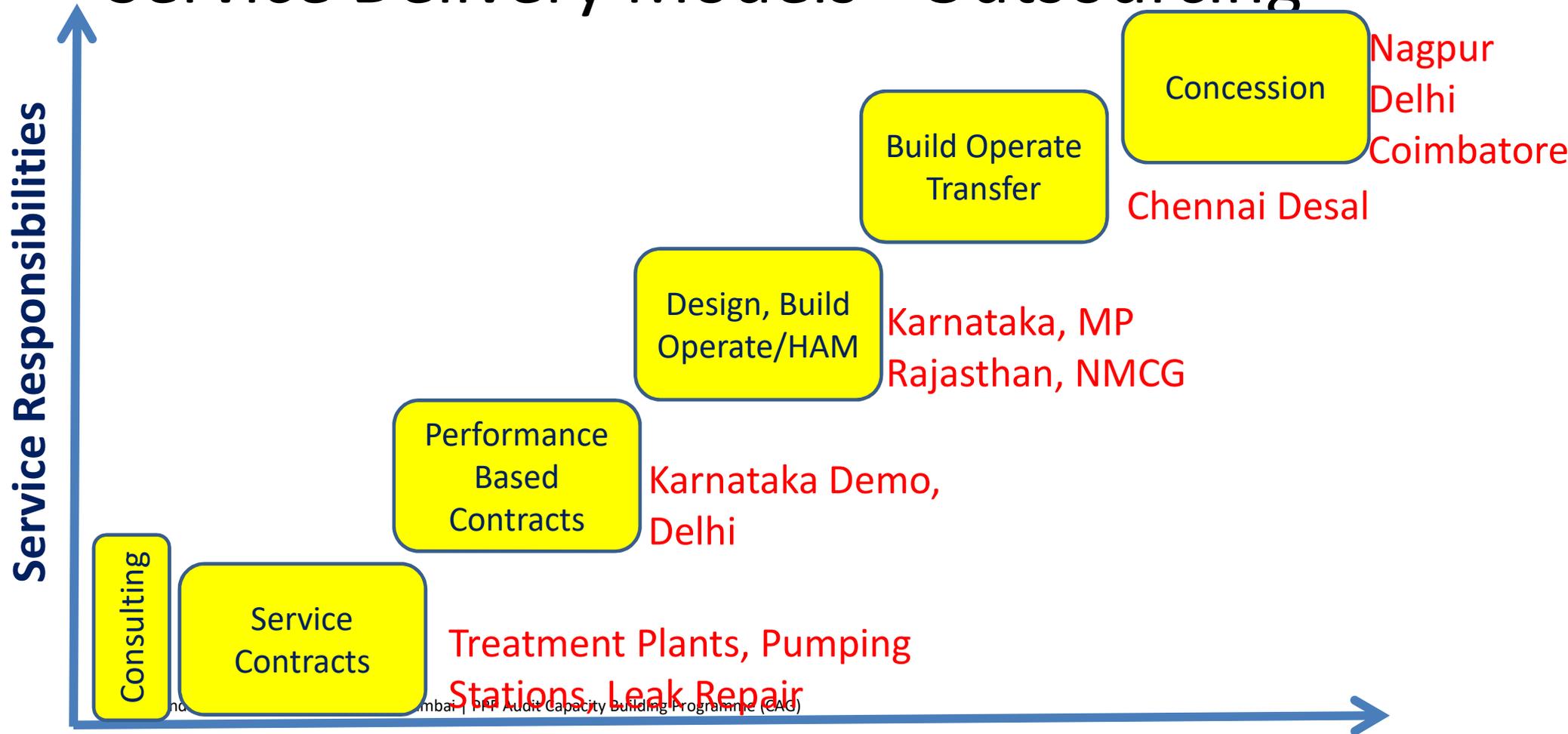
## Merits

- Public ownership
- Historical service provision model in most of the utilities
- Customers can deal with one agency (ULB or Water Authority) for all services
- Accountability to government and elected politicians
- Employee loyalty strong

## Risks

- Low financial strength and autonomy to plan and expand
- Dependent on state funding support
- Bureaucratic decision-making processes
- State control does not allow continuous growth and mutation
- Trade unions

# Service Delivery Models - Outsourcing



# Outsourcing – Merits and Risks

## Merits

- Necessary expertise made available
- Potential access to good (and global) practices and technology
- Flexibility to meet a growing and more affluent customer base
- Professional managers brought in through the contract
- Market used to obtain competitive prices
- Potential cost reductions arise from efficiency gains, increased innovation and contract incentives
- Measured accountability to customers with improved customer services

## Risks

- Requires effective contract administration
- Requires a well resourced market – insufficient private sector agencies
- Resistance from employee unions
- Low water tariffs leads to insufficient revenue to sustain operations

# Contract Case Studies

- A. Performance Based Operator Contract – KUWASIP
- B. DBO Contracts – Karnataka, Madhya Pradesh, NMCG
- C. Water Loss Reduction Contracts - Bangalore
- D. Concessions – Malaviya Nagar, Delhi

# Performance Based Operating Contract

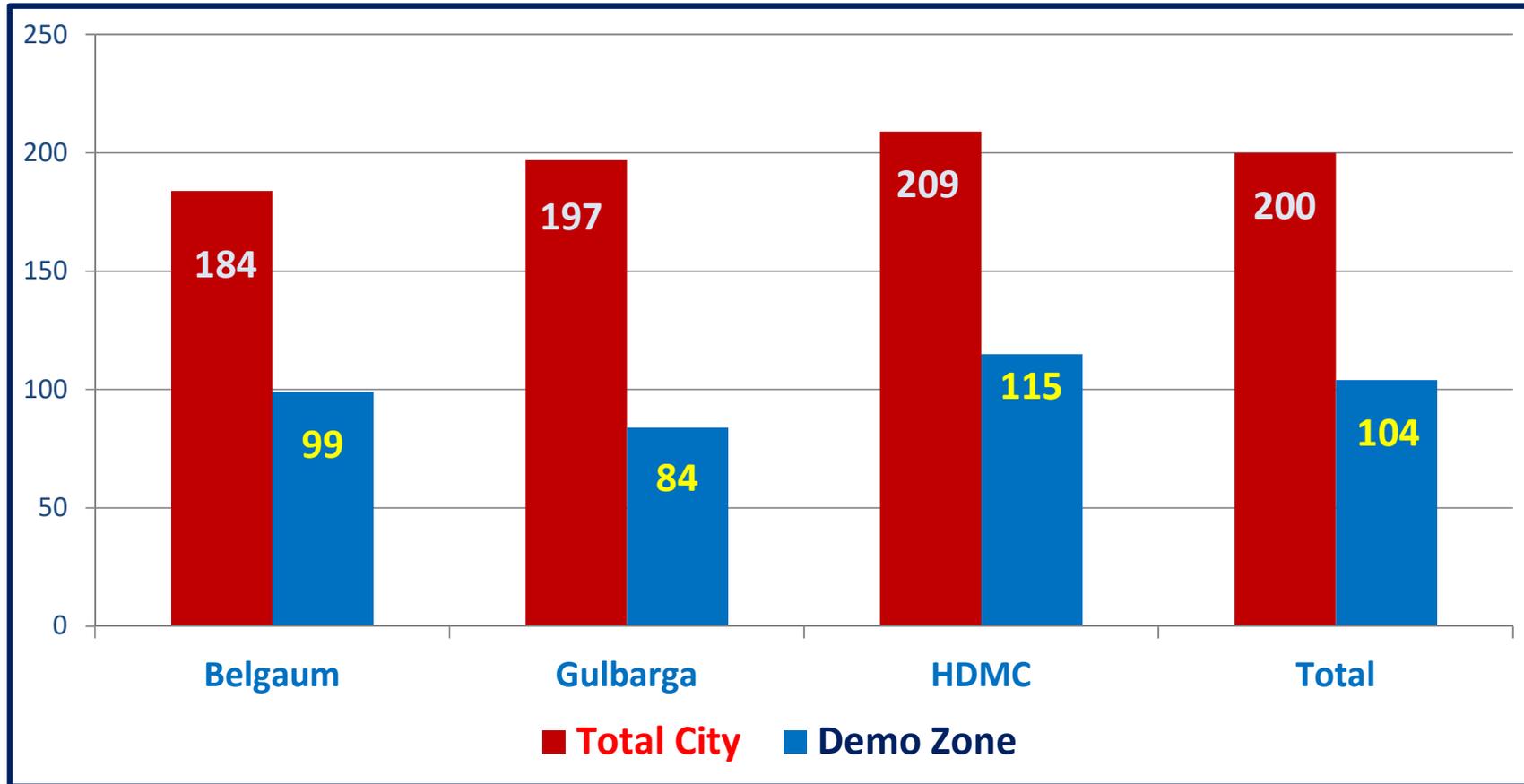
## KUWASIP – Demo Zone Project

- Water Operator was selected based on competitive Management Fee
- 9 months Preparatory Period: Study and development of Capital Investment Plan within the Capital Investment Threshold
- Construction price discovered by competitive bidding organised by the Operator and approvals controlled by KUIDFC
- Two Year Implementation Period: Infrastructure improvements by third party construction contractors supervised by Operator and paid directly by KUIDFC
- Five years O&M Period: Operator provides O&M services and maintains target Service Levels; The contracts renewed further and continues with private sector
- Remunerated by Management Fee – 60% Fixed and 40% linked to performance; bonus for higher performance and capital efficiency bonus

## Lessons

- Successful model and created interest and demand for continuous water supplies
- Total performance risk to Operator and incentive for capital efficiency
- Market did not prefer replication due to lack of private water industry in the country and monopoly of MNC operators

# Results comparison



All Numbers in Litres per person of System Input Volume into the Zone

Source: 2016 KUIDFC Data

# DBO Contracts

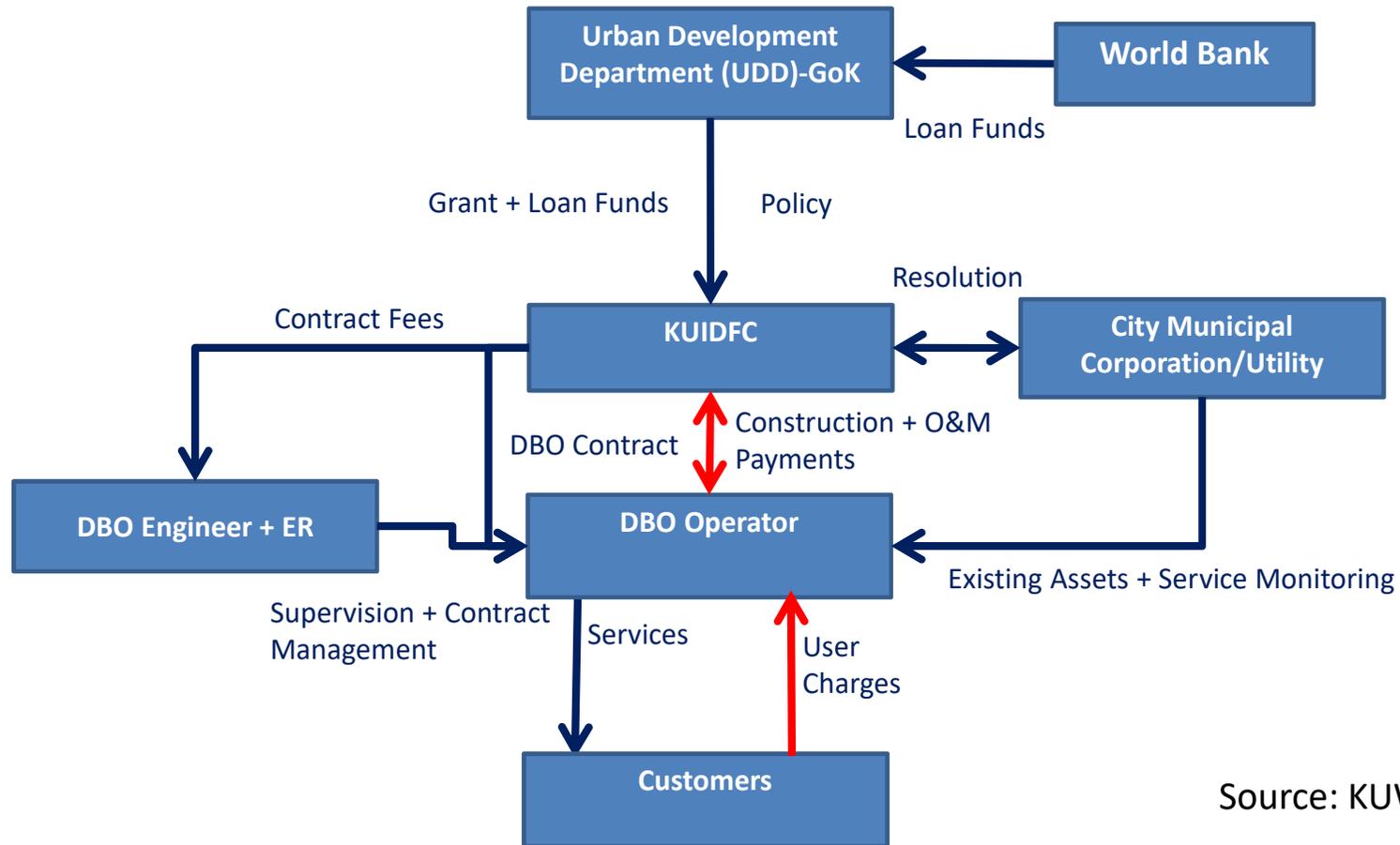
## KUWSMP, MPUSIP, RUIDP, Delhi

- Design consultant prepares indicative BOQs for infrastructure improvements
- DBO contractor (FIDIC Gold Book) is appointed based on construction price + O&M Price
- One year study and design validation phase followed by 3- 4 years of Construction Period
- 5 – 15 years O&M Period: Operator provides O&M services and maintains target Performance Standards
- Remunerated by Construction Payments and O&M Fee – 70% Fixed and 30% linked to performance

## Lessons

- Due to construction scope, more construction company bidders participating
- Successful in small towns but mixed success in large cities
- Service level improvements in terms of hours of supply, customer services, revenue collection improvements but no significant success in delivering city wide 24x7 supplies

# DBO Contract Structure



Source: KUWSMP

# NMCG – HAM Contracts

Construction  
Phase

40% of Capex

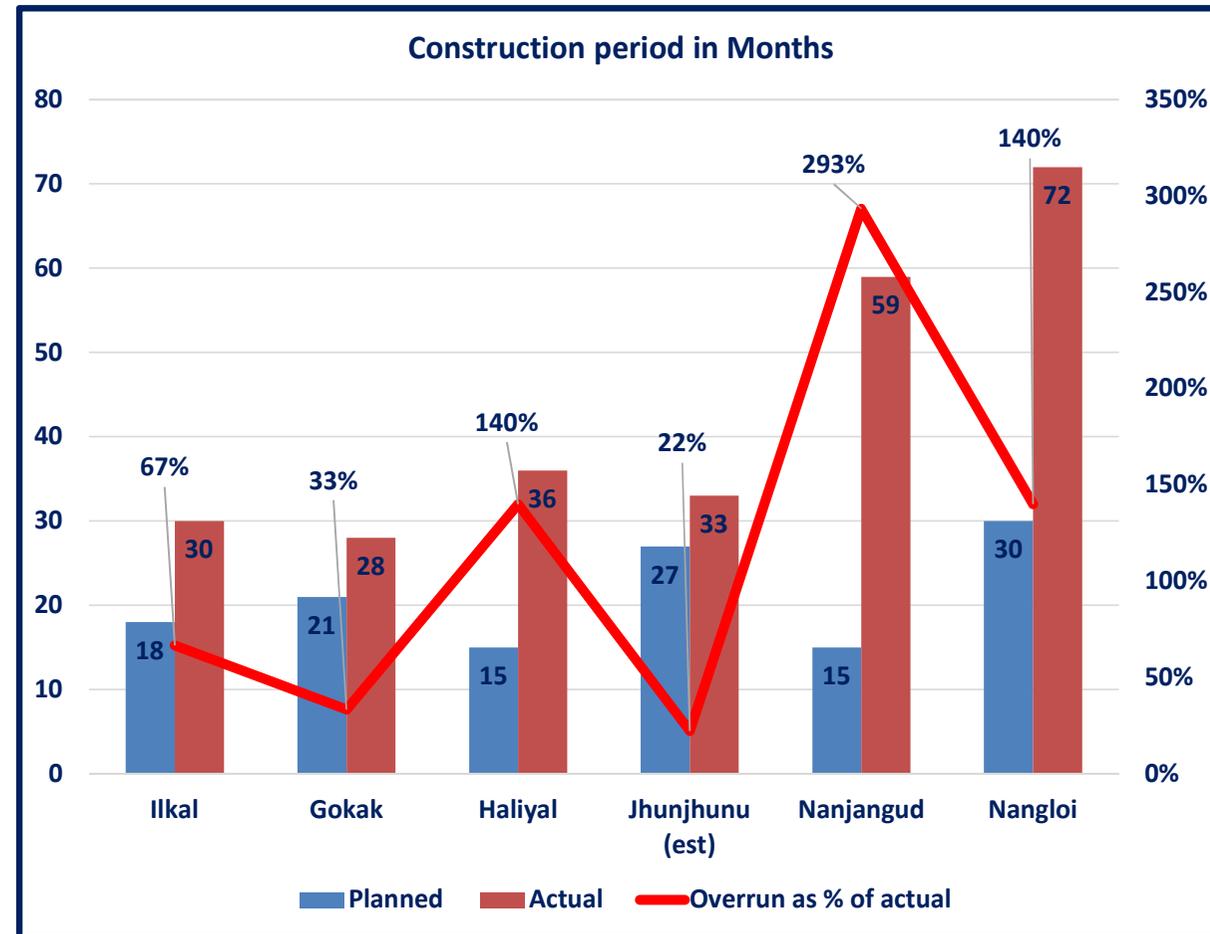
O&M Phase

Balance 60% Capex on Equated Annual Instalments  
Operations and Maintenance Cost  
Asset Replacement Fund  
Payments linked to performance

Payment Security Guarantee – GOI + MIGA;  
Interest Rate and Inflation Risks with Authority

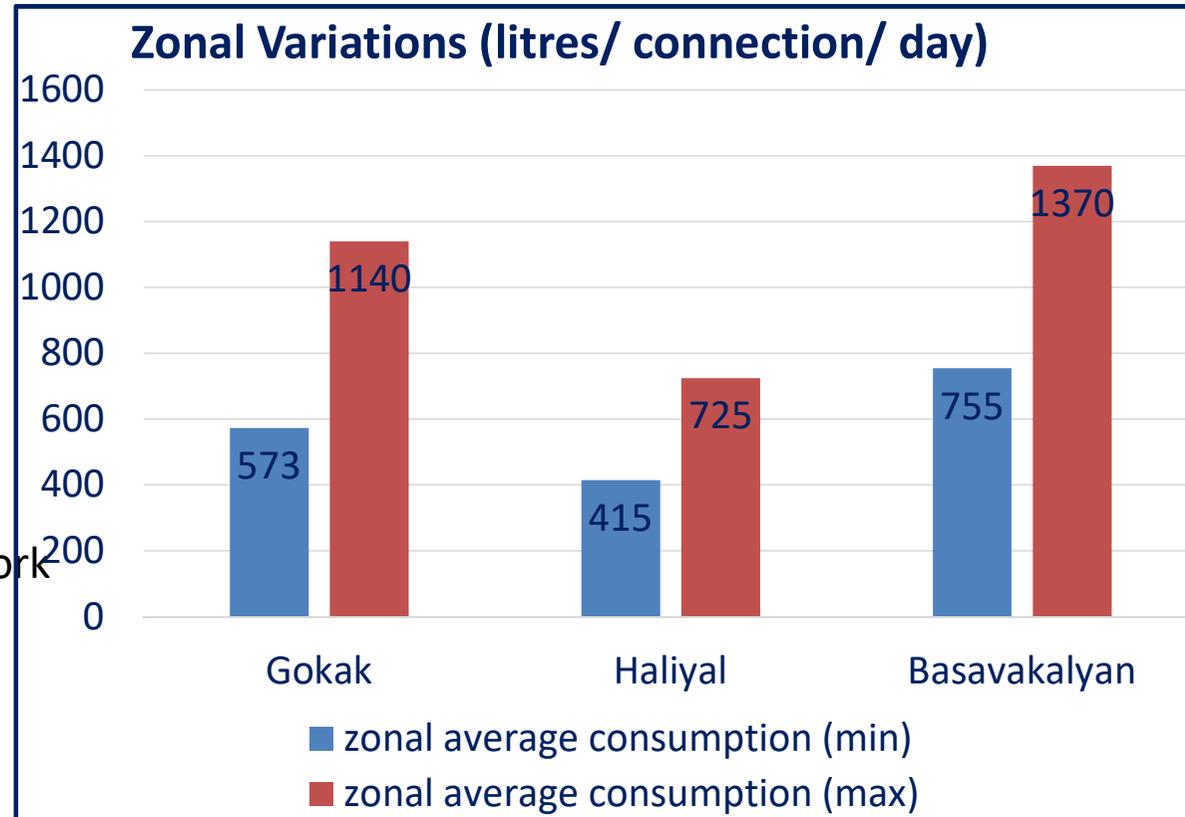
# Construction Time Over-runs

- Impractical contract timelines
- Delay in right of way permits
- Lack of support from elected representatives
- Design variations and legacy issues
- Third party damages to the network
- Contractor's low performance
- Resistance to metered connections
- High connection fees for new connections
- Legacy arrears preventing



# Factors Affecting Service Levels

- **Bulk water shortages**
  - Issues in initial planning
  - Third party dependency for bulk water
  - Power outages
- **Unaccounted consumption**
  - Reluctance to take metered connections
  - Challenges in shifting from old to new network
- **Variation in demand**
  - Variation across zones (DMAs)
  - Variations over time of supply

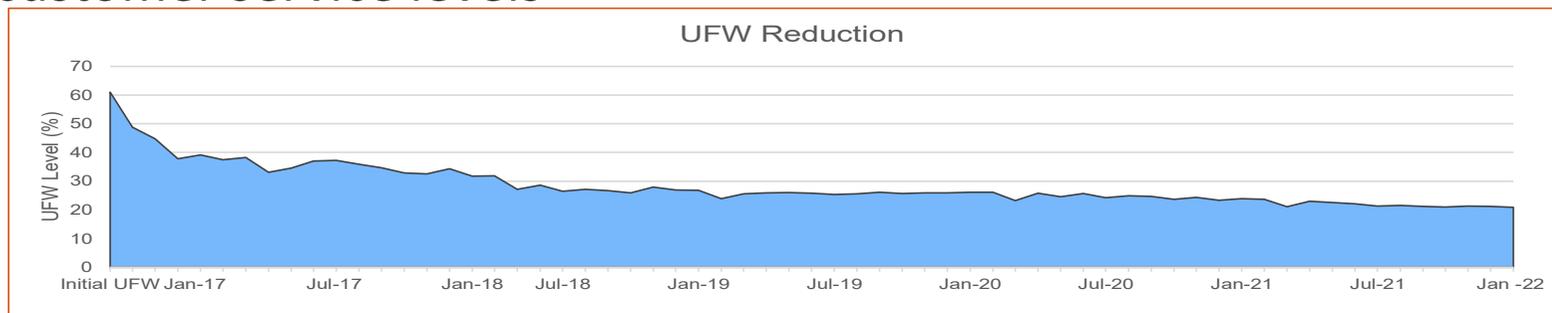


Source: KUIDFC – World Bank 2019 Study

# Water Loss Reduction Contracts

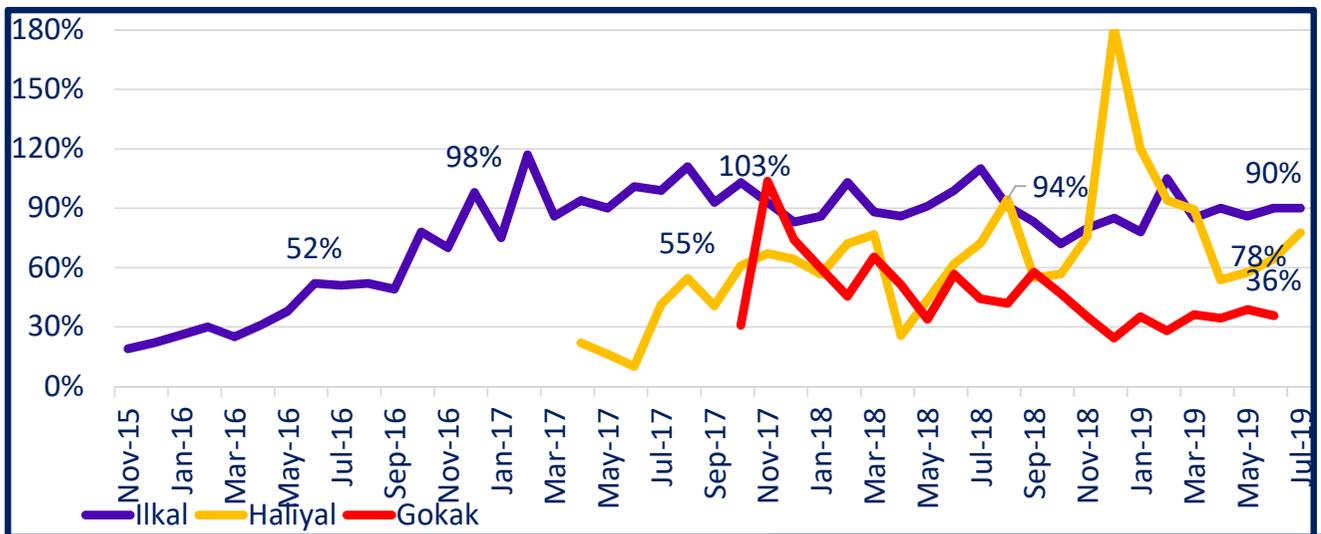
## Bangalore

- FIDIC Redbook based works contract- survey, designs, DMA establishment, leak detection, rehab & repair works on pipeline, service connections, meter replacement
- Maintenance – Monitoring UfW level, repair works to reduce UfW.
- KPI: Reduction of UfW to 16% measured in all DMAs; graded penalty mechanism for higher UfW
- Contractor is responsible only for maintenance but not for operations, service delivery, meter reading and commercial services which is retained by the Board
- **Lessons**
- Partial success with reduction in volume of water losses
- Utility gains benefit from saved water but no measurable improvements in customer service levels



Source:  
Suez Environment

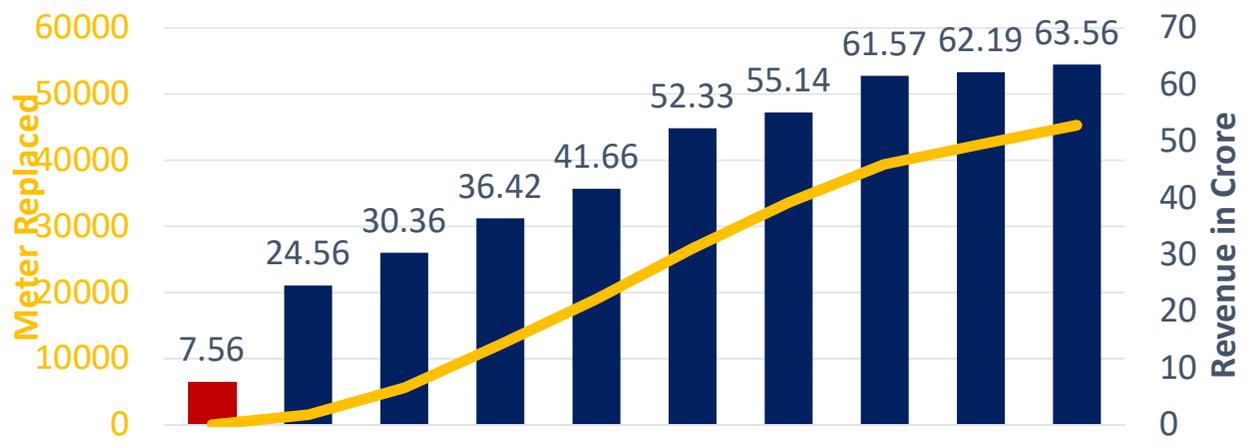
# Improving Revenues – assured benefit



Ilkal, Haliyal and Gokak  
 Source: KUIDFC - World Bank 2019 Study

## Malaviya Nagar Delhi

Source:  
Suez Environment



# Good Practices – Lessons Learnt

## Green Field Design Build and Operate (DBO) Contracts

- Suitable for green field development and single location assets
- Addition of construction and O&M increases accountability but adds complexity
- O&M obligations retains quality and functionality of assets
- Performance linked payments can be used to drive outcomes
- Regulated risks passed to contractor
- Investment risk to owner and construction and operating risk to contractor
- Hybrid annuity models (HAM) with a portion of payments for assets released during O&M service period (but at a cost)

## Brown Field Operating Contracts

- Suitable for existing assets and multi-location assets
- Focus on O&M can ensure progressive service delivery improvement
- Works contract combined with a O&M contract for rehabilitation of existing assets and improved O&M and service delivery
- Good for efficiency improvement programs – 24x7, NRW Reduction, Water Quality enhancement

# Technology and Flexibility

## Technology

- Technology for optimising performance of existing assets and planning new assets
- Technology for monitoring service delivery and contractor performance
- Starting with some basic instrumentation technology in place for effective baselining
- Performance data – daily, monthly, yearly – is crucial to ensure continued performance and preventive maintenance

## Flexibility

- How to guarantee performance of existing often neglected asset?
- Poor historical maintenance records – flexibility of readjusting baseline performance and contract targets – susceptible for manipulation
- Availability of backup funding for meeting historical maintenance backlog

# Typical project risks

- Substantially high variations during implementation due to buried nature of network assets
- Lack of reliable baseline leading to contract target adjustments
- Erratic funding availability leading to partial investments resulting in continuous catching up syndrome not sync with city's continuous growth
- One set of guidelines for entire country covering thousands of cities and lakhs of villages, more autonomy for local body necessary to suit to local resource availability

# Failure Points in PPP Structuring

- Limited availability of contracting agencies interested in O&M and service delivery – monopoly trend
- Desktop DPR preparatory culture – no real diagnostic of existing service delivery baseline
- Ambitious construction targets linked to political or bureaucratic cycles – Optimum time for a million people city is 7 years for good quality construction
- Erratic fund availability both for Authority and Operator

# Regulatory and Policy Bottlenecks

- Water sector regulation is limited to monitoring of treated sewage discharge by State Pollution Control Boards
- Difficult to regulate as there are several local body governments responsible for water services function unlike few companies in power sector
- Multitude of institutions – Local Bodies, State Departments, State owned Boards, City Level Boards makes it complex to ensure accountability
- Accountability is limited to Government but not to customer

# Relevance for Audit Oversight

- Maximising output for each rupee invested
  - Contractors prefer to work in low dense outer areas but not in core city with more beneficiaries due to restricted workspace; results in low output from investment
  - Political preference to assets (OHTs, Treatment Plants) that can be seen by voters rather than buried pipelines which cause temporary inconvenience to residents
- Capital spent per unit volume of water delivered to customers not mere augmentation of production capacity
- Capital spent per unit expansion of network with new connections
- Audit oversight on ensuring allocation of sufficient funding for preventive maintenance for each rupee invested as capital – needs tariff revisions which is often neglected by bad politics

## Further Reading

- 24x7 Water Supply is Achievable:  
<https://documents1.worldbank.org/curated/en/436231468043455838/pdf/722560WSP0Box30rnataka0water0supply.pdf>
- Running Water in India's Cities – A Review of five recent PPP initiatives  
<https://openknowledge.worldbank.org/entities/publication/5770ad25-9cda-5683-a7ea-8b45c2111794>
- PPP Resources Center <https://ppp.worldbank.org/>

# Acknowledgements

- IIM, Mumbai
- KUIDFC
- BWSSB
- Indore Municipal Corporation
- NMCG
- The World Bank