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National Association of Regulatory Utility Commissioners

RATE OF RETURN REGULATION

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Revenue Required

The Revenue Required is **P Q** = B r + E +d + T

- **P** is the Unit Price,
- **Q** is the assumed quantity of units sold
- **B** is Rate Base
- **r** is the allowed rate of return
- **E** is Expenses
- **d** is depreciation
- **T** is Taxes

The Rate Base B

What are the objectives when determining B?

- Give certainty to investors (especially for new entrants)
- Give incentives to investors
- Share benefits between investors and customers
- Give correct price signals for consumption and investment
- Give signals of regulator's expectations regarding the maintenance of assets

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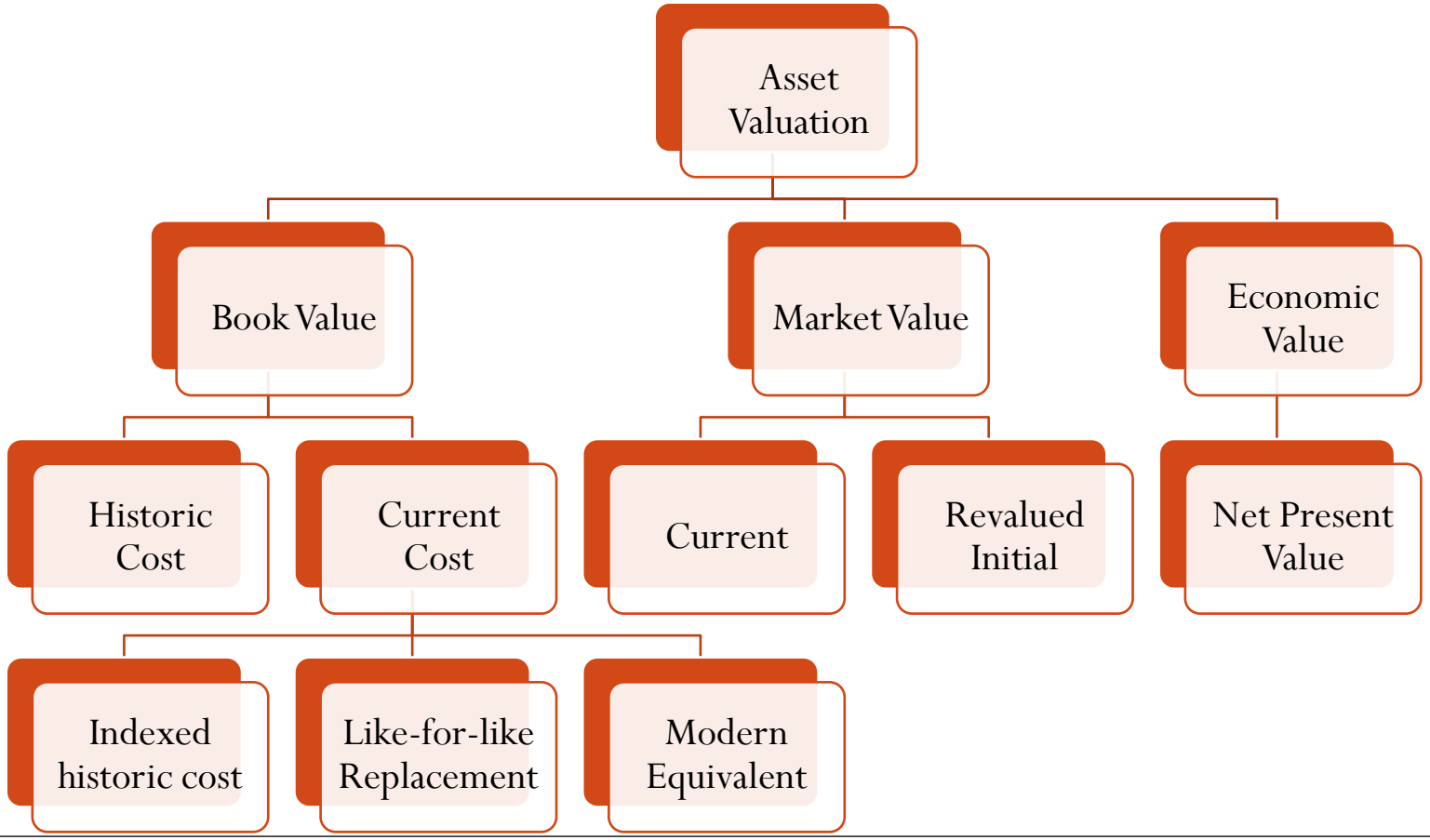
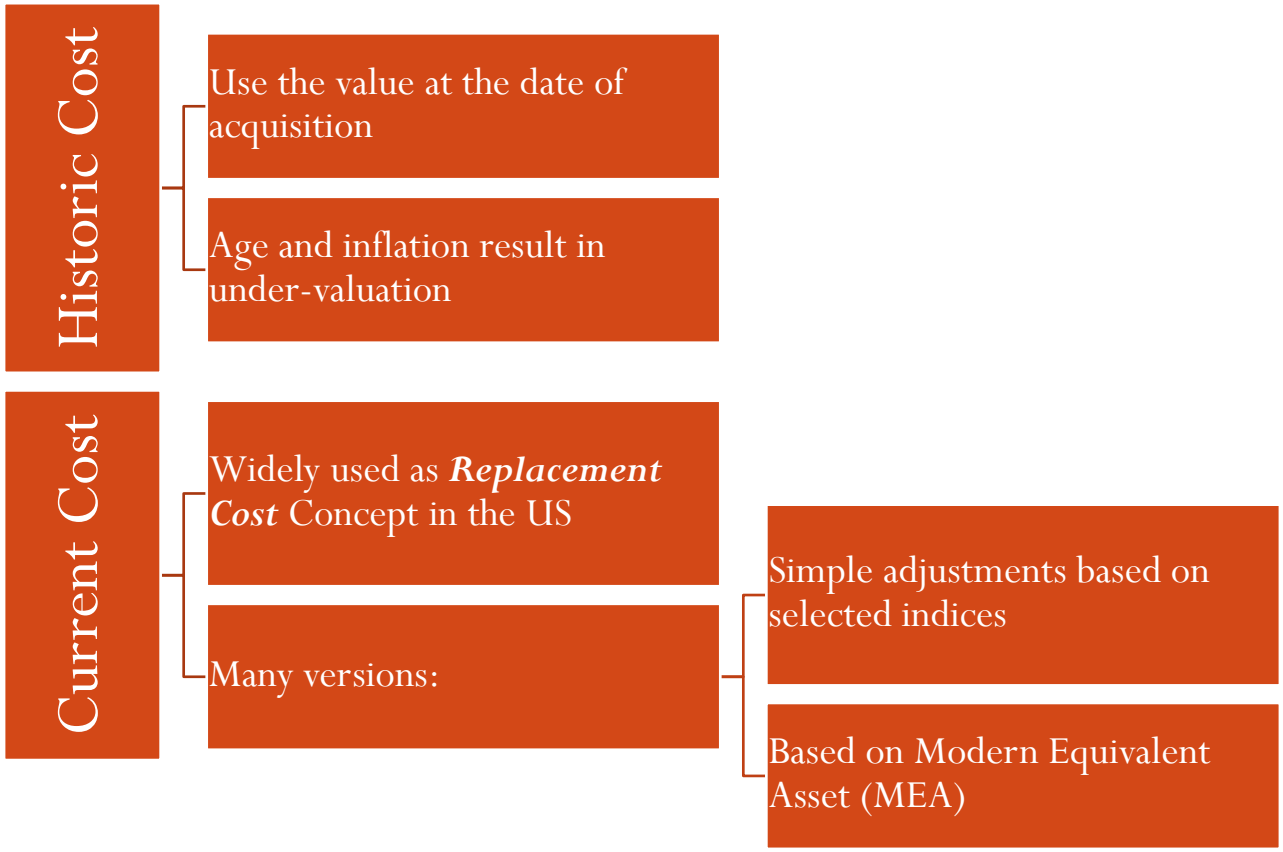
Determining B, Rate Base



B -Asset Valuation: Book Value



B-Asset Valuation: Book Value

Possible Disadvantages

- Values incomplete or not available
- Often too low: *Historic Cost*
- Often too high: *Current Cost*

Economic Values often used, but

- Market values often not available
- NPV depend on assumptions

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B – Updating Asset Base

Regulator forecasts values to	reflect the changes in **existing** assets
	account for **investment** in the system
	account for **depreciation** of assets
Existing assets updated by	**general** inflation (RPI/CPI)
	producer inflation
	specific industry/asset inflation
Investment	Add **gross** investment to the Asset Base
Depreciation	Subtract **depreciation** from the Asset Base

B – New Investments

Concerns

- Investments exceed forecast level
- Timing of investments differs from projections

These could be due to:

- inefficient decisions on investments
- Uncontrollable costs, eg.
  - International prices of steel
  - Changes in specifications to external factors

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B – New Investments

Regulator	allows, disallows or partially allows new investment.
Questions for the regulator:	Is investment 'used and useful'?
	Was investment prudent?
To minimize intrusiveness, reviews require:	clear guidelines on timing and method of reviews

B – New Investments

Used: Is the investment USED to provide a utility service?

Useful: Is the investment useful? *Just because a line is energized does not mean it should be**

Prudent: Was the investment the most economical?

Policy issues: How do you account for work in progress? Wait until it is complete, or make allowances as project progresses?

B – Main points

Determination of initial asset value is a compromise among diverse, conflicting objectives

To reduce risk and promote fairness, established Asset Base should not be varied during control period, except through updating

Updating the Asset Base involves decisions about

- incentives
- inflation

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r – Allowed Rate of Return

Company (investors) should earn 'a fair level of profit"	Both investors and consumers should benefit
Rate of Return should :	Promote renewal of assets
	Stimulate investment in expansion of services
Rate of Return needs to be forward looking,	Enabling the firm to plan
Rate of Return depends on	Value of B (regulatory Asset Base)
	Forecast rate of return (Weighted Average Cost of Capital)

r- Allowed Rate of Return

r estimates the company's cost of capital

- Financial markets determine cost of capital
- But regulator can be a factor in the cost of capital

r is

- the marginal cost of finance
- determined by the mix of debt and equity
- forward looking, but based mainly on historic and comparative market data
- can be calculated in different ways: subjectivity inevitable

r – Allowed Rate of Return

r is earned on:	existing assets
	net investment
Relationship between **r** and Cost of Capital:	If **r** = CoC, then investment should be optimal
	If **r** > CoC, then company has incentive to over-invest
	If **r** < CoC, then company has incentive to under-invest
Important relationship between	**r**, Rate of Return
	B (Asset Base)
	Investment requirements

Expenses E: Example gen costs

GENERATION COSTS	Year (t-1) (USD)	Year (t) (USD)	% Change
Electricity imports	2,949,153	16,650,685	565%
Electricity Purchase	4,850,514	5,428,219	112%
Plant maintenance	1,108,919	1,904,110	172%
Leased plant expenses	6,032,231	5,341,644	89%
	14,940,817	**29,324,658**	196%
Staff costs	20,556,266	18,772,877	91%
Depreciation	11,222,562	11,772,877	105%
Plant Operating Costs	2,682,967	70,411	3%
Machinery Maintenance	287,580	532,603	185%
Administration	2,085,301	2,235,890	107%
Transport	1,500,139	1,335,616	89%
External Services	1,747,152	976,438	56%
Training	302,862	284,658	94%
Travel and Accomm.	444,290	792,329	178%
Insurance	863,295	996,712	115%
Bad debt provision	1,513,476	1,108,493	73%
Other Operating costs	189,775	212,055	112%
	43,395,665	**39,090,959**	90%
	58,336,482	**68,415,617**	117%

Additional Expenses E

Investment in system reinforcement and Expansion

Investment in Key Performance Indicators

- **Metering**:
  - reduce no. of unmetered customers
  - Customer billing
- **Customer Service**
  - Reduce waiting time for new connections from 83 days to 30.
  - Reduce debtor days from 146 to 60 days (over two year period)
- **Quality of Service**
  - Reduce unplanned outages to 5 hours per customer
- **Cash Management**
  - Total receivables to be reduced from 66% of turnover to 17% (over 2-year period)
- **Loss Reduction: reduce from 27% to 14%**

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Expenses E - Questions

For which expenses would require detailed explanation?

What information would you request as justification for the expenses?

What is the relevance of the commitment to Key Performance Indicators?

d - Depreciation

Wear and tear on assets represents a consumption of the asset value

This consumption is reflected in the operating costs and capital value of the company

The determination of the Asset Base and Depreciation charge have similar objectives:

- Consumers should pay a 'fair' cost for the 'consumption' of the assets
- But consider inter-generational equity : most assets have a longer life than the consumers

d – Approaches to Depreciation

Options

- Current Cost Depreciation
- Historic Cost Depreciation
- Depreciation of the initial Asset Value plus separate depreciation of new investment
- Infrastructure renewals charge

Options allocate depreciation charges between existing and future assets

Depreciation could differ from determination of B: Book values could be used

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d – Depreciation summary

Depreciation is an important concept for keeping the system at maximum operational capacity

Watch relationship between **r** and **d**: company could lengthen asset lives if r is set to boost profits

The inter-generational effects are a matter of equity

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End