

Methods for Valuing Utility Assets

IPU Advanced Regulatory Studies Program

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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:
 - › Tax assessments
 - › Redistribution of system capacity (joint ownership)
 - › Pricing of utility service
 - › Financial planning and reporting

What is unique about valuing public utilities?

1. Involves natural monopolies

- › Economic / rate regulation
- › Rate making – Valuation circularity

2. Thinly traded market

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

3. 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.

Case Introduction

- ABC company owns and operates a water pipeline in the upper Midwest
- The company buys potable water from a supplier that obtains the water Lake Michigan
- The company purchases the water and conveys it to three wholesale customers downstream
- The pipeline system consists of an 18-mile pipeline, one booster station, and two water storage tanks all built in 2001
- The company is regulated by a public utilities commission as a common carrier pipeline



Valuation Steps at a Glance



Historical Income Statements

ABC COMPANY HISTORICAL INCOME STATEMENT

Description	For Fiscal Year Ended December 31				
	2017 (\$000s)	2018 (\$000s)	2019 (\$000s)	2020 (\$000s)	2021 (\$000s)
Revenue:					
Water Revenue	27,319	27,895	28,427	28,917	29,462
Other	75	-	-	(27)	-
Operating Revenues	27,394	27,895	28,427	28,890	29,462
Operating Expenses:					
Purchased Water	19,958	20,357	20,764	21,179	21,603
Fuel and Power	213	233	263	261	241
Contract Services	104	112	104	104	104
General Taxes	128	130	133	110	139
Depreciation	990	1,004	1,006	1,007	1,016
Other	293	299	299	299	299
Total Operating Expenses	21,686	22,135	22,569	22,960	23,402
Income From Operations	5,708	5,760	5,858	5,930	6,060
Other Income and (Expense):					
Interest Income	46	38	36	69	114
Interest Expense	-	(10)	-	-	-
AFUDC	25	3	5	15	12
Amortization of Debt Expenses	-	(1)	(1)	(1)	(1)
Total Other Income and (Expense)	71	30	40	83	125
Pretax Income	5,779	5,790	5,898	6,013	6,185
Provision for Income Taxes	2,219	2,223	2,265	2,309	2,375
Net Income	3,560	3,567	3,633	3,704	3,810

Historical Balance Sheets

ABC COMPANY
HISTORICAL BALANCE SHEETS

Description	As of Fiscal Year End December 31				
	2017 (\$000s)	2018 (\$000s)	2019 (\$000s)	2020 (\$000s)	2021 (\$000s)
ASSETS					
<i>Current Assets:</i>					
Cash and Cash Equivalents	7	7	8	8	9
Accounts Receivable, Net	1,480	1,759	2,053	1,880	1,675
Unbilled Revenue	409	476	571	571	651
Other Current Assets	83	79	77	75	73
Total Current Assets	1,979	2,321	2,709	2,534	2,408
<i>Fixed Assets:</i>					
Utility Plant in Service	57,567	58,535	60,215	62,138	64,519
Construction Work in Progress	1,006	54	131	305	257
Accumulated Depreciation	(11,452)	(12,337)	(13,156)	(14,164)	(15,169)
Net Fixed Assets	47,121	46,252	47,190	48,279	49,607
Total Assets	49,100	48,573	49,899	50,813	52,015
LIABILITIES AND EQUITY					
<i>Current Liabilities:</i>					
Accounts Payable	35	23	58	1,441	775
Accrued Taxes	1,194	903	1,244	597	561
Other Current Liabilities	542	558	575	592	610
Short-term Debt	(8,593)	(9,765)	(11,476)	(13,474)	(13,072)
Total Current Liabilities	(6,822)	(8,281)	(9,599)	(10,844)	(11,126)
<i>Long-Term Liabilities:</i>					
Deferred Income Tax	5,437	6,132	6,463	6,892	6,317
Total Liabilities	(1,385)	(2,149)	(3,136)	(3,952)	(4,809)
<i>Equity Capital:</i>					
Common Stock	1	1	1	1	1
Additional Paid-In Capital	42,786	42,786	42,786	42,786	42,786
Retained Earnings	7,698	7,935	10,248	11,977	14,037
Total Common Equity	50,485	50,722	53,035	54,764	56,824
Total Liabilities and Equity	49,100	48,573	49,899	50,813	52,015

Valuation Approaches



Income Approach



Market Approach



Asset Approach

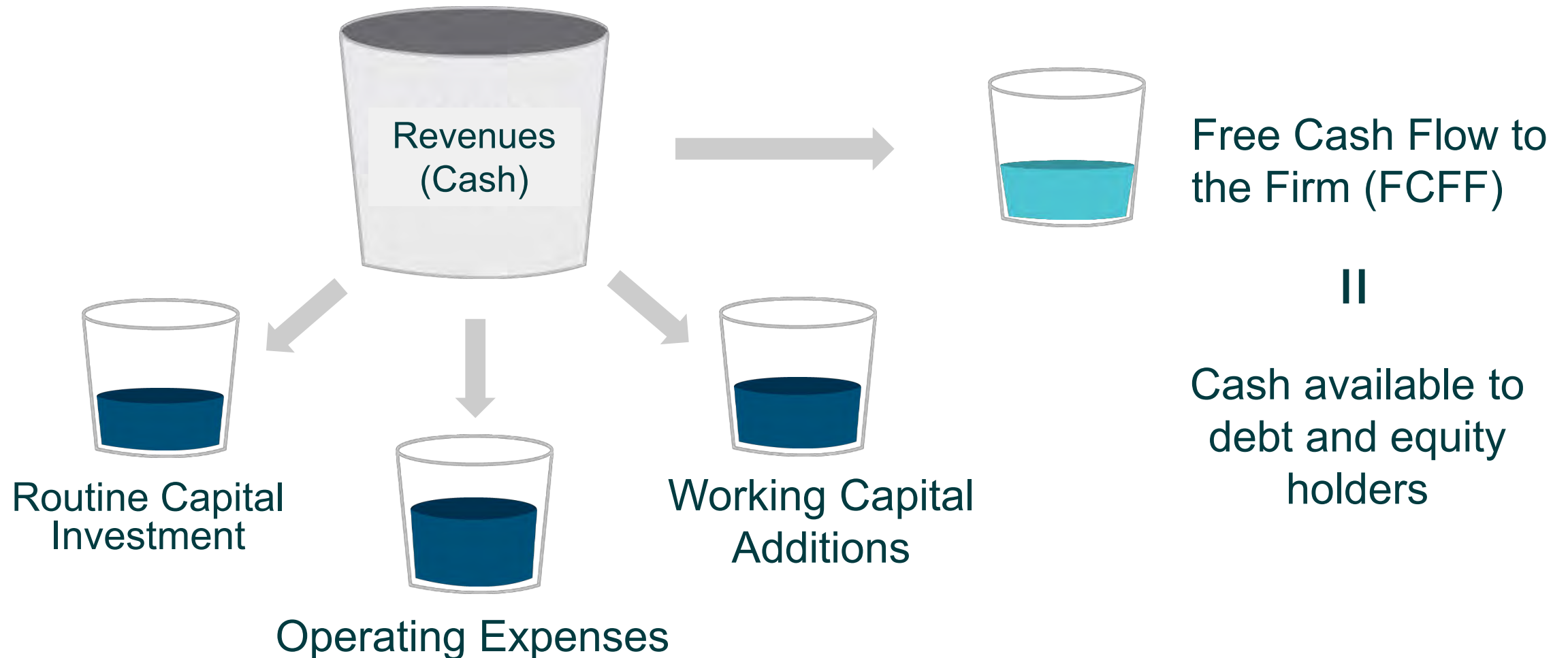
Income Approach Theory

- 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.

Net Cash Flow Measurement of Economic Benefits



Free Cash Flow ABC Company Example

Net Income	\$3,810
Add: Depreciation Exp	1,016
Add: Interest Exp x (1-t)	-0-
Less: Interest Inc x (1-t)	(70) [\$114 x (1-38.4%)]
Less: Working capital additions ¹	(9)
Less: Capital expenditures ²	<u>(1,372)</u>
Free Cash Flow	\$3,375 (in \$000s)

¹Historical working capital (WC) as % of revenues = 1.6%

WC additions calculated as the increase in revenues between 2021 and 2020 x 1.6%

²Based on historical average increase in gross UPIS of 2.9%

ABC COMPANY HISTORICAL INCOME STATEMENT	
Description	2021 (\$000s)
Revenue:	
Water Revenue	29,462
Other	-
Operating Revenues	<u>29,462</u>
Operating Expenses:	
Purchased Water	21,603
Fuel and Power	241
Contract Services	104
General Taxes	139
Depreciation	1,016
Other	<u>299</u>
Total Operating Expenses	23,402
Income From Operations	6,060
Other Income and (Expense):	
Interest Income	114
Interest Expense	-
AFUDC	12
Amortization of Debt Expenses	<u>(1)</u>
Total Other Income and (Expense)	125
Pretax Income	6,185
Provision for Income Taxes	2,375
Net Income	<u>3,810</u>

Income Approach Valuation

Most Common Methods

- **Direct Capitalization Method**

- › Value = Benefit Stream / (Discount Rate – Growth Rate)
 - No variation in the capitalization rate
 - A consistent income stream
 - A constant growth rate that does not terminate

- **Discounted Cash Flow**

- › Value = Sum Benefits Stream in period N) / (1 + Discount Rate)^N
 - Allows for variable growth rate and income stream

Cost of Capital / Discount Rate

Weighted Average Cost of Capital:

$$\text{WACC} = \text{Cost of Equity} \times \text{Equity \%} + \text{Cost of Debt} \times \text{Debt \%}$$

Cost of Equity Capital:

$$\text{Cost of Equity Capital} = \text{Risk-Free Rate} + \text{Premium for Risk}$$

Cost of Capital / Discount Rate

(ABC Company Example – Hypothetical Willing Buyer)

Description	Amount	Source:
Cost of Equity Capital		
Risk-Free Rate of Return	3.0%	Normalized Rate from Duff & Phelps
Long-Term Equity Risk Premium	6.0%	Normalized from Duff & Phelps
Industry Beta	0.37	From SIC Industry Median Beta, Duff & Phelps
Equity Risk Size Premium	5.6%	Decile 10 Size Premium, Duff & Phelps
Total Cost of Equity Capital	10.8%	
Cost of Debt Capital		
Average Cost of Debt	4.64%	Bond yields for corporate bonds rated Baa
Tax Rate	38.4%	Based on company's average tax rate
Cost of Debt (Tax Adjusted)	2.9%	
Capital Structure		
Equity	60%	Average capital structure of guideline companies
Debt	40%	Average capital structure of guideline companies
Total	100%	
Weighted Average Cost of Capital	7.6%	

Direct Capitalization Method

ABC Company Example

Assumptions:

- FY 2021 is typical for revenues, expenses and free cash flows
- Future growth in cash flows = 2.0%

Direct Capitalization Value Indicator:

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

$$\text{Value} = \frac{\$3,375}{7.6\% - 2.0\%}$$

$$\text{Value} = \$60,269$$

ABC Corporation Hypothetical Willing Buyer

Discount Rate = 7.6%

Free Cash Flow Calculation (From Prior Slide)

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

Company Income Projections

ABC COMPANY					
PROJECTED INCOME STATEMENT					
For Fiscal Year Ended December 31					
Description	2022	2023	2024	2025	2026
	(\$000s)	(\$000s)	(\$000s)	(\$000s)	(\$000s)
Revenue:					
Water Revenue	29,525	29,811	30,092	30,377	30,666
Other	-	-	-	-	-
Operating Revenues	29,525	29,811	30,092	30,377	30,666
Operating Expenses:					
Purchased Water	21,569	21,785	22,003	22,223	22,445
Fuel and Power	260	263	263	263	263
Contract Services	105	105	105	105	105
General Taxes	191	197	203	209	215
Depreciation	1,016	1,020	1,023	1,025	1,027
Other	296	299	299	299	299
Total Operating Expenses	23,437	23,668	23,895	24,123	24,353
Income From Operations	6,088	6,143	6,198	6,254	6,312
Other Income and (Expense):					
Interest Income	153	190	237	293	349
Interest Expense	(12)	-	-	-	-
AFUDC	4	3	2	2	2
Amortization of Debt Expenses	(1)	(1)	(1)	(1)	(1)
Total Other Income and (Expense)	144	192	238	294	350
Pretax Income	6,232	6,335	6,436	6,548	6,662
Provision for Income Taxes	2,393	2,433	2,471	2,515	2,558
Net Income	3,839	3,902	3,964	4,034	4,104

Discounted Cash Flow Method

ABC Company Example (Jan 2022)

ABC COMPANY

INCOME APPROACH VALUATION - DISCOUNTED CASH FLOW METHOD

Description	2022 (\$000s)	2023 (\$000s)	2024 (\$000s)	2025 (\$000s)	2026 (\$000s)	Terminal Year
Free Cash Flow:						
Net Income	3,839	3,902	3,964	4,034	4,104	4,104
Add Depreciation Expense	1,016	1,020	1,023	1,025	1,027	1,027
Add: Interest Expense x (1-t)	(7.39)	-	-	-	-	-
Less: Interest Income x (1-t)	(94)	(117)	(146)	(180)	(215)	(215)
Less: Working Capital Additions	(472)	(5)	(5)	(5)	(5)	(5)
Less: Capital Expenditures	(1,290)	(1,316)	(1,343)	(1,369)	(1,397)	(1,335)
Free Cash Flow	2,990	3,485	3,494	3,504	3,515	3,576
Period for PV Calculation	0.5	1.5	2.5	3.5	4.5	4.5
PV Factor @ 7.6%	0.9640	0.8959	0.8327	0.7739	0.7192	0.7192
PV of Cash Flows	2,883	3,122	2,910	2,712	2,528	45,929
Total PV of Cash Flows	\$ 60,083					

$$\text{Terminal Value} = \frac{\text{Terminal Free Cash Flow}}{\text{Discount Rate} - \text{Growth Rate}}$$

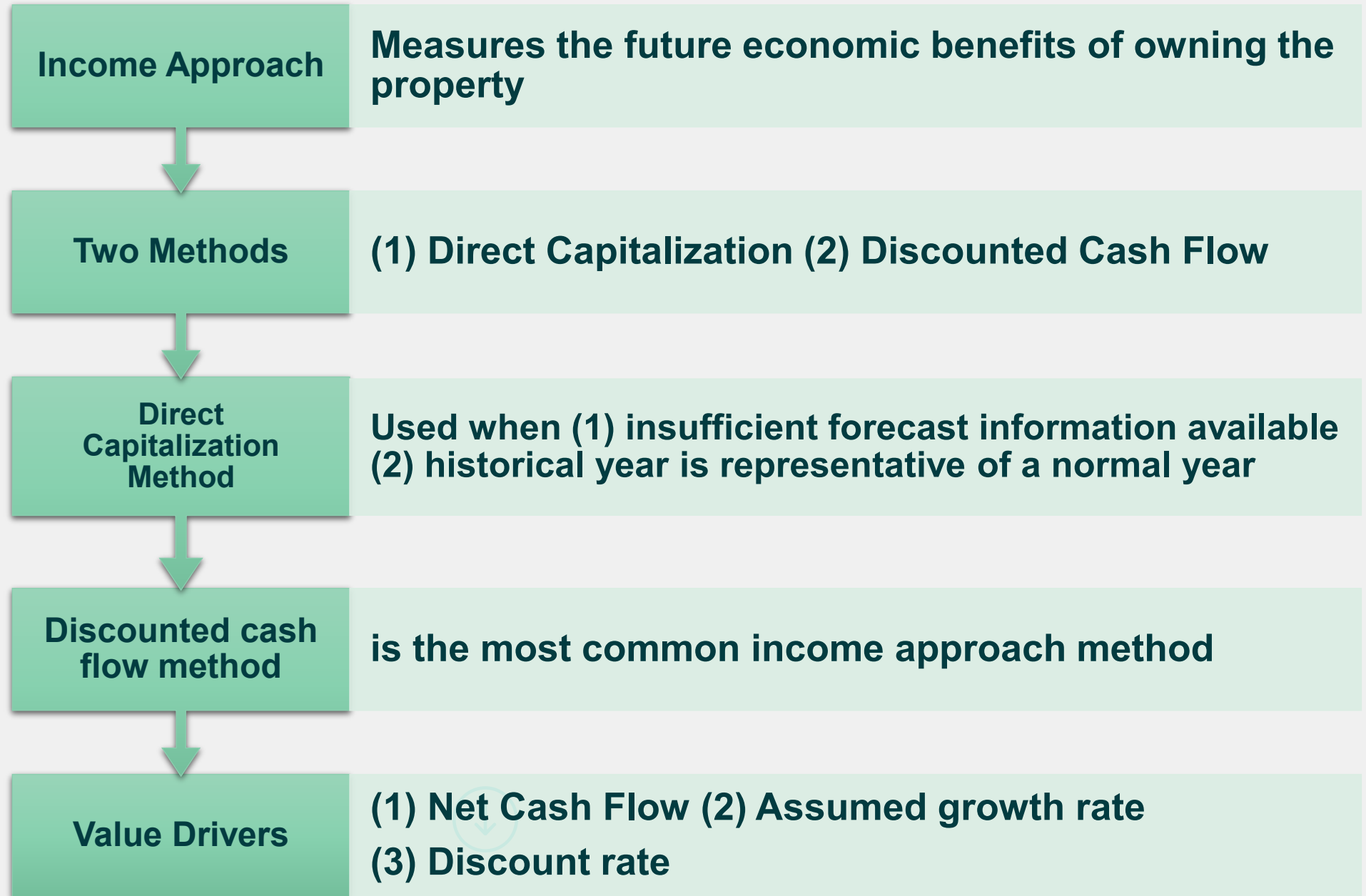
$$\text{PV of Terminal Value} = \text{TV} \times \frac{1}{(1+r)^n}$$

$$\text{PV Factor} = \frac{1}{(1+r)^n}$$

$$\text{PV} = \text{FV} \times \text{PV Factor}$$

Income Approach

Take-Aways



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

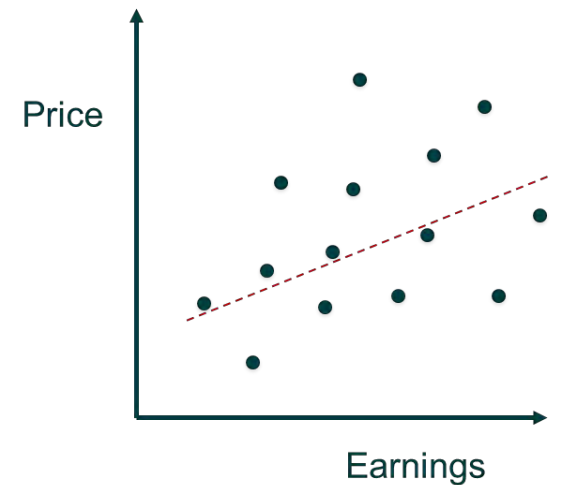
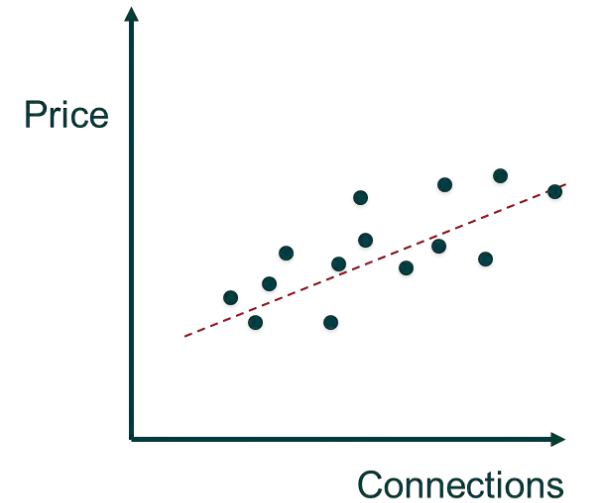
What price multiples to use?



Common price multiples used for public utilities

Considerations in Choosing Price Multiples

- ✓ Common Sense and Judgement
- ✓ 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)

No.	Sale Date	Seller	Buyer	System Type	State (Same or Different)	Purchase Price (\$000)	Net Plant Book Value (\$000)	RCNLD (\$000)	Annual Sales (\$000)	EBITDA (\$000)
1	Apr-19	Water Company A	Water Company B	Wholesale Pipeline	Same	\$39,100	\$27,535	\$156,400	\$4,290	\$2,940
2	Aug-20	City Water System	Water Company C	Wholesale Pipeline	Same	\$20,680	\$17,525	\$54,421	\$3,335	\$3,335
3	Jan-14	Water Compay D	Mid-Size City	Retail Water System with Wholesale Pipeline	Different	\$137,793	\$115,793	\$405,275	\$27,331	\$12,194
4	Apr-19	Water Company E	Water Company F	Wholesale Pipeline	Different	\$36,581	\$33,560	\$49,433	\$11,506	\$3,445
5	Nov-18	Water Company G	Large City	Retail Water System with Wholesale Pipeline	Same	\$32,800	\$24,792	\$91,111	\$2,512	\$3,952
6	Aug-21	Water Company H	Water Company I	Retail Water System	Different	\$7,470	\$4,640	\$39,617	\$2,454	\$876
		Subject / Target		Wholesale Pipeline			\$49,607	\$95,000	\$29,462	\$7,076

Which transactions would you consider and use as comparable transactions?

- a. None of the Transactions
- b. Transactions 1, 2
- c. Transactions 1, 2, and 4
- d. Transactions, 1, 2, 4, and 5
- e. All Transactions

Example Guideline Transaction Method (ABC Company)

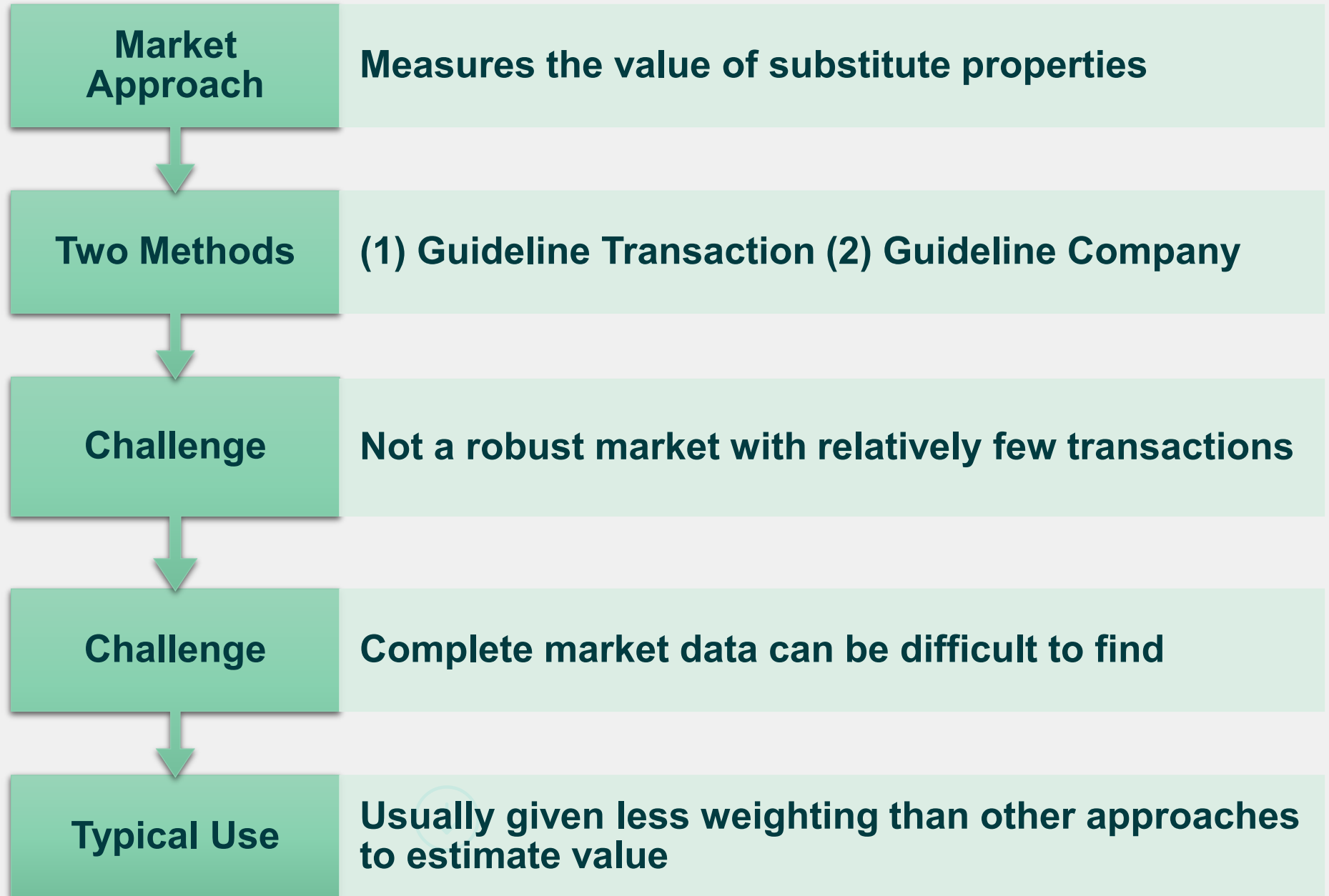
No	Sale Date	Seller	Purchase Price (\$'000)	Price to Net Plant Book Value	Price to RCNLD Value	Price to Sales	Price to EBITDA
1	4/12/2019	Water Company A	\$39,100	1.42	0.25	9.11	13.30
2	8/15/2020	City Water System	\$20,680	1.18	0.38	6.20	6.20
3	1/26/2014	Water Compay D	-----	-----	-----	-----	-----
4	4/3/2019	Water Company E	\$36,581	1.09	0.74	3.18	10.62
5	11/1/2018	Water Company G	\$32,800	1.32	0.36	13.06	8.30
6	8/5/2021	Water Company H	-----	-----	-----	-----	-----
Mean			\$32,290	1.25	0.43	7.89	9.61
Median			\$34,690	1.25	0.37	7.66	9.46
Std Deviation				0.13	0.18	3.65	2.64
Coeficient of Variation				0.10	0.43	0.46	0.28

Example Guideline Transaction Method (ABC Company)

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

Market Approach

Take-Aways



Asset (or Cost) Approach Theory

Based on the principle of substitution

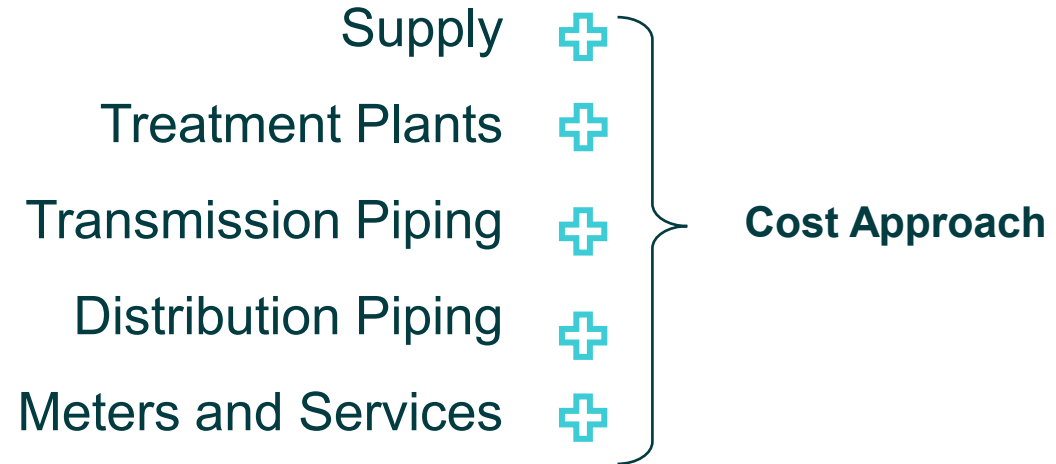
An asset accumulation approach

Relevance

Asset Accumulation Approach

Public Utility Asset Components

Tangible “Plant”



Real Property



Intangible Assets



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?

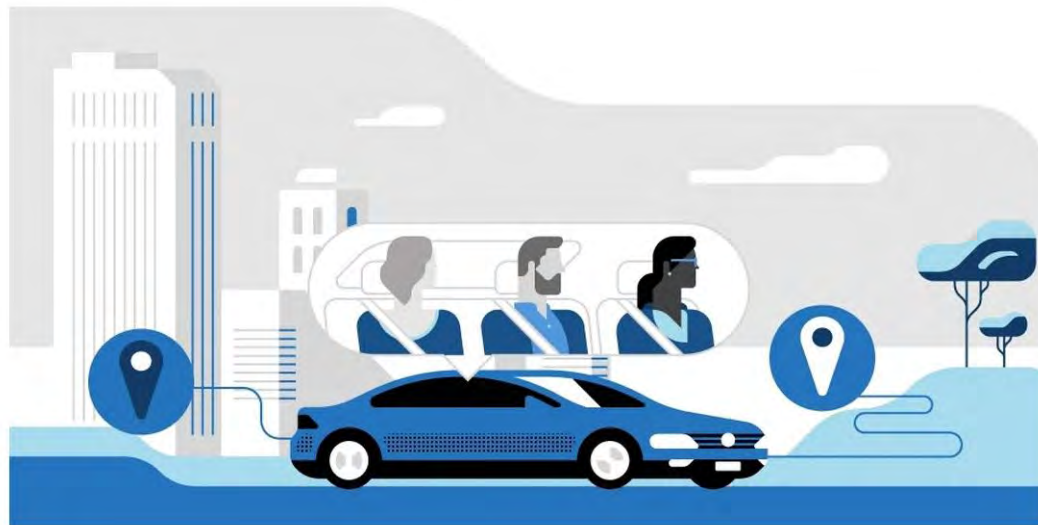
What forms of depreciation should be considered?

- **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

Item	Description	Reproduction Cost New	% Depreciated	Depreciated Cost New
Pipe Section 1	60-inch Branch w/ valves, metering, manholes	\$ 24,936,000	25%	\$ 18,702,000
Pipe Section 2	36-Inch Branch w/ valves, metering, manholes	8,631,000	23%	6,645,870
Pipe Section 3	42-Inch Branch w/ valves, metering, manholes	18,241,500	25%	13,681,125
Pipe Section 4	42-Inch Tunnel Branch	54,600,000	19%	44,226,000
Booster Station	Structure, pumps, valves electrical and instruments	9,363,000	38%	5,805,060
Storage Tank	Steel Tanks (3) 2 MG	<u>10,270,500</u>	32%	<u>6,983,940</u>
Subtotal		\$ 126,042,000		\$ 96,043,995
Soft Costs	Design, Inspection, Permitting	\$14,782,000		14,406,599
Financing	Construction Interest			4,802,200
Real Estate	Real Property			<u>9,015,000</u>
Total				<u>\$124,267,794</u>

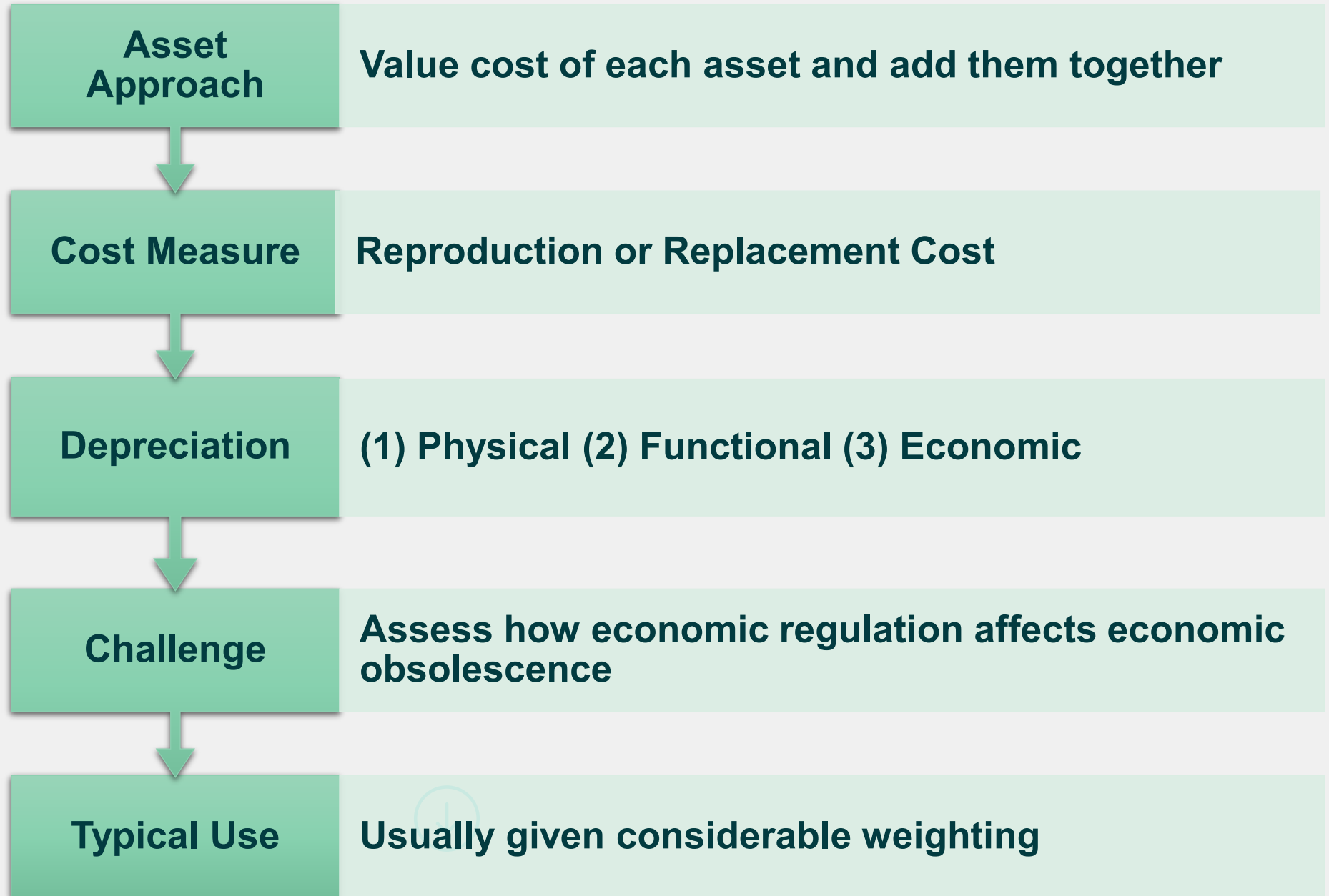
Example
ABC Company

Economic Obsolescence

- If company earnings are based on an original cost rate base, a buyer may not be able to recover and earn a full return on RCNLD.
- Several methods can be used to measure economic obsolescence.
- In this example, earnings are limited and do not support paying a price equal to RCNLD. A 50% economic obsolescence factor was calculated.
- RCNLD cost reduced for economic obsolescence to \$62 million.

Asset Approach

Take-Aways



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

Which approach would you rely on the most for valuing the ABC Company?

a. Income Approach

b. Market Approach

c. Asset Approach

d. Equal weighting on all three

Valuation Summary – ABC Company

Description	Estimated Value	Reliance
Income Approach		
Discounted Net Cash Flow Method	\$ 60,100	Relatively More
Direct Capitalization Method	60,300	Relatively More
Market Approach		
Guideline Transaction Method	65,000	Relatively Less
Guideline Public Company Method	N/A	Relatively Less
Cost Approach		
RCNLD with Economic Obsolescence	62,100	Relatively Less
Estimated Value (Rounded)	\$61,500	

Values shown in \$000s

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

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For More Information



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