Introduction to Regulatory Accounting

John Caldwell, Ph.D.
Director of Economics

EEI Advanced Rates Training Course
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Agenda for Today’s Presentation

1. Review of General Ratemaking Concepts
2. Regulatory Accounting: An Overview
3. Regulatory Accounting and the Rate Case
   - Test Year
   - Rate Base
   - Operating Expenses
   - Capital Structure
   - Taxes
The Regulated Natural Monopoly
How Much Should be Sold, and at What Price?

Electricity Production/Consumption (Millions of MWh/Year)

Cost/KWh

Marginal Cost

The monopolist prefers this.

The regulator prefers this . . .

but will settle for this.

The Ratemaking Formula

Required Revenue = Cost of Service + Fair Return
Why Should a Utility be Allowed to Make a Return on Investment?  
Isn’t Recovery of Expenses Enough?

- Must pay interest on the debt.
- Must make enough earnings to attract investors.

How are Revenue Requirements Determined?

\[ R = O + (V - D) \times r \]

- \( R \): total revenue requirements
- \( O \): operating costs
- \( V \): gross value of tangible and intangible property
- \( D \): accrued depreciation of tangible and intangible property
- \( r \): allowed rate of return
A Note on Depreciation
What Is it? Why Do We Need It?

- It is both an **expense** and a **(negative) asset**
  - **Expense**: provides a return of (not on) investment
  - **Asset**: Accumulated depreciation reflects decline in the book value of the asset
- It is determined by
  - Original book value of asset
  - Assumed asset life
  - Method of depreciation (straight line, double-declining balance, etc.)

### Depreciation
An Example

<table>
<thead>
<tr>
<th>Year</th>
<th>Book Value at Beginning of Year</th>
<th>Depreciation Expense</th>
<th>Accumulated Depreciation</th>
<th>Book Value at End of Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$100,000</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$80,000</td>
</tr>
<tr>
<td>2</td>
<td>$80,000</td>
<td>$20,000</td>
<td>$40,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>3</td>
<td>$60,000</td>
<td>$20,000</td>
<td>$60,000</td>
<td>$40,000</td>
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<tr>
<td>4</td>
<td>$40,000</td>
<td>$20,000</td>
<td>$80,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>5</td>
<td>$20,000</td>
<td>$20,000</td>
<td>$100,000</td>
<td>$0</td>
</tr>
</tbody>
</table>
## Cost of Service

### Operating Revenues
- Sales of Electricity
- Miscellaneous Service Revenues
  - Late Payment Charges
  - Connection Fees

### Operating Expenses
- Purchased Power Costs
- Fuel
- O&M
- Depreciation
- Interest on Customer Deposits
- Taxes

### Return on Investment

## Utility Accounting

### Four Sets of Books!

<table>
<thead>
<tr>
<th>Function</th>
<th>Tax</th>
<th>Regulatory</th>
<th>Financial Reporting</th>
<th>Managerial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine tax</td>
<td>Fair return; reasonable rates</td>
<td>Information for external users</td>
<td>Information to best run the utility</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goal of Method</th>
<th>Tax</th>
<th>Regulatory</th>
<th>Financial Reporting</th>
<th>Managerial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair taxation; growth</td>
<td>Measure cost of service</td>
<td>Income and balance sheets</td>
<td>Cost/benefit metrics</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Who Sets Rules</th>
<th>Tax</th>
<th>Regulatory</th>
<th>Financial Reporting</th>
<th>Managerial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legislature</td>
<td>Utility Commissions</td>
<td>FASB, SEC, FERC</td>
<td>Company management</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Who Enforces Rules</th>
<th>Tax</th>
<th>Regulatory</th>
<th>Financial Reporting</th>
<th>Managerial</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRS; government</td>
<td>Utility Commissions</td>
<td>CPA, SEC</td>
<td>Company management</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Differences from Other Methods</th>
<th>Tax</th>
<th>Regulatory</th>
<th>Financial Reporting</th>
<th>Managerial</th>
</tr>
</thead>
<tbody>
<tr>
<td>All taxable activities included</td>
<td>Only regulated activities</td>
<td>Most economic events included</td>
<td>Current value; marginal costs; cash flows</td>
<td></td>
</tr>
</tbody>
</table>

Source: Joel Berk, “The Utilities Four Sets of Books,” in *Public Utility Finance and Accounting*
Regulatory Accounting vs. “Regular” Accounting
What’s the Difference?

Balance Sheet

Assets
- Utility plant (a long-term asset) is listed first rather than last, followed by other long-term assets
- Current assets (cash, accounts receivable, inventories) listed next
- Deferred charges listed last

Liabilities
- Capitalization (including long-term debt) listed first
- Current and accrued liabilities listed next
- Deferred credits and operating reserves listed last

Income Statement

• “Above vs. Below the Line”
  - “Above the line” revenues and expenses correspond to those activities associated with providing regulated public utility service
  - “Below the line” corresponds to activities outside the jurisdiction of the commission

• AFUDC
  - Allowance for funds used during construction (AFUDC) is the net cost of money used for construction purposes
  - In addition to appearing on the income statement, AFUDC is also capitalized as part of utility plant

Assets
(dollars in thousands)

Utility Plant, at original cost (including construction work in progress of $145,000) $3,935,000
Less - Accumulated depreciation and amortization $1,672,000
Total utility plant $2,263,000
Other Property and Investments $158,000

Current Assets:
- Cash and cash equivalents $20,000
- Accounts receivable $85,000
- Fuel adjustment clause $10,000
- Materials and supplies, at average cost $46,000
- Electric production fuel, at average cost $14,000
- Prepayments and other $11,000
Total current assets $186,000

Other Assets
- Regulatory assets $149,000
- Deferred charges and other non-current assets $23,000
Total other assets $172,000

$2,779,000
### Capitalization and Liabilities

<table>
<thead>
<tr>
<th>Capitalization</th>
<th>Amount (dollars in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common shareholders’ equity</td>
<td>$778,000</td>
</tr>
<tr>
<td>Preferred stock</td>
<td>$125,000</td>
</tr>
<tr>
<td>Long-term debt, excluding amounts due within one year</td>
<td>$816,000</td>
</tr>
<tr>
<td><strong>Total capitalization</strong></td>
<td><strong>$1,719,000</strong></td>
</tr>
<tr>
<td>Current Liabilities (obligations due within one year)</td>
<td>$249,000</td>
</tr>
<tr>
<td><strong>Total current liabilities</strong></td>
<td><strong>$467,000</strong></td>
</tr>
<tr>
<td>Other Current Liabilities</td>
<td></td>
</tr>
<tr>
<td>Accounts payable</td>
<td>$106,000</td>
</tr>
<tr>
<td>Sinking funds due within one year</td>
<td>$2,000</td>
</tr>
<tr>
<td>Dividends declared on common and preferred stocks</td>
<td>$19,000</td>
</tr>
<tr>
<td>Customer deposits</td>
<td>$8,000</td>
</tr>
<tr>
<td>Taxes accrued</td>
<td>$20,000</td>
</tr>
<tr>
<td>Interest accrued</td>
<td>$6,000</td>
</tr>
<tr>
<td>Accrued employment costs</td>
<td>$33,000</td>
</tr>
<tr>
<td>Other</td>
<td>$24,000</td>
</tr>
<tr>
<td><strong>Total other</strong></td>
<td><strong>$593,000</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$2,779,000</strong></td>
</tr>
</tbody>
</table>

### Consolidated Statement of Income

| Operating Revenues                                  | $1,031,000                      |
| Cost of Energy                                      |                               |
| Fuel for electric generation                        | $242,000                       |
| Power purchased                                     | $44,000                        |
| **Operating Margin**                                | **$745,000**                   |
| Operating Expense and Taxes (except income)         |                               |
| Operation                                           | $174,000                       |
| Maintenance                                         | $47,000                        |
| Depreciation                                        | $120,000                       |
| Taxes (except income)                               | $44,000                        |
| **Operating Income Before Utility Income Taxes**    | **$360,000**                   |
| Utility Income Taxes                                | $99,000                        |
| **Operating Income**                                | **$261,000**                   |
| Interest and Other Charges                          |                               |
| Interest on long-term debt                          | $50,000                        |
| Other interest                                      | $8,000                         |
| Allowance for borrowed funds used during construction and carrying charges | ($2,000) |
| Amortization                                        | $2,000                         |
| **Net Income**                                      | **$203,000**                   |
| Dividend requirements on preferred shares           | $3,000                         |
| Balance available for common shareholders           | $200,000                       |
| Average common shares outstanding                   | $3,281,000                     |
| Earnings per average common share                   | $3.16                          |
| Dividends declared per common share                 | $1.85                          |
Test Year

• . . . Is the Period Used to Develop a **Representative Cost of Service Reflecting**:
  o Jurisdictional Sales  o Revenues
  o O&M Expenses  o Depreciation
  o Taxes  o Fair Return on Rate Base

• . . . May Be:
  o **Historical** (12 Months): Assumes the Past Will Be Like the Future
  o **Partially Forecasted** (MD Allows 8 + 4; FERC Allows 3 + 9)
  o **Fully Forecasted** (Budgeted)

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The Test Year (cont.)
Getting from Actual Costs to Representative Costs

• **Nonrecurring Items are Amortized**
  – Amortization (from the Latin “admortire” – “to kill”) allocates a cost over several time periods, like depreciation
  – Examples:
    • Acquisition adjustments (from purchase/sale of utility plant or property)
    • Legal fees
    • Unusual property losses (e.g., storm damage, acts of God)
    • Rate Case Expenses

• **Revenues (and Expenses) are Normalized**
  – Historical data is adjusted for “known and measurable changes”
  – Examples: weather, customer growth, bad debt expense
A Normalization Example: Weather

1. Use historical data and linear regression to develop a sales equation:

   \[ \text{Sales} = (m_1 \times \text{HDD}) + (m_2 \times \text{CDD}) + b, \]

   Where
   
   \[ m_1 = \frac{\text{usage}}{\text{heating degree-day}} \]
   
   \[ m_2 = \frac{\text{usage}}{\text{cooling degree-day}} \]
   
   \[ b = \text{base (non-weather) usage} \]

2. Normalize sales in any period by using the weather coefficients of the above model, along with normal and actual weather data:

   \[ \text{Normal Sales} = \text{Actual Sales} + [m_1 \times (\text{normal HDD} - \text{actual HDD})] + [m_2 \times (\text{normal CDD} - \text{actual CDD})] \]

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Case Study: Residential Sales per Customer

\[ b = 468 \text{ kWh/month} \quad m_1 = 0.7 \text{ kWh/HDD} \quad m_2 = 2.1 \text{ kWh/CDD} \]

<table>
<thead>
<tr>
<th>Month</th>
<th>Actual Sales</th>
<th>HDD Normal</th>
<th>CDD Normal</th>
<th>Normal Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>1,192</td>
<td>917 940</td>
<td>8 3</td>
<td>1,192 + [0.7 x (917-940)] + [2.1 x (8-3)] = 1,186</td>
</tr>
<tr>
<td>February</td>
<td>996</td>
<td>732 820</td>
<td>8 2</td>
<td>996 + [0.7 x (732-820)] + [2.1 x (8-2)] = 947</td>
</tr>
<tr>
<td>March</td>
<td>906</td>
<td>593 552</td>
<td>18 7</td>
<td>906 + [0.7 x (593-552)] + [2.1 x (18-7)] = 958</td>
</tr>
<tr>
<td>April</td>
<td>713</td>
<td>345 263</td>
<td>33 34</td>
<td>713 + [0.7 x (345-263)] + [2.1 x (33-34)] = 769</td>
</tr>
<tr>
<td>May</td>
<td>768</td>
<td>159 132</td>
<td>104 126</td>
<td>768 + [0.7 x (159-132)] + [2.1 x (104-126)] = 741</td>
</tr>
<tr>
<td>June</td>
<td>1,036</td>
<td>39 27</td>
<td>216 285</td>
<td>1,036 + [0.7 x (39-27)] + [2.1 x (216-285)] = 899</td>
</tr>
<tr>
<td>July</td>
<td>1,261</td>
<td>9 5</td>
<td>323 385</td>
<td>1,261 + [0.7 x (9-5)] + [2.1 x (323-385)] = 1,134</td>
</tr>
<tr>
<td>August</td>
<td>1,259</td>
<td>15 7</td>
<td>292 356</td>
<td>1,259 + [0.7 x (15-7)] + [2.1 x (292-356)] = 1,130</td>
</tr>
<tr>
<td>September</td>
<td>1,023</td>
<td>77 56</td>
<td>160 196</td>
<td>1,023 + [0.7 x (77-56)] + [2.1 x (160-196)] = 962</td>
</tr>
<tr>
<td>October</td>
<td>788</td>
<td>282 238</td>
<td>56 55</td>
<td>788 + [0.7 x (282-238)] + [2.1 x (56-55)] = 821</td>
</tr>
<tr>
<td>November</td>
<td>761</td>
<td>539 523</td>
<td>16 16</td>
<td>761 + [0.7 x (539-523)] + [2.1 x (16-16)] = 772</td>
</tr>
<tr>
<td>December</td>
<td>1,058</td>
<td>817 898</td>
<td>8 2</td>
<td>1,058 + [0.7 x (817-898)] + [2.1 x (8-2)] = 1,014</td>
</tr>
</tbody>
</table>
The Test Year (cont.)
Accounting for Contingencies: Operating Reserves

• Operating Reserves cover losses which have a predictable probability of occurrence
• Examples
  – Property Insurance (self-insurance against property damage due to accidents, fires, floods, etc.)
  – Injuries and Damages (protection against liability suits)
  – Pensions and benefits
• Commission may order discontinuance of any expense allocation into these reserves if they are perceived to be sufficiently accumulated
• Cannot be diverted to other uses without approval
• Generally not deductible for income tax purposes

Capital Expenditures vs. Expenses
What’s the Difference?

<table>
<thead>
<tr>
<th>Capital expenditures achieve greater future benefits.</th>
<th>Expenses maintain a given level of service.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Additions to assets</td>
<td>• Removal costs of assets</td>
</tr>
<tr>
<td>• Improvements</td>
<td>• Replacements</td>
</tr>
<tr>
<td>• Machinery and equipment (full delivered, installed cost)</td>
<td>• Repairs and maintenance work</td>
</tr>
<tr>
<td>• Land purchases (including liens and improvements)</td>
<td>• Administrative activities</td>
</tr>
<tr>
<td>• Buildings (including materials, labor, permits, and interest charges during construction)</td>
<td>• Accounting</td>
</tr>
<tr>
<td>• Long-term capital leases</td>
<td>• Customer Service</td>
</tr>
<tr>
<td>• Construction work in progress</td>
<td>• Billing</td>
</tr>
</tbody>
</table>
What is the “Rate Base”?  
The net value of a utility’s used and useful property.

Components
- Electric Plant in Service
- Future Use Plant
- Construction Work-in-Progress (CWIP)
- Materials and Supplies
- Cash Working Capital

Deductions (Cost-Free Capital)
- Accumulated Depreciation
- Customer Advances and Deposits
- Accumulated Deferred Income Tax

The Rate Base
What is its “Fair Value”?

Reproduction Cost

- **Pros**
  - Will prevent misallocation of economic resources due to rates that are too high / too low
  - Will ensure necessary earnings growth during inflationary periods
- **Cons**
  - An “imaginary” number
    - What is being “reproduced”?
    - Under what conditions?
    - What is the “current” price?
  - Consequences
    - Wide estimate variations
    - Regulatory delay
    - Expensive valuation

Original Cost

- **Pros**
  - Administrative advantages: easily understood, relatively simple and inexpensive to calculate
  - Enables utilities to maintain credit standing and attract new capital
- **Cons**
  - Not “inflation-proof”
    - Asset values generally rise
    - Under periods of high inflation, even aging assets could continue to increase in value
  - Consequences
    - Regulatory lag in adjusting return
    - Complications when selling/buying regulated assets
### Property Types

<table>
<thead>
<tr>
<th>Production Plant</th>
<th>Transmission Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Steam Production</td>
<td>• Transmission Substations</td>
</tr>
<tr>
<td>• Nuclear Production</td>
<td>• Transmission Lines</td>
</tr>
<tr>
<td>• Hydraulic Production</td>
<td></td>
</tr>
<tr>
<td>• Other Production</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distribution and Mass Property</th>
<th>Intangible Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Distribution Substations</td>
<td>• Organization Costs</td>
</tr>
<tr>
<td>• Distribution Lines (Mass Property)</td>
<td>• Franchises</td>
</tr>
<tr>
<td></td>
<td>• Software Systems and Licenses</td>
</tr>
<tr>
<td></td>
<td>• Patent Rights</td>
</tr>
</tbody>
</table>

### General Plant
- Office Furniture and Equipment
- Computers
- Large Tools
- Vehicles
- Laboratory Equipment

### Working Capital

**Definition:** the monetary value of necessary investment in materials and supplies and cash required for ongoing operations

- Working Capital is included in rate base

**Components of Working Capital:**
- Materials and Supplies
- Fossil Fuel Inventory
- Nuclear Fuel
- Cash Working Capital
  - Less Customer Deposits
Cash Working Capital

• Definition: the amount of money that the company must have available to cover day-to-day operations
• The need arises from the time lag between expenditures made to provide service and revenue received in return for that service
• How Much is Needed?
  – The Lead-Lag Study Approach:
    1. Net Receipt Lag = Average time difference between when expenses must be paid (“expense lead”) and when revenue is collected (“revenue lag”)
    2. Adjusted Daily Cost of Service = Average daily O&M (less depreciation and amortization) plus taxes
    3. Cash Working Capital = Net Receipt Lag x Average Daily Cost of Service
  – The Formula Approach (1/8 of O&M less fuel and purchased power)
  – The Balance Sheet Method (current assets – current liabilities)

Asset Retirement Obligations

• Many assets have a negative salvage value (i.e., cost to remove exceeds revenue from sale), with a legal obligation to retire them
• This negative salvage value – or asset retirement obligation (ARO) – could be very significant (e.g., nuclear plant decommissioning costs)
• To account for this, the original cost of the asset is increased by the “fair value” of the ARO and depreciation expense is adjusted accordingly
• But these adjustments are not necessarily allowed in the rate base!
Asset Retirement Obligations
Accounting Rx

Procedure
1. Estimate current cost of ARO as discounted value of future expense
2. Increase asset value of plant by this amount and adjust annual depreciation accordingly
3. Increase current cost of ARO each year to reflect higher discounted value
4. Charge the change in the current cost of ARO as an “accretion expense”

Example
• $10,000 asset with 5-year life
• $4,000 net dismantling cost at end of 5-years
• Assume credit –adjusted risk free rate of 8.5%
• Present value of $4000 @ 8.5% is $2,660
• Increase value of asset to $12,660
• Increase 5-year straight -line depreciation from $2000 to $2,532

Accounting for Asset Retirement Obligations
Example

<table>
<thead>
<tr>
<th>Depreciation Expense</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Original Plant</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$2,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>2) Asset Retirement Obligation</td>
<td>$532</td>
<td>$532</td>
<td>$532</td>
<td>$532</td>
<td>$532</td>
<td>$2,660</td>
</tr>
<tr>
<td>3) Total</td>
<td>$2,532</td>
<td>$2,532</td>
<td>$2,532</td>
<td>$2,532</td>
<td>$2,532</td>
<td>$12,660</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Asset Retirement Obligation</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4) Beginning of Year</td>
<td>$2,660</td>
<td>$2,886</td>
<td>$3,132</td>
<td>$3,398</td>
<td>$3,687</td>
</tr>
<tr>
<td>5) End of Year</td>
<td>$2,886</td>
<td>$3,132</td>
<td>$3,398</td>
<td>$3,687</td>
<td>$4,000</td>
</tr>
<tr>
<td>6) Accretion Expense</td>
<td>$226</td>
<td>$246</td>
<td>$266</td>
<td>$289</td>
<td>$313</td>
</tr>
</tbody>
</table>

Accretion Expense is the annual change in the present value of the Asset Retirement Obligation.

Note that at the end of Year 5, the accumulated depreciation for the ARO ($2,660) plus the accumulated accretion expense ($1,340) gives us the actual amount of money we need ($4,000) to retire the asset!!!
CWIP and AFUDC
How Do We Account for Facilities Still Under Construction?

- The Problem:
  - Construction work in progress (CWIP) is currently not “used and useful” and so shouldn’t be in rate base . . .
  - But the utility must raise large sums of money now to do the work, without current compensation in its rates
- A (Partial) Solution:
  - Allow utility to add cumulative financing costs associated with project to total cost of plant when it does go into the rate base
  - This is known as an “Allowance for Funds Used During Construction” (AFUDC)
- An Alternative (Better?) Solution: Phase CWIP into the rate base during the construction phase

CWIP and AFUDC
Comparative Example

Assumptions
- $100 million investment
- 4-year construction period
- 8% CWIP Financing Rate
- 13.2% Revenue Requirement
- 30-Year Book Life

<table>
<thead>
<tr>
<th>Construction Period</th>
<th>CWIP Investment</th>
<th>CWIP Year-End</th>
<th>Cumulative CWIP / Rev. Req.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$25,000,000</td>
<td>$2,000,000</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>2</td>
<td>$25,000,000</td>
<td>$2,000,000</td>
<td>$4,000,000</td>
</tr>
<tr>
<td>3</td>
<td>$25,000,000</td>
<td>$2,000,000</td>
<td>$6,000,000</td>
</tr>
<tr>
<td>4</td>
<td>$25,000,000</td>
<td>$2,000,000</td>
<td>$8,000,000</td>
</tr>
</tbody>
</table>
CWIP and AFUDC
Comparative Example

Revenue Requirement

<table>
<thead>
<tr>
<th>Year</th>
<th>CWIP</th>
<th>AFUDC</th>
<th>Difference</th>
</tr>
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<tbody>
<tr>
<td>2011</td>
<td>$2,000,000</td>
<td>$0</td>
<td>$(2,000,000)</td>
</tr>
<tr>
<td>2012</td>
<td>$4,000,000</td>
<td>$0</td>
<td>$(4,000,000)</td>
</tr>
<tr>
<td>2013</td>
<td>$6,000,000</td>
<td>$0</td>
<td>$(6,000,000)</td>
</tr>
<tr>
<td>2014</td>
<td>$8,000,000</td>
<td>$0</td>
<td>$(8,000,000)</td>
</tr>
<tr>
<td>2015</td>
<td>$16,343,590</td>
<td>$19,612,308</td>
<td>$3,268,718</td>
</tr>
<tr>
<td>2016</td>
<td>$15,902,564</td>
<td>$19,083,077</td>
<td>$3,180,513</td>
</tr>
<tr>
<td>2017</td>
<td>$15,461,538</td>
<td>$18,553,846</td>
<td>$3,092,308</td>
</tr>
<tr>
<td>2018</td>
<td>$15,020,513</td>
<td>$18,024,615</td>
<td>$3,004,103</td>
</tr>
<tr>
<td>2019</td>
<td>$14,579,487</td>
<td>$17,495,385</td>
<td>$2,915,897</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td>$5,317,949</td>
<td>$6,381,538</td>
<td>$1,063,590</td>
</tr>
<tr>
<td>2041</td>
<td>$4,876,923</td>
<td>$5,852,308</td>
<td>$975,385</td>
</tr>
<tr>
<td>2042</td>
<td>$4,435,897</td>
<td>$5,323,077</td>
<td>$887,179</td>
</tr>
<tr>
<td>2043</td>
<td>$3,994,872</td>
<td>$4,793,846</td>
<td>$798,974</td>
</tr>
<tr>
<td>2044</td>
<td>$3,553,846</td>
<td>$4,264,615</td>
<td>$710,769</td>
</tr>
<tr>
<td>Total</td>
<td>$318,461,538</td>
<td>$358,153,846</td>
<td>$39,692,308</td>
</tr>
<tr>
<td>NPV @ 10%</td>
<td>$108,442,253</td>
<td>$111,161,529</td>
<td>$2,719,276</td>
</tr>
</tbody>
</table>

NPV @ 10%

Treatment of Disallowances and Abandoned Plant

- Any part of a recently completed plant that is disallowed for ratemaking purposes is deducted from the value of original plant and treated as a loss
- Any plant (completed or under construction) that is abandoned is also deducted (from the value of original plant if completed, or from CWIP if under construction)
  - Any portion of this abandoned plant that is also disallowed for ratemaking purposes is treated as a loss
  - Any portion that is not disallowed, and for which future revenues are expected to be received, shall be treated as a separate asset with a cost equal to the present value of expected future revenues
    - The discount rate used is the incremental borrowing rate
    - If the original cost of allowed plant exceeds the present value of revenues, then the difference is also treated as a loss
Operating Expenses
General Categories

• Power Production
  – Fuel (including transportation, handling, maintenance of equipment, and fuel cost)
  – Purchased Power
  – Transmission (by others)
  – Environmental Costs
• Transmission and Distribution (O&M)
• Customer Service, Information, and Sales
• Administrative and General Expenses

Types of Operating Expenses

Operations
• Labor Costs
• Fuel Costs
• Rent
• Meter Reading Expenses
• Customer Record-Keeping Expenses
• Sales Expense

Maintenance
• Labor
• Materials and Supplies

Taxes
• Income Taxes
• Taxes Other than Income Taxes

Depreciation/Amortization
King Solomon Revisited
Sometimes Assets and Expenses Can’t Be Tied to a Single Owner!

- **Jurisdictional (Regulated) vs. Non-jurisdictional Activities**
- **Common Plant** - utility plant which is engaged in providing more than one utility service (e.g., gas and electric)
- **Common Costs** – costs incurred jointly in providing more than one utility service
- **Joint Ownership of Assets** (e.g., power plants)

These must be “split up” using allocation methods

---

Rate of Return

- **Return on Investment (ROI)**
  - Return on Rate Base
  - Includes Return on Debt and Equity
- **Return on Shareholders’ Equity (ROE)**
- **What Constitutes a “Fair” Rate of Return?**
  - Maintain Credit Rating / Financial Integrity
  - Attract Capital at Reasonable Cost
  - Comparable to Other Investments with Similar Risks
Capital Structure

- Definition: The Means by Which a Firm is Financed

- Sources of Capital
  - Common and Preferred Stock
  - Retained Earnings
  - Debt

- In a Rate Case, Capital Structure May Be:
  - Actual
  - Hypothetical
  - Parent Company
  - Projected
  - Adjusted for Cost-Free Items
  - Deferred Income Taxes
  - Customer Advances, Deposits

Capital Structure (cont.)

Issues

- Actual vs. Ideal?
- Provides no Specific Allowance for Efficiency
- “Parent vs. Child”: Whose Should be Used?
- What About Inflation?
- Gradualism: How Rapidly Should Rates Be Allowed to Change?
- Should There Be Compensation for Regulatory Risk?
Return on Equity
An Evolving Concept

• Supreme Court Precedents
  – Bluefield (1923): Return on capital must be reasonably sufficient for utility to maintain credit rating and raise money
  – Hope (1944): ROE should be comparable to returns earned in other enterprises with similar risks

• Later Refinements
  – Expert “judgment” is not enough in determining R.O.E. (i.e., statistical measures of risk must be used)
  – “Comparable risk” estimates of R.O.E. should be more than simply average returns of similar companies
  – The risk-adjusted return should reflect what investors would actually require for a company with its particular risk profile

Return on Equity
How is it Calculated?

• Risk Premium Approach
  – The Simple Method: \( R.O.E. = \text{Mortgage Bond Interest Rate} + 3-5\% \)
  – A More Sophisticated Method: Capital Asset Pricing Model
    \( R.O.E. = \text{Risk-free interest rate} + (\beta \times \text{Market Risk Premium}) \)

• Discounted Cash Flow Technique
  – Generic Method: \( R.O.E. = (\text{Dividend} / \text{Stock Price}) + \text{Growth Rate} \)
  – FERC Method: \( R.O.E. = (1 + 0.5 \times \text{Growth Rate}) \times (\text{Dividend} / \text{Stock Price}) + \text{Growth Rate} \)

• Comparable Company Technique
Rate of Return / Capital Structure

<table>
<thead>
<tr>
<th>Capitalization</th>
<th>Amount (millions)</th>
<th>Capital Structure</th>
<th>Cost</th>
<th>Weighted Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Debt</td>
<td>$604</td>
<td>40.3%</td>
<td>9.23%</td>
<td>3.72%</td>
</tr>
<tr>
<td>Short-Term Debt</td>
<td>$63</td>
<td>4.2%</td>
<td>6.07%</td>
<td>0.25%</td>
</tr>
<tr>
<td>Preferred Stock</td>
<td>$87</td>
<td>5.8%</td>
<td>6.77%</td>
<td>0.39%</td>
</tr>
<tr>
<td>Common Stock Equity</td>
<td>$671</td>
<td>44.7%</td>
<td>13.00%</td>
<td>5.82%</td>
</tr>
<tr>
<td>Deferred Taxes</td>
<td>$75</td>
<td>5.0%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>Total Capitalization</strong></td>
<td><strong>$1,500</strong></td>
<td><strong>100.0%</strong></td>
<td></td>
<td><strong>10.18%</strong></td>
</tr>
</tbody>
</table>

Taxes
Two Main Types

- **Income Taxes** (Federal and State)
- **Taxes Other Than Income**
  - Property Taxes
  - Taxes Collected on Behalf of Others
    - Sales Tax (Customers)
    - Personal Income Tax (Employees)
    - Social Security Tax (Employees)
**Investment Tax Credits**

- The Investment Tax Credit (ITC): A reduction in income tax liability equal to a percentage of the book value of a depreciable asset the year it is put into service.
- Intended as a government incentive for businesses to expand by rewarding shareholders (not customers).
- But for utilities, regulators usually don’t see it that way!
- Two main methods of accounting for ITC:
  - **Flow-Through**
    - Recorded as a one-time reduction in operating expenses
    - All benefits go to ratepayers
  - **Normalization**
    - Spreads tax savings over life of investment as an amortized rate base reduction
    - Benefits shared between shareholders and ratepayers

---

**Federal Domestic Production Tax Deduction**

- Enacted in 2004 as Section 199 of the Internal Revenue Code
- Applicable to all “qualified production activities income”, including electricity generation.
- Originally set at 3% of taxable income, but grew to 9% effective in 2010 tax year.
- For integrated utilities, a separate calculation must be performed to identify income specifically tied to electricity generation.
- Integrated utilities would like to extend the credit beyond generators to an allocation of return on general plant in service, but . . .
- States (currently strapped for cash) would like to eliminate the tax deduction altogether by redirecting the money from the deduction into state taxes!
Deferred Taxes

Deferred taxes arise when the method of depreciation used for regulatory purposes differs from the method of depreciation used for computing income taxes. This affects the timing of tax payments, but not the total amount paid.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>$2,000</td>
<td>$4,000</td>
<td>$800</td>
<td>$1,600</td>
<td>$800</td>
</tr>
<tr>
<td>Year 2</td>
<td>$2,000</td>
<td>$2,400</td>
<td>$800</td>
<td>$960</td>
<td>$160</td>
</tr>
<tr>
<td>Year 3</td>
<td>$2,000</td>
<td>$1,440</td>
<td>$800</td>
<td>$576</td>
<td>($224)</td>
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<tr>
<td>Year 4</td>
<td>$2,000</td>
<td>$1,080</td>
<td>$800</td>
<td>$432</td>
<td>($368)</td>
</tr>
<tr>
<td>Year 5</td>
<td>$2,000</td>
<td>$1,080</td>
<td>$800</td>
<td>$432</td>
<td>($368)</td>
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<tr>
<td>Total</td>
<td>$10,000</td>
<td>$10,000</td>
<td>$4,000</td>
<td>$4,000</td>
<td>$0</td>
</tr>
</tbody>
</table>

Assumptions: $10,000 investment with 5-year life and no salvage value
40% income tax rate
Regulatory reporting uses straight-line depreciation
Tax reporting uses double-declining balance depreciation

Accounting for Deferred Income Taxes

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Beginning of Year</td>
<td>$10,000</td>
<td>$8,000</td>
<td>$6,000</td>
<td>$4,000</td>
<td>$2,000</td>
</tr>
<tr>
<td>2) End of Year</td>
<td>$8,000</td>
<td>$6,000</td>
<td>$4,000</td>
<td>$2,000</td>
<td>$0</td>
</tr>
<tr>
<td>3) Average</td>
<td>$9,000</td>
<td>$7,000</td>
<td>$5,000</td>
<td>$3,000</td>
<td>$1,000</td>
</tr>
<tr>
<td>Deferred Taxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Beginning of Year</td>
<td>$0</td>
<td>$800</td>
<td>$960</td>
<td>$736</td>
<td>$368</td>
</tr>
<tr>
<td>5) End of Year</td>
<td>$800</td>
<td>$960</td>
<td>$736</td>
<td>$368</td>
<td>$0</td>
</tr>
<tr>
<td>6) Average</td>
<td>$400</td>
<td>$880</td>
<td>$848</td>
<td>$552</td>
<td>$159</td>
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<tr>
<td>Average Rate Base</td>
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<tr>
<td>Line 3 – Line 6</td>
<td>$8,600</td>
<td>$6,120</td>
<td>$4,152</td>
<td>$2,448</td>
<td>$841</td>
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<tr>
<td>Average Capitalization</td>
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<tr>
<td>Debt</td>
<td>$4,025</td>
<td>$2,865</td>
<td>$1,943</td>
<td>$1,146</td>
<td>$394</td>
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<tr>
<td>Preferred</td>
<td>$525</td>
<td>$374</td>
<td>$253</td>
<td>$149</td>
<td>$51</td>
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<tr>
<td>Equity</td>
<td>$4,050</td>
<td>$2,882</td>
<td>$1,955</td>
<td>$1,153</td>
<td>$396</td>
</tr>
<tr>
<td>Deferred Taxes</td>
<td>$400</td>
<td>$880</td>
<td>$848</td>
<td>$552</td>
<td>$159</td>
</tr>
</tbody>
</table>
Rules and Standards
Some Guidelines You Should Know

• **FERC** Uniform System of Accounts

• **ASC 980** (aka **FASB 71**): “Accounting for the Effects of Certain Types of Regulation”

• **FERC Form 1** (Reporting Standard)

• **SEC** (Securities Exchange Commission)
  Forms 10Q and 10K

FASB Accounting Standards Codification (ASC)
Some Other Important Ones for Utilities

• **ASC 740**: Income Taxes

• **ASC 815**: Derivatives and Hedging

• **ASC 410**: Asset Retirement Obligations

• **ASC 360**: Fixed Assets (Property, Plant, and Equipment)

• **ASC 840**: Leases

• **ASC 225**: Income Statement

• **ASC 450**: Contingencies for Gains and Losses
Regulatory Accounting
Guiding Principles

• Regulatory reporting should provide a reasonable assessment to both regulators and shareholders of:
  – The value of the company’s assets
  – Normal operating expenses
  – Nonrecurring or extraordinary costs
  – Expected future liabilities

• As a part of the ratemaking process, the proper reporting of costs, revenues, and assets should result in the setting of just and reasonable rates that allows the company to continue to provide reliable electricity service and to effectively meet growing demand