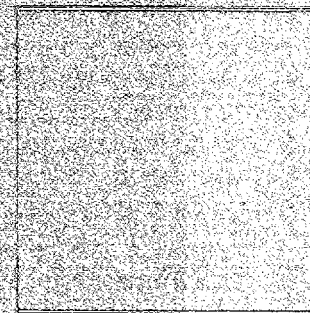
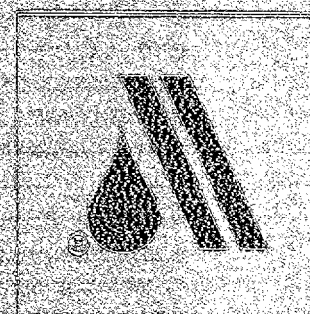
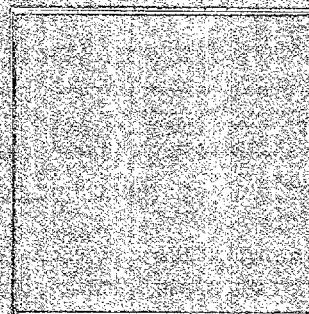




AMERICAN WATER WORKS ASSOCIATION

MANUAL OF WATER SUPPLY PRACTICES

Water Rate Structures and Pricing

AWWA M34

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AWWA MANUAL M34

Second Edition



American Water Works Association

MANUAL OF WATER SUPPLY PRACTICES—M34, Second Edition
Water Rate Structures and Pricing

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Preface

In 1954 the American Water Works Association (AWWA) published the report *Determination of Water Rate Schedules*, later issued as the first AWWA manual on water rates. Since then, AWWA Manual M1, *Water Rates*, has been updated several times, most recently in 1991. With each new edition, the water rates manual has included expanded discussions on water rate designs that differ from the single-class, declining block rates developed in the manual.

Utilities across North America have been developing and implementing water rates that vary from the once-traditional declining block rates. In response to the trend to develop innovative new rates, the AWWA Rates and Charges Subcommittee determined that a manual was needed to discuss rate alternatives being considered and used. In 1992 the subcommittee completed its work and AWWA published Manual M34, *Alternative Rates*.

The Rates and Charges Subcommittee recognized the need to update this popular manual as the use of new rate alternatives continued to grow through the 1990s. This updated manual expands on the previous edition by providing new rate alternatives, expanded discussions, and more current guidance. The manual has been given a new title to better reflect its contents. The rate structures and pricing policies are no longer alternatives—in many cases they are typical. While declining block rates were once considered the norm, they are now presented as one of the alternatives to consider.

As with all the rate-related books prepared by the Rates and Charges Subcommittee, this manual will not prescribe solutions. Rather, it is intended to provide guidance and advice. The examples presented are just that—examples. The underlying data and assumptions are not endorsed or recommended by AWWA or the Rates and Charges Subcommittee for use elsewhere. The purpose of this manual is to describe the different rate forms, enumerate the advantages and disadvantages of various alternatives, present likely effects on customers and the utility, and provide information to determine which rate structures are most relevant to a particular situation.

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Introduction

During the past 20 years, the cost of supplying drinking water has increased significantly. Reasons for the rapid increase include the passage and implementation of the US Safe Drinking Water Act, the need to develop more remote and expensive water supplies, the requirement to replace aging infrastructure, and rapid economic development in some areas. The increased cost of water resulted in increased water rates and charges.

Through most of the past century, a single schedule of declining block rates applicable to metered water sales to all classes of customers was prevalent across North America. Due to the relatively low cost of water in comparison to most other utility services, customers usually paid little attention to their water rates and rate structures. However, as water rates and charges have increased and water bills have become a more significant percentage of customers' overall expenses, consumer interest in the structure of rates has increased. Water utilities also recognize that the methods used to charge for service can influence customers' use patterns.

As a result of these changing attitudes, numerous alternative rate structures have evolved. In part, this increased awareness and interest has resulted from recognizing the effect water rates may have on a community's social, economic, political, and environmental goals. Recent national rate surveys indicate that the traditional declining block rate structure is no longer the primary rate structure used by water utilities in the United States. That structure has been replaced by numerous other rate structures and pricing policies that better reflect customer, community, and utility goals.

AWWA endorses the goal of water rates and charges that recover costs from classes of customers in proportion to the cost of serving those customers. AWWA also recognizes that other considerations must be balanced in determining rates and charges to reflect emerging objectives of the utility or the community it serves, or both.

During the analysis of alternative rate structures, the first consideration should be whether or not a rate or pricing alternative is consistent with state or local laws and policy directives. Some states and regulatory commissions have developed clear guidance on rate alternatives. For example, declining block rates are prohibited in at least one state. Other factors to consider include financial sufficiency, equity, flexibility, effect on customers, simplicity, ease of implementation, and water conservation.

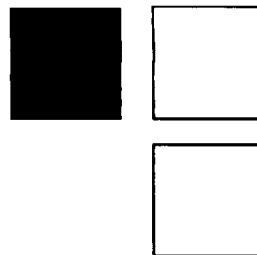
With the emergence of new rate and pricing policies there has been a continuing evolution in rate structures. In some cases, rates and rate structures may have been adopted to achieve certain goals without a full understanding of the effects or resulting implications. Some rate alternatives, if not properly designed, may even have effects that are counter to what was intended.

The intent of this manual is to help policymakers and rate analysts keep all relevant considerations in mind when evaluating and selecting alternative rate structures and pricing policies. This will help ensure that the selected rate forms achieve desired goals.

This manual presents information relating to the following four primary topics:

- the development and implementation of water rates and charges
- four fundamental rate structures—uniform rates, declining block rates, inclining block rates, and seasonal rates
- pricing issues
- several customer-specific pricing alternatives

Examples of rate structures provided in this manual include assumptions applicable to the alternative presented. They are presented for illustrative purposes only and are not intended to provide specific or comprehensive guidance in how to calculate such rates. Numerous variations can be used for each alternative presented. The examples in this manual show possible results based on the assumptions presented; they do not show the results that always or even typically occur. In most cases, data from AWWA Manual M1, *Water Rates* (Fourth Edition), have been used as a basis for the examples. These examples should not be used to determine specific rates or rate structures—they are for illustration only.



Chapter 1

Selection of Rate Structures

A utility is presented with a major challenge when it sets out to select a rate structure that is responsive to the philosophy and objectives of both the utility and its community. It is important to the utility and its customers to select the appropriate rate structure because the majority of the utility's revenues are collected through water rates and because pricing policies may support a community's social, economic, political, and environmental concerns.

A *water rate structure* is a fee or schedule of fees designed, among other things, to recover the utility's costs. Rate structures vary from utility to utility, but generally include three elements. First, they include consideration of the classifications of customers served (i.e., residential, commercial, and industrial). Second, they establish the frequency of billing. Third, they identify the charges or schedule of charges each classification of customer will be assessed.

It is this final element of a rate structure, the schedule of charges, on which utilities and customers tend to focus. These charges vary by utility in level (how high or low) and in design (how customers are charged). For water utilities that use a cost-of-service approach, the level of the utility's rates is a function of the utility's costs and customer demands. The design, however, is a function of many diverse and sometimes competing objectives.

When diverse and competing objectives are well understood and evaluated, a utility has the opportunity to design a rate structure that does more than simply recover its costs. A properly selected rate structure should support and optimize a blend of various utility objectives and should work as a public information tool in communicating these objectives to customers.

PLANNING THE RATE STRUCTURE STUDY

The process of selecting the most appropriate rate structure for a particular utility is not simple. The selection is complex because there are so many types of rate

structures. No one rate structure meets all utility objectives equally, and not all objectives are valued the same by the utility or its customers.

Because selecting the most appropriate rate structure is an important undertaking, it is advisable that the utility spend some time upfront planning the approach for the selection process. The process described in this chapter divides the study approach into three steps. It is important to remember that there is no one correct way to design a study of this nature. Among other things, planning the study approach is a valuable exercise that will identify ideas and obstacles. The actual study may deviate somewhat from the plan, but the plan should help keep the study moving in the right direction. As with any decision, selecting the appropriate rate structure depends on at least the following three components:

- defining the goals and objectives of the rate structure
- evaluating the available alternatives in meeting these goals and objectives
- understanding and communicating the potential effects on customers

Based on these three components, a rate selection process might include the following steps:

Step 1 Defining Goals and Objectives

This critical starting point is often difficult. Questions such as “Why is the study being conducted?”, “Is there a problem with the existing structure?”, and “What is the goal of the study?”, must all be addressed in order to focus the study scope. As part of this step, it is important to have a clear understanding as to why alternative rate structures are being considered. In order to determine if the existing method or an alternative rate structure best meets the utility’s needs, there must be a comprehensive understanding of the utility’s operations, its economic environment, and the customers it serves. It is also important to understand

- the utility’s history
- how customers responded to existing and previous rate structures and rate increases
- who are the major classes and major customers
- the availability of water resources
- the level of current or future costs
- customer and utility concerns
- socioeconomic status and concerns of customers
- legal constraints on the utility

These factors play an important part in determining which rate structure best meets the utility’s goals.

Next, the utility must determine its rate structure objectives. Rate structures can perform several functions that support the utility’s overall objectives. Rate objectives common to many utilities and their customers include

- yielding necessary revenue in a stable and predictable manner
- minimizing unexpected changes to customer bills
- discouraging wasteful use and promoting justified uses

- promoting fairness and equity
- avoiding discrimination
- maintaining simplicity, certainty, convenience, feasibility, and freedom from controversy
- compliance with all applicable laws

Evaluating and weighing alternative rate structures and effects against these objectives is, perhaps, the most important part in the process of selecting a rate structure.

Step 2 Evaluating Available Alternatives

The first item to assess when evaluating alternative rate structures is the level of effort allotted to the study. The availability of resources and time and the inclusion and degree of public involvement are primary drivers in determining this level of effort. More rigorous and technically complete studies, involving significant public input, require ample resources and time.

Public involvement (discussed in detail in chapter 3) can take many forms, but often it includes a core group of individuals who study the issue as a committee and periodically report and consult with the general public at open meetings. Typically, a committee should also have representation from utility management, finance staff, the governing board, and customer groups that would be affected by the rate structure. The composition of this committee is crucial if the results are to be meaningful and responsive to the utility's overall objectives. The committee must have credibility with the key parties involved with the utility, as well as with constituencies in the community they represent.

Next, a list of alternative rate structures needs to be identified. Although rate structures are generally composed of three components (who is charged, how often, and how much), most discussion about rate structures centers around the structure's consumption charge. Typically, there are four basic types of consumption charges, including declining block, uniform block, inclining block, and seasonal. These are discussed in detail in chapters 7 through 10. With these four basic types of consumption charges, combined with the additional option of service charges, meter charges, or minimum charges (see chapter 11), as well as the potential for various customer class configurations, there are numerous rate structures from which to choose. In order to facilitate the selection process, the study must focus on a reasonable number of suitable alternatives.

Finally, evaluation criteria are developed to determine how well each alternative rate structure meets the selected rate objectives. Evaluation criteria can be both quantitative and qualitative. It is commonly thought that a quantitative analysis is less subjective than a qualitative analysis and is, therefore, more favorable. However, most quantitative analyses are based on certain assumptions and data limitations. Hence, a quantitative analysis should not necessarily be construed as precise. In developing evaluation criteria, both quantitative and qualitative analyses may be appropriate depending on the objective being measured. For example, a quantitative analysis might be developed to measure a rate structure's effects on the objective of revenue stability; a qualitative analysis would be used to measure perceived fairness of a rate structure.

Step 3 Understanding and Communicating Outcomes

Most evaluations of rate structures have a technical format. The tendency when presenting the technical trade-offs, such as the revenue effects or typical customer bills under various rate structures, is to present the information in a quantified form. For many audiences, however, a numerical presentation of an evaluation is overly complicated and may not be well understood. The message often becomes lost in the numbers. Simple charts, graphs, and matrix figures tend to work well for a wide range of audiences because the display reinforces the message and the numbers add information. For diverse audiences (including decision makers) to understand them, technical outcomes must be presented in easily understood formats that express and support the technical analysis in nontechnical terms.

RATE STRUCTURE VARIABLES AND CONSIDERATIONS

Availability and Quality of Data

The importance of the availability and quality of data cannot be overemphasized. In order to perform a good rate structure evaluation, there must be reliable and ample data resources. Key types of information are past and projected cost records, water sales data by billing period and customer class, revenue data by billing period and type of charge, and other customer account data. Ideally this data will also include bill tabulation information. A bill tabulation displays the distribution of accounts and usage levels under current conditions. This information is often presented by customer class, meter size, month, season, or year. These data are necessary not only to determine the cost to serve each customer class, but also to estimate the billing effects of various rate structures to different types of customers. See chapter 4 for a detailed discussion of the data requirements for setting rates.

Customer Diversity

The water utility's total system demands, seasonal demands, facility needs, and the resulting costs are a function of the diverse demands among a water utility's customers. Recognizing and recovering the costs associated with different types of demand from the appropriate customer classes avoids subsidies among customer classes and minimizes potential subsidies within customer classes. Differences in demand patterns and facility requirements is typically the basis for distinguishing customer classes. This diversity of demand among classes results in different costs of service per unit of water sold.

Seasonality of Revenues and Costs

The seasonal variability of operating expenses and revenues should be reviewed when selecting a rate structure. It is likely that a utility's revenues will fluctuate to a greater extent over the course of a year than do the utility's operating expenses. The financial integrity of a utility requires that the utility's rate structure, along with other financial controls, support the cash flow needs of the utility by not jeopardizing the utility's ability to meet its annual and seasonal expenses.

It is also important to draw the distinction between operating expenses as they relate to cash flow and as they relate to a cost-of-service analysis. Although the operating expenses on a cash flow basis may not fluctuate dramatically, a cost-of-service analysis may indicate that a portion of the utility's costs are associated with meeting peak demands. For example, the payroll expense at the treatment plant may

occur at a relatively level amount each month but, based on cost-of-service principles, some of this cost may be allocated to peak demands.

Ability to Send Price Signals

Many of the desired outcomes of a rate structure depend on customers receiving a price signal, or bill. For a utility to maximize its price signal, customers must have timely information and the signal must be significant to customers.

The element of time is critical to sending a price signal. As long as utilities maintain monthly and bimonthly billing cycles, a customer's bill lags the initial week's consumption by at best one to two months. The customer's ability to respond to the signal quickly is limited because the signal arrives after the fact. Over the long term, however, it may be possible for customers to adjust their water consumption habits based on previous price signals.

Price Elasticity of Demand

Price elasticity of demand is a measurement of how buyers respond to changes in price. Under normal conditions, as the price of a product increases, buyers demand less of the product. This relationship, measured in percentages between the change in price and the change in demand, is called the *price elasticity of demand*.

All products have a different price elasticity of demand. Products that are non-price responsive, i.e., as price changes, the relative change in demand is small, are *price inelastic*. This is generally considered to be the case for water. See chapter 5 for more detailed discussion of price elasticity.

Weather Risks

For many communities, weather is a major concern when estimating annual water sales and revenues. It is important for a utility to examine the extent to which variations in weather may affect customer usage patterns and the utility's ability to meet its financial obligations. It is equally important for the utility and its customers to realize that some rate structures result in greater revenue and bill volatility because of seasonal weather patterns.

Implementing an Alternative

Before selecting an alternative structure, it is important to evaluate the time and cost of implementing the alternative. Elements of the new rate structure that might require additional time include collecting additional data, reclassifying customers into new classes, programming billing and accounting systems, and developing the rates.

SUMMARY

In general, a utility should determine how its rate structure can support its goals and objectives, which might include the following:

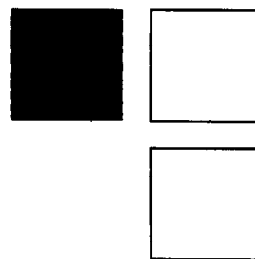
- yielding total revenue in a stable and predictable manner
- minimizing unexpected changes to customers
- discouraging wasteful use, and promoting justified uses
- promoting fairness and equity
- avoiding discrimination

6 WATER RATE STRUCTURES AND PRICING

- maintaining simplicity, certainty, convenience, feasibility, and freedom from controversy
- complying with all applicable laws

The level of effort allotted should be determined when a comprehensive study of alternative rate structures is to be undertaken, including evaluating the availability of data and how the public will be involved. This step includes listing alternatives to be studied and criteria to evaluate how each alternative meets the selected rate objectives. Finally, the trade-offs for each alternative rate structure need to be evaluated, measured, and communicated to decision makers.

The remaining chapters of this manual are designed to evaluate the benefits and detriments of various alternative rate structures. Selecting the most appropriate rate structure is a function of unique circumstances facing each utility and no one rate structure meets all objectives equally. In selecting a rate structure, a utility must evaluate the strengths and weaknesses of each rate structure and select the one that maximizes the overall objectives of the utility.



Chapter 2

Legal and Regulatory Considerations

Regardless of whether a water utility is government- or investor-owned, unless a tariff design and rate structure comply with governing statutes and case law, the decisions implementing such structures may not be upheld by the courts if challenged. Procedural requirements such as public notice, public input via hearings or written comments, council votes, or referendums must be strictly followed in order to avoid a reversal by a court on procedural grounds. Such procedural requirements vary significantly by state and by municipality and will not be addressed in this chapter. While the substantive law relative to rate setting also varies by state, there are common guiding principles that will be addressed, as well as significant differences among jurisdictions. It is important to note that, regardless of the statutory or case law at the time this manual was prepared, a review of the relevant statutes and case law should be made before making a major decision or change regarding tariff design.

JURISDICTION OF ECONOMIC REGULATION OF WATER UTILITIES

Authority over regulation of rates and rate design of water utilities differs depending on whether the utility is owned by the government (public ownership) or by shareholders (private ownership). Generally, the rates for private water utilities are regulated by state public utility commissions, while rates for most public water utilities are regulated by municipal boards, councils, commissions, water districts, etc. There are some states in which state public utility commissions exercise total or partial jurisdiction over public water utility rate setting. Moreover, some counties or municipalities have authority to set rates of private water utilities.

GENERAL LEGAL STANDARDS

In order to be upheld by the courts, rates, whether set by a municipal body or an investor-owned utility, need not be perfect. They must, however, be just and reasonable, and bear a rational relationship to a legitimate governmental interest. The cases that address rate setting show that there are myriad factors that may justify discriminatory rates among various classes of users. Historical and current cases continue to hold that it is only *unjust* or *unreasonable* discrimination that renders a rate or charge objectionable. It is important that in designing rates, all factors that create differences among classes of customers be analyzed and articulated in the ordinance or order authorizing the rate structure. As water bills become a larger percentage of customers' income and total expenses, more attention will be focused on the procedural and substantive techniques for allowing their implementation.

A basic tenet of the law involving municipal rate setting is that rates established in a lawful manner by a municipality or municipal authority are presumed to be reasonable, fair, and lawful.¹ A presumption of validity is accorded rates enacted by municipal ordinance and those challenging the rates bear the heavy burden of proving that the rates charged are unjustly discriminatory and unreasonable.² However, once sufficient evidence is introduced to challenge the validity of the presumption, the presumption becomes inoperative.³ A showing that rates lack uniformity is by itself insufficient to establish that rates are unreasonable and hence unlawful. To be objectionable, the discrimination must "draw an unfair line or strike an unfair balance between those in like circumstances having equal rights and privileges. It is only unjust or unreasonable discrimination which renders a rate or charge unreasonable."⁴ The rates charged by the municipality must be reasonable as well as free from unjust discrimination among the customers it serves "taking into account their situation and classification."⁵

The rate differential is but one factor to be considered in determining unjust discrimination. The rates charged by the utility must bear some relationship to the present or future costs of providing water service.⁶

Regardless of a duty imposed by statute, municipalities have a common law duty to charge reasonable rates. When a municipal corporation owns and operates a water system for the purpose of selling water to consumers, it is acting in a business capacity and is generally to be treated as if it were a private utility company.⁷ Compare with *Delony v. City of Little Rock et al.*,⁸ which held that the City acted in a governmental capacity in its ownership of the water system. See also, *County Water System, Inc. v. Salt Lake City*.⁹

FACTORS TO BE CONSIDERED IN DETERMINING IF RATES ARE UNREASONABLY DISCRIMINATORY

Both the reasonableness of, and the presence of unjust discrimination in, a rate-setting contract are questions of fact that must be determined from all of the circumstances surrounding the contract.¹⁰ For example, a municipal water system supplied water to a wholesale electric company located outside of its municipal boundaries. The water system increased its rates by 350 percent in 3 years, while the record showed that its actual costs during that period increased by 28 percent. The court held that the municipality not only breached an agreement with the company, but also illegally discriminated against the company under common and statutory law because it charged industrial users outside the city limits a higher rate than industrial customers located inside the city.¹¹ The test to determine whether or not

rates charged by a municipality are discriminatory is based on a consideration of such factors as differences in the amount of the product used, the time when used, the purpose for which used, and any other relevant facts reflecting differences in costs. Rates that are reasonably related to differences in costs of providing service are not unreasonably discriminatory.¹²

In concluding that there was a reasonable basis for surcharging a group of customers for water service that was particularized to them, a Massachusetts court upheld a surcharge on water users in an area in which a new water main was installed.¹³

Unreasonableness will be shown where the discrimination rests on the nonresident status of the user without an explanation of why nonresidents' rates should be higher.¹⁴ All nonresidents challenging a rate set by a municipality that differentiates between customers inside the municipal limits versus those outside those boundaries must show that the discrimination is not based on cost of service or some other reasonable basis.¹⁵

A city's first duty is to its own inhabitants who order and pay for a municipal plant directly or indirectly and who, therefore, have a preferred claim to the benefits resulting from public ownership. Based on this reasoning, courts have typically held that the municipality, in the absence of legislative limitation, may discriminate as to rates based solely on the political boundaries of the municipality.¹⁶

Courts have noted several factors, including the following, that justify increased rates to residents outside of the city:

- on average, service to those outside of the city involves greater expense than service to its residents
- the filter plant from which the water is distributed is inside the city
- in any given direction, the suburban areas lie farther from the plant than the intervening urban territory and these greater distances are shown to entail greater costs in the installation and maintenance of water mains and in the pumping of water
- the outlying districts are less densely populated than the city itself, which involves a greater average expense in the reading of meters and the making of service calls¹⁷

However, even if no cost differentials exist, other justifications could exist. Those factors may include additional risk of responsibility to finance a major repair in the event of catastrophe or breakdown, responsibility for ongoing replacement and repair of system components, contributions of residents to the initial construction of the system (tax or other funds or labor), and monies from the general fund used to pay salaries of those who manage and operate the system.

In interpreting two provisions of the Municipalities Authorities Act in *Township of Racoon v. The Municipal Water Authority of the Borough of Aliquippa*,¹⁸ the Pennsylvania Commonwealth Court held that there is no limitation that rates be reasonable and uniform where an authority contracts with another, presumably outside its limits (as compared to rates for service within its area). The court explained that the "discrepancy is not illogical when the difference between the two situations is examined. In the first case (inside the authority's limits), a municipal authority is granted the exclusive authority to set rates for its services. The recipient of these services has no input into the rate-making process. It is therefore protected by the provision requiring the rates to be reasonable and uniform and subject to judicial review. Such is not the case when two municipal bodies contract for

services...but that rate, of course, will be the subject of negotiation before a contract is concluded. There is nothing in the statute to prevent the inclusion of a clause providing for periodic rate increases and, conversely, nothing to prohibit setting a maximum rate...."

CURRENT TRENDS

A review of the cases decided recently reveals that in the municipal rate-setting arena, as in other areas of the law, courts are cognizant of economic and environmental change. This is particularly apparent in cases involving municipalities' attempts to set conservation rates and rates that attempt to attract or retain industry.

In *Flatley v. City of Malden*,¹⁹ the owner of an apartment complex with one water meter for each multiple apartment building, brought an action against the City challenging the propriety of the City's water rate system, which provided higher per unit rates for greater use, or inclining block rates. The rate structure was challenged on the basis that it created an impermissible discrimination between consumers who receive the same service under similar conditions, i.e., between apartment dwellers and residents of single-family dwellings. In upholding the lower court holding that the City's rates were not unreasonably discriminatory, the Appeals Court noted that the City's legitimate basis for creating the inclining block rates was to conserve water and that that purpose was achieved under the rate system challenged. The court also noted that if the City had charged single-family residences a flat rate, while charging apartment dwellers under an inclining block structure, such would have been unreasonably discriminatory.

In *Brydon v. East Bay Municipal Utility District*,²⁰ owners of single-family residences challenged the municipal utility district's inclining block water rate structure. In this case, the water rate structure was adopted as part of a Comprehensive Drought Management Program. The homeowners challenged the rate structure on the grounds that it violated the California constitutional prohibition against a "Special Tax" without two thirds voter approval. In upholding the inclining block rate structure, the court noted that such structure was a response to state mandated water resource conservation requirements. The court also went into an in-depth discussion of water usage in various districts and relative levels of water consumption and pointed out that 11 percent of single-family residences that use 35 percent of all water sold to the single-family market were placing a disproportionate strain on a frail market. The court stated that, "To the extent that certain consumers overutilize the resource, they contribute disproportionately to the necessity for conservation and the requirement that the District acquire new sources for the supply of domestic water."

The courts are cognizant of both environmental and economic conditions in reviewing challenged municipal rate structures. A recent Louisiana case, which addressed a charge against a municipality of discriminatory electric rates, is instructive. In *Liberty Rice Mill, Inc. v. City of Kaplan*,²¹ the Louisiana Court of Appeals held that a city ordinance restructuring municipal electric rates so as to retain a large customer and employer was not unreasonable and impermissibly discriminatory. In that case after Garan, Inc. (Garan), a local garment manufacturer threatened to relocate if its electric rates were not reduced. The City reduced its rates from 8.7 cents to 8.0 cents per kW•h and simultaneously raised Liberty Rice Mills' (Liberty) rates from 8.7 cents to 9.4 cents per kW•h. Liberty alleged that the 0.7 cent rate increase to it, coupled with the 0.7 cent decrease to Garan, was unreasonable and discriminatory.

The question presented was: "Is it unreasonably discriminatory to restructure rates because one entity has threatened to leave the system?"

The court referenced the leading Louisiana case of *Hicks v. City of Monroe Utilities Commission*.²² The issue in *Hicks* was whether or not the City could charge more for water to those customers outside the city limits who took water service only, than it did to customers also outside the city who took both water and electricity services. The court in *Hicks* held that setting water rates four times higher for customers not subscribing to the City's electric services than those customers subscribing to both water and electricity services was arbitrary, capricious, unreasonable, oppressive, and discriminatory and the rate could not be sustained since the basis for the classification was entirely collateral to and unconnected with the particular service being provided.

The municipal corporation has two classes of powers, one public (governmental) and one private (proprietary). In its proprietary functions, the municipality is held to the same responsibility as a private corporation. As a utility provider, the municipality acts in its proprietary role and one of its principal obligations in that capacity is the same as a private utility corporation—to serve its customers at a reasonable nondiscriminatory rate.

Although obligated to maintain a uniform nondiscriminatory rate among its customers, a municipal corporation operating a public utility nevertheless has the right to make a reasonable classification of its customers and to charge a different rate according to the classification based on such factors as the cost of service, the purpose for which the service is received, the quantity or amount received, the different character of the service provided, the time of its use, or any other matter that presents a substantial difference as a ground of distinction.

The underlying public policy rationale for approving discounted rates to a certain customer (Garan) was that eventually the entire community and all utility customers will benefit because of the effect that the preferential treatment has on attracting and retaining industry in the community. The court held that, "A classification and a rate schedule made for the purpose of keeping in the community industry that employs a large number of persons is not unreasonable." The court noted that there might have been better schemes, but that is not the standard. The classification merely has to be reasonable.

In one recent case, those challenging a city's rate structure claimed that certain rates or fees were "taxes" and thus subject to the jurisdiction of a state tax court. Although the determination of such cases is extremely dependent on state law, they are noteworthy because the appellate court held that the challenged rates were not taxes. In *West Capital Associates Limited Partnership v. City of Annapolis*,²³ the City brought an action against a water and sewer customer for breach of contract, seeking to collect unpaid real estate tax equivalent fees charged for water and sewer service to customers outside city limits under a utility agreement.

In this case, a developer owned a parcel of property, most of which was outside the city limits, and annexation was precluded by certain language in the industrial revenue bonds used to finance the project. The Annapolis City Code authorized the provision of water and sewer service to customers outside the city limits at twice the charge to customers inside the city limits, but allowed the city council, by ordinance, to approve an agreement including a rate equal to that charged city residents if the outside user agreed to make annual payments to the City in amounts equivalent to city real property taxes. Such agreement was signed and for a number of years the payments in lieu of real estate taxes were made. After a number of years, the developer refused to pay the fees and claimed that the fees were illegal and

unconstitutional because there was no reasonable relationship between the amount of the user charge and the cost of providing service.

In this case, the court also rebuffed a challenge to rates that were higher to those outside the city limits. The court noted that, absent a statute to the contrary, a municipality is not required and cannot be compelled to provide water or sewer service outside its geographic boundary. Further, the court stated that although municipalities are required to charge rates that are reasonable and not unfairly discriminatory, they may properly discriminate between residents and nonresidents and charge higher rates to the latter. The court then went on to discuss the facts that were not provided in the case.

The appellant in this case offered no evidence beyond the mere fact that the residential rates (inside the city) were lower than the rate contractually fixed for it (outside the city), to justify a charge that its rate was unreasonable or discriminatory. The court noted that no evidence was produced to show that the plant and facilities used to provide the water and sewer service were not, in some measure, supported by the general revenues of the city. If indeed, the ability to provide the service was funded to any extent by such revenues, even to the extent that the municipality-owned plant and facilities themselves are not subject to municipal taxation, then it would certainly be reasonable for the City to impose, as a surcharge on nonresidents, an additional amount in lieu of taxes that would be paid if the property were subject to the City property tax. Otherwise, the court explained, the city residents would, in effect, be subsidizing the nonresident user.

CONCLUSION

Whether one reviews the municipal rate-setting cases from a historical or a current perspective, it is clear that rates that are legally passed bear a presumption of validity and the burden of showing that such rates are unreasonably discriminatory rests with those challenging the rates. Municipal leaders, however, should not be sanguine about such a presumption because as rates increase as a result of the additional construction needed to meet environmental dictates, challenges to rate design will become more frequent and more organized. Well-organized challenges will present enough evidence that the burden will shift to the municipality to show the reasons why its rates are just and reasonable. Municipal officials can ready themselves for these disputes by preparing a cost-of-service study. Even if such study will not be used as the sole basis for rate setting (or at all), deviations from the cost-of-service study should be carefully analyzed and documented. The key to having municipal rates upheld by the courts is to analyze and document the factual basis for the rates selected. Accordingly, municipal officials should familiarize themselves with the engineering and accounting rationales for setting rates as well as keeping current on cases that address rate design, in order to authorize rates that will be upheld by the courts.

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Chapter 3

Public Involvement

Designing water rates through a structured public decision process involves an interactive exchange of ideas and information between utility decision makers and public stakeholders. It requires that involved stakeholders have the opportunity to meaningfully participate in the decision-making process. Public involvement is distinguished from public relations or public education efforts because it requires two-way communication.

The interactive nature of public involvement in water rate making involves communication techniques ranging from citizens advisory committees (CACs) to Internet surveys. Open interaction also requires establishing a structured decision process to provide appropriate exposure to the democratic process.

GENERAL CONSIDERATIONS AND POLICY ISSUES

Public involvement is not required to design water rates that meet utility requirements. In fact, under certain circumstances, public involvement may not be a viable option. Public involvement in decision-making processes that affect community stakeholders (over a broad range of issues) is a proven approach to enhancing public acceptance of utility policies. Considerations in determining the degree to involve the public in water rate development, and the form of this involvement, relate to

- the magnitude of potential effects on community stakeholders
- the extent to which options may reflect community values
- the extent to which the utility can (and is willing to) cede decision-making responsibility to community stakeholders

Beyond these general considerations, the development of water rates raises a number of important policy issues. For example,

- How should revenue responsibilities be distributed across customer classes?
 - Should variances from cost-of-service-based rates be eliminated, and if so, over what time period?
 - Should subsidies be provided to support economic development?

- Should water rates be structured to encourage water conservation, and if so, what conservation rate designs are appropriate for which customer classes?
- How should water rates be structured to address affordability concerns?

Resolution of these policy issues often involves balancing conflicting community values. For example, rates are often considered fair and equitable if they are based on cost of service. However, shifts in revenue responsibilities to affect cost-based rates may compromise economic development or affordability objectives.

Public involvement in utility rate development is beneficial in that affected parties are more likely to accept rate decisions if they have had the opportunity to participate in the rate development process. This principle is not unique to rate development, but is the basis for use of public involvement and structured public decision processes for a broad range of issues. Involving the public in rate development allows affected parties to identify unique cost allocation and rate design approaches that reflect community circumstances and values better than rate designs developed in isolation.

HISTORICAL PERSPECTIVES

Water rate development, like most utility decision making, historically has been a relatively closed process. Typically, utility staff or consultants conduct all major steps of the rate development process—projection of usage characteristics, estimation of revenue requirements, allocation of costs to customer classes, and rate design—without input or review by affected ratepayer representatives. For regulated utilities, this process culminates in submittals of rate filing packages in support of rate increase requests to the applicable regulatory body. Public involvement is essentially confined to participation of interveners in subsequent rate hearings. For municipal utilities, the annual municipal budget adoption process is analogous to the filing of a rate filing package; public involvement occurs during budget hearings.

For water rate changes that preserved relatively low-cost water service, as was largely the case through the 1970s, this limited level of public involvement was not particularly problematic. Several factors have heightened interest and public involvement in water rate design. Perhaps the most significant factor has been a trend of substantial increases in water rates in the 1980s and 1990s. As the stakes have increased, utility customers have increasingly demanded assurance that they pay their fair share of utility costs. Additionally, increased public interest in environmental stewardship in general, and water conservation in particular, has generated interest in conservation rate designs. Also, significant changes in costs and rate designs of other utility services, most notably electric and telephone service, have raised the question of whether or not similar changes may be available for water service.

PUBLIC INVOLVEMENT PLANNING

Heightened public interest in water rate development has increasingly led to use of public involvement strategies to gain acceptance of water rate changes. Utilities can follow the basic 10-step process outlined in the American Water Works Association Research Foundation's report *Public Involvement Strategies: A Manager's Handbook* to structure a public water rate decision process. Discussion of the 10-step process follows.

Ten-Step Approach to Public Involvement

The 10-step process highlights the importance of effective planning for public involvement. Eight of the 10 steps precede implementation and focus on establishing a strategy responsive to the specific circumstances and interests of potentially affected stakeholders. Specific issues or questions are raised by using these steps to develop public involvement strategies (see Figure 3-1).

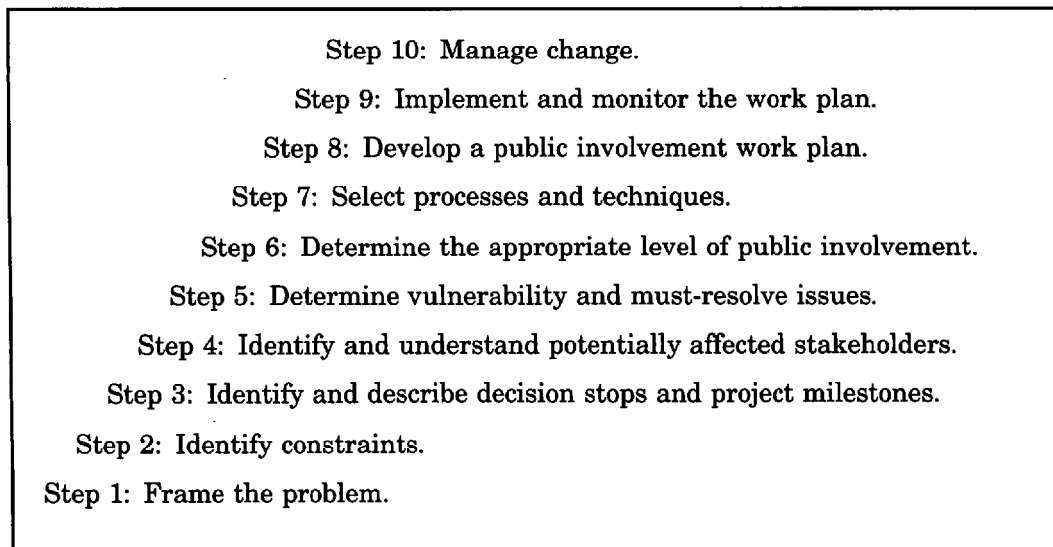


Figure 3-1 The 10-step process

Step 1 Frame the problem. Water rate development, by definition, involves determining the appropriate distribution of revenue responsibilities among customer classes. Rate design relates to selecting the particular structure of charges that recover allocated revenue responsibilities. Decisions on these issues reflect community values associated with the financial responsibilities of different ratepayer groups. Accordingly, public involvement on water rate issues addresses questions of how costs are allocated between customer classes, whether one customer class subsidizes another, and whether incentives are provided to use or conserve water resources. In this step, it is useful to prepare a brief problem statement, review factual information about customer demands and utility revenue requirements, and identify critical assumptions needed to develop rate alternatives.

Step 2 Identify constraints. Water rates are required to serve specific functions, most notably for generating adequate revenues to support utility performance and ensure the financial integrity of utility operations. An abundance of water rate litigation suggests that rates are generally required to be “just, reasonable, and non-discriminatory” (see chapter 2). Beyond these constraints, water rates generally do not gain public or political acceptance unless community values and sensitivities are respected. The step of identifying constraints on water rate changes determines the boundaries within which water rate alternatives may fall. For example, if implementing cost-of-service-based rates requires substantial increases in residential rates, then moving to such rates may require a multiple-year transition.

If environmental stewardship and promotion of water conservation is a strong community value, declining block rate designs may be problematic. Similarly,

inclining block rates may be equally problematic in communities seeking to encourage water-intensive development. Also, logistical constraints may exist on the level of public involvement available for water rate making. For example, rate adoption may be required within an internally or externally specified time frame, or budgetary constraints may practically limit available communication vehicles.

Step 3 Identify and describe decision steps and project milestones.

These rate-making constraints reflect the need to develop rate options that can gain the acceptance of utility decision makers, municipal and regulatory authorities, and ratepayers. Designing a public involvement program requires integrating the public decision process with the formal, legal process required to enact rate changes. Accordingly, the steps by which rate changes are approved and enacted should be clearly understood by all participants in the public decision process. Public involvement program planning should identify the vehicles and timing by which program participants have an opportunity to influence rate decision making.

It is particularly important to carefully delineate how public involvement efforts affect formal rate adoption steps when selected ratepayer representatives are asked to dedicate a substantial amount of time and effort to a public involvement program. For example, CACs are commonly formed to serve as advisory bodies to utility management or governing boards. These CACs are often not vested with decision-making authority, and serve only in an advisory capacity. This aspect of the CAC's role should be clearly explained at the outset of any public decision process to avoid unfounded expectations of decision-making authority.

Step 4 Identify and understand potentially affected stakeholders.

Alternative assignments of class revenue responsibilities and rate designs affect customer bills differently. Evaluating the merits of one alternative over another requires an understanding of the affected parties. An understanding of stakeholder perspectives is required to develop effective communication strategies about rate alternatives.

Stakeholder groups are not typically defined by the customer class groupings used to establish rates. Therefore, it is important to avoid the danger of evaluating stakeholder interests on the basis of customer class rate effects. In many instances, stakeholder group interests cut across customer classes; in other instances, they are quite specific. For example, environmental groups may be concerned about rate designs for industrial, commercial, and residential customers, while gardening club members are primarily composed of a subset of residential users. While each of these groups may have residential-class members, their views about water conservation rate designs are likely to be much different, as are the communications media by which they obtain information. At a minimum, it is important to identify and engage stakeholders whose support is required to secure rate adoption or whose opposition could compromise public acceptance of proposed rates.

Step 5 Determine vulnerability and must-resolve issues. Public involvement in water rate making is fundamentally a tool for utility managers to gain acceptance of water rate changes. Preserving existing rates is generally not a problem. Accordingly, when planning a public involvement program, it is important to structure a public decision process that ensures resolution of fundamental rate challenges. In some cases, this may be adoption of some form of systemwide rate increase. In other cases, the distribution of revenue responsibilities across customer classes may be at issue. In still other cases, rate designs to support water conservation, economic development, or other community goals may be of fundamental interest.

In any case, public involvement programs for water rate making should be focused on specific rate issues and be structured to ensure timely development of

acceptable rate options. To do so, while honoring stakeholder interests and concerns, an honest assessment of vulnerabilities is helpful. Vulnerabilities may be in the form of the potential for legal challenge of a given class's rates or simply (and commonly) the potential for given stakeholder groups to employ political influences to circumvent structured public decision processes. Vulnerabilities may range from a utility's credibility with potentially affected stakeholders, to decision-maker inexperience with rate issues, to changes in economic conditions that alter perspectives on the viability of potential water rate changes.

Step 6 Determine the appropriate level of public involvement. Answers to issues in step 5 indicate the extent to which public involvement may help resolve critical water rate issues and gain acceptance of water rate changes. In many instances, the must-resolve issues are limited and relatively simple. For example, acceptance of a limited systemwide rate increase without modifications to the distribution of class revenue responsibilities or rate structures is unlikely to require extensive public involvement.

An appropriate level may be achieved through a limited number of public meetings (or other forms of information exchange) in advance of the annual budget adoption process. This level would typically be supplemented by one-way forms of communications to advise interested stakeholders of proposed rate changes. In other cases, a concerted effort using multiple outreach forms may be required. These cases will often involve consideration of changes in the distribution of revenue responsibilities across and within customer classes or acceptance of substantial increases in overall rate levels.

Step 7 Select processes and techniques. Once the appropriate level of public involvement has been determined, utility managers can select from a broad range of processes and techniques to solicit ratepayer input and inform interested stakeholders. For all but the most limited of rate issues, an effective public involvement program uses multiple media to communicate with the broad diversity of stakeholder groups. Processes and techniques should be selected based on their effectiveness in communicating information to, and soliciting input from, particular ratepayer groups. Techniques should also be appropriate for the level of information detail to be communicated and the relative complexity of rate-making decisions.

For example, cost-of-service studies focus on relatively complex issues of interclass revenue distribution and rate structures. Public involvement programs for these studies often involve CACs composed of a broad spectrum of stakeholder representatives. Citizens advisory committees are particularly useful because of the zero-sum game nature of cost-of-service questions—every dollar of revenue responsibility not distributed to one customer class must be borne by other customer classes. For such studies, a forum for public discussion among representatives of all customer classes may avoid challenges by one customer class of preferential treatment of other classes. Because CACs are generally composed of a diverse mix of community representatives with competing interests, it is important to establish guidelines for committee interaction and its role in the public decision process. An example of such guidelines is provided in Figure 3-2.

For complicated rate issues, public involvement approaches may also include distribution of informational brochures or newsletters (possibly with accompanying survey instruments), speakers' bureaus, print or broadcast media articles, as well as a variety of public meeting forms. Recently, computer technology advances have made available additional information exchange vehicles. Many utilities now have Internet home pages that can be modified to allow ratepayers to access a wealth of information and provide input on rate issues.

The Citizens Advisory Committee (CAC) primarily advises the utility's rate study project team on public concerns and perspectives regarding water rate-making issues. The CAC operates under the following general guidelines and conditions, subject to consensus revision of rate study participants.

- CAC members are appointed by the utility's governing board and selected to ensure representation of a diversity of ratepayer groups. CAC members are asked to solicit the opinions of their constituency and articulate the positions of their memberships.
- CAC meetings may be open to the public and may include a period for general public comment.
- Members of the CAC do not hold voting positions or adopt recommendations under majority rule requirements. Rather, members participate in discussions of rate-making principles with the objective of developing consensus recommendations. In the event that consensus may not be achieved on specific issues, both majority and minority opinions will be considered by the project team and reported to the utility's governing board.
- CAC discussions review rate-making options for water rates to reflect community values and concerns. The rate study project team provides objective information on these rate-making options to the CAC and solicits CAC recommendations. The project team balances CAC recommendations with its fiduciary and management responsibilities in selecting from available rate-making options. CAC recommendations are usually nonbinding on either the rate study project team or the utility's governing board. However, all CAC recommendations will be documented and forwarded to the utility's governing board for their review and consideration.
- Project team decisions are reported to the CAC once determined but are not subject to rereview during subsequent CAC meetings. Similarly, the CAC does not review and recommend reconsideration of past utility decisions. In particular, CAC activities do not duplicate existing budget practices or processes.
- Project team support of CAC activities is limited to providing information necessary for considering outstanding rate-making issues and decisions. The project team provides information available from utility records, which may be collected and distributed without extensive expenditures of staff time or budget resources.
- The CAC ceases with the completion of the rate study project and adoption of water and wastewater rates. CAC membership is voluntary and is not to be compensated by the utility.

Figure 3-2 Suggested citizens advisory committee guidelines

Step 8 Develop a public involvement work plan. The steps previously described about planning a public involvement program mention a number of activities that typically cross the responsibilities of several functional organizations within a utility. Customer service personnel need to know about the planned rate development process and be able to direct inquiries appropriately. Financial

management staff are required to develop (and possibly present) information on utility costs. Frequently, plant and field operations managers and engineering staff need to provide information and respond to questions. Public communications or top utility management personnel need to represent the utility in public discourse and ensure logistical support of public involvement activities.

Failure to coordinate these activities effectively and properly support a public decision process can serve to undermine rather than enhance a utility's credibility and public trust. Accordingly, it is extremely important that public involvement programs be well planned and appropriately budgeted. A public involvement plan should provide a clear delineation of responsibilities, the scheduling of program activities, communications protocols, and the linkages between public input and the rate development process.

Frequently it is useful to develop a public involvement program mission statement to promote internal commitment to the program as well as external understanding. This statement is typically separate from that used to guide development of rate options; it deals specifically with objectives of the public involvement program. For example, while the rate development process may be oriented to "developing cost-based, equitable water rates," the public involvement program may be developed to "ensure that water rates reflect community values through balanced and informed input of interested stakeholders."

Step 9 Implement and monitor the work plan. Facilitating public involvement activities is not the primary background of most utility personnel, and implementing the public involvement work plan is likely to be uncomfortable. This is particularly true for water rate making when a measure of controversy is typically unavoidable and concerns tend to be acute. While effective program planning can go a long way toward easing the discomfort, several elements are key to successful program implementation, including

- Utility representatives must be able to communicate effectively and respectfully with stakeholder groups.
- Communication on the status of public involvement and rate development tasks must be regular and comprehensive to ensure against miscommunications.
- Responses to information requests should be carefully reviewed and checked against other information provided to interested parties. Discrepancies should be clearly reconciled.

Step 10 Manage change. Public involvement programs for water rate development typically support some form of rate study (e.g., cost-of-service analysis or rate structure evaluation) that generates new information on the utility's existing water rates and future rate options. The framework for public decisions on water rate issues evolves from the rate study. External factors may alter the decision-making environment. These factors may range from unanticipated additions, to utility revenue requirements, to changes in the political landscape. The inevitability of change means that the public decision process must be responsive to new information and viewpoints. As changes occur, all participants in the decision process should be fully advised of modifications to the public involvement program and the reasons for these modifications. Also, utility representatives should be extremely careful not to grant authority that may be altered under new circumstances.

COMMUNICATIONS TOOLS

Applying the 10-step (or similarly comprehensive) process to developing public involvement strategies affords a utility manager the opportunity to effectively use public outreach and communication tools. Ultimately, water rate decision making may be improved by a greater understanding of rate development challenges and informed community participation.

As noted in the discussion of step 7, Select Processes and Techniques, a broad range of communication tools may be used to implement a successful public involvement program, each with its relative advantages and disadvantages. The selection of tools should be oriented toward ensuring opportunities for all ratepayers to learn about and become involved in the project, without incurring unnecessary expenditures. Several of the most commonly used tools for water rate public involvement programs are discussed in the sections that follow.

Bill Inserts

Brief letters or small-sized inserts distributed with each ratepayer's bill offer a means to communicate with the entire ratepayer population. Unfortunately, these inserts are frequently viewed as "junk mail." Responses to inserted survey instruments or service offerings typically obtain 10 to 20 percent response rates. Bill inserts are often recommended to announce significant rate study events, such as the commencement of CAC meetings, reports of findings, and rate change implementation dates.

Newsletters

Topic-specific newsletters may be published and distributed to key community groups or mailed to all ratepayers as a way of providing more in-depth information than is typically afforded through a bill insert. Newsletters can be particularly useful if a high level of interest or concern about the rate study has been expressed and interested parties have requested detailed information. The cost of newsletter publication (both in terms of staff time and printing and mailing expenses) tends to only be justified in cases where significant issues are to be addressed and a sizable readership may be reasonably anticipated.

Speakers' Bureau and Community Group Presentations

A less expensive, and often more informative, vehicle for disseminating information to interested ratepayers is to make presentations to requesting community groups. In-person contact allows for direct communication with ratepayers and may express the city's commitment to inform and involve the public more strongly than printed materials. However, beneficial in-person contact requires effective public speaking and facilitation skills by rate study representatives and community group use of the available service.

Information Line

A 24-hour telephone line that provides a recorded message about rate study events typically includes CAC meeting times and dates, locations of published study materials, public hearing times and dates, and phone numbers of city staff to contact with specific questions. It is important to maintain this line for general information, not as a hot line.

Print and Broadcast Media Relations

Announcements of the times and dates of public hearings and city council work sessions on rates should be made in the local print media and, if possible, broadcast media. Local public access channels may be used to broadcast CAC meetings or special informational programs on the rate study. Accurate coverage by the local press may be encouraged through media briefing sessions and advance notices of potentially newsworthy decision making.

Internet Site

Internet sites allow access to a wealth of information about water rate issues. In addition to quick access to information about public involvement program events (e.g., CAC meetings or public hearing dates), actual materials from the rate study may be made available on the site. These may include issue papers generated as part of the rate study, presentations made to utility decision makers, and general reference information. Information may be solicited from those accessing the site through survey instruments or general requests for comment. While this communication tool has a limited (and often unrepresentative) audience, it is relatively inexpensive to update and is likely to become increasingly important.

EVALUATION

As noted, successful implementation of public involvement programs is promoted through continuous evaluation of the effectiveness of communication methods and responsiveness to change. While the ultimate evaluation standard for a public decision process is acceptance and adoption of proposed rates, this measure may be compromised by influences outside the scope of public discourse. Accordingly, the criteria used to evaluate public involvement programs should relate to those aspects of the program over which participants have a reasonable measure of control. For example, while consensus recommendations may not be reached, commendable public involvement programs typically are structured to provide interested parties the opportunity to learn about rate issues and participate in the discussion of proposed rates.

Similarly, while attendance at public meetings on rates may be limited, utilities that attempt to provide information and solicit public input through a variety of communications vehicles are considerably less likely to be criticized for arbitrary rate development practices. Lastly, because public involvement simultaneously invites criticism and collaboration by members of the public, an important criteria for evaluating public involvement activities relates to the professionalism and respect utility representatives demonstrate in the public decision process. Commendable performance with respect to this criteria will convey benefits far beyond the scope of rate development issues.

SUMMARY

Several factors, most notably increases in system revenue requirements and conservation initiatives, have heightened public interest in water rate making. Concerns include questions about the distribution of revenue responsibilities across customer classes, incentives provided through rate structures, and the affordability of basic levels of service. Public involvement in water rate making is a potentially powerful tool to enhance community understanding of rate issues and gain acceptance of proposed rate changes.

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Public decision processes generally require careful planning and a high level of utility commitment. Comprehensive planning may be facilitated by using established processes for developing public involvement strategies. This planning helps identify the communication tools to be used to inform and engage community stakeholders. Fundamentally, public involvement requires that community stakeholders have the ability to participate in the water rate decision process, and public involvement programs should be evaluated on the quality of this participation.

REFERENCE

American Water Works Association Research Foundation. 1995. *Public Involvement Strategies: A Manager's Handbook*. Denver, Colo.: American Water Works Association Research Foundation and American Water Works Association.

Chapter 4

Data Requirements

A key factor in developing supportable utility rates is the availability of sound, accurate records and data. Maintaining good records is helpful not only to the rate practitioner establishing rates, but is critical to a utility's ability to adequately ensure and assess the effect of alternative rate forms on issues such as revenue sufficiency and stability, individual customer or customer class equity, and conservation goals and objectives.

Accurate and detailed records are important in developing rates and evaluating the effects of rates on customers in the following areas:

- customer records (number of customers, billed usage, revenues, demographics, seasonal variations in use, and demand factors)
- plant investment (functional breakdown and design capacities)
- operations and maintenance expenses (functional and object class breakdowns, and seasonal variations)
- monthly cash flow for the utility
- customer survey information

This chapter addresses the elements outlined in Figure 4-1 and why and how maintaining adequate records in these areas are important in establishing alternative rate forms.

CUSTOMER RECORDS

From a rate-making standpoint, customer-related data and statistics are probably the most important area in which a utility should maintain accurate and extensive records. By far the most significant source of revenue for nearly every water utility is that produced from water sales or rate revenue. The application of a particular rate structure to the number of bills and/or metered water usage produces the billings and revenue that sustain the utility's financial well being. Without accurate customer billing records, the development of a rate structure can be hampered, possibly

Customer Records

Number of Customers and Bills

- By Meter Size
- By Customer Class
- By Billing Frequency (if different for different classes)
- Number of Public Fire Hydrants
- Number of Private Fire Services by Size
- Monthly Summary
- Annual Summary
- Maintain Consistent Definition of Customer Classes (if applicable)
- Maintain Historical Data for 3–5 Years

Metered Consumption

- By Meter Size
 - By Billing Frequency (if varies by class)
 - Monthly Summary
 - Annual Summary
- By Customer Class
 - Monthly Summary
 - Annual Summary
- Individual Customer
 - For Customer Relations and Customer Service Purposes
 - Necessary for Certain Rate Forms (e.g., “excess-use” rates tied to individual characteristics)
- Bill Frequency Distribution (number of bills with zero usage, 1 unit, 2 units, etc.)
- Maintain Historical Data for 3–5 Years

Billed Revenue Data

- By Meter Size
 - Monthly Summary
 - Annual Summary
- By Customer Class
 - Monthly Summary
 - Annual Summary
- Maintain Historical Data for 3–5 Years

Peak-Period Demand Data

- System Coincidental Demands
 - Total Production or Output to Distribution System
 - Maximum Day Demand
 - Maximum Hour Demand
 - Monthly Data for Each of Above Items
 - Maintain History for 5–10 Years
- Customer-Class Demands
 - Requires Demand Meter Study (can be an expensive undertaking)
 - Nonresidential Demands
 - Select Representative Sample Accounts
 - Use Individual Demand Recording Meters or Establish Hourly Meter Reading
 - Schedule by Utility Staff

Other Customer Records

- Demographics of Service Area
- Price Elasticity of Demand Studies

Plant Investment Records

Establish Uniform System of Accounts

- Classify Plant Investment by Function (raw water, treatment, etc.)
- Provide for Recording Annual Additions and Retirements
- Provide for Depreciation Accounting Records to Parallel Plant Investment

Determine System Capacity for Each Functional Plant Element

Separate Plant Investment Between Peak Season and Nonpeak Season Demand and to Specific Users (as necessary)

Operation and Maintenance Expense

Establish Uniform System of Accounts

- Classify Operation and Maintenance by Function (raw water, treatment, etc.)
- Classify Operation and Maintenance by Object Classification (salaries, purchase of services, materials and supplies, and equipment)
- Separately Identify Expenditures for Power and Chemicals

Identify Specific Expenses Associated with Seasonal or Peak Usage and to Specific Users

Summarize Operation and Maintenance Expenses Monthly and Annually

Maintain Historical Data for 3–5 Years

Figure 4-1 Data requirements check list

resulting in the establishment of rates that do not generate sufficient revenue to meet the utility's revenue requirements or revenue bond covenants.

Number of Customers and Bills

As a starting point, most utilities maintain certain standard customer-related statistics. These typically include the number of customers by size of meter and by customer class if customers are classified for rate making or other purposes. These records are usually kept on either a monthly or year-end count. Billing frequencies may vary by type or classification of customers. For example, residential accounts may be billed bimonthly or quarterly, while other accounts are billed on a monthly basis. It is also common for utilities to maintain records regarding the number of bills issued by meter size and/or customer class.

Detailed information on number of customers and bills by meter size and class of customer are used to develop customer-related charges, such as minimum bills or service charges. These types of charges are common to virtually every type of alternative rate form, and are necessary data supporting their development. If customer classifications are used by the utility, it is important to develop sound, consistent definitions for the classifications. This is especially important if different rate forms are developed and applied to different classifications of customers.

Metered Consumption

Another common customer statistic is metered consumption by meter size or by class of customer, or both. Ideally this information should be maintained in as much detail as the utility's billing system or customer database will permit. At minimum, data should be maintained on an annual basis, but preferably on a billing cycle basis (monthly, bimonthly, etc.), again by class and meter size. In developing seasonal rates, it is necessary to know the metered consumption for each month, because there is a different rate for defined monthly periods or seasons under this rate form. Maintaining consumption data for individual customers is also important, particularly for certain types of rate structures, such as excess-use rates, whereby each customer is charged at a higher unit rate when their water usage exceeds an established threshold, e.g., more than 125 percent of winter period use.

Benefits of Customer Records

Detailed customer records make it possible to design and evaluate different rate structures in the context of a utility's goals and objectives, which may include such elements as financial stability, enhanced equity, and conservation. Records include the number of bills and metered consumption for as many years as possible. This information is essential in areas where weather can vary significantly from year to year and where water sales are sensitive to weather patterns, such as regions where lawn irrigation constitutes a large proportion of annual water sales.

Maintaining these types of records for an extended period, from 3 to 5 years, for example, should build a database that encompasses a wide range of weather conditions, related water usage, and demands on the system. This database enables the rate practitioner to test alternative rate structures against a variety of weather conditions to determine the sensitivity and variation in monthly and annual revenue of alternative rate forms. At that point, the magnitude of necessary reserves or working capital balances that need to be maintained to protect the revenue stability of the utility can be determined.

Another important reason to keep detailed records of metered consumption by class of customer and/or meter size on a billing period basis to develop a bill

frequency distribution analysis or bill tabulation. See Appendix A of AWWA Manual M1, *Water Rates* (Fourth Edition), for a discussion and example of a bill tabulation. These analyses are particularly important in developing declining or inverted block rate structures, or in establishing lifeline rates, where a different unit rate is assigned to metered consumption that falls in predetermined consumption or rate blocks. With these rate forms, it is necessary to know the percentage distribution of the annual usage of the utility into each rate block (by class, if appropriate or germane to the particular utility).

Billed Revenue Data

A third customer statistic important in rate development and maintained by most utilities, is customer revenue billing information. Available by customer class or meter size, this information provides a benchmark against which to measure the revenue anticipated from proposed new rates. Applying existing rates to the customer statistics discussed above (bills and consumption) to develop a *pro forma* level of billings, and comparing those billings with actual billings, measures the accuracy of billing statistics or units of service. When the proposed rates are applied to these billing units, the utility can be more confident that the anticipated billings and revenue will be achieved.

It is also important to retain billing information by individual customer in the utility's billing database. This is particularly true whenever a change in the rate form is planned. There are often more customer inquiries when a rate structure is changed. It is helpful to the customer service representatives to have billing history available to aid in answering customers' questions. It is also helpful to the rate practitioner and the utility's public relations department to have such information available to establish profiles of typical customers affected by changes in rates. These profiles provide excellent tools for explaining the new rate structure in public forums.

Demand Data

Customer-class demand data are also extremely beneficial to determine cost-of-service allocations and design rates. Few water utilities have this type of information because developing maximum day and maximum hour demand data on a customer or customer-class basis can require significant financial resources. Demand meters must be purchased and installed, and the data must be reviewed, interpolated, and expanded to fit the entire class of customers. Measuring residential customers requires careful planning, statistically valid samples, and coordination with other municipal agencies, such as the fire department, when certain areas must be valved off. If done properly, the results of these studies can also be useful to the water utility's engineering and planning staff, because the demand data is helpful in sizing mains, storage reservoirs, and so forth.

Usually, information on customer-class demands is based on systemwide coincidental maximum daily and hourly demands. This information is usually available or obtained from treatment plant pumping records and storage tank drawdown data. Combined with monthly metered consumption data by customer class, this information is used to estimate customer-class demand data. Specific customer-class demand data will be available to more utilities as advances are made in water meter-reading technology. Therefore, it is important to maintain good records of systemwide maximum daily and hourly demands to simulate class demands.

Demographic Data

A demographic distribution of the utility's customer base is another type of customer record not typically maintained by water utilities. This is becoming an increasingly important piece of information as water rates across the country climb because of increasing regulatory requirements.

Many utilities implement discount rates or lifeline rates to accommodate the increasing number of fixed-income and low-income customers (discussed in chapter 19). Whether discount rates are targeted to a specific group of customers or available to the entire customer base, as some lifeline rates are, it is necessary to know how many customers are affected, and if targeted to a specific group, who they are. Often, utilities find it useful and cost-effective to coordinate with other agencies in the community that already have a system and database in place and are equipped to deal with such customers. Using these agencies' resources often makes sense when a utility is considering implementing discount rates or rate considerations.

Price Elasticity

One final area of customer record keeping that results from the information discussed previously, is the ability to measure the price elasticity of customer demand for water. Price elasticity is the relationship of the change in the demand for a commodity (water, in this case) relative to the change in the price of the commodity. The need to have information regarding price elasticity is important whenever a utility is faced with implementing a rate increase. This need is particularly strong when a conservation rate structure is implemented because the intent of this type of rate structure is to encourage a reduction in use, either during peak-demand periods or over the year. To properly design the water rates and to maintain financial stability for the utility, it is necessary to make some allowance for the amount of reduced water use that is anticipated as a result of the rate increase.

Measuring price elasticity for water is a tedious and somewhat judgmental undertaking because there are many variables involved, including climatological considerations, educational and informational programs on conservation and efficient use of water, economic cycles, and so forth. Without sufficient detail and accuracy of customer billing records, the task of assessing price elasticity becomes extremely difficult and results may not be entirely meaningful.

Billing Frequency

The frequency of customer billing is an important consideration when implementing any adjustment in a utility's water rates. Stipulations or constraints in billing frequency may exist in the utility's regulations, ordinances, or policies, that will affect the billings and collections under new rates during the first year in which the rates become effective.

Depending on the utility's specific rate ordinance or regulation, the first bill rendered to each customer subsequent to the effective date of a rate adjustment must often be prorated between the previous rates and the new rates. The proration is usually based on the number of days of service received by the customer before and after the effective date of the new rates. Proration may be applicable to both the volume-related portion of the customer's bill as well as the fixed, or customer-related portion. The net effect of this proration process is that the new rates will not be fully effective the first year. The more frequent the billing, the less proration will impact revenues, i.e., the new rates will become fully effective sooner with more frequent billing.

When adjusting rate levels, it is important to consider the timing of billing collections as well as the potential lag in realizing full billings under new rates because of the proration process. This latter consideration is particularly important for those utilities whose accounting records and/or revenue bond debt service coverage requirements are legally established on the cash basis as opposed to the accrual basis of accounting. Without considering both the billing lag and the collection lag, utility revenues may fall short of the intended level of billings and receipts.

PLANT INVESTMENT

Plant investment is used in the rate-making process in (1) the allocation of capital-related costs, such as debt service, annual cash financed capital additions, and replacements under the cash approach to revenue requirements and rate making; and (2) for allocation of return on investment-related costs under the utility approach. The accounting system *Uniform System of Accounts for Class A Water Utilities*, published by the National Association of Regulatory Utility Commissioners (NARUC) provides for the accumulation and accounting for additions, replacements, and retirements of utility property on a functionalized basis, representing the distinct service functions that categories of property provide. Classifications of plant investment under the NARUC system include source of supply, source water pumping and transmission, water treatment, treated water pumping, transmission and distribution, system storage, hydrants, meters and services, and administrative and general property. Functional classification of plant investment allocates capital-related costs to the appropriate functional category. These functionally allocated costs then can be distributed to the various classes of customers in proportion to their respective demands and use of plant facilities.

The design capacities of the various plant facilities are associated elements of plant investment that are useful in designing certain alternative rate forms. The majority of water system facilities are generally designed to meet peak system demands, whether it be maximum day demands (river source of supply, well fields, raw water pumping and transmission, treatment, treated water pumping, and certain treated water transmission mains) or maximum hour demands (transmission and distribution mains, system storage, and booster pumps).

For certain types of rates, including seasonal, inverted, and off-peak rates, it may be useful to know what the nonpeak season demands or capacity requirements of the utility system are, and what the associated plant investment is to provide for these nonpeak season demands. If this type of information can be determined by the utility staff, perhaps in conjunction with the utility's design engineer, it can prove valuable in determining the costs of the system associated with providing off-peak demands, unit costs of service, and appropriate rates associated with those demands.

OPERATION AND MAINTENANCE EXPENSES

As discussed in the previous section on plant investment, detailed records of historical operation and maintenance (O&M) expenses should be maintained on a functional basis. The *Uniform System of Accounts for Class A Water Utilities* provides guidelines for establishing accounting records that capture annual O&M data on a functional basis. For O&M expenses, in addition to recording the total expenses by function, it is important to break down the functional expense by the object classifications the utility uses in its budgetary processes. These object classes typically include personnel services (and related fringe-benefit expenses), purchase of

services (including power, which should be recorded separately from other expenses for cost allocation purposes), materials and supplies (including chemicals, which also should be recorded separately), and equipment expenses.

As in the case of plant investment, accounting of O&M expenses should agree with NARUC guidelines. This accounting provides for adequate breakdown of expenses for cost-of-service allocation and appropriated distribution of functionally allocated expenses to customer classes in proportion to their respective demands on the water system.

In designing certain types of rates, including seasonal, inverted, and off-peak rates, it is useful to have O&M expenses in the detail described above, on a monthly basis. This information helps to determine the cost of water service in an off-peak period or season.

REVENUE STABILITY AND SUFFICIENCY

The principal objective of any rate structure should be to maintain the financial stability of the utility. Revenues must be sufficient on an annual basis to meet the utility's revenue requirements and revenue bond covenants, as applicable. Reserve funds and rate stabilization funds may be available to assist in meeting these financial obligations on either a planned or an emergency basis. However, stable and adequate rate revenue, over the long run, is the cornerstone of a utility's financial integrity.

During the course of the year, seasonal variation in demand creates a variation in the associated billings and revenues. Most of a water utility's monthly costs, on the other hand, remain relatively fixed during the year, with monthly fluctuations being primarily for power and chemical expenses, which tend to vary directly with water production. Utilities that experience significant monthly swings in demand during the year should look at monthly cash flow analyses to determine which months a cash flow shortfall can be expected. Working capital reserves or other sources of readily available funds for meeting the fixed costs of doing business during the negative cash flow months must be provided. When implementing a rate form that has among its objectives encouraging conservation or more efficient use of water, it is doubly important to understand monthly cash flow patterns. Revenue that may be counted on from, for example, higher peak-season rates, may not materialize if normal seasonal demand for higher-priced consumption does not occur.

CUSTOMER SURVEY INFORMATION

As a utility gathers data requirements and information to establish a rate form that meets its objectives and goals, it is important to find out what utility customers perceive to be important. Before beginning to implement a new rate form, or retaining the existing rate form, it may be a sound investment of additional time and resources to investigate customers' attitudes about their water service. A well-designed customer attitude survey should yield information the utility can use in restructuring its rate format.

SUMMARY

Many utilities maintain records, data, and statistics of the nature and detail described in this chapter. Not all the information and data discussed will be necessary, or possible, for all utilities to collect. It is important from a rate-making

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standpoint to capture as much detail as possible to facilitate the task of rate setting and provide for a more defensible rate structure.

REFERENCE

AWWA. 1991. AWWA Manual M1, *Water Rates*, 4th ed. Denver, Colo.: American Water Works Association.