



Pursuing Water Conservation in Trinidad and Tobago: Universal Metering as a Strategic Option

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Presentation Outline

- Introduction
- Advantages/Disadvantages of Metering
- Issues related to Metering
- Water Metering in T&T – Implementation & Costs
- Conclusion

Introduction

- Trinidad and Tobago a country beset by intermittent water supply
 - High demand, low supply (deficit of 139Ml/d)
 - Discontinuous unpredictable distribution (over 200 schedules)
 - Truck borne water supply in many areas
 - Potential for water contamination
- Some additional facts:
 - Estimated NRW of 38% (389Ml/d)
 - Metering of customers is negligible (3% of customer base)
 - Annual water demand outstrips supply by 44,000Ml, expected to increase by 27% by 2015

Policy needed for more efficient water use

Introduction (cont'd)

Need for **demand side** measures such as:

- Public education
- Water regulations and restrictions
- Water conservation tools such as metering, pricing and leakage prevention.

Presentation set outs metering as one strategic alternative for more efficient water use in Trinidad and Tobago

Advantages of Metering

- Customers pay in relation to their volume of usage
- Reduction of water consumption in the order of 15-50%
- Corresponding reduction in the annual O&M costs for the water and sewerage systems
- Deferment of capital costs of upgrading and expansion of water and sewerage system facilities
- Increased efficiency in water system operation
- Aids planning of future upgrade of pumping and storage facilities
- Environmental benefits including reducing or eliminating impact on watersheds to create additional storage, reducing impact on low stream flow during the dry season, extended sewage and effluent disposal service

Disadvantages

- Capital Costs. Initial outlay can be prohibitive, dampening any enthusiasm to carry out metering
- Affordability. If rates are kept low, then universal metering will not be successful in having customers reduce their consumption
- Since customers like to have unrestricted water use, the installation of water meters can be perceived as a reduction in benefit to the customer

Issues related to Metering

- Water Consumption
- Tariffs
- Customer Attitudes
- Customer Choice
- State Policy
- Environmental Considerations
- Costs/Benefits
- Private Sector Involvement

Water Consumption

- Universal metering has led to reduced water consumption.
- Must be tied to an appropriate pricing regime based on measured use in order for customers to be encouraged to economise on water use.
- Can result in supply side benefits in the reduction of water abstractions and the deferment of expensive investments

Water Consumption (cont'd)

Summary of consumption change scenarios after metering had been implemented in various territories:

- On the Isle of Wight, a 21% saving in household use
- National United Kingdom Water Metering trials project (1989–1993) suggest that households may have reduced their demands by 10-11%.
- Universal metering program in the city of Vernon, British Columbia demonstrate 15.7% savings on average and 29.4% savings on peak demands
- City of Calgary has witnessed an 11% reduction in average daily demands after introducing voluntary program

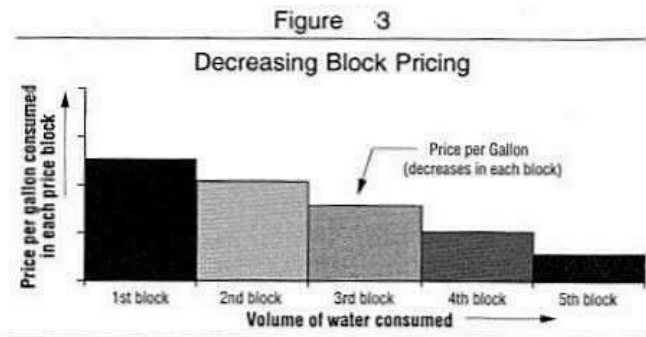
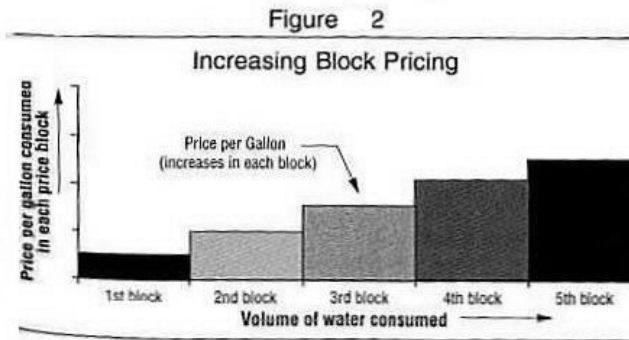
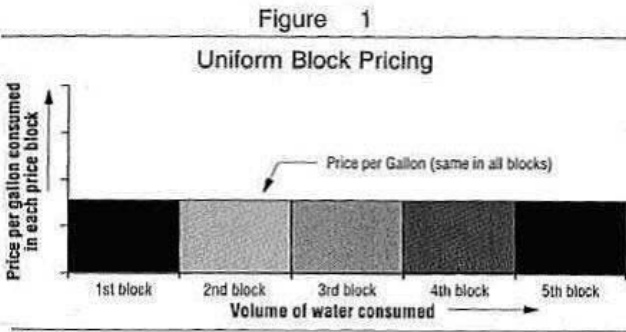
Water Consumption (cont'd)

- In Gdansk, Poland...metering and higher tariffs led to a fall in domestic consumption of 33 percent; in Bydgozcz consumption fell from 213 l/c/d to 147 l/c/d (a 30 percent decline).
- In the Baltic states higher tariffs led to reductions of around 50 percent
- In Sao Paulo, water provider able to reduce consumption by 18% to targeted consumers
- In Jalandhar, consumption fell by 40% after metering
- In Grenada, the metering of domestic supply has radically altered the way that the public perceives and uses water
- In St Vincent, the water authority was able to improve the reliability of supply because metering led to a reduction in the demand for water

Tariffs

- Water Rates for unmetered users in Trinidad and Tobago based on the Annual Rateable Value (ARV)
- By charging based on the ARV, the charge is oriented towards ability to pay rather than for the amount of water consumed
- As such there is no incentive to reduce water consumption.

Block Pricing



*Seasonal/Peak
charge*

Customer Attitudes

- Customers may welcome metering as it could result in lower bill
- Customers could be suspicious as they fear higher charges if personal usage is high
- Outright refusal by communities to compulsory metering e.g. Calgary, Sacramento
- In St Vincent initial reluctance to metering with consumers refusing to let utility staff on their properties to install meters and there was also tampering of meters.

Has been found that consumers do pay less when metered - 50% of customers paid less in UK after being metered

Customer Choice

- Voluntary or compulsory?
- Optional approach to metering can be pursued. In the UK households can choose to have a meter installed - installation and meter are free of charge
- In Calgary, voluntary programme unveiled in 1991 with moderate success

Adoption of a mandatory programme preferable as voluntary programme encourages water conservation but high cost of meter installation and inability to postpone costly expansion projects are seen as major drawbacks

State Policy

- Does the State support metering?
- If criterion is to keep water costs low, then metering would not be a priority to most governments.
- May also consider the capital costs too high and the benefits of metering not adequate.
- Mixed signals could also be sent, in that there could be assent to meter but actual efforts by utility are not fully supported.

State support for a universal metering programme is necessary for success. Its participation is essential or else utility is not clear with respect to implementation and is likely to be considered by the public as unaware of what it is trying to achieve.

Environmental Considerations

- Additional demands for water due to increased consumption can have significant adverse effects on the environment.
- Increased water abstractions from aquifers, rivers and lakes make less water available for wildlife and aquatic life.
- Construction of new water schemes is no longer viewed favourably but now attracts the ire of environmentalists.
- View is that proper demand side management is required to reduce demand so that large schemes can be minimised.

The option of metering is therefore an attractive one.

Private Sector Involvement

- State run utilities tend to suffer from low revenues and little investment
- Difficulty in funding multi million project as metering
- Performance contract with private sector is one option
- Benefits to utility in no up front funding, transfer of best practices and technology, and ease of procurement

Costs/Benefits

- Benefits and costs of a metering programme must be measured to assess if worth pursuing as a major undertaking
- Costs include meter material, installation and maintenance costs as well as administrative costs inclusive of public relations campaign
- Benefits of metering include the utility savings from deferred costs for water schemes, reduced treatment and distributions costs for both water and wastewater as well as customer benefits
- Simple B/C model developed

*Water Metering in
Trinidad and Tobago
RIC Proposal
Implementation and Costs*



Background

- The RIC Board of Commissioners in March 2002, endorsed the concept of universal metering for the water sector in Trinidad and Tobago
- The Commissioners also noted some of the main reasons to date for the failure to meter, such as the:
 - High initial capital cost of about TT\$372-528 million;
 - High cost to individual customers;
 - Continuous supply issues;
 - Lack of political commitment.

Main proposals

- Adoption of a fast track approach;
- Outsourcing of the metering function
- Use of the open tendering process for the selection of five (5) contractors/companies
- Project management of Metering Programme by multi agency team
- Implementation of a Pilot Programme before a full metering project is implemented

Fast Track Approach

Benefits of a fast track approach:

- Impact on revenues
- Optimum level of metering
- Ease of installation

Outsourcing

Benefits of Outsourcing:

- Removal of the responsibility for the initial capital investment from the utility and Government
- Promoting competition among private contractors within the utility sector
- The assurance that the costs of metering are not passed on to the consumers
- An accelerated metering implementation program

Companies & Contracts

- Trinidad and Tobago be divided into five areas, one contractor per area to supply, install, read and maintain the water meters.
- Each contractor/company would comprise:
 - A Local Operating Partner (at least 60% of the equity).
 - A Meter Supplier (A foreign supplier - who will also bring Export Finance Credit).
 - The Utility (WASA), no more than 10% of the equity (optional)

Companies & Contracts (cont'd)

- With contract, payments would be made on a “pay per read” basis.
- For their initial investments and annual costs, contractors will be reimbursed on the number of reads that are made per meter on a monthly basis and over a fixed period.
- Period could be from 10 to 20 years.
- Contractors will be held accountable for maintaining high performance of the metering system for its useful life. 99% success read rate will be required. If AMR is utilized system accuracy must be over 99% accuracy.

Contracts & Costs

(10 year period)

	CAPITAL COSTS	US\$	TT\$
1	Cost of 55,458 ¹ meters at US\$370 per meter ²	20,519,460	129,067,403
2	Cost of Automatic Reading (AMR) Network ³	48,000	301,920
3	TOTAL	20,567,460	129,369,323
4	ANNUAL COSTS		
5	Annual Debt Service for meters: 10% per annum/10 year loan	2,051,946	12,906,740
6	Annual Maintenance cost at 1% of investment cost	205,195	1,290,674
7	Annual Debt Service for AMR Network: 10% per annum/10 year loan	4,800	30,192
8	Annual Operating Costs	114,467	719,997
9	Contingencies (10% of the total of lines 5-8)	237,641	1,494,760
10	TOTAL	2,614,048	16,442,364
11	PROFITS (10% of total annual costs)	261,405	1,644,236
12	GRAND TOTAL (line 10+ line11)	2,875,453	18,086,601
13	Price per read (line 11 divided by 665,496⁴)	4.32	27.00

Benefit Cost Model

Benefits from Water Savings	2007	2008	2009	2010	2011	Total
(a) Water saved (Ml/d)	19	41	64	91	120	335
(b) Utility Savings						
((a)*1K*365* TT\$2.20)	TT\$ 17,435,966	TT\$ 37,021,502	TT\$ 58,824,531	TT\$ 82,916,341	TT\$ 109,371,097	TT\$ 305,569,437
(c) Equivalent No. of Customers						
((a)*1M/(3.64*560lpcd))	9,374	19,904	31,625	44,578	58,800	164,281
(d) Customer Coping Costs						
((c)*TT\$1800)	TT\$ 16,873,152	TT\$ 35,826,489	TT\$ 56,925,741	TT\$ 80,239,895	TT\$ 105,840,721	TT\$ 295,705,999
(e) Total Savings (b) + (d)	TT\$ 34,309,118	TT\$ 72,847,991	TT\$ 115,750,272	TT\$ 163,156,237	TT\$ 215,211,819	TT\$ 601,275,436
(f) Metering Programme Costs for 5 years						TT\$ 452,165,025
Benefit Cost Ratio ((e)/(f))						1.33

Some Project Comparisons

Subject	RIC Proposal	Philadelphia Water	Sabesp
1. Company size	3,300 staff, 1.3 million people	2,000 staff, 2 million people	19,000 staff, 25 million people
2. Publicly owned	Yes	Yes	Yes
3. Financial status	Unprofitable		Profitable
4. Objective of project	Conservation/Efficiency	Improved Billing/Access to meters	Revenue/Conservation
5. Capital constraints of service provider	From Government and usually limited	None, but wanted to minimise exposure to risk	Access to international capital but subjects to constraints by State
6. Universal Metering	Yes, > 300,000 meters	Yes, 420,000 meters	No, only targeted customers, 32,000 meters
7. Private sector participation	Yes	Yes	Yes
8. Joint venture	Yes	No	Yes
9. Performance based contract	Yes	Yes	Yes
10. Contract Period	10 years	20 years	3 years
11. Contract type	Pay per read	Pay per read	Installation
12. Government	??	No	Yes

Project Management

- Team of not more than six (6) persons, comprising personnel from the WASA, RIC and the MPUE, to supervise the overall implementation of this metering project.

Pilot Programme

- Pilot project be initiated - 10,000 to 15,000 meters installed in various selected locations
- Geographical spread of the locations should be such as to adequately test the integrity of the meter reading system
- One contractor, chosen from at least three bidders, be given the responsibility for purchasing, installing and reading the meters in the pilot programme areas
- Pilot areas should include premises found in the majority of T&T; i.e. single residences, condominiums, apartments and businesses

Advantages of Pilot Programme

- Allows for project testing. Outcome of pilot project will determine whether it is more feasible to promote Automatic Meter Reading (AMR) over Remote Meter Reading (RMR)
- Different arrangements may be experimented with during this stage to come up with the most ideal solution for implementation
- Increases the opportunity for public awareness of the new system to be implemented, and allows time for promoting the concept throughout the country

Project Tasks

1. Project Management
 - Preparation
 - Planning & Control
 - Evaluation
2. Public Communication
 - Planning
 - Training
 - Advertising
 - Informing
3. Revenue Collection Adjustments
 - Tariff Changes
 - Billing Changes
 - Customer Casdastre Improvements
4. Meter Implementation
 - Mobilisation
 - Installation
 - Operations
 - Closeout
5. Meter Services
 - Testing
 - Maintenance

Conclusion

- WASA to execute major implementation of TT\$1.2 billion three-year strategic plan to improve the level of service to customers.
- Planned expenditure of TT\$27 billion over the next ten to fifteen years
- Development of a Water and Wastewater Master Plan over the next two years
- Must also be an approach for persons to reduce water use and conserve water

Conclusion (cont'd)

- Universal metering one course of action and WASA must pursue adequate measures to ensure a comprehensive programme is put in place.
- Adoption of a fast track approach to the implementation of universal water metering should achieve economic and customer service benefits.
- Proposal would lead to greater efficiency in the utility, ensure greater customer satisfaction and redound to the benefit of all the stakeholders concerned.

Thank You!