Overview of the Utility Rate Setting Process

Introduction

The following is a summary of principles, written in as non-technical a manner as possible, to allow someone unfamiliar with the technical terms utilized in the setting of utility rates to have a basic understanding of how rates are set and why they differ so much for different systems. It is not an all-encompassing discussion, nor is it meant to be legally sufficient in all of its descriptions.

For example, it is normal for a person competent in the utility rate setting arena to have over five years of exposure to the rate setting process before they are considered to be sufficiently educated to design new rates on their own. In addition, there are classes sponsored each year by the National Association of Regulatory Utility Commissioners to update those involved in such endeavors.

Just the Final Order issued by the Florida Public Service Commission (FPSC) in its last full rate case for Florida Water Services runs over 1,000 pages, including 800 pages of tables. To get rates designed exactly according to established rate setting-rules is tedious, extremely detailed and technical. This paper does not intend to take the reader to the depth necessary to design rates.

To make the concepts more tangible, at the end of this paper we present some data from the last full rate case during which rates were set for Pine Ridge and Citrus Springs. We discuss some of the relationships that drive rates either higher or lower and show how those variables affected the rates that were set.

The Rate Setting Process

Although rates for private, for-profit utilities have different cost components than those for a governmental utility, the process for setting rates is quite similar. For detailed examples of some of the rate setting dockets at the FPSC, you can go to the following link: http://www.psc.state.fl.us/dockets/cms/. This link shows the list of dockets that are currently being worked on (or recently completed) by them.

The main differences between a for-profit utility and a governmental utility are that the private utility has two cost components that a governmental utility does not incur – payments of taxes (such as property, sales and income) and payment of dividends to stockholders. The other primary difference is that a governmental entity can usually rely on tax-free bonds, which carry a lower interest rate than taxable bonds for financing major acquisitions or major capital improvements.

The rest of this document will focus on how rates are set in the systems owned by Citrus County. There are three types of rate cases – index, limited and general.

Index rate case

An index rate case is one where rates are increased across the board by an amount equal to the inflation that has befallen utilities within the state. This is usually done parallel with the County's budget setting process and follows the index adjustment percentage approved by the FPSC each year. The application of a small index adjustment each year allows a utility to keep up with inflationary costs which it cannot possibly control. It also

allows the utility to make gradual rate adjustments without having to go through the very expensive process of a full rate case. For more than the past decade, the allowed index adjustment has averaged just over 2.1% per year. To see the process in more detail, you can go to the FPSC at the footnoted site.[1]

Limited rate proceeding

The second noted way of changing rates is through a limited rate proceeding. We have never used a limited rate case procedure for Citrus County Utilities. A limited rate proceeding is done when a single significant parameter has changed and there is imminent danger of either not having sufficient funds to cover necessary expenses or insufficient revenues to meet bond covenants.[2]
An extreme example recently occurred in southeast Florida when the South Florida Water Management District issued a total ban on outdoor irrigation. The revenues of many local utilities there became insufficient to cover their operating costs and their bond payments, and they had to have emergency rate increases. We do not anticipate this occurrence here, but unforeseen circumstances may cause it to happen in the future.

General rate case

The general rate case is the one which will receive the most discussion in this paper as it is the one that usually gets the most attention, and, rightfully so, since it usually has the largest single-year impacts on rate changes. To understand the rate setting process, we must introduce a few definitions at this point:

- ***Test year*** – the period of time over which revenue requirements are to be determined. Most of the time the most recent full fiscal year is chosen. This is called using an historical test year. Sometimes the current year is used along with projections as to what the rest of the year looks like. Rarely an entirely future year – or future test year – is chosen.
  This is usually used only when it is known that significant changes are imminent. The problem with a fully historical test year is that cost information is stale and may be more than a year old in terms of what certain items cost today.
  Of all the test years, using a fully historical test year has the greatest chance of understating a utility's revenue requirements. On the other hand, it certainly has the most accuracy in determining what the real costs were. Citrus County

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1 http://www.floridapsc.com/agendas/archive/080129cc/08012916.pdf#xml=http://www.psc.state.fl.us/search/pdfhi.aspx?query=index+adjustment+2008&pr=default&prox=page&rorder=500&rprox=500&rdfreq=500&rwfreq=500&rlead=500&rdepth=0&sufs=0&order=r&mode=&opts=&cq=&id=479da1a479. (Copy the entire link as this is an archived document on their site.)

2 Bond covenants generally are binding contractual obligations by the County for which it is held accountable in order that the bond underwriter and bond insurance agent can be assured that their bond repayments can be made on time. Failure to meet bond covenants would basically render the bond market unavailable to our County or make bond interest rates too high to afford.

usually uses an historical test year as the underpinnings for its rate designs and then uses a forecast for the next five years. That way, it can roll in rate increases slowly over a number of years instead of one big increase all at once.

- ***Revenue Requirements*** – the reasonable and prudent expenses during the test year. "Reasonable and prudent" have an established legal definition. Expenses that could have been avoided (such as fines), expenses that were not bid out when they should have been, expenses that were not needed to serve current customers (such as the major expansion of a wastewater treatment plant) are a few examples of expenses that would not be added to revenue requirements. Operating costs, electricity, chlorine, operational staff costs, debt repayment and normal equipment replacement costs are some costs that are almost always found to be reasonable and prudent.

- ***Rates*** – the unit price of any part of utility service. Most rates are one-time fees, but the two most frequently thought of – particularly during a rate case – are the two monthly rates below:

    - ***Base Monthly Facility Charge*** – the basic charge for being able to provide either water service or sewer service or both to a customer. This does not go to zero just because a customer may leave for several months to go up north. This is for two reasons; (1) the utility cannot "un-build" the facilities that are in place to service this customer and (2) to allow this discount would mean that permanent customers would have to pay more.

    - ***Gallons Used Charge*** – the rate per thousand gallons charged for actual usage of the utilities. Water is usually priced with increasing costs the more one used during a month.[3] Sewerage charges are usually charged on each thousand gallons of water used during a month, but only for a very limited number of gallons – in the case of Citrus County Utilities – over the first 5,000 or 6,000 gallons (depending on system) of water consumed each month. Sewage is not metered since there is no reliable way to meter sewage in a gravity line such as those leaving the standard household. The reason it is limited to the first several thousand gallons is that studies have shown that above that level most usage is for outdoor usages, mainly irrigation and pools, which do not create additional sewage flows.

- ***Equivalent Residential Unit*** – otherwise known as an ERU, in concept, is generally the usage of a single average household. In practice, it is the usage of a single household receiving service through a standard residential meter, which

[3] For instance, in both Citrus Springs and Pine Ridge water costs $1.35 per thousand gallons up to 10,000 gallons in a month; then the costs rises to $1.78 up to 20,000 gallons; then $2.13 up to 30,000 gallons; then $2.84 up to 50,000 gallons; and finally $4.25 per thousand gallons for all monthly consumption above 50,000 gallons. This increasing rate structure is usually called a conservation rate structure.

is otherwise know as a five-eighths by three-quarter inch meter. A customer using a large meter – for example a one inch meter – will be able to impose and instantaneous demand on the utility system that is two-and-a-half times as big as can be imposed by the standard meter. Therefore, such a customer is allocated the costs of 2.5 times the base monthly facility charge of a standard meter.[4]

Most of the one-time fees are related to capital investments that the utility has made in water production facilities, water transmission facilities (the major water lines), wastewater treatment plants, and wastewater transmission facilities (the major sewer mains). When these are built, they are almost always oversized compared to the current customer demands.

This is the most economical way to provide future capacity for future growth. New customers pay a pro rata share of the invested costs in these four categories of capital expenditures. In addition, a new customer also pays for those utility facilities that only serve that customer. These include any line extensions to and from the lot and the meter.[5]

Operations and Maintenance

Once a test year is chosen, then all non-capital expenses – generally called operations and maintenance or O&M – are identified. In addition, interest expenses for any borrowed monies are added since that is an on-going expense of the utility. Again, each of these expenses are reviewed to determine whether they were reasonable and prudent – and occasionally, where appropriate, looked at to assure that they were incurred to serve current customers and not future customers. All of the costs that pass these investigations then become the revenue requirements of the utility. For a given level of revenue requirements, the following relationships are almost always true:

- The greater the number of ERU's, the lower the rate
- The greater the amount of gallons used, the lower the rate
- The greater amount of the capital expenses paid for by either developers or by customers through their connection fees, the lower the rate

In combination, it can be said that in general, the lower the investment serving more customers and selling more product, the lower the rates.

How Revenue Requirements are Translated to Rates

The next step is as much an art as it is accounting. Once the revenue requirements are established, then those revenues must be collected through the monthly rates. In simplest

[4] This concept is otherwise known as meter equivalency. A table of meter equivalency is published by the American Water Works Association. However, anyone can determine what it is by looking at any rate table and dividing the lowest meter charge into the charges for larger meters. In Pine Ridge, a standard meter costs $5.70 a month, while a 1 inch meter costs $14.26 per month – 2.5 times the smaller meter cost.

[5] There are other fees such as deposits, bad check charges, late payment fees, etc. but they are not material to this discussion of understanding the major points of how rates are set.

form, one would take the average number of customers during the test year times the existing base monthly facility charge times 12 to get the revenues from all customers through the existing fixed charge. To that you would sort all customer bills from low to high and determine how many gallons were consumed that fell in the first 10,000 gallons consumed each month, how much fell into the next tier of cost, and so forth. Then each tier of usage is multiplied times its gallons used rate to determine the revenues from those gallons used rates. This total gallons-used revenue is added to the total revenue from the base monthly facility charge to determine the revenues that the current rates are expected to generate. To the extent that the projected revenues fail to cover the revenue requirements, there is a revenue short-fall – otherwise known as a revenue deficiency. If, for instance the current rates were predicted to raise a total of $600,000 over the test year, and the revenue requirements were determined to be $750,000, the revenue deficiency would be $150,000. By ratioing the short-fall to the projected revenues you get a percentage that is close to the amount that rates (on average) need to go up in order to meet the revenue requirements. In the example that we are using, it would mean an average rate increase of 25 percent.

Base charge and gallons used rate

The most common way that revenue requirements are spread out to create new rates is as follows: 40 percent of the revenue requirements (approximately) are allocated to the base monthly facility charge and 60 percent are allocated to the gallons used rate.

For the base monthly facility charge, the first step is to determine the total ERU's. For example, if there were 500 customers on standard meters and 500 on 1 inch meters (each one inch meter being equivalent to 2.5 ERU's), then the total ERU's would be 1,750. If 40% of the revenue requirements were $300,000, then the rate for each ERU would be $300,000 divided by 1,750 divided by 12 months, or $14.29. Those customers with standard meters would have a base monthly facility charge of $14.29 while those with a 1 inch meter would have a base monthly facility charge of $35.71.

The remaining 60 percent of revenue requirements are allocated to gallons used charges. The process is a little more cumbersome and requires computers since there are a number of factors at work.

These include allocating the costs to each tier of consumption (remember the conservation rate structure where the price rises the more you use each month), and recognizing that the higher the cost, the less likely future customers are to use the higher amounts. This is known as price elasticity and is in fact the expected conservation impact of the tiered rate structure.

Unless we are grossly exceeding our current water use permit, one can usually get very close to the final gallons used rate design by increasing each tier by the average amount of rate increase indicated by the revenue deficiency (which we calculated earlier as 25 percent). An example of how the gallons used charges could change is shown in the table on the following page:

Item	0 to 10,000 gallons	10,001 to 20,000 gallons	20,001 to 30,000 gallons	Over 30,000 gallons
Existing Rates	**$1.20**	**$2.00**	**$3.20**	**$4.80**
Expected Consumption	**100,000**	**40,000**	**20,000**	**20,000**
Revenues from Existing Rates	**$120,000**	**$80,000**	**$64,000**	**$96,000**
Cumulative Revenues from Existing Rates	**$120,000**	**$200,000**	**$264,000**	**$360,000**
New Rates	**$1.50**	**$2.50**	**$4.00**	**$6.00**
Revenues from New Rates	**$150,000**	**$100,000**	**$80,000**	**$120,000**
Cumulative Revenues from New Rates	**$150,000**	**$250,000**	**$330,000**	**$450,000**

(Consumption is in 1,000's of gallons and rate is cost per 1,000 gallons)

In this example, each of the tiers started out with certain rates and each of those were raised 25%. As can be seen, the net result is that projected revenues went from $360,000 to $450,000, or 25% more, which is what was needed to cover the revenue requirements.[6]

Summary

The basic process is quite fundamental no matter where it is done. The nuances, such as what is considered to be applicable to current customers, what is to be paid by future customers, what is a reasonable level of anticipated repair and replacement, what are reasonable interest rates, and a myriad of other considerations are the subjects of numerous econometric (combing economic theory with statistics to analyze and test economic relationships) studies and regulatory analyses.

Those topics are well beyond the scope of this document, but must be kept in mind when one looks at the details of a full rate analyses. The basics, as outlined above, are (1) establishing a test year; (2) identifying the reasonable and prudent revenue requirements during that test year; (3) allocating those revenue requirements to certain consumption units – almost always ERU's and gallons used consumption; and via multiplication (4) testing to determine that the proposed rates will generate the revenues required.

[6] There are econometric models used by Rate Consulting professionals and by the water management district that would make the table above somewhat more complicated to calculate. They forecast the percentage reduction in usage versus the percentage increase in pricing and include considerations for such things as affluence of the neighborhood being served, current average usage amount, average lot size, ease to put in private wells, and other explicit inputs.

Some Specific Observations on Pine Ridge and Citrus Springs

During the last full rate case for these two systems, the following data was determined to be true:

Water System Item	Citrus Springs	Pine Ridge
Revenue Requirements	$432,753	$275,907
Contributed Capital	$611,895	$1,237,455
% of Total Capital	12%	28%
Total Water Sales (1,000 gallons)	155,027	154,712
Avg. No. of Customers in 1996	1,917	938
ERU's Projected for 1996	2,109	2,019
Average Gallons per month per customer	6,739	13,744
Approved 1996 Rates		
Base Monthly Facility Charge per ERU	$7.39	$4.90
Gallons Used Charge (per 1,000)	$1.53	$1.02
Average Monthly Bills		
Base Monthly Facility Charge	$8.13	$10.55
Monthly Gallons Used Charge	$10.31	$14.02
Average Monthly Water Bill	$18.44	$24.57

Explanation of the differences

The table above was gleaned from over 1,000 pages of the final order in Rate Case 950495-WS before the FPSC. The FPSC disallowed significant amount of revenues from both systems – over $57,000 from Citrus Springs and $112,000 from Pine Ridge. As can be seen, the cost to Pine Ridge was further reduced because 28 percent of that systems capital costs were paid for by either the developer or the customers through their connection fees. For Citrus Springs, the comparable figure was only 12 percent. Even though Pine Ridge had less than half the number of customers, gallons used sales were almost equal. This means twice the sales per customer for Pine Ridge. The greater the sales for a given set of customers, the lower the rate.

Also, if you look at the ERU's for Pine Ridge you will see that it is only 4 percent different than Citrus Springs. This is because the majority of the Pine Ridge customers are on one inch meters. While it is true that the base monthly facility charge is less for Pine Ridge than Citrus Springs for the same size meter, as you can see it does not mean that they are paying less. On a per customer basis, even back when this case was

adjudicated, the average customer in Pine Ridge was paying 33 percent more than the average customer in Citrus Springs.

The disparity

For a 1 inch meter, they would have been paying $12.25 compared to a standard meter in Citrus Springs of $7.39. This is 66 percent more than Citrus Springs. Since the gallons used rates for Pine Ridge were recently raised to be equal to those of Citrus Springs, this disparity still exists today.

A typical customer in Pine Ridge is paying $14.26 for a one inch meter, while the typical customer in Citrus Springs is paying $8.76 for a standard meter. The typical Pine Ridge customer is still paying 63 percent more in base monthly facility charges.

This document was written by Robert Knight, the Director of Water Resources Department of Citrus County. Knight has more than 30 years of utility experience, including more than 20 years of rate setting experience. He has appeared as an acknowledged rate expert witness in numerous dockets before the Florida Public Service Commission and the Federal Energy Regulatory Commission. He has published papers on the design of load management, curtailable, and interruptible rates. In the 1980's, he developed a methodology adopted by the FPSC for testing the cost effectiveness of those rates and his methodology is still is use today.