

# Utility Enterprise Cost of Service and Rate Design: The Grand Forks Experience

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## Background

Throughout the last twenty years, utilities have seen changes that have driven increasing capital, operation, and maintenance costs. Among these changes are the continued aging of infrastructure installed over the last century and heightened regulatory requirements associated with the implementation of the Clean Water Act and the Safe Drinking Water Act. For the fortunate, these costs can be spread over a larger population base due to population growth and economic development, while the less fortunate communities experiencing population decline have a smaller population base over which to spread increasing costs. The fiscal pressures due to these changes are sure to continue.

In response to these challenges, City leaders and Utility Managers are continually striving for increased efficiency and decreased costs. Managers must also secure sufficient revenues to: 1) meet operation and maintenance expenditures, 2) meet existing debt payments, 3) meet future debt service needs, 4) meet reserve requirements, and 5) preserve the financial health of the utility. Knowledge of the true cost of service provides a sound basis for achieving these goals.

## What is Revenue Sufficiency?

The concept of revenue sufficiency is the concept of the "balanced budget". A measurement of the revenue requirements against the revenues that will be generated from the utility's rate structure will show either a revenue deficiency (revenue is less than revenue requirements), or a revenue sufficiency (revenue exceeds revenue requirements). A financially health utility will be capable of meeting all revenue requirements, including the funding of prudent reserves, using annual revenues. Many utilities operate in a state of revenue deficiency, which means they either rely on existing reserves, skimp on funding reserves, or utilize other City funds to cover shortages.

Becoming revenue sufficient means that a utility can count on receiving adequate revenues to fully fund utility operations, including debt service obligations, capital improvements from rate revenues, and reserves. Achieving revenue sufficiency does not necessarily happen overnight, as there are significant pressures to not raise rates, or at least minimize rate increases, each year. In some cases, reserves may be available for rate smoothing. In others, there may be no choice but to implement a multi-year rate increase strategy that will bring the utility rates to a level capable of bringing in enough rate revenue to cover projected expenses. When possible, utilities experiencing a significant revenue deficiency should gradually work toward achieving revenue sufficiency by implementing steady, manageable rate increases to minimize the burden to users.

## What is Cost of Service?

The term cost of service means exactly what you would expect it to - the cost involved in providing a service to a particular customer. Ideally, utility rates would always reflect the cost of service, not a penny more or less. In reality, this is rarely the case. A cost of services evaluation is the process of reasonably determining the cost of providing services to classes of customers that have similar characteristics, and assigning costs such

that rates can be designed that are nondiscriminatory and closely meet the cost of providing service to each customer class. A rate structure that is reflective of the cost of service percentages does not necessarily guarantee revenue sufficiency for a utility, but it does ensure that the charges made to each user class are fair.

To determine the cost of service, a year of data that is representative of typical utility operations is needed. Both the actual expenditures and the actual revenues for that year are then evaluated. In the evaluation, which consists of a detailed analysis of the types of expenses and which users benefit from them, costs are allocated to user classes and an overall cost to provide service to each particular user class is derived. Gaining an understanding of the cost of service is particularly important for systems with distinctly different user classes, such as residential, commercial/light industrial, institutional, bulk, or heavy industrial users.

The costs of service by user class are then compared to the amount of revenue that was generated from each user class to determine whether inequities exist within user classes. Ideally, the cost percentages for each user class will closely resemble the revenue percentages for each user class. If they do not, the utility may want to consider conducting a rate design exercise in which alternate rate structures that strive to remedy inequities between user classes are developed.

## How Revenue Sufficiency and Cost of Service Come Together

Used in conjunction, revenue sufficiency and cost of service analyses are excellent tools for utility planning efforts. Revenue sufficiency is something that utilities evaluate every year as they review their projected budgets and rate structures, whether they realize it or not. The next step in this annual process is to extend the forecast period of the revenue sufficiency analysis out four or five years, to better understand the direction in which the utility is going before it gets there. The development of a revenue sufficiency model that can be used annually allows utilities to run rate adjustment and capital improvement planning scenarios.

An understanding of the cost of service is a tool that can be used to make sure that as utilities maintain or move toward revenue sufficiency, all users are paying their fair share. By adjusting the rates of various user classes to more closely resemble the true cost of service, a utility will be working to improve the equitability of its rate structure. In some cases, this may involve the implementation of a new rate structure; in others, it may simply involve increasing rates for certain user classes more aggressively than the rates for other classes. In the end, a utility may have very good reasons for not eliminating inequities in the rate structure. In all cases, it is important to involve a variety of people - including system policy makers, financial representatives, as well as Public Works and Utility Managers - in evaluating the rate structure to avoid assumptions that would provide a change that would not be in line with the City's objectives. It is also important to note that changes intended to remedy cost of service inequities should be made gradually; that is, a large increase in a particular user classes' revenue percentage may hit hard and cause an undesirable effect. Utilities are best advised to implement changes one step at a time, regularly re-evaluating the impacts to ensure the desired effects are achieved. In a perfect scenario, rate structures would be based precisely on the cost of service, and would therefore be both fair and revenue sufficient.

## The City of Grand Forks Utilities - Why They Chose to Evaluate the Cost of Service

Communities, such as Grand Forks, North Dakota, are recognizing the need to balance desires for economic development, growth in the community, adequate infrastructure, and top-notch services with affordable utility rates for new and existing residences and businesses. This involves a determination as to the extent that utility costs should be borne by the various user classes.

The Grand Forks utility enterprises, with total 2003 budgets for the wastewater, waterworks, solid waste, and stormwater enterprises equal to approximately \$24 million or \$8.0, \$8.2, \$6.2, and \$1.5 million, respectively,

are significant annual "businesses". For a City of approximately 50,000 people, Grand Forks has a relatively complex mix of utility user classes, including various residential classes, commercial and light industrial, institutional, major food processing industries, the Grand Forks Air Force Base, non-residents, and other user classes. For example, these user classes discharge different flows and strengths to the wastewater system, place different demands on the water system, include a water system consecutive user, result in different challenges for the stormwater system, and include residential and non-residential solid waste customers.

The wastewater and water utility rate structures in Grand Forks were last evaluated from a cost of service standpoint in the mid- to late 1980s, and a cost of service evaluation for the solid waste utility was last completed in the mid-1990s. Recent adjustments to utility rates have been based on percentage increases projected to achieve the required utility revenue to meet operation and maintenance expenses, debt service, and other expenses. As such, there has been concern in Grand Forks that the practice of adjusting individual utility rates based on percentage increases may be compounding any potential existing inequities among user classes. As a result, the Public Works and Finance Departments determined that completion of a cost of services evaluation for the Wastewater, Waterworks, Solid Waste, and Stormwater Utilities was appropriate prior to initiating the 2004 budget process.

## Description of the Project Team and Process

To complete these detailed studies, the City assembled a team of representatives from the Finance and Public Works Departments, and retained Advanced Engineering and Environmental Services, Inc, (AE2S), along with AE2S' subconsultant, Malcolm Pirnie, Inc. Because the Finance and Public Works Departments work together regularly on developing the annual budget and planning capital improvements and associated debt obligations, it made sense to develop a tool that would meet the needs of both departments. User-friendly spreadsheet tools developed by the consultant team were utilized for both the cost of service and revenue sufficiency studies, and were tailored to be user friendly to the Finance Department in terms of entering budgeted expenses, revenues, debt service, and cash and reserve fund data, as well as to the Public Works Department in recording projected capital improvements funded using rate revenue, bonds, low-interest loans, or special assessments.

The wastewater and water analyses were initiated in the fall of 2002. As a result, the revenue sufficiency was based on the 2003 budgeted revenue and expenses, and the cost of service analysis was based on actual expenditures and revenues from 2001, which was considered a representative year. The delayed timing of the solid waste and stormwater analyses, completed after the wastewater and water evaluations, allowed for the use of preliminarily budgeted 2004 expense and revenue values for the revenue sufficiency analysis, and actual 2002 expense and revenue values for the cost of service analysis.

Several upfront assumptions were made as part of these analyses:

1. The utility managers have set a goal of maintaining a utility fund balance equal to at least 90 days of operating expenses for use in the case of emergencies. As a result, this was set as the annual target cash balance.
2. Based on inflation and labor statistics, non-labor operating expenses and labor expenses were indexed at rates of 2.4 and approximately three percent, respectively, for each year in the evaluation forecast period.
3. To be conservative, population growth was not factored into the final analyses.
4. For the wastewater and water analyses, 2001 was assumed to represent a year of average flow values. For the solid waste and stormwater analyses, billing data from 2002 was assumed to be representative.
5. Capital improvement projections through the forecast period were based on the latest capital improvements plan available.

## Findings of Evaluations

In general, the results of the revenue sufficiency analyses showed that revenue deficiencies would exist for all four utilities through 2008 and beyond without the implementation of rate increases. This was expected based on challenges such as those noted in the introductory paragraph of this article. These challenges are universal throughout the water industry and have been well-documented by organizations such as the American Water Works Association as momentum toward the implementation of cost-based rates is growing. Based on this information, alternate rate adjustment scenarios were developed for the Grand Forks utilities, in which several optional rate structures and/or rate adjustment combinations were presented.

For the wastewater, water, and stormwater utilities, cash reserves were greater than the target value equal to 90 days of working capital. This situation allowed for a recommendation to prudently spend down excess cash while building dedicated renewal/replacement (R&R) reserves and gradually increasing rates to a point in the future where the cash balance would reach the target level and the revenue deficiency would be eliminated. The solid waste utility cash balance, however, was less than the target value. As a result, the projected solid waste utility rate increases were intended to both eliminate the revenue deficiency and to build the cash balance up to the target balance.

In terms of the cost of service findings, mixed results were found for the different utilities. For the wastewater utility, inequities were found in the rate structure for one of two heavy industrial users and the commercial/light industrial user class. Residential wastewater rates were generally found to be equitable. It was noted that wastewater flow and strength projections from each customer class could vary from year to year, particularly for heavy industrial users. As a result, the cost of service cost allocations to particular user classes based on actual flows and strengths will change as flow and strength values change.

The water utility rates were also found to have some inequities. Water revenues from the heavy industrial and commercial/industrial user classes appeared to be higher, and revenue from the residential user class appeared to be significantly lower than the associated allocated cost to serve them. As with wastewater, it was noted that the cost allocations based on actual flow could vary for each user class according to changes in consumption.

Residential core solid waste charges were generally found to be in line with the costs, but the costs for special services, such as appliance pickup and brush and yard waste collection, were found to exceed the revenue collected for those services. In addition, municipal solid waste tipping fees were found to be inadequate based on the cost of service, and inert tipping fees were found to be higher than the cost of service dictated they should be.

The stormwater cost of service evaluation was complicated due to data limitations, and as a result, it was difficult to obtain total billable runoff units by property type and corresponding revenues by property type. Based on the available data, however, the results showed that the existing stormwater rate structure is generally equitable. In addition, the stormwater coefficients currently in use by the City were found to be in line with those suggested as national planning standards.

In all cases, it was noted that the required utility rate adjustments are highly sensitive to the magnitude of capital improvement projects funded through rates in a given year. It was recommended that the City continue to use the spreadsheets tools developed for the revenue sufficiency portion of the analysis on an annual basis to assist in budget, capital improvement, and rate planning.

## Recommendations: The Formulation of a Plan

Based on the results of these analyses, utility managers and City leaders came up with an approach for each utility to strive for rate equitability and revenue sufficiency.

1. In 2004, a new wastewater utility rate structure will be implemented, in which the base rate will be lowered for residential and commercial users and increased for heavy industrial users. Previously, the wastewater base rate included the first 5,000 gallons. Residents were charged per 1,000 gallons for flow over 5,000 gallons, but were not charged for flow over 10,000 gallons. The 2004 rate will not include the first 5,000 gallons of flow, and users will be charged per thousand gallons for all flow up to 10,000 gallons. The 10,000-gallon billing limit will remain for residential users. The flow rate will increase for residential and commercial users, but will decrease for heavy industrial users. Surcharge rates will also be increased to correspond to debt incurred for the new wastewater treatment plant. Fees for the industrial pretreatment program will also be increased in an effort to more fully fund that program through direct program fees. Excess cash from the utility fund will be used to cover the revenue deficiency until phased rate increases can correct the revenue deficiency.
2. In 2004, a new water utility rate structure will be implemented, in which the declining block flow rates will be eliminated. Previously based on meter size for all users, new base rates will be set for each class, including a single rate for all residential users, several tiers for the commercial class based on meter size to represent the variety of users in that class, and a single rate for heavy industrial users. Different flow rates will also be set for each class - residential, commercial, and heavy industrial, and the commercial class will have three different flow rates tied to meter size, to reflect economies of scale. Excess cash from the utility fund will be used to cover the revenue deficiency until phased rate increases can correct the revenue deficiency.
3. In 2004, the solid waste rates will not undergo a change in structure, but some adjustments will be made to the rates for inert waste, municipal solid waste, and special pickup charges to begin to remedy cost of service inequities. In addition, increases to the rates for core services will be made to work toward revenue sufficiency and to bring the cash balance up to the target balance equal to 90 days of operating capital.
4. In 2004, the stormwater rates will not undergo a change in structure or increases due to a strategy to balance overall utility rate increases and to utilize existing cash reserves to make up for near-term revenue deficiencies.
5. It was recommended that all utilities, upon reaching a state of revenue sufficiency, consider implementing a policy of rate indexing. This simplifies the rate-setting decision process and acclimates users to predictable annual increases.
6. It was recommended that the wastewater and water utilities form restricted R&R funds that cannot be used to support other departments or programs.
7. It was recommended that all cross-fund transfers of services provided to or by each utility be accounted for in the annual utility budgets.
8. For the water utility, it was recommended that the utility consider implementing peak shaving elements, such as a summer rate surcharge based on the average winter flow or a summertime usage rate for flow over 10,000 gallons, into future rate structures, particularly as the City evaluates building a new water treatment facility.
9. For the wastewater and water utilities, it was recommended that the City evaluate implementing a separate multi-family user class in the future, as these users are currently either in the residential or commercial classes.
10. For the stormwater utility, it was recommended that the City update the existing stormwater billing database to improve the billing process.
11. Lastly, it was recommended that the revenue received and cost of service relationships and the revenue sufficiency be evaluated for each utility on an annual basis.

## Policy Maker and Citizen Benefits

As can be imagined, the revenue sufficiency and cost of service evaluations were of great interest to Grand Forks City leaders. Through their involvement, the evaluation proved to provide an educational opportunity. As a result, City leaders have gained an understanding of utility rate-setting issues that will assist them in future planning efforts. City leaders have also recognized a need to provide educational opportunities to the citizens when it comes to the topics of utility capital improvement and rate-setting. This has proven to be a very positive development for everyone. The Finance and Public Works Departments have formed an efficient team and have begun an invaluable educational process that will hopefully increase the efficiency of managing these utilities.

## Conclusion

There is no question that more challenges lie ahead for policy makers and utility managers as they strive to balance the quest for efficient, top-notch utility services for which customers are charged a fair and equitable cost against the pressures of controlling expenses and avoiding or minimizing necessary rate increases. It is in this situation that rate planning becomes a critical tool in preserving a utility's financial health.

Extended-term revenue sufficiency and cost of service analyses are tools that can provide utilities with information needed to assist in prioritizing improvements, controlling costs, and implementing rate increases, while working toward becoming revenue sufficient. Collectively, these ultimately translate to strong financial health.

As Grand Forks experienced, determining the costs of service and utilizing long-term revenue sufficiency analyses as a rate-planning tool formed the basis for a strategy to eliminate the revenue deficiencies through phased rate increases. The plan also involved some restructuring of utility rates to address concerns regarding equitability. The revenue sufficiency analyses also served to increase the accuracy and credibility of the budgeting and long-range capital improvements planning processes. In the end, the joint planning efforts between representatives from the financial, operational, and policy-making aspects of City operations proved to be an excellent educational experience, and laid the groundwork for future rate planning exercises intended to lead the Grand Forks utilities to self-sufficiency and strong financial health.

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