Are Your Utility Rates Defensible? Establishing Cost-Based Utility Rates

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Current Utility Rate Issues

- Hesitancy of governing bodies to adjust rates
  - “It’s the economy”
- Lack of adequate funding to fund the repair and replacement of existing utility infrastructure
- Declining water consumption
  - Revenue shortfalls
  - Places greater emphasis on establishing cost-based fixed charges
Your Last Public Rate Hearing?

There must be a better way!
Overview of Utility Rate Making
What is the Role of Rates?

- **Customers Care About**
  - Is the service on?
  - Is the service of acceptable quality?
  - Amount of their bill

- **The Bill (Rates)**
  - Primary communication with customers
  - Primary determinant of utility performance
  - Influence consumption (how and when) and efficient use
  - Social goals
  - Fair/equitable

- **Financial Viability**
  - Pays the bills
  - Revenue stability—matching cash inflows and outflows
  - Funding the future – O&M and Capital Needs
Review of the Global Rate Setting Principles

- Global Principles Around Which Rates Must (Should) be Set
  - Rates should be **cost based** and **equitable** and set at such a level that they meet the full revenue requirements of the utility (O&M and Capital)
  - Rates should be **easy to understand and administer**
  - Rates and the process of allocating costs should conform to **generally accepted** rate setting techniques
  - Rates should be **stable** in both their ability to provide adequate revenues to meet the utility’s financial, operating and regulatory requirements and in the customer’s perception of the rates from year to year
The Rate Setting Decision Pyramid

- Federal Laws/Regulations
- Bond (Legal) Covenants
- Policies
- Principles
Establishing Written Financial Policies

• Few utilities have written policies concerning the financial planning and rate setting process

• Advantages of written policies
  – Written policies provide clear policy direction to management
  – For policy-makers – provides a consistent and business-based decision-making framework
  – Written policies help to move the financial planning and rate decisions from a political “tug of war” to prudent “business decisions”
  – Bond ratings (best management practice)

• Recommend establishing written financial and rate setting polices for each utility
Overview of the Rate Setting Process

Revenue Requirement

Compared the revenues of the utility to its expenses to determine the overall level of rate adjustment.

Cost of Service

Equitably allocates the revenue requirements between the various customer classes of service.

Rate Design

Design rates for each class of service to meet the revenue needs of the utility, along with any other rate design goals and objectives.
Developing Revenue Requirements

A “Step by Step” Approach
Overview of Developing Revenue Requirements

• Compares Sources of Funds with Applications of Funds

• Test Periods—Establishing the method of determining revenue requirements
  – Historical—a recent “typical” year, accounting based
  – Projected—budgeted or forecasted
  – Pro forma—historical base year with adjustments for “known and measurable” changes

• “Cash Basis” versus “Utility/Accrual Basis”
Comparison of “Cash Basis” and “Utility/Accrual Basis”

<table>
<thead>
<tr>
<th>Cash Basis</th>
<th>Utility Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ O&amp;M Expenses</td>
<td>+ O&amp;M Expenses</td>
</tr>
<tr>
<td>+ Taxes/Transfer Payments</td>
<td>+ Taxes/Transfer Payments</td>
</tr>
<tr>
<td>+ Debt Service (P&amp;I)</td>
<td>+ Depreciation Expense</td>
</tr>
<tr>
<td>+ Capital Projects Funded from Rate Revenues</td>
<td>+ Return on Rate Base</td>
</tr>
<tr>
<td>Σ = Total Revenue Requirements</td>
<td>Σ = Total Revenue Requirements</td>
</tr>
</tbody>
</table>

Where: Rate Base =

+ Original Cost of Plant
− Accumulated Depreciation
= Net Plant in Service
+ Working Capital
− Contributions in Aid
= Rate Base
Detail of the “Cash Basis” Approach

\[
\begin{align*}
&\text{+ O&M Expenses} \\
&\text{+ Taxes/Transfer Payments} \\
&\text{+ Debt Service (P&I)} \\
&\text{+ Capital Projects Funded from Rates} \\
&= \text{Total Revenue Requirements} \\
&- \text{Miscellaneous Revenues} \\
&= \text{Balance Required from Rates}
\end{align*}
\]

\[
\begin{align*}
&\text{+ Total Capital Projects} \\
&- \text{Long-Term Debt (Bond Proceeds)} \\
&- \text{Reserves} \\
&- \text{Grants} \\
&- \text{Customer Contributions (e.g. DIF’s)} \\
&= \text{Capital Projects Funded from Rates}
\end{align*}
\]

\[(i + \text{Term}) \geq \text{Annual Deprec. Exp.}\]
## Simple Layout For Capital Infrastructure Planning Purposes

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Project 1</td>
<td>$500,000</td>
<td>$500,000</td>
<td>$500,000</td>
</tr>
<tr>
<td>Capital Project 2</td>
<td>0</td>
<td>3,000,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Capital Project 3</td>
<td>250,000</td>
<td>400,000</td>
<td>600,000</td>
</tr>
<tr>
<td><strong>Total Capital Projects</strong></td>
<td><strong>$750,000</strong></td>
<td><strong>$3,900,000</strong></td>
<td><strong>$2,100,000</strong></td>
</tr>
</tbody>
</table>

**Less: Outside Funding Sources**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserve Funds</td>
<td>0</td>
<td>$650,000</td>
<td>$350,000</td>
</tr>
<tr>
<td>Revenue Bonds</td>
<td>0</td>
<td>2,500,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Connection Fees</td>
<td>50,000</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td><strong>Total Outside Funding</strong></td>
<td><strong>$50,000</strong></td>
<td><strong>$3,200,000</strong></td>
<td><strong>$1,400,000</strong></td>
</tr>
</tbody>
</table>

**Net Balance Funded From Rates**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>$700,000</strong></td>
<td><strong>$700,000</strong></td>
<td><strong>$700,000</strong></td>
<td></td>
</tr>
</tbody>
</table>
Capital Infrastructure Funding

• Lack of adequate and prudent funding to maintain existing facilities is a major industry issue
  – U.S. has billions in deferred maintenance projects
• Failure to adequately repair, replace or improve a utility’s infrastructure simply leads to higher overall costs
• The need to establish a policy or philosophy for consistent and adequate funding within rates for repair and replacement (R&R) activities
Methods to Establish **Minimum** Repair and Replacement Rate Funding Levels

- **Minimum rate funding** is generally a function of current plant investment or future capital plans
  
  - ≥ Annual Depreciation Expense
    - Currently $750,000/year
    - Depreciation expense is *not* the same as replacement cost
  
  - Replacement Cycle (Average Useful Life)
    - $25 M in plant and 50 year replacement cycle = $500,000/year
  
  - Replacement Cost/Replacement Cycle
    - $50 M in replacement value and 50 year replacement cycle = $1 M per year funding needs

- **Current plant** is $25 M with ≈ $250,000 in annual rate funding = 100 year replacement cycle (at replacement cost may be ≈ 150 to 200 years)
Better Yet – Asset Management Plans

• Depreciation expense is an accounting convention
  – Useful life vs. service life
  – Actual service life is a function of many issues

• Asset management plans provide a systematic method of assessing replacements
  – Condition assessments
  – Financial plan

• An asset management plan provides the framework for prudent and sustainable infrastructure decisions
Types of Capital Infrastructure Projects and Methods of Funding

• “Renewal and Replacement” Projects
  – Need for adequate funding from rates/debt
• “Legally Mandated” Projects
  – Grants
  – Low-Interest Loans
  – Bond Funding (Typically Revenue Bonds)
• “Growth Related” Projects
  – System Development Charges/Rates/Debt
Other Key Financial Planning Considerations

- Financial Planning Considerations
  - Debt service coverage ratios
    - Planning target vs. minimum rate covenant
  - Reserve levels
    - Types of reserves and establishing minimum levels
## Interrelationship Between Rate Funded Capital and Debt Service Coverage

<table>
<thead>
<tr>
<th>Calculating Debt Service Coverage</th>
<th>Source of Coverage Above 1.00 DSC</th>
<th>DSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Total Revenues</td>
<td>+ O&amp;M Expenses</td>
<td></td>
</tr>
<tr>
<td>– O&amp;M Expenses</td>
<td>+ Taxes</td>
<td></td>
</tr>
<tr>
<td>– Taxes</td>
<td>+ Debt Service</td>
<td>= 1.00</td>
</tr>
<tr>
<td></td>
<td>+ Balance After Debt Pmt/CIP from Rates</td>
<td>&gt; 1.00</td>
</tr>
<tr>
<td></td>
<td>= Total Revenue Requirements</td>
<td></td>
</tr>
</tbody>
</table>

Balance Available for Debt Service Payment

\[
\frac{\text{Balance Available for Debt Service Payment}}{\text{Debt Service Payment}} = \text{DSC}
\]

**Note:** Refer to your specific bond covenants for purposes of calculating debt service coverage ratios.
Examples of the Interrelationship Between Rate Funded Capital & DSC

<table>
<thead>
<tr>
<th>Example 1</th>
<th>Example 2</th>
<th>Example 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Revenues</td>
<td>$4,000,000</td>
<td></td>
</tr>
<tr>
<td>O&amp;M Expenses</td>
<td>2,000,000</td>
<td></td>
</tr>
<tr>
<td>Taxes</td>
<td>1,000,000</td>
<td></td>
</tr>
<tr>
<td>Balance Avail for Debt Service</td>
<td>$1,000,000</td>
<td>1.00</td>
</tr>
<tr>
<td>Debt Service Payment</td>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Balance for CIP (Rate Funded)</td>
<td>$0</td>
<td>$300,000</td>
</tr>
</tbody>
</table>

**Note:** In financing capital projects, there is a trade-off between debt funded capital and rate funded capital
# Example of the Summary of the Water Revenue Requirement ($000)

<table>
<thead>
<tr>
<th>Sources of Funds</th>
<th>CY 2009</th>
<th>CY 2010</th>
<th>CY 2011</th>
<th>CY 2012</th>
<th>CY 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate Revenues</td>
<td>$33,982</td>
<td>$33,982</td>
<td>$33,982</td>
<td>$34,152</td>
<td>$34,323</td>
</tr>
<tr>
<td>Miscellaneous Revenues</td>
<td>$4,107</td>
<td>$3,719</td>
<td>$3,909</td>
<td>$3,936</td>
<td>$3,961</td>
</tr>
<tr>
<td>Total Source of Funds</td>
<td>$38,090</td>
<td>$37,701</td>
<td>$37,891</td>
<td>$38,088</td>
<td>$38,283</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application of Funds</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Operations &amp; Maintenance</td>
<td>$25,687</td>
<td>$26,625</td>
<td>$27,596</td>
<td>$28,603</td>
<td>$29,504</td>
</tr>
<tr>
<td>Taxes and Transfers</td>
<td>8,767</td>
<td>8,747</td>
<td>8,757</td>
<td>8,801</td>
<td>8,845</td>
</tr>
<tr>
<td><strong>CIP From Rates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIP From Rates Capital Plan</td>
<td>$3,225</td>
<td>$3,225</td>
<td>$3,225</td>
<td>$3,242</td>
<td>$3,258</td>
</tr>
<tr>
<td>CIP From Rates Operations Complex</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total CIP from Rates</td>
<td>$3,225</td>
<td>$3,225</td>
<td>$3,225</td>
<td>$3,242</td>
<td>$3,258</td>
</tr>
<tr>
<td>Debt Service</td>
<td>$1,070</td>
<td>$1,147</td>
<td>$1,111</td>
<td>$1,050</td>
<td>$1,037</td>
</tr>
<tr>
<td>Additional Capital Improvement</td>
<td>(660)</td>
<td>(1,024)</td>
<td>(722)</td>
<td>(418)</td>
<td>(6)</td>
</tr>
<tr>
<td><strong>TOTAL REVENUE REQUIREMENT</strong></td>
<td>$38,090</td>
<td>$38,720</td>
<td>$39,967</td>
<td>$41,278</td>
<td>$42,639</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plus: Additional Taxes with Rate Increase</td>
<td>$0</td>
<td>$255</td>
<td>$520</td>
<td>$798</td>
<td>$1,090</td>
</tr>
<tr>
<td>Balance/(Deficiency) of Funds With Added Tax</td>
<td>$0</td>
<td>($1,274)</td>
<td>($2,596)</td>
<td>($3,988)</td>
<td>($5,445)</td>
</tr>
<tr>
<td>Balance as a % of Rate Adjustment Required</td>
<td>0.00%</td>
<td>3.75%</td>
<td>7.64%</td>
<td>11.68%</td>
<td>15.87%</td>
</tr>
</tbody>
</table>

| Proposed Rate Adjustment               | 0.00%   | **3.75%**| **3.75%**| **3.75%**| **3.75%**|
Example of a Summary of a Rate Transition Plan

<table>
<thead>
<tr>
<th>Year</th>
<th>Present Average Monthly Bill</th>
<th>Proposed Rate Increase</th>
<th>Customer Bill on Proposed Rate Increase</th>
<th>Monthly Bill Difference</th>
<th>Cumulative Bill Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>$23.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>$23.93</td>
<td>3.75%</td>
<td>$24.82</td>
<td>$0.90</td>
<td>$0.90</td>
</tr>
<tr>
<td>Projected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td>3.75%</td>
<td>$24.82</td>
<td>$0.90</td>
<td>$0.90</td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td>3.75%</td>
<td>$25.75</td>
<td>$0.93</td>
<td>$1.83</td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td>3.75%</td>
<td>$26.72</td>
<td>$0.97</td>
<td>$2.79</td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td>3.75%</td>
<td>$27.72</td>
<td>$1.00</td>
<td>$3.80</td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td>3.75%</td>
<td>$28.76</td>
<td>$1.04</td>
<td>$4.84</td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td>3.75%</td>
<td>$29.84</td>
<td>$1.08</td>
<td>$5.91</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td>3.75%</td>
<td>$30.96</td>
<td>$1.12</td>
<td>$7.03</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td>3.75%</td>
<td>$32.12</td>
<td>$1.16</td>
<td>$8.19</td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td>3.75%</td>
<td>$33.32</td>
<td>$1.20</td>
<td>$9.40</td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td>3.75%</td>
<td>$34.57</td>
<td>$1.25</td>
<td>$10.65</td>
</tr>
<tr>
<td>2020</td>
<td></td>
<td>3.75%</td>
<td>$35.87</td>
<td>$1.30</td>
<td>$11.94</td>
</tr>
</tbody>
</table>
Example of a Summary of Capital Improvement and Reserve Funding

Average Monthly Water Bill

Reserve Funds

Capital Expenditures
Summary of the Revenue Requirement Analyses

- Developed based upon overall utility objectives
- Should be developed and based upon “prudent” financial planning criteria
- The revenue requirement analysis determines adequate funding for the utility to operate on a financially stable basis
Cost of Service Studies

“Splitting the Pie”
The Two Main Objectives of a Cost of Service Study

- Determine the cost to serve each class of service (Do cost differences exist?)
- Derive average unit costs, which are useful for rate design purposes

A cost of service provides the cost-basis for an equitable allocation of costs
Water System Network

River

Source and Treatment

Well Field

Filter Plant

Storage Reservoir

Transmission

Industry X

System A

Zone 1

System C

Zone 2

Industry Y

Zone 3

Industry Z

System B
Rate Differentials for Inside vs. Outside City Customers

• Most municipal utilities have a rate differential for inside vs. outside City customers
  – Typical range of differentials - 0% to 100%

• Basis for the differential
  – Ownership
  – Risk
  – Fair return on investment
  – Other??

• Cost Allocation Issues –
  – Can you demonstrate a 50% or 100% cost differential between inside and outside customers?
Example of a C-O-S Summary Table and Average Unit Cost Table

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue at Present Rates</td>
<td>$2,269,610</td>
<td>$1,258,040</td>
<td>$785,220</td>
<td>$226,350</td>
</tr>
<tr>
<td>Allocated Costs</td>
<td>2,383,100</td>
<td>1,336,455</td>
<td>799,865</td>
<td>246,780</td>
</tr>
<tr>
<td>$ Difference</td>
<td>$113,490</td>
<td>$78,415</td>
<td>$14,645</td>
<td>$20,430</td>
</tr>
<tr>
<td>% Difference</td>
<td>5.0%</td>
<td>6.2%</td>
<td>1.9%</td>
<td>9.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodity Costs - $/1,000 gal.</td>
<td>$1.26</td>
<td>$1.26</td>
<td>$1.26</td>
<td>$1.26</td>
</tr>
<tr>
<td>Capacity Costs - $/1,000 gal.</td>
<td>$0.73</td>
<td>$0.92</td>
<td>$0.63</td>
<td>$0.44</td>
</tr>
<tr>
<td>Total Costs - $/1,000 gal.</td>
<td>$1.99</td>
<td>$2.18</td>
<td>$1.89</td>
<td>$1.70</td>
</tr>
<tr>
<td>Customer Costs - $/Cust./Mth.</td>
<td>$13.53</td>
<td>$9.75</td>
<td>$15.32</td>
<td>$457.68</td>
</tr>
</tbody>
</table>
Results of the Cost Allocation Process

• An equitable allocation of costs that considers:
  – Usage characteristics
  – Facility requirements

• Average unit costs
  – Cost-based rate designs
Rate Design
Goals of Rate Design

- Yield the Total Revenue Requirements
- Easy to Understand
- Easy to Administer
- Continuity in Philosophy
- Equitable and Non-Discriminating (Cost-Based)
- Provide Revenue Stability
- Promote Efficient Allocation of Resources
Key Issues With Rate Design

- Level vs. Structure
- Price elasticity (sensitivity)
- In theory, all rate designs should collect the same level of revenue
- Customer bill impacts and bill comparisons
- Affordability
Types of Rate Design

• **Declining Block**
  - 0 – 10 CCF @ $1.90/CCF
  - 11 – 100 CCF @ 1.80/CCF
  - 101 – 1,000 CCF @ 1.70/CCF
  - 1,001 – CCF @ 1.60/CCF

• **Inverted (Increasing) Block**
  - 0 – 10 CCF @ $1.50/CCF
  - 11 – 50 CCF @ 1.75/CCF
  - 51 – CCF @ 2.25/CCF

Note: May also be called a “tiered” rate structure
Types of Rate Designs (continued)

- **Uniform Block**
  All Usage @ $1.60/CCF

- **Seasonal Rate**
  Summer - $1.90/CCF
  Winter - $1.60/CCF
Types of Rate Designs (continued)

- Variable Meter Charge, with Flat Volume Charge
  - 5/8” x 3/4” meter $10.00/month
  - 1 inch meter 25.00/month
  - 1-1/2 inch meter 50.00/month
  - 2 inch meter 80.00/month
  - 3 inch meter 150.00/month
  - All usage $1.65/CCF
Understanding the Price Elasticity of Demand

Inelastic demand – large changes in price result in small changes in consumption

Elastic demand – small changes in price result in large changes in consumption
Determining “Affordability”

- Generally based upon a percentage of median household income
  - Percentage ranges from 1.5% to 2.5% per utility (water/wastewater)
  - Affordability measure is a community-wide measure and not an individual measure
  - Even if rates are “affordable” the utility may still want to address low income customers
Summary of Rate Design

• Setting cost-based and justified rates is a complex process

• Final Adopted Rate Designs Should:
  – Collect the desired level of revenues
  – Reflect the way costs are incurred (fixed vs. variable)
  – Reflect the balance of policy objectives against the desire for cost-based rates
If You Want to Learn More!

- **American Water Works Association (AWWA)**
  - 3 Day Financial Management Seminar
    - September 19 – 21st, Orlando, Florida
    - Earn CEU’s
    - [www.awwa.org](http://www.awwa.org)
  - AWWA M-1 Manual; *Principles of Water Rates, Fees and Charges*
  - Water Environment Federation; *Manual of Practice No. 27, Financing and Charges for Wastewater Systems*
Overview of the Speaker

Tom Gould, Vice President
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Bellevue, Washington 98004
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Tgould@HDRinc.com

Background and Experience:
Tom has over 32 years of consulting experience working primarily with public utilities in the specialized area of financial planning, cost of service and rates for water, wastewater, electric, solid waste and natural gas utilities. Tom has worked with utilities across the U.S. and Canada.

He is an instructor for the American Water Works Association Financial Management Seminar. He is a member of the AWWA Rates and Charges Committee. He is a contributing author to the AWWA M-1 Manual, Principles of Water Rates and Charges, and the AWWA M-34 Manual, Water Rate Structures and Pricing.