Metering with Commodity Rates for New Connections and Retrofit of Existing Connections

Presentation to the NE IL RWSPG

May 27, 2008

Hala A. Ahmed, AICP
Presentation Content

• Metering: Definition & Purpose
• Meter Categories
• Meter Types
• Important Metering Considerations
• Water Conservation Thru Metering
• Metering Costs
• Case Studies
• Recommendations
Metering: Definition & Purpose

• Installing (or replacing) water meters in existing customer sites and assuring new construction is metered
• Provides customers info needed to recognize volumetric price incentives
• Metering is necessary for implementing Conservation Pricing
• Monitor Water Use
  – How much
  – Where
  – Waste Identification
  – Opportunities for Savings
Categories of Meters

- Main Meters
- Submeters
- Flow Meters
Categories of Meters (contin.)

• Main meters:
  – Installed by utilities
  – Measures total water inflows to facility
  – Shows baseline demand and use patterns
  – Water bill lists readings from main meter(s)
  – Verifies accuracy of water bills
Categories of Meters (contin.)

• Submeters:
  – Monitors specific water uses (cooling towers, irrigation)
  – Helps to assess water efficiency
  – Pinpoints opportunities to increase efficiency by tracking sources of potential inefficiencies
  – Helps reduce sewage costs by comparing amount of water used with sewer discharges

• Flow or Temporary Metering Devices:
  – Portable measurement devices used to measure flow rates or volume uses for specific sites, eqp. or processes
# Types of Meters

<table>
<thead>
<tr>
<th>Types of Meters</th>
<th>Positive Displacement</th>
<th>Turbine</th>
<th>Compound</th>
<th>Ultrasonic &amp; Electronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>Translate volume measurement into flow via rotating disc</td>
<td>Register flow to spin of rotor as water flows thru meter</td>
<td>Consist of 2 meters: turbine &amp; displacement</td>
<td>Installed inside or outside a specific pipe</td>
</tr>
<tr>
<td>Benefits</td>
<td>Extremely accurate for low volumes of water</td>
<td>Accurate for medium &amp; large flows</td>
<td>Used for facilities that require both hi &amp; low flows</td>
<td>Used for specific process or eqp.</td>
</tr>
<tr>
<td>Ideal Use</td>
<td>Residential 5/8- 2” connections</td>
<td>2-8” connections</td>
<td>3-8” connections</td>
<td>Instantaneous or cumulative flow volumes</td>
</tr>
<tr>
<td>Cost for CII</td>
<td>$400- 2,500</td>
<td>$1,300- 2,500</td>
<td>$50- 900</td>
<td></td>
</tr>
</tbody>
</table>
Important Metering Considerations

• Meters are sensitive to pipe size (sized to match water service supply)
• Meters should comply with US standards
• Meters should be tested and calibrated regularly to insure their accuracy
• Water bills should be designed to communicate water consumption
Water Conservation thru Metering

- Insure that meter types and sizes match flows
  - Water & Sewer Dept in Boston launched a meter-downsizing program in 1989 that resulted in 2,070 meters being downsized.
    - Program Capital Costs: $700,000
    - Increased Department net revenue: >$5 million/year
- Use meters to insure more efficient water audits
- Separate meters for water lines attached to irrigation systems
- Separate meters for cooling towers & other industrial processes required for sewer allowances
Water Conservation thru Metering (contin.)

- Install submeters and record readings for large eqp. or processes
- Read meters on a monthly basis for sites that use <1 million gallons/yr (mgy), weekly for 1-1.75 mgy, daily for >7.5 mgy
- Read meters when facility is not in operation
- Resize meters when flow rates change significantly as a result of change in eqp. or processes
Metering Costs

- Staff time to develop meter program & new rate structures
- Meter installation
- Administration
- Contractors
- Marketing
### Metering Costs (contin.)

<table>
<thead>
<tr>
<th>Water Supplier</th>
<th>Avg Cost/Meter Installation ($)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denver Water Dept, CO (1993)</td>
<td>425</td>
<td>Includes purchase, installation, repair &amp; public education</td>
</tr>
<tr>
<td>CUWCC (2003)</td>
<td>500-1,000 for single family, 500-3,000 for multi &amp; commercial</td>
<td>Costs for retrofits</td>
</tr>
<tr>
<td>Sacramento Suburban, CA (2002)</td>
<td>910/residential</td>
<td>Includes up to 28 sq. ft. landscape restoration</td>
</tr>
<tr>
<td>San Juan Water District, CA (2002)</td>
<td>453</td>
<td>246 for meter &amp; box installation, 207 for upgrade</td>
</tr>
</tbody>
</table>
Case Study I

- Canadian National Research Council
  - > 50 buildings with labs & engineering research
  - Water used for eqp cooling, cooling towers & domestic use
  - Each building metered separately, meters read & reconciled monthly
  - Large discrepancies (>20%) between demand and water supplied investigated periodically
  - After completion of water audit and installation of conservation measures, water use declined by 20% and bill decreased by Can$100,000.

Case Study II

• New York
  – 1994 analysis of 590 multi-family buildings in New York City and 676 in Jamaica, New York
  – Jamaica service area was metered while New York City buildings were not
  – Statistical model regressed housing density, median income/census tract, building size water use & dummy variable
  – Metered billing resulted in 36% decrease in water use, authors attributed to metering

Source: Speedwell, The Impact of Metered Billing for Water and Sewer on Multifamily Housing in New York. 1994
Others

- Denver, CO: universal metering program reported 28% water savings with summer peak reduction of 38.4% in 1995
- Greater Vancouver: 20% reduction in single family consumption due to meters, rate structure and bi-monthly billing
- CUWCC: estimates that metering with volumetric pricing reduces demand by 20%.* Water consumption in un-metered service areas is higher
- Regionally: City of Chicago is installing the Automated Meter Reading Program with a remote transmitter that will allow greater efficiency in data collection

*Note: other programs may have been concurrent with the metering program evaluations
Recommendations

• Provide utilities with financial means, e.g. grants, to install and retrofit meters in existing buildings
• Implement program to install meters in all existing buildings within a specific time span
• Require metering for all new construction
• Assess feasibility of installing dedicated landscape meters
Recommendations (contin.)

- Implement different rate structures for indoor & outdoor water uses to encourage water conservation during peak months- use dedicated landscape meters
- Conduct regular water audits thru use of meters in government buildings
Questions/Comments?

Hala A. Ahmed, AICP
(312) 368-8800
hahmed@cmap.illinois.gov