



Setting Rates: Best Practices for Electric Cooperatives

PART 4

JULY 18, 2008

Methodologies for Determining Revenue Requirements

***Editor’s Note:** The first three parts of this series were included in the April 27, 2007, July 27, 2007, and January 4, 2008, issues of Solutions News Bulletin. Additional articles in the series will appear later this year.*

Overview

This special Solutions insert is the fourth in a series, “Setting Rates: Best Practices for Electric Cooperatives.” The series examines how electric cooperatives can apply best practices when setting rates for their members.

This part discusses the two predominant approaches for determining the revenues required to prudently operate the cooperative, to maintain the desired equity ratio and/or provide for an equity management plan, and to meet the future financial goals of the cooperative. These two approaches are the Coverage Ratio (CR) method and the return on rate base method—also known as the Rate of Return (ROR) method. This part also outlines the benefits and drawbacks associated with each method and includes these sections:

- Introduction
- The CR method
- The ROR method
- Summary
- Glossary
- Additional resources

Introduction

In setting rates for electric utilities, state regulatory commissions have sought to create a balance between the utility’s financial interests and the consumer’s right to reliable service at reasonable rates.

Investor-owned utilities are owned by stockholders who are largely not customers of the utility. This creates an implicit conflict of interest between customers and stockholders that is usually resolved by rate regulation.

With cooperatives, the same conflict between customers and owners is not present since the customers are the owners of the utility. This situation—coupled with the generally smaller size of cooperatives, the fact that most cooperatives are not-for-profit entities and the remedies customer-owners have against a

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cooperative’s board of directors and management—generally provides suitable protection for customers. Most states recognize this and do not regulate distribution cooperatives’ rates. In fact, only about 16 states currently rate regulate distribution cooperatives.

In the absence of formal rate regulation by the state, the cooperative’s board of directors becomes the *de facto* regulator. As such, it must contend with the same fundamental questions that a state regulator would face. One such question is determining the adequate revenues required to meet the distribution cooperative’s financial plan and return patronage capital pursuant to a prudent schedule.

The approach most often used by electric cooperatives is the CR method. Frequently, this refers to the times interest earned ratio (TIER). However, it actually can be one of several ratios, including net or operating TIER, debt service coverage (DSC) ratio or modified DSC ratio. In this paper, TIER is generally used in discussing the CR method.

This method considers the margins plus other factors—e.g., long-term interest expense, depreciation and amortization, non-operating margins (interest) and cash receipts of patronage capital. It directly reflects the revenues and expenses of the cooperative but not the equity costs.

The ROR method provides cooperatives with an alternative approach for determining revenue requirements that has certain benefits, such as a direct relationship between the cost of equity and revenue requirements and the direct inclusion of the net amount of the cooperative’s investment in the determination of revenue requirements. This is also the most widely used method for determining revenue requirements as it is commonly used in the rate proceedings of electric, gas and telephone utilities.

The Coverage Ratio Method

The Rural Utilities Service (RUS) and its predecessor, the Rural Electrification Administration, have used TIER to evaluate and regulate cooperatives since the industry was established. In the early years, cooperatives were largely debt financed, with little or no equity. This highly leveraged position made the CR method well suited for cooperatives.

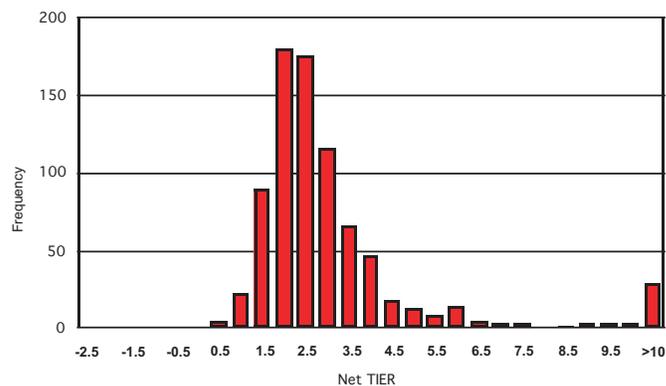
Today, RUS specifies minimum coverage ratios for net TIER, operating TIER, DSC and operating DSC. The equation used to measure actual net TIER is illustrated in Equation 1.

Equation 1

$$\text{Net TIER} = (\text{Net Margins} + \text{Long-term Debt Expense}) / \text{Long-term Debt Expense}$$

One theoretical difficulty in setting rates with TIER—or another coverage ratio—is that an optimal TIER is seldom known. In practice, TIER is frequently set to historical norms, such as what other cooperatives have done. Indeed, CFC’s Key Ratio Trend Analysis (KRTA) is frequently used for the purpose of “benchmarking” performance measures, or ratios. However, the question of the appropriate value of TIER is not addressed by benchmarking. Chart 1, which uses information from CFC’s 2006 KRTA database, illustrates a frequency distribution of net TIER for 813 distribution cooperatives.

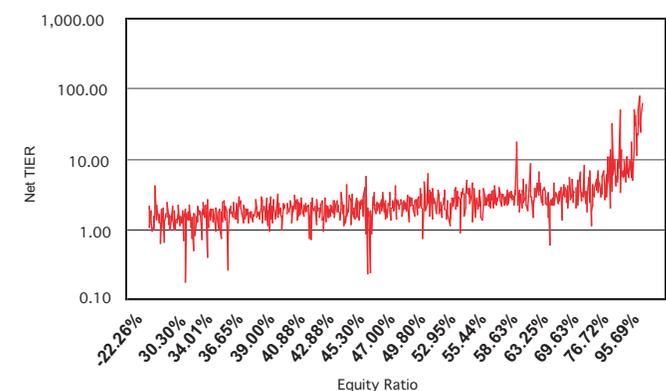
CHART 1: Distribution Cooperatives’ Net TIER



Source: CFC’s 2006 KRTA Database

The value of TIER is directly related to the equity ratio as illustrated in Chart 2. Therefore, when deciding on an appropriate TIER, the amount of debt the cooperative has in its capital structure should be considered.

CHART 2: Relationship Between Net TIER and Equity Ratio



Source: CFC’s 2006 KRTA Database

Formulas developed to assist cooperatives in managing their equity seek to provide appropriate cost-of-equity guidelines based on various criteria and frequently must be converted to a TIER target.

Once the target TIER has been selected, the increase in revenues can easily be determined by algebraic manipulation of Equation 1, as shown in Equation 2.

Equation 2

$$\text{Increase in Revenues} = [(\text{TIER} \times \text{Long-term Interest Expense}) - \text{Long-term Interest Expense}] - \text{Net Margins}$$

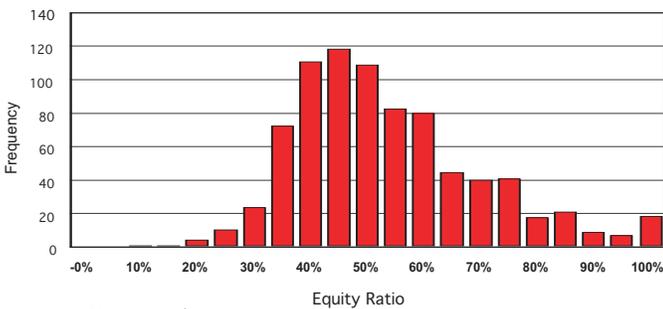
So long as TIER is greater than one, margins are positive. This is not to suggest that low TIER values are adequate for cooperatives. Over the last several decades, cooperatives have rightly sought to increase their equity ratios, which have also increased coverage ratios such as net TIER.

Today, many cooperatives still use the CR method to determine revenue requirements, even though cooperatives generally are not as highly leveraged as those in the early years.

In recent years, cooperatives have grown equity—and consequently, TIER. Equity benefits the modern cooperative by providing a means of growing plant investment and providing a buffer against earnings volatility. Indeed, equity ratios are an appreciable part of the total capitalization of many cooperatives as illustrated in Chart 3, created from CFC’s 2006 KRTA database.

The median value for the 2006 equity ratios illustrated

CHART 3: Distribution Cooperatives’ Equity Ratios



Source: CFC’s 2006 KRTA Database

in Chart 3 is 47.27 percent. As the distribution suggests, however, the average value is even higher (50.80 percent). Cooperatives have matured into the well-financed and governed entities we see today.

So, is the use of TIER still appropriate? TIER is still an appropriate means of setting revenue requirements at cooperatives, but there are additional issues to be considered.

The Rate of Return Method

Although many electric cooperatives use the CR method, the predominant approach for determining revenue requirements at utilities of all types is the ROR method, which is widely used in rate proceedings of electric, gas and telephone utilities. This approach is more comprehensive than the CR method, but it is also more difficult to use. It measures the

return on the investment in net plant and related items such as inventories, construction work in progress, allowance for funds used during construction and cash working capital. It is illustrated in Equation 3 in simple form.

Equation 3

$$\text{Revenue Requirement} = \text{Operating Expenses} + \text{ROR} \times (\text{Rate Base} - \text{Depreciation})$$

Where:

ROR = Rate of Return
(the weighted cost of both debt and equity)

This approach is particularly useful where the debt and equity comprise a significant portion of the cost of providing service. Indeed, the value of the rate base should be close to the value of the capitalization after taking into account subsidiary investments. If not, care should be taken to understand why. Mismatches between financing terms and depreciation may account for some differences.

In the ROR method, the return—which represents investment in net plant, inventories and working capital requirements—represents the weighted cost of debt and equity used to finance the rate base, as shown in Chart 4.

CHART 4: Capital Structure and Weighted Return on Rate Base Example

	Capitalization Ratio	Cost	Weighted Cost
Debt	55%	5.00%	2.75%
Equity	45%	6.50%	2.92%
TOTAL	100%		5.67%

Chart 4 illustrates both the return on rate base (5.67 percent) as well as the return on equity (6.50 percent). By computing the return on rate base, and “back-solving” for the return on equity, the cooperative can compute its “earned return on equity” at existing operating revenues. If the cooperative is computing the return on rate base to determine the desired level of operating revenues, the return on equity must be determined.

Although entire books have been written on the economic and financial theories that govern the cost of equity determination, the cost of equity for a cooperative is reasonably straightforward. CFC has long held that cooperative equity has a cost, and that cost is determined through the application of one or more formulas. This is the root of equity management. The ROR method provides a means for a cooperative to directly apply the cost of equity in the determination of the appropriate level of operating revenues.

On a forward-looking basis, equity costs can be determined by the application of several related formulas. These formulas have been developed over the past 30-plus years. Work by RUS and CFC has resulted in modification of the original formula to reflect a forward-looking analysis. The modified formula is shown as Equation 4.

Equation 4

$$K_e = [(1+g)^{n+1} - (1-g)^n] / (1+g)^n - 1$$

Where: K_e = cost of equity

g = growth in total utility plant

n = patronage capital cycle

This formula computes the minimum return required to hold the equity ratio at its present level while growing at a fixed rate of growth (g) with revolving capital credits at a specific cycle (n years). It also implicitly assumes a retirement of patronage capital schedule that grows as margins grow over time. Other methods differ in the way they treat capital credits and equity ratios.

As with the CR method, capital structures heavily skewed to either debt or equity may require adjustments to either the capital structure in the form of a hypothetical capital structure or adjustments to the return on equity to reflect extreme situations.

Summary

Although most cooperatives use a CR method to determine revenue requirements, there is an alternative approach.

The CR method does provide an easy means by which revenue requirements can be evaluated or set. But CR methods only indirectly reflect the cost of equity. For instance, revenues above a 1.0 TIER are attributable to the equity component, but it is unclear whether the difference in the existing or proposed TIER is truly adequate without first studying the effects of the cooperative's past and future equity ratios, its future growth and its patronage capital return policy.

The limitations associated with the use of a CR method for determining revenue requirements are largely solved by using the ROR method. This method is also more comprehensive and, therefore, more precise. The downside of the ROR method is that it is more difficult to use.

Both methods, if applied diligently, should provide electric cooperatives with useful means of determining revenue requirements or evaluating the adequacy of existing revenues.

Glossary

Coverage Ratio: A ratio that measures interest coverage. TIER, debt service coverage (DSC) ratio and modified DSC ratio are all measures of interest coverage.

CWIP: Construction work in progress. A component of rate base.

Equity Cost: The annualized cost of equity in percentage terms. For an investor-owned utility, the cost of equity is indirectly measured. It represents the opportunity cost of other investments of similar risk. This cost can be measured by the discounted cash flow method, the comparable earnings approach, the capital assets pricing model or other similar method. For cooperatives, the cost of equity is the cost to return patronage capital pursuant to a specific schedule. Hence, the cost of equity for a cooperative is a more straightforward calculation than for an investor-owned utility.

Equity Ratio: Total equity and margins divided by total capitalization of the cooperative. Total capitalization is the sum of total equities and margins and total long-term debt.

Key Ratio Trend Analysis (KRTA): A series of ratios and measurements of distribution cooperatives that permits comparisons among companies. The database is compiled annually by CFC.

Median Value: The median measures the middle position of a frequency distribution for a group of data.

Operating Income: Operating revenues less operating and maintenance expenses, depreciation expense and non-income-related taxes.

Return on Rate Base: Operating income divided by the rate base.

Revenue Requirement: Minimum revenues required for the prudent operation of the utility.

Times Interest Earned Ratio (TIER): A key financial ratio used to measure a cooperative's financial health and its ability to meet interest expense on long-term debt. It compares the cooperative's margins with interest expense.

Additional Resources

Hahn, Robert L., and Aliff, Gregory E. (October 2003). *Accounting for Public Utilities*.

NARUC Staff Subcommittee on Accounting and Finance (Summer 2003). *National Association of Regulatory Utility Commissioners Rate Case and Audit Manual*.

NRECA Rate Issues Study Committee (January 1989). *Rate Issues And Strategies: A Guide For Rural Electric Policymakers*.

Setting Rates Series Is Available Online

The first four parts of this series "Setting Rates: Best Practices for Electric Cooperatives" are available on CFC's Extranet and through cooperative.com.

Go to CFC's home page at www.nrucfc.coop and log into the Extranet. From the Extranet, select Tools & Information and then CFC Library.

The series is also posted on cooperative.com. Go to: www.cooperative.com/services/retailrates.htm.