

# Weighted Average Cost of Capital Methodology Comparison

*The Georgian National Energy and Water Supply Regulatory  
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# ***GNERC vs MPSC STAFF***

## ***WACC FORMULA***

$$\text{GNERC: WACC pre-tax} = g * R_d + (1 - g) * R_e / (1 - T)$$

where:  $g$  = share of attracted capital  
 $R_d$  = cost of attracted capital  
 $R_e$  = cost of own (equity) capital  
 $T$  = profit tax

$$\text{MPSC: WACC pre-tax} = W_d * R_d + W_e * R_e / (1 - T)$$

where:  $W_d$  = weight or percentage of embedded debt  
 $R_d$  = cost of debt  
 $W_e$  = weight or percentage of common equity  
 $R_e$  = cost of equity capital  
 $T$  = Income tax

Conclusion: Similar methods in establishing basic WACC



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# Determining WACC Percentages

- ❑ Use the percentages of the various types of capital that will finance utility operations, primarily Long-Term Debt and Equity.
- ❑ Can take into account other sources of funding into the WACC calculation
  - Short-term Debt
  - Customer Contributions
  - Zero or low cost loans from the government
  - Tax credits



# Estimating WACC Percentages

- ❑ If the value of debt is not known, better to estimate WACC percentages using current market values for debt.
- ❑ A targeted equity percentage can be negotiated or determined and the utility WACC can be amended within those parameters.



# Example of WACC Calculation

- Utility has \$30 stock price and 2 million shares of stock outstanding with a return of 10%.  
Utility has \$55 million in debt at a cost rate of 5.50% and a tax rate of 35%.
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- $V_e = \$30 * (2 \text{ million}) = \$60 \text{ million}$   $R_e = 10.0\%$
- $V_d = \$55 \text{ million}$   $R_d = 5.50\%$
- Total Value =  $\$60 + \$55 = \$115 \text{ million}$
- $W_e = \$60 / \$115 = 0.52$
- $W_d = \$55 / \$115 = 0.48$



# WACC Calculation

$$\text{WACC pre-tax} = W_d * R_d + W_e * R_e / (1 - T)$$

$$= 0.48 * (5.50\%) + \frac{0.52 * (10.0\%)}{(1 - 0.35\%)}$$

$$= 2.64\% + 8.0\%$$

$$= 10.64\%$$



# *COST of Debt and Equity*

- ☐ MPSC costs debt and equity different from GNERC
- ☐ Method 1 (Primary): Total Cost
  - Utility issues debt with established maturity dates
  - Cost on a net proceeds basis after accounting for all financing fees
- ☐ Method 2: Cost Debt by finding bond cost of similar company with a similar credit/bond rating and other comparable characteristics
- ☐ MPSC Cost of Equity established by 3 basic financial models :
  1. CAPM:  $R_e = R_{rf} + (R_m - R_{rf}) * \beta$
  2. DCF:  $R_e = D_0 (1 + g) / P_0 + g$
  3. Risk Premium:  $R_e = \text{Current Utility Bond Yield} + \text{Historical Stock to Bond Spread}$



# Cost of Debt – Method 1. Total Cost

Utility issues various long-term debt over many years. The debt cost takes into account all costs associated with issuing the debt and is priced based on net proceeds. The net proceeds basis constitutes the “debt premium” in our calculation.

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(L)
			Stated		Amount	Initial	Under-		Net	Cost		
(000)		Original	Maturity	Interest	of	Proceeds	Writer	Finance	Proceeds	Based on	Amount	Annual
<u>Line</u>	<u>Description</u>	<u>Issue Date</u>	<u>Date</u>	<u>Rate (%)</u>	<u>Offering</u>	<u>to Company</u>	<u>Costs</u>	<u>Expenses</u>	<u>to Company</u>	<u>Net Proceeds</u>	<u>Outstanding</u>	<u>Cost</u>
1	5.0% LT Bond	1-Jan-10	1-Jan-20	5.00%	\$ 100,000	100%	0.50%	0.03%	99.46700%	5.12%	\$ 100,000	\$ 5,123
2	4.0% Bond	1-Feb-12	1-Feb-27	4.00%	\$ 300,000	100%	0.60%	0.04%	99.35800%	4.23%	\$ 300,000	\$ 12,690
3	6.5% Mortgage	1-Mar-13	1-Mar-33	6.50%	\$ 500,000	100%	0.75%	0.08%	99.16900%	6.61%	\$ 500,000	\$ 33,050
4	Total										\$ 900,000	\$ 50,863
5	Average Cost									5.65%		



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# Method 2: Comparable Company

Find a comparable company based on

- Size
  - Industry
  - Credit rating
  - Market share
- Review comparable company's debt cost and establish similar debt cost for utility



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# Cost of Equity $R_e$ – Capital Asset Pricing Model (CAPM)

## CAPM

$$R_e = R_{rf} + (R_m - R_{rf}) * \beta$$

where:

$R_{rf}$  is risk free rate

$R_m$  is the market risk

$\beta$  = beta coefficient: measure of an securities volatility to the market

Risk Free rate – similar to GNERC, use of Long-term U.S. Treasury Bond



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# Market Risk $R_m$

- ❑ Determined from the Average Market Return of Large Industrial/Commercial Companies over Several Years
- ❑ Data Provided by Professional Compiling Firms: Ibbotson Assoc., Dow Jones Industrial, Blue Chip, etc.
- ❑ U.S. Market Risk Premium Averaged between 5% -8% over the last 50 years.



# Beta Coefficient $\beta$

- ❑ Measure of how a security's price will move with the market. Derived by regression analysis of a company's stock price over a defined period. Benchmark beta is 1.
- ❑ Betas over 1 considered more risky than market. Betas under 1 considered less risky than market
- ❑ Determined by analysts at professional financial firms
  - Value Line Research Center
  - Yahoo Finance
- ❑ Michigan Utility betas averaged between 0.6 – 0.9 over the last 10 years. Less risky than market.



# CAPM Calculation

- Risk free: Long U.S. Treasury =  $R_{rf} = 3.50\%$
- Market Risk Premium:  $(R_m - R_{rf}) = 7.5\%$
- Beta:  $\beta = 0.80$

$$\begin{aligned} R_e &= R_{rf} + (R_m - R_{rf}) * \beta \\ &= 3.50\% + (7.5\%) * 0.80 \\ &= 9.50\% \end{aligned}$$



# Cost of Equity $R_e$ – Risk Premium Model (RP)

- ❑ Required rate of return determined from difference between investing in utility stocks versus utility bonds
- ❑ Derive difference between the historical yields on utility stocks and utility bonds to determine historical spread.
- ❑ Add historical spread to current yield on utility bond to determine required equity return. Can modify as necessary.



# Risk Premium Calculation

1. Electric Utility Stock Return over last 20 years = 13.2%
2. Electric Utility Bond Return over last 20 years = 6.1%
3. Historical Spread 7.1%
4. Current yield on Long Term Electric Utility Bond = 6.5%
5.  $R_e$  = Current Bond Yield  $R_d$  + Historical Spread or (Debt Premium)  
 $\quad\quad\quad = 7.0\% + 6.5\%$   
 $R_e \quad\quad\quad = 13.5\%$



# Cost of Equity $R_e$ – Discounted Cash Flow Model (DCF)

- ❑ Rate of return derived by Investors expectation of dividend growth, stock price and cash flow.
- ❑ DCF:  $R_e = \frac{D_0(1+g)}{P_0} + g$ 
  - Where:
    - $D_0$  is current paid dividend to Shareholders
    - $P_0$  is current price of stock
    - $g$  is growth rate





# Growth rate (g)

- Utility Growth Determined by Finance Analysts at Financial Firms
  - Value Line Research Center
  - Zack's Financial
  - Yahoo Finance
- Growth rate can be calculated with Sustainable Growth Rate Formula  $br + sv$ . Where “b” is earnings retention ratio, “r” is average rate of return on book value and “sv” is growth rate based on future sale stock above book value.



# DCF Calculation

- $D_0 = \$1.25$
- $P_0 = \$28$
- $g = 5.5\%$
- DCF:  $R_e = \frac{D_0(1+g)}{P_0} + g$ 
$$= \frac{\$1.25(1+0.055)}{\$28} + 5.5\%$$
$$= 4.71\% + 5.5\% = 10.21\%$$



# Return on Equity Summary

- The various  $R_e$  methods use different inputs in the models and thus provide different results. This variation in results is helpful in determining a most reasonable rate of return for shareholders and investors.
  - CAPM = 9.50%
  - Risk Premium = 13.50%
  - DCF = 10.21%
- A return on equity within the range of results can provide flexibility and be viewed as reasonable.

