Getting the Price Right

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Brown Bag Series
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Illinois-Indiana Sea Grant
University of Illinois Extension
Chicago Metropolitan Agency for Planning
Regional water framework

Water 2050
- RWSPG (2006)
- Water 2050 (2010)

GO TO 2040 & Update
- GO TO 2040 (2010)
- Update (2014)

ON TO 2050 (2018)
Water industry challenges

1. Aging infrastructure
2. Financing for capital improvements
3. Long term water supply availability

- Chicago region municipalities had a stormwater funding backlog of $233 per household.

Source: 2015 AWWA State of the Water Industry Report

Communities have a choice to make about how to manage water assets

Avoid the issue and risk...
- emergency repairs
- business interruption
- public health impacts
- regulatory problems
- higher long-term costs

OR...

Invest proactively in management of water infrastructure assets to continue providing high-quality, reliable service. (at a lower long-term cost)

Source: RCAP
Paying for water service

The public can best be provided water service by self-sustained enterprises adequately financed with rates and charges based on sound accounting, engineering, financial, and economic principles.

American Water Works Association (AWWA)

Providing stormwater services through a user fee rather than taxation.

What is a stormwater utility? (CMAP)

Much of water infrastructure is not funded on a pay-as-you-go basis, many communities turn to debt and loan funds to finance their infrastructure.
### Paying for water service II

#### Figure 8. Financing and funding sources

<table>
<thead>
<tr>
<th>Financing Sources</th>
<th>Provides Funds</th>
<th>Repayment</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue bonds (&quot;rate-supported&quot;)</td>
<td>Immediately</td>
<td>By rate payers over 10-30 years</td>
<td>Makes funds available immediately; ties payments to benefits received</td>
<td>Increases rates; high interest costs</td>
</tr>
<tr>
<td>Revolving loans</td>
<td>Immediately</td>
<td>By rate payers over 10-20 years</td>
<td>Makes funds available immediately; ties payments to benefits received; potentially lower interest costs</td>
<td>Increases rates; competition with other local agencies for funds</td>
</tr>
<tr>
<td>General obligation bonds (&quot;tax-supported&quot;)</td>
<td>Immediately</td>
<td>By tax payers over 10-30 years</td>
<td>Makes funds available immediately; ties payments to benefits received; potentially lower interest costs</td>
<td>Increases taxes; compete with other local services for limited bond funds; separate payment from benefit</td>
</tr>
<tr>
<td>Assessment-supported bonds</td>
<td>Immediately</td>
<td>By assessed customer over 10-30 years</td>
<td>Makes funds available immediately; matches payments to benefit</td>
<td>Requires legislative approval; not practical for projects that serve all or most customers; assessments can become burdensome to customers</td>
</tr>
<tr>
<td>Assessments (unbounded)</td>
<td>Immediately</td>
<td>By assessed customer at time of construction</td>
<td>Makes funds available immediately; matches payments to benefit</td>
<td>Requires legislative approval; may have serious impact on assessed customers</td>
</tr>
</tbody>
</table>

#### Funding Source

<table>
<thead>
<tr>
<th>Provides Funds</th>
<th>Repayment</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital fees (hook-ups, taps, system development of impact fees)</td>
<td>Immediately</td>
<td>By new customers immediately</td>
<td>Requires new customers to pay for impacts they place on system</td>
</tr>
<tr>
<td>Reserves</td>
<td>In future</td>
<td>By rate payers each year until reserve is adequate</td>
<td>Eliminates need for borrowing; improves financial stability of system</td>
</tr>
<tr>
<td>User charges</td>
<td>Immediately</td>
<td>By rate payers immediately</td>
<td>Eliminates need for borrowing or reserves</td>
</tr>
</tbody>
</table>

Source: U.S. EPA
Paying for water service III

<table>
<thead>
<tr>
<th>Source of Funding</th>
<th>Percent of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water rate revenue</td>
<td>89%</td>
</tr>
<tr>
<td>General obligation bonds</td>
<td>37%</td>
</tr>
<tr>
<td>State revolving fund loan</td>
<td>23%</td>
</tr>
<tr>
<td>Other</td>
<td>9%</td>
</tr>
</tbody>
</table>

Planning Water Loss Survey, 2013. More than one answer could be selected. n = 79.

Figure 1. Estimated percentage of utilities using source of funding.
Full cost pricing definition

“implies that **all private and social costs** associated with a product or activity (and determined using full cost accounting) are included in the price of an activity”

See Conway-Schempf, PhD. *Full Cost Accounting* [http://gdi.ce.cmu.edu/gd/education/FCA_Module_98.pdf](http://gdi.ce.cmu.edu/gd/education/FCA_Module_98.pdf)
Analogy: what is the full cost of driving?

- Gas
- Maintenance
- Operation
- Financing
- Road Maintenance & Construction
- Traffic Congestion
- Emissions Impacts
Full cost water pricing

- Operations, Maintenance, Administration
- Debt Service
- Reserves
- Infrastructure Renewal and Repair
- Infrastructure Replacement
- Planning & Programming
- Water Source Protection

Cost of Service Water Rates
Cost of Resource Depletion & Degradation
Full Cost
Cost of service rates: the pricing gap

Adjusting price towards full supply cost.

FULL SUPPLY COST PRICING

OPERATION AND MAINTENANCE COST

CAPITAL COST

CURRENT COSTS

REPLACEMENT AND GROWTH

TRADITIONAL PRICING

OPERATION AND MAINTENANCE COST (SUBSIDIZED)

CAPITAL COST (HISTORIC, SUBSIDIZED)

PRICING GAP

STEP 1: IDENTIFY REVENUE REQUIREMENTS

WATER AND WASTEWATER REVENUE REQUIREMENTS
- OPERATING COSTS
- CAPITAL REQUIREMENTS

STEP 2: DETERMINE COST OF SERVICE

ALLOCATE REVENUE REQUIREMENTS TO CUSTOMER CLASSES

RESIDENTIAL
COMMERCIAL
INDUSTRIAL
GOVERNMENTAL
SPECIAL CONTRACT CUSTOMERS

STEP 3: DESIGN RATE STRUCTURE

FIXED CHARGE BY:
- ACCOUNT
- METER SIZE
- EQUIVALENT RESIDENTIAL UNIT
- OTHER FIXED UNIT

RECOVERS VARIOUS COSTS ON A FIXED BASIS
- CUSTOMER SERVICE COST
- CAPITAL REQUIREMENTS
- FIXED O & M COST
- COMBINATION

FIXED CHARGE

CONSUMPTION CHARGE

RECOVERS REMAINING REVENUE REQUIREMENTS

VARIABLE CHARGES BY:
- 1,000 GALLONS
- 100 CUBIC FEET
- OTHER VOLUMETRIC UNIT

Source: George A. Raffelli, Water and Wastewater Finance and Pricing.
Revenue sufficiency

- annual operation and maintenance expenses
- financing of capital costs
- maintenance of working capital and required reserves
- achievement of defined financial performance metrics
- support of an asset management program
Step 1: Revenue requirements

Investor-owned - Rate based, rate of return method
  - O&M, depreciation, taxes, rate of return on rate base

Municipal - Cash flow method
  - O&M, debt service, reserves, capital additions

### Revenue Requirements

<table>
<thead>
<tr>
<th>Fixed Costs</th>
<th>Variable Costs</th>
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<tr>
<td>Capital Recovery</td>
<td>O &amp; M</td>
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<tr>
<th>Cost of Capital</th>
<th>Return on Equity</th>
<th>Interest on Debt</th>
<th>Depreciation</th>
<th>Taxes, Other, Fixed</th>
<th>Other</th>
<th>Customer Accounting</th>
<th>Energy</th>
<th>Chemicals</th>
<th>Labor</th>
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Adapted from Beecher 2009
Step 2: Cost of service rate setting

Cost allocation by function
- Water
- Wastewater
- Stormwater

Rate differentiation by customer classes
- Price according to user costs imposed on the system

Rates differentiated by
- Type of Customer
- Meter Size
- Meter Type
- Location
- Structural Attributes
- Water Source
- Real Estate Tax Status
- Senior Citizen Status
Step 3: Design rate structure
Rate-design options for $20 revenue recovery

Source: Adopted from Beecher (2009)
Step 3: Design rate structure

Price/unit vs. Quantity consumed

- Increasing-block
- Uniform
- Decreasing-block

Source: Adopted from Beecher (2009)
Illinois guidelines and regulations

- Illinois Commerce Commission (ICC)
  - Illinois Public Utilities Act (220 ILCS 5/)
  - Electric Supplier Act [220 ILCS 30/]
  - Title 83: Public Utilities
  - Others...
- Citizens Utility Board Act (220 ILCS 10/)
- Local Records Act (50 ILCS 205/)
- Stormwater fee
  - Illinois Municipal Code 65 ILCS 5/Art. 11 Div. 139 and 141

Figure 3. Population served by water utility ownership

Rate design: art, politics, science

Adapted from Sheard 2009
Balancing fixed and variable charges

- Recovering more revenue through fixed charges
- Recovering more revenue through variable charges
- Revenue Stability
- More Revenue Risk
- Weakens price signal
- Strengthened price signal
- Revenue Sufficiency
- More Equitable
Why Benchmarking?

- Benchmarking rates to multiple objectives (cost recovery, affordability, conservation, can help communities make better water pricing decisions

- Benchmarking can also help build internal and external support for water rate policies.

- Provide regional snapshot.

- Performance Indicators (PI)
  - How are we performing?
  - How do we compare?
  - How can we improve?
# Metrics for Benchmarking

<table>
<thead>
<tr>
<th>Description of Metric</th>
<th>Calculation</th>
<th>Benchmark</th>
</tr>
</thead>
</table>
| Operating Ratio                                | \[
\frac{\text{Operating Revenues}}{\text{Operating Expenses}}
\]                                      | 1.0       |
| Debt Service Coverage Ratio                    | \[
\frac{\text{Operating Revenues} - \text{Operating Expenditures}}{\text{Debt Service}}
\]                                      | 1.0       |
| Active Debt per Customer                       | \[
\frac{\text{Total Active Debt}}{\text{Number of Customers}}
\]                                      | Average   |
| Percent of Annual Operating Expenditures in Cash Reserves | \[
\frac{\text{Cash Reserves}}{\text{Annual Operating Expenditures}}
\]                                      | One month |

Source: Adapted from UNC School of Government Environment Finance Center  The State of Full Cost Pricing: Full Cost Pricing Among Public Water & Sewer Utilities in the Southeast 2008
IISG Northeastern Illinois Water/Wastewater/Stormwater Rate Survey

- Covers NE Illinois region planning area.
- Rates collected from local ordinances, and telephone contacts.
- Result is a sample of 238 water supply systems (FY2017)
- Municipal level data includes:
  - Billing frequency, water source, water unit, base rate, volumetric rate, rate structure, block rates and size.
  - Allows for calculation of representative monthly water/wastewater bills for benchmarking.
State of your rates? Benchmarking Tool

State of your rates?
http://www.efc.sog.unc.edu/reslib/item/northeast illinois water and wastewater rates dashboard#

Created: David Tucker, Environmental Finance Center at University of North Carolina at Chapel Hill (http://efc.sog.unc.edu) & funder (U.S. EPA)
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Questions?

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