Incentives for Change: Why Utilities Continue to Build and How Regulators Can Motivate Them to Modernize

Methodology

February, 2017

Scenario Methodology

Overview

Acadia Center compares the potential utility shareholder earnings and ratepayer costs of different approaches to meeting grid needs.

Transmission for Reliability vs. Local Energy Resources

This scenario compares the impact on Maine ratepayers and Central Maine Power (CMP) shareholders of a traditional transmission upgrade in the Boothbay region versus the Boothbay Sub-Regional Smart Grid Reliability Project.

Methodology – Traditional Transmission System Upgrade

1. Estimate the weighted average cost of capital ("WACC") for CMP
    a. Estimate the percentage equity ("%E") and percentage debt ("%D") in the utility's capital structure
    b. Estimate the allowed return on equity ("ROE") for the transmission upgrade
    c. Estimate the cost of debt ("COD")
    d. Estimate the effective tax rate ("t")
    e. Estimate WACC using:

$$WACC = (ROE \times \%E) + (COD \times \%D \times (1 - t))$$

2. Use 45 years of revenue requirements ("RR") provided in Maine Public Utilities Commission Docket No. 2011-00138, Central Maine Power response to GRID-002-019.

3. Calculate the present value of revenue requirements ("PVRR") in years 1 through n using:

$$PVRR_n = R_n / (1+WACC)^n$$

4. Calculate the total present value of revenue requirements ("TPVRR") by summing PVR_n for all years

5. Calculate the levelized annual revenue requirements ("LARR") using:

$$LARR = TPVRR / \{[1 - (1/(1 + WACC)^{45})] / WACC\}$$

Values Used in the Analysis

%E	50%
%D	50%
ROE	11.74%
COD	4.68%
t	40.8%
WACC	7.26%

Source for the value of E, t, and COD is Maine Public Utilities Commission Docket No. 2013-00168, Stipulation, July 3, 2014, page 11.

Methodology – Boothbay Sub-Regional Smart Grid Reliability Pilot Project

1. Use GridSolar actual and projected 2012-2025 expenditures ("E") from Boothbay Sub-Region Smart Grid Reliability Pilot Project Final Report, January 19, 2016, pp. 30 and 52

2. Calculate the present value of expenditures ("PVE") in years 1 through *n* using:

$$PVE_n = E_n / (1+WACC)^n$$

3. Calculate the total present value of expenditures ("TPVE") by summing PVE_n for all years

4. Calculate the levelized annual expenditures ("LAE") using:

$$LAE = TPVE / \{[1 - (1/(1 + WACC)^{13})] / WACC\}$$

Expand Natural Gas Distribution Network vs. Promote High-Efficiency Electric Heat Pumps

This scenario compares the utility shareholder earnings and ratepayer impacts from expanding natural gas distribution networks in Connecticut and promoting customer adoption of high efficiency electric heat pumps.

Methodology – Gas Distribution System Expansion

1. Estimate the weighted average cost of capital ("WACC")
    a. Estimate the percentage equity ("%E") and percentage debt ("%D") in the utility's capital structure
    b. Estimate the allowed return on equity ("ROE") for the distribution system expansion[1]
    c. Estimate the cost of debt ("COD")
    d. Estimate the effective tax rate ("t")
    e. Estimate WACC using:

$$WACC = (ROE \times \%E) + (COD \times \%D \times (1 - t))$$

2. Compile actual 2015 capital expenditures ("C") and customers served by residential-only off-main expansion projects from Hurdle Rate Summary worksheets. Source: Worksheets from Off-Main Portfolio View Project Summaries submitted by CNG and SCG in Docket No. 13-06-02 in compliance with Order 11. Filing Dates (2015): March 30, July 1, December 17

3. Estimate the shareholder returns each year over the depreciable life of the investments
    a. Estimate the depreciation rate (in years) used for ratemaking ("DR")
    b. Calculate the annual depreciation expense ("d") using:

$$d = C / DR$$

    c. Calculate shareholder returns ("R") in years 1 through *n* using:

$$R_n = (C - (d \times (n\text{-}1)) \times ROE \times \%E$$

4. Calculate the present value of shareholder returns ("PVR") in years 1 through *n* using:

$$PVR_n = R_n / (1+WACC)^n$$

5. Calculate the total present value of shareholder returns ("TPVR") by summing PVR_n for all years

6. Calculate the levelized annual shareholder return ("LAR") using:

$$LAR = TPVR / \{[1 - (1/(1 + WACC)^{DR})] / WACC\}$$

[1] ROE for SCG and CNG listed in Avangrid, Inc. Annual Report (2015) to U.S. Securities and Exchange Commission (p. 15)

Values Used in the Analysis

%E	56.75%
%D	43.25%
ROE	9.27%
COD	2.82%
t	32.5%
WACC	6.08%
C	$10.56 million
DR	20 years

Methodology – Promotion of Efficient Heat Pumps

1. Assume 100% of residential customers served by the 2015 off-main gas expansion projects instead had become heat pump customers ("HPC")

2. Determine the heat pump rebate ("R") per customer. Source: Heat pump rebates available to customers listed on EnergizeCT.com.

3. Estimate program administration costs ("A%") as a percentage of rebate costs

4. Determine the performance incentive percentage ("PI%") of total program costs

5. Calculate the shareholder performance incentive ("PI") using:

$$PI = HPC \times R \times (1 + A\%) \times PI\%$$

Values Used in the Analysis

HPC	930
R	$500
A%	10%
PI%	4.25%

For more information:

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