Methods of Valuing Utility Assets

IPU Advanced Regulatory Studies Program

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Presenters

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Learning Objectives

- Why public utilities need to be valued
- Various standards of value
- Three common valuation approaches
- Methods used to value public utilities
- Factors that make valuing public utilities unique and challenging
Why are Public Utility Assets Valued?

- Mergers / Acquisitions / Consolidation
- Condemnation / Eminent Domain
- Other Situations:
  - Redistribution of system capacity (joint ownership)
  - Pricing of utility service
  - Insurance and tax purposes
  - Financial planning and reporting
What is unique about valuing public utilities?

NATURAL MONOPOLIES
- Economic / rate regulation
- Rate making – Valuation circularity

THINLY TRADED
- 100 – 200 Water / wastewater utility transactions per year
- <100 gas / electric utility transactions per year

DIVERSE MARKET
- Both private and public buyers and sellers
- Different regulatory environments (e.g., traditional vs. fair value)
What do we mean by value?

- What value?
- From whose perspective?
- For what purpose?
- Value as of when?

Most common value definition

Fair Market Value

The price at which the property would change hands between a willing buyer and a willing seller, where neither is under any compulsion to buy or sell and both parties have reasonable knowledge of the relevant facts.

(Source: IRS Revenue Ruling 59-60)
Valuation Standards (Examples)

- **Uniform Standards of Professional Appraisal Practice (USPAP) – Appraisal Foundation**
  Provides ethics and performance standards for the appraisal profession

- **Business Valuation Standards – American Society of Appraisers**
  Provides minimum requirements for developing and reporting on the valuation of businesses.

- **Statement on Standards for Valuation Services (SSVS 1) – American Institute of Certified Public Accountants (AICPA)**
  Provides guidelines for developing estimates of value and reporting of results. Applies to all AICPA members who perform valuation services.

Note: these standards are general in nature and not industry or sector-specific
Valuation Steps at a Glance

1. Understand Assignment
   - Purpose
   - Client’s use

2. Understand Value Premise
   - Standard of value
   - Premise of value
   - Level of control

3. Analyze Market
   - Economy
   - Industry
   - Local factors

4. Analyze the Company / System
   - Assets
   - Historical financial performance

5. Consider & Apply Value Approaches
   - Assess appropriateness
   - Apply appropriately

6. Reconcile Results
   - Develop opinion of value
Valuation Approaches

Income Approach  Market Approach  Asset Approach
Income Approach Theory

• The value of a property is the present value of the future economic benefits of owning the property.

• Approach is relevant when the property being valued generates or is anticipated to generate net income, profits, or free cash flows.
Income Approach

The value under the income approach comes down to basically three things:

- **Net Cash Flows**
- **Discount Rate**
- **Growth Rate**
Net Cash Flows

The cash a company generates after accounting for cash outflows to support operations and maintain its capital assets
Discount Rate

Basic Equation:

Discount Rate = Risk-Free Rate + Premium for Risk

Weighted Average Cost of Capital:

WACC = Cost of Equity \times Equity\% + Cost of Debt \times Debt\%
Income Approach Valuation
Most Common Methods

**Direct Capitalization Method**

\[
\text{Value} = \frac{Benefit\ Stream_{n+1}}{\text{Discount Rate} - \text{Growth Rate}}
\]

- No variation in the capitalization rate
- A consistent income stream
- A constant growth rate that does not terminate

**Discounted Cash Flow**

\[
\text{Value} = \sum \frac{Benefit\ Stream_n}{(1 + \text{Discount Rate})^n}
\]

- Allows for variable growth rate and income stream
Direct Capitalization Method (Example)

Direct Capitalization Value Indicator:

\[
\text{Value} = \frac{\text{Normalized Free Cash Flow}}{\text{Discount Rate} - \text{Growth Rate}}
\]

Value = $3,375 / (7.6\% - 2.0\%) = $60,269

Discount Rate = 7.6\%
Growth Rate = 2.0\%

Net Cash Flow Calculation:

Net Income $3,810
Add: Depreciation Exp 1,016
Add: Interest Exp x (1-t) 0
Less: Interest Inc x (1-t) (70)
Less: Working capital additions\(^1\) (9)
Less: Capital expenditures\(^2\) (1,372)
Free Cash Flow $3,375

Values shown in $000s.
# Discounted Cash Flow Method Example

<table>
<thead>
<tr>
<th>Description</th>
<th>2023 ($000s)</th>
<th>2024 ($000s)</th>
<th>2025 ($000s)</th>
<th>2026 ($000s)</th>
<th>2027 ($000s)</th>
<th>Terminal Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Income</td>
<td>3,839</td>
<td>3,902</td>
<td>3,964</td>
<td>4,034</td>
<td>4,104</td>
<td>4,104</td>
</tr>
<tr>
<td>Add Depreciation Expense</td>
<td>1,016</td>
<td>1,020</td>
<td>1,023</td>
<td>1,025</td>
<td>1,027</td>
<td>1,027</td>
</tr>
<tr>
<td>Add: Interest Expense x (1-t)</td>
<td>(7.39)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Less: Interest Income x (1-t)</td>
<td>(94)</td>
<td>(117)</td>
<td>(146)</td>
<td>(180)</td>
<td>(215)</td>
<td>(215)</td>
</tr>
<tr>
<td>Less: Capital Expenditures</td>
<td>(1,290)</td>
<td>(1,316)</td>
<td>(1,343)</td>
<td>(1,369)</td>
<td>(1,397)</td>
<td>(1,335)</td>
</tr>
<tr>
<td><strong>Net Cash Flow</strong></td>
<td><strong>2,990</strong></td>
<td><strong>3,485</strong></td>
<td><strong>3,494</strong></td>
<td><strong>3,504</strong></td>
<td><strong>3,515</strong></td>
<td><strong>3,576</strong></td>
</tr>
<tr>
<td>Period for PV Calculation</td>
<td>0.5</td>
<td>1.5</td>
<td>2.5</td>
<td>3.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>PV Factor @ 7.6%</td>
<td>0.9640</td>
<td>0.8959</td>
<td>0.8327</td>
<td>0.7739</td>
<td>0.7192</td>
<td>0.7192</td>
</tr>
<tr>
<td>PV of Cash Flows</td>
<td>2,883</td>
<td>3,122</td>
<td>2,910</td>
<td>2,712</td>
<td>2,528</td>
<td>45,929</td>
</tr>
<tr>
<td><strong>Total PV of Cash Flows</strong></td>
<td>$ 60,083</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Income Approach

Take-Aways

Income Approach

Measures the future economic benefits of owning the property

Two Methods

(1) Direct Capitalization (2) Discounted Cash Flow

Direct Capitalization Method

Used when (1) insufficient forecast information available (2) historical year is representative of a normal year

Discounted cash flow method

is the most common income approach method

Value Drivers

(1) Net Cash Flow (2) Assumed growth rate (3) Discount rate
Market Approach Theory

Based on the principle of substitution

“Market” focused approach

Can be the most difficult to use in valuing public utilities
Two Methods Under the Market Approach

Guideline Transaction Method

Guideline Publicly Traded Company Method
Market Approach Methods

Guideline Transaction Method

1. Identify sales transactions that are similar or comparable to the subject

Guideline Company Method

1. Identify publicly traded companies that are similar or comparable to the subject

2. Various value multiples are calculated
3. The value multiples are compared to the subject company
4. The different indicators of value are reconciled
Considerations in Selecting Comparable Market Transactions

- Industry
- Size
- Growth Expectations
- Business and Financial Risk
- Regulatory environment
- Transaction date
Considerations in Choosing Price Multiples

What price multiples to use?

Common price multiples used for public utilities
Considerations in Choosing Price Multiples

✓ Common Sense andJudgement
✓ Data Availability
✓ Dispersion –
  › Measures the how dispersive the data is around the mean
  › Coefficient of variation (CV) = Standard Deviation / Mean
  › Price multiples with the least dispersion may be selected
Sources for Company and Acquisition Market Data

1. Public Utility Commission Docket Information
2. SEC Filings
   › 10-K Reports
   › 10-Q Reports
   › 8-K Reports of special events
3. Investment and Data Services
   › Bloomberg
   › Mergerstat
   › Morning Star
   › Value Line
4. Company Investor Presentations
## Example Guideline Transaction Method (ABC Company)

<table>
<thead>
<tr>
<th>Value Indicator</th>
<th>Target Firm Value Indicator</th>
<th>Value Multiple</th>
<th>Median Valuation Multiple</th>
<th>Indication of Value</th>
<th>Weight</th>
<th>Weighted Indication of Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Plant Book Value</td>
<td>$49,607 Price/NPBV</td>
<td>x 1.25</td>
<td>= $ 62,170</td>
<td>x 0.4</td>
<td>= $ 24,868</td>
<td></td>
</tr>
<tr>
<td>EBITDA</td>
<td>$7,076 Price/EBITDA</td>
<td>x 9.46</td>
<td>= $ 66,940</td>
<td>x 0.6</td>
<td>= $ 40,164</td>
<td></td>
</tr>
<tr>
<td>Total weighted indication of value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$ 65,032</td>
</tr>
</tbody>
</table>

Net Plant Book Value: 
$49,607 \times 1.25 = 62,170 \times 0.4 = 24,868$

EBITDA: 
$7,076 \times 9.46 = 66,940 \times 0.6 = 40,164$

Total weighted indication of value: 
$65,032$
Market Approach

Take-Aways

<table>
<thead>
<tr>
<th>Market Approach</th>
<th>Measures the value of substitute properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Methods</td>
<td>(1) Guideline Transaction (2) Guideline Company</td>
</tr>
<tr>
<td>Challenge</td>
<td>Not a robust market with relatively few transactions</td>
</tr>
<tr>
<td>Challenge</td>
<td>Complete market data can be difficult to find</td>
</tr>
<tr>
<td>Typical Use</td>
<td>Usually given less weighting than other approaches to estimate value</td>
</tr>
</tbody>
</table>
Asset (or Cost) Approach Theory

Based on the principle of substitution

An asset accumulation approach

Relevance
Asset Accumulation Approach

Public Utility Asset Components

Tangible “Plant”
- Supply
- Treatment Plants
- Transmission Piping
- Distribution Piping
- Meters and Services

Real Property
- Land and Easements

Intangible Assets
- Customer data
- Agreements
- Goodwill

Cost Approach

Market Approach

Combination of Approaches
Cost Approach Used for Tangible Assets

How much money would a prudent investor pay for the subject property in its present location, condition, and operating under present and potential regulatory restrictions?

Cost Approach = Cost – Depreciation

• What cost should be used to measure the value of the tangible assets?

• What forms of depreciation should be considered?
What forms of depreciation should be considered?

- **Physical Deterioration** = Loss in value due to normal wear and tear on the property.

- **Functional Obsolescence** = Loss in value from the functional deficiencies or inadequacies of the property.

- **Economic Obsolescence** = the loss in value of a property caused by factors external to the property, such as economic regulation.
Economic Obsolescence

A form of depreciation in which the loss of value of the property is caused by factors external to the property.

Uber Ride Share

**Scenario 1:** Uber can charge a market rate of $50 from the airport to downtown

**Scenario 2:** A local law is passed that limits what Uber can charge from the airport to downtown to $40

Under Scenario 2, economic obsolescence is $10.
# Reproduction Cost New Less Depreciation

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Reproduction Cost New</th>
<th>% Depreciated</th>
<th>Depreciated Cost New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Section 1</td>
<td>60-inch Branch w/ valves, metering, manholes</td>
<td>$43,177,500</td>
<td>25%</td>
<td>$32,383,125</td>
</tr>
<tr>
<td>Pipe Section 2</td>
<td>36-Inch Branch w/ valves, metering, manholes</td>
<td>8,631,000</td>
<td>23%</td>
<td>6,645,870</td>
</tr>
<tr>
<td>Pipe Section 3</td>
<td>42-Inch Tunnel Branch w/ valves, metering, manholes</td>
<td>54,600,000</td>
<td>19%</td>
<td>44,226,000</td>
</tr>
<tr>
<td>Booster Station</td>
<td>Structure, pumps, valves electrical and instruments</td>
<td>9,363,000</td>
<td>38%</td>
<td>5,805,060</td>
</tr>
<tr>
<td>Storage Tank</td>
<td>Steel Tanks (3) 2 MG</td>
<td>10,270,500</td>
<td>32%</td>
<td>6,983,940</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>$126,042,000</td>
<td></td>
<td>$96,043,995</td>
</tr>
<tr>
<td>Soft Costs</td>
<td>Design, Inspection, Permitting</td>
<td>$14,782,000</td>
<td></td>
<td>14,406,599</td>
</tr>
<tr>
<td>Financing</td>
<td>Construction Interest</td>
<td></td>
<td></td>
<td>4,802,200</td>
</tr>
<tr>
<td>Real Estate</td>
<td>Real Property</td>
<td></td>
<td></td>
<td>9,015,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$124,267,794</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Reproduction Cost New Less Depreciation (with Economic Obsolescence)

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings Before Interest Taxes, Depreciation</td>
<td>$3,810,000</td>
</tr>
<tr>
<td>RCNLD Estimate</td>
<td>124,268,000</td>
</tr>
<tr>
<td>Required Rate of Return</td>
<td>7.6%</td>
</tr>
<tr>
<td>Required Return on Assets</td>
<td>$9,444,368</td>
</tr>
<tr>
<td>Difference = Income Loss</td>
<td>(5,634,368)</td>
</tr>
<tr>
<td>Capitalized Economic Obsolescence ($)</td>
<td>(74,136,421)</td>
</tr>
<tr>
<td>Economic Obsolescence (%)</td>
<td>59.7%</td>
</tr>
<tr>
<td>RCNLD (with condition-based depreciation only)</td>
<td>$124,268,000</td>
</tr>
<tr>
<td>Less Economic Obsolescence</td>
<td>(74,136,421)</td>
</tr>
<tr>
<td>RCNLD (with Economic Obsolescence)</td>
<td>$50,131,579</td>
</tr>
</tbody>
</table>
Asset Approach

Take-Aways

Asset Approach

Cost Measure

Value cost of each asset and add them together

Depreciation

Reproduction or Replacement Cost

(1) Physical (2) Functional (3) Economic

Challenge

Assess how economic regulation affects economic obsolescence

Typical Use

Usually given considerable weighting
Pulling it All Together - Reconciliation

Reconciliation = Analysis of alternative indicators of value to arrive at a final estimate of value.

Consider:

• strength and weaknesses of the data and procedures used
• quality and quantity of data available and analyzed
• relevance of the approaches, methods, and techniques used

*Judgement is the key ingredient in reconciling the estimates
Wrap-Up

There are three generally accepted valuation approaches: Income Approach, Market Approach, and the Asset Approach.

These are standard approaches used in business valuation.

Standard approaches should be tailored to public utilities based on their unique characteristics.

Valuing public utilities is complex due to economic regulation. Valuation and rate-making are closely inter-twined.
References and Additional Reading


3. Valuation of Railroad and Utility Property, Arlo Woolery, CAE.


