

## **Plenary 10: Financial Modelling I**

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**Wednesday, 09:00 to 10:15**



- 1. Why financial modelling?**
- 2. Model structures and modelling techniques**
- 3. Key accounting requirements and outputs**
- 4. Free cash flow**
- 5. Summary**

# Why Financial Modelling – Overview

Behind every significant commercial deal is (or at least should be!) a financial model – financial models aim to provide a representation of possible future outcomes given certain assumptions

- A model enables the users to evaluate a potentially costly option before any financial commitment is made
- It allows users to experiment with various options and test important variables without financial risk
- The model is a tool to assist in decision making – in most cases it does not have to be 100% accurate
- Through a good modelling process, the decision makers are able to focus on critical business issues



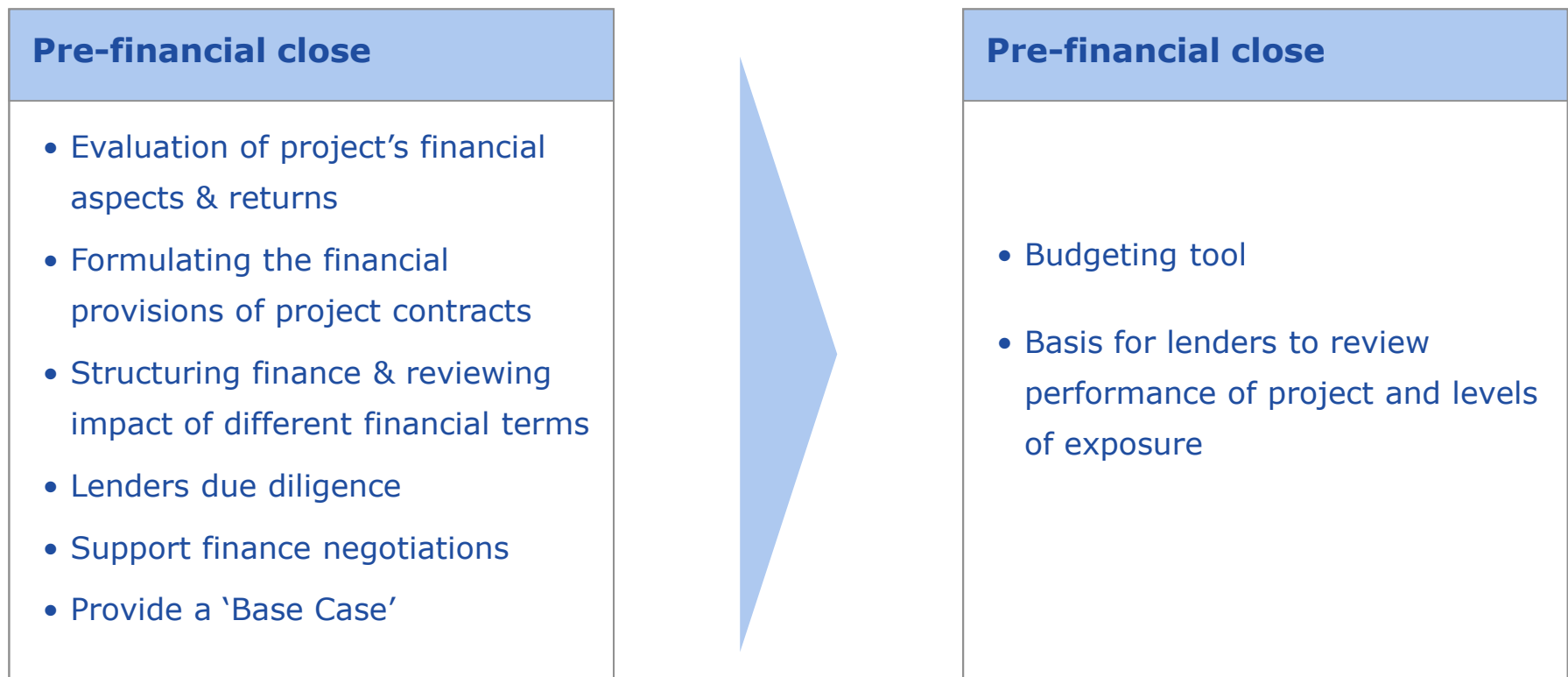
## Examples of uses

- Valuations
- Forecasts & Projections
- Evaluation of options
- Raising Finance
- Feasibility Studies
- Investment Appraisal
- Business Cases
- Closing down a business

# Financial Modelling – the PPP context

**An adequate financial model is an essential tool for the financial evaluation of a PPP project, by project sponsors, investors, lenders or the procuring authority.**

The PPP financial model has several purposes



# Financial Modelling – the PPP context

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## **Scope of a PPP financial model?**

A PPP financial model should cover the whole of a Project Company's operations, not just the project

## **Duration of a PPP financial model?**

A PPP financial model should cover the whole period from when the initial development costs on the project are incurred to the end of the project life

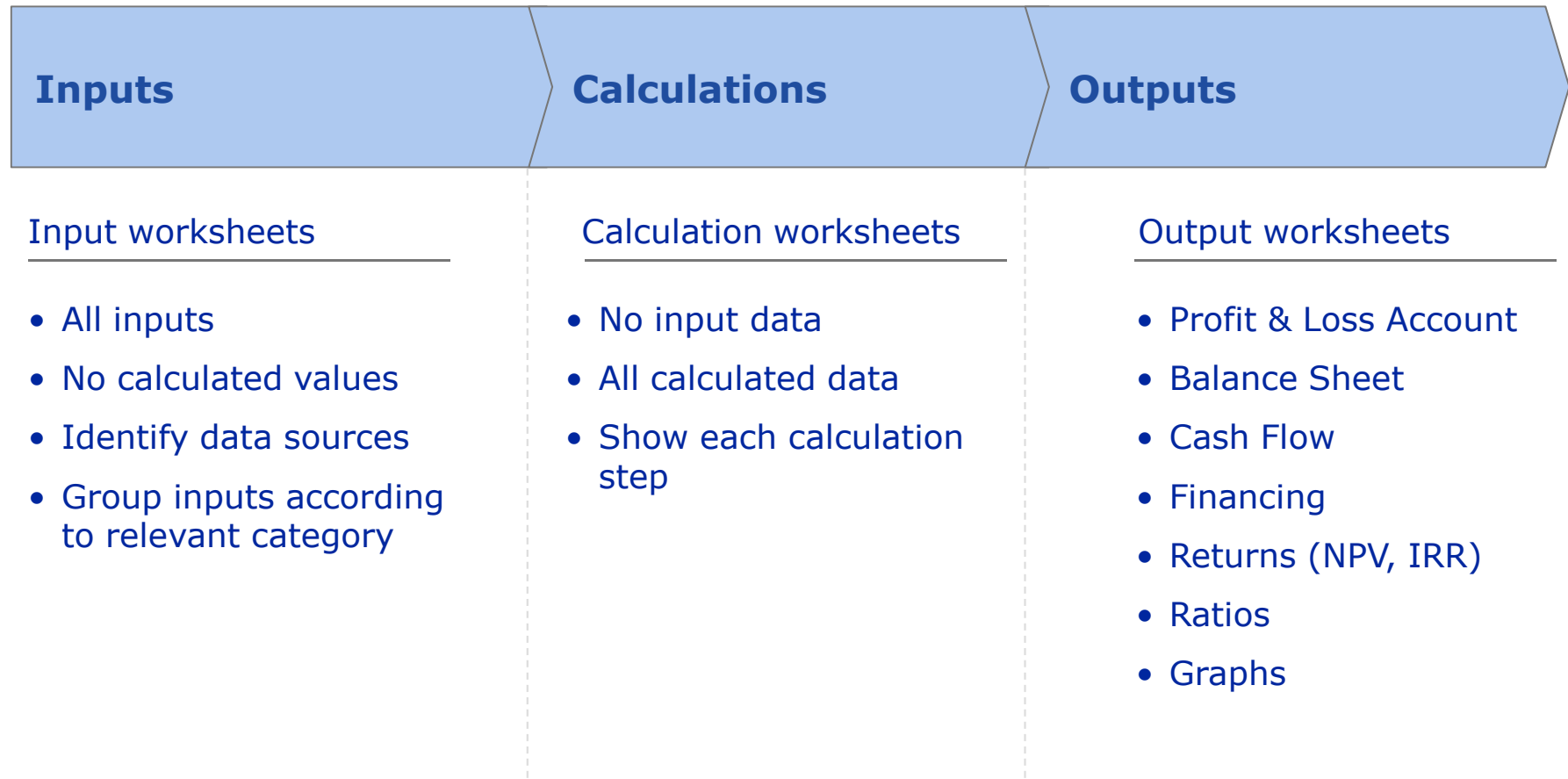
## **Periodicity of a PPP financial model?**

A PPP financial model is usually prepared on the basis of 6-month periods. However, during the construction phase this may not be detailed enough

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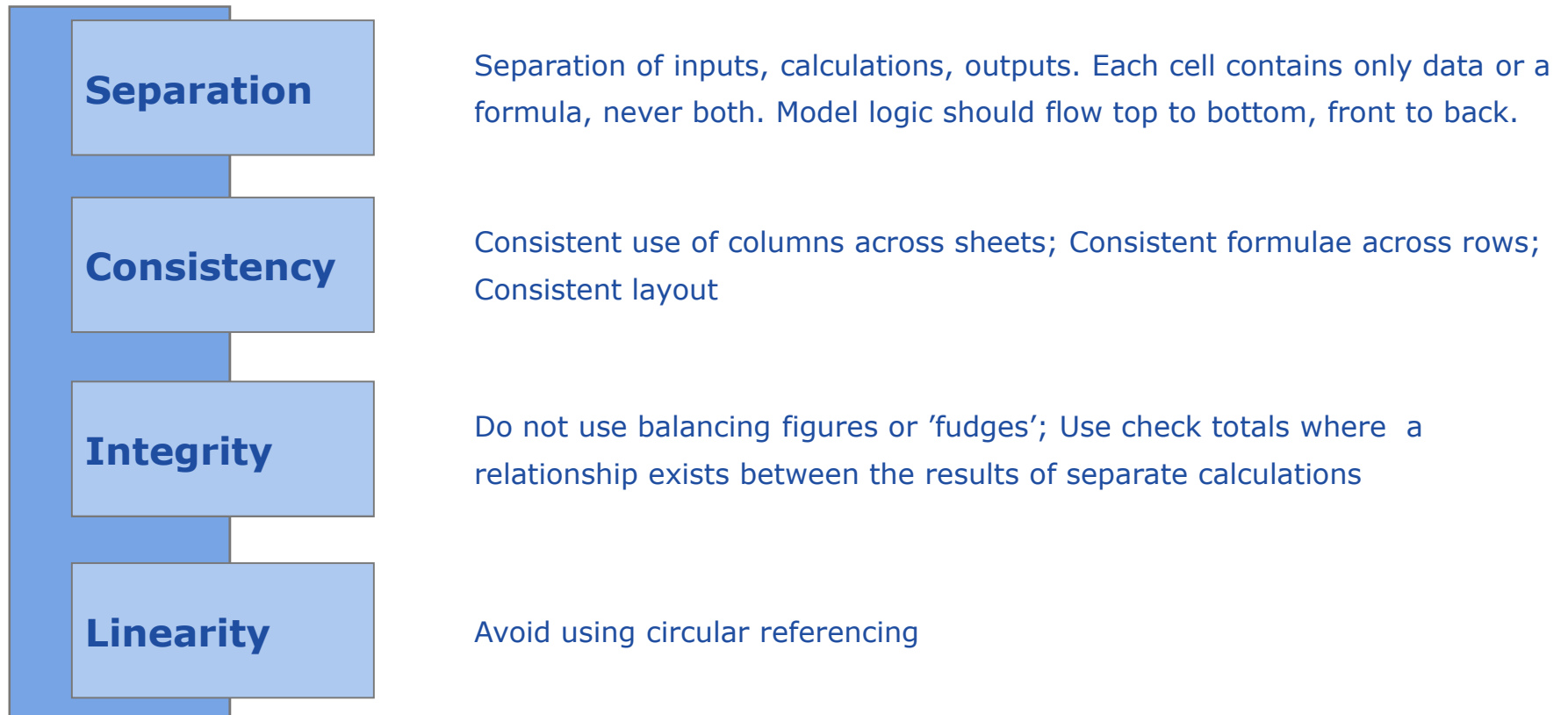
# Typical financial model structure

One approach to structuring models, which is considered best practice, follows a separation structure – inputs, calculations, and outputs



# Overall approach to financial modelling

The overall approach to good financial models includes four key principles





# Other 'best practice' modelling techniques

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## 1. Objectives

- Outputs from the model should be clearly defined at the start of the process

## 2. Plan → Document → Build → Evaluate

## 3. Simplicity

- Use small & simple logical steps
- Split complex formulae into constituent parts

## 4. Modularity

- Separate set of calculations for each area of calculations, e.g. fixed assets, operating costs, debt service

## 5. Version control

- Adopt a logical naming convention
- Save any changes as a different version

## 6. Data management

- Compile data book
- Reference input data

# Session agenda

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# Key accounting requirements and outputs

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Most financial models have three financial statements:

- Profit and Loss Account (P&L) *or* Income Statement
- Balance Sheet (BC)
- Cash Flow Statement (CF)

# Profit and Loss Account (P&L)

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**The P&L shows a summary of the financial performance of ProjectCo over a particular period in time (e.g. a year, quarter)**

In most cases the P&L statement is the first output of the modelling process

## What are we trying to model?

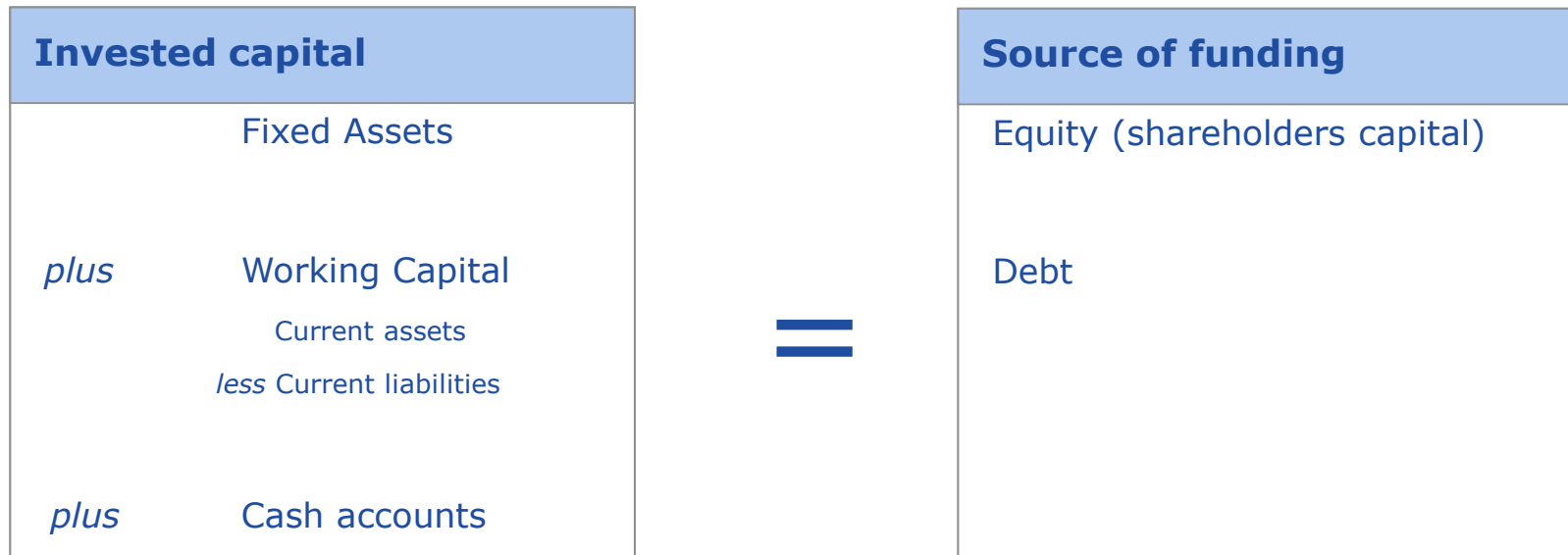
	Operating Revenue
<i>less</i>	Operating expenses
<i>less</i>	Depreciation
<i>less</i>	Net interest expense
<i>less</i>	Tax
=	Profit after tax

- Accruals basis
- Ignore working capital, capex, principal payments

# Balance Sheet Fundamentals

**A balance sheet is a summary of the financial position of ProjectCo at a particular point in time.**

Essentially, it is a list of the business' investment (assets) and the financing of those investments (liabilities & equity)



- Balance sheet serves as a quality control check on calculations
- Treatment of terminal value at end of contract is important

# Modelling the Balance Sheet

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The Balance Sheet has the following broad structure:

	Assets	
		Fixed assets e.g. plant, property & equipment
		Current assets e.g. cash
		Other cash accounts
<i>less</i>	Current liabilities	
<i>less</i>	Long term liabilities	
=	Shareholders Funds	

- The cash balance appears in the Balance Sheet as an asset
- The depreciation noted in the P&L reduces the value of fixed assets
- Any debts are also noted as part of the liabilities

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# Cash Flow Statement Fundamentals

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## **The Cashflow statement is often the most important report for many business purposes**

- It assesses the extent to which reported profits have been realised in the form of cash
- It forecasts future cash flows
- It enables the economics of a project to be to be looked at before financing, i.e. is the project viable?
- It is the basis for investment appraisal – NPV & IRR calculations



## Modelling the Cash flow

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- After tax nominal cash flow
- Movement in cash - not accounting based accruals
- Inflation
- Measures of return: Net Present Value (NPV) and Internal Rate of Return (IRR)
- Cash balance at the year end is used in the Balance Sheet
- Interest charge for the year is used in the P&L statement



Consideration of cash flow can be split in two parts:

- Size of the cash flow
- Timing of the cash flow

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## Summary and Further Reading

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- Financial models aim to provide a representation of possible future outcomes given certain assumptions
- Financial models are particularly important and useful within the PPP context
- Most good financial models follow a separation structure – inputs, calculations, and outputs
- Key modelling principles include: Separation, Consistency, Integrity and Linearity
- Key model outputs are:
  - Profit and Loss Account (P&L)
  - Balance Sheet
  - Cash Flow Statement
- Further reading: Khan and Parra “Financing Large Projects: Using Project Finance Techniques and Practices” (2003)

## Annex: Free Cash Flow - 1

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This is a key element of PPP financial modelling – in most cases free cash flow is the only source of income that the project has

- Risk = cash flow volatility
- So how can we best understand potential cash flow volatility?
  - **Full due diligence on project**
- Assess cash available to financiers
  - **Appropriate measure is Free Cash Flow (FCF)**
- FCF determines 'should we do the deal' - FCF is all there is!
- FCF measures implications of the project's technical, contractual, and market characteristics

## Annex: Free Cash Flow - 2

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Free Cash Flow equals:

### **Operating cash flow**

Operating revenue

*less* Operating costs

*plus* Adjustments for non-cash items (depreciation, amortisation)

***plus* +/- (changes) to working capital**

***plus* +/- capex**

- A model which delivers FCF can be used to measure and quantify risks or cash flow volatilities and help us answer:
  - **What level of volatility can be accepted?**
  - **What level of volatility must be covered through contractual arrangements?**
- Predictability is key

# Plenary 11: Financial Modelling II

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**Wednesday, 10:45 to 12:00**



- 1. Revenues and costs**
- 2. Fixed Assets and Depreciation**
- 3. Financing**
- 4. Project cash flow and evaluation**
- 5. Testing risk**
- 6. Presenting your results**

# Revenues and costs

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At the its simplest, the modelling process is aimed at comparing the revenues and costs of a particular project

- Key revenue drivers
  - Volume of good or service
  - Price per unit
  
- Key cost drivers
  - Capital costs
  - Operating costs
  - Tax
  - Financing costs
  - Depreciation



## How will revenues and costs change?

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- Decide whether the model is in nominal or real prices
- Consider likely/actual terms and conditions:
  - Which drivers will change?
  - What is the rate of change?
  - Will the costs and revenues change at different rates?
- When starting to model think about calculating cumulative escalation / inflation factors as required

# Session agenda

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## Handling capex

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- Capital Expenditure (Capex) is firm's investment in fixed assets
- Plus, for modelling purposes, some items may be capitalised, such as Infrastructure Development Costs (IDCs)
- In some jurisdictions, capital investments are treated differently for tax purposes than other expenses
- Capex is usually a function of a specific technical offer within a PPP project:
  - Timing of capex during construction
  - Timing of capex during operations
- Does not appear on P&L

## Handling depreciation

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- Depreciation is the recognition of the declining value of a fixed asset over its useful life
  - Reflects the “consumption” of the asset
  - Often considered on a straight-line basis
  - BUT can be considered on a per unit basis for some projects
- Non-cash item so does not appear in the cash flow statements
- Certain fixed assets will not be depreciable, such as land
- Typically, no adjustment is made to depreciable basis for inflation although regulation in some sectors may affect this
- **Net Book Value** is the value of assets at cost less the sum of all depreciation charged to date. Net book value is used in the **Balance Sheet**

## Issues to note about Capital Allowances

- A business can claim tax allowances, called Capital Allowances, on certain purchases or investments - this means that it can deduct a proportion of these costs from taxable profits and reduce the tax bill
- Capital Allowances replace depreciation in the Tax calculation
- Depreciation can be calculated in different ways by different companies (e.g. straight line or reducing balance basis) – Capital Allowances are calculated according to the tax code of the jurisdiction
- Capital Allowances are calculated on the same basis for all companies

# Session agenda

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# Financing Fundamentals

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The Financing Requirement of a project is the sum of Capex and Net Operating Cashflow

A project will be financed through a combination of debt and equity

## Key modelling requirements - debt

- Tenor
- Drawdown schedule
- Repayment profile
- Interest rate (base interest rate + margin)
- Fees – arrangement, underwriting, commitment, agency
- Other requirements

## Key modelling requirements - Equity

- Different forms of equity – different rights attached to shares
- Dividend policy
- Redemption policy

## Modelling financing

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- Agree assumptions as regards how much of the initial cash shortfall will be raised by financing
- Decide % split of the financing requirement between equity and debt
- Financing will have an impact on the cash calculations & Cashflow statement
- Financing is also reflected in the Balance Sheet
- Servicing of financing (i.e. interest & dividends declared) are reflected in the P&L – although interest during construction (IDC) may be rolled up to be paid later
- In order to deal with circularity in the modelling, interest is calculated on an average debt balance in the year
- Note assumptions in Data Book



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# Project Cashflow & Evaluation Fundamentals

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Internal Rate of Return (IRR) = discount rate which produces an NPV of zero

- Use of =IRR() on free cashflows to calculate the internal rate of return
- Many companies have a benchmark IRR against which to appraise investments

The Net Present Value (NPV) calculation is used to tell us what the present value of a project would be at a given discount rate

- Use of =NPV() on free cashflows to calculate present value
- If discount rate > IRR, the project should have a positive net present value

Free cashflows exclude the impact of any project financing

# Free cash flow

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Constructing the free cash flow is important when we deal with evaluation metrics – it is calculated as below

## Free cash flow

Operating cash flow  
*plus/less*  
Changes in the working capital  
*less*  
Capex  
*less*  
Proforma tax paid  
  
= Free cash flow (pre financing)

## Evaluating the opportunity – NPV recap

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- NPV (net present value) is an important concept
- The NPV is the value today of a sum of money due in the future, taking account of the cost of money, known as the discount rate
- NPV calculation provides a means of valuing an investment – if a PPP contract is expected to provide a stream of net revenues in the future, the value of the project to the investor can be determined by discounting this stream of revenues to an NPV
- The chosen discount rate will be the minimum rate of return on investment required by the investor of equity in a Project Company – this is usually derived from the investor's cost of capital
- NPV is calculated on the free cash flow

### Example - three options:

NPV = 0                      investment covers its cost of finance

NPV > 0                    investment earns more than its cost of finance

NPV < 0                    investment does not earn sufficient to cover its cost of finance

### **When should you invest?**

1 2 3 4 5 6

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# Discounting recap

- Discounting is the process of finding the present value of an amount of cash at some future date
- The discounted value of a cash flow is determined by reducing its value by the appropriate discount rate for each unit of time between the time when the cashflow is to be valued to the time of the cash flow – most often the discount rate is expressed as an annual rate
- The choice of discount rate makes a substantial difference to the result - higher the discount rate, lower the NPV and vice versa

## Example:

- Assume discount rate is 10% per year
- Assume a set of cash flows of \$100, \$100 and \$100 over a three year period
- At its simplest, the value of the cash flows in today's terms is valued as follows:
  - Year 1:  $\$100 / (1-10\%)^1 = \$90.9$
  - Year 2:  $\$100 / (1-10\%)^2 = \$82.6$
  - Year 3:  $\$100 / (1-10\%)^3 = \underline{\$75.1}$
  - **Total value of cash flows = \$248.6**

# Timing of discounted cashflows

- The previous example assumed that the cash flows appear at the end of the year for which 10% discount rate is applied
- Increasing accuracy of modelling will often require changes to this assumption, having the cash flows appear at the start of the year or equally throughout the year
- Example:
  - Taking same assumptions as per the previous slide, NPV with timing differences will be

## Cash flow received at start of year

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- Year 1:  $\$100 / (1-10\%)^{(1-1)}$  = \$100.0
- Year 2:  $\$100 / (1-10\%)^{(2-1)}$  = \$90.9
- Year 3:  $\$100 / (1-10\%)^{(3-1)}$  = \$82.6
- **Total value of cash flows = \$273.5**

## Cash flow equally distributed in year

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- Year 1:  $\$100 / (1-10\%)^{(1-0.5)}$  = \$95.3
- Year 2:  $\$100 / (1-10\%)^{(2-0.5)}$  = \$86.7
- Year 3:  $\$100 / (1-10\%)^{(3-0.5)}$  = \$78.8
- **Total value of cash flows = \$260.8**

# Evaluating the opportunity – IRR recap

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## Internal Rate of Return (IRR) calculations

- Linked to the NPV

### Blended IRR

- measures the return on an investment over its life
- Calculate the net cash-flows (i.e. free cash flow)
- Establish what discount rate leads to the company cash-flows to equal 0
- How does the IRR compare to the WACC?

### Equity IRR

- Measures the rate of return on equity paid in by investors over a project's life
- Calculate the new cash-flows (including the cost of debt)
- Remaining cash-flow is attributable to equity
- Establish what discount rates leads to the equity cash-flows equalling 0
- How does the ERR compare to the Cost of equity?

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## Testing risk points Modelling – sensitivities and scenarios

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- **Sensitivities** look at the financial effect of the commercial and financial risk aspects of a project not working out as originally expected
- Models do sensitivity analysis really well
- Using sensitivities will provide the risk framework for an opportunity:
  - If the price goes below 'x' then not worth investing
  - If operating costs increase beyond 'y' then not worth investing
- A **Scenario** is a collection of sensitivity changes depicting a particular state of the world, e.g.
  - High inflation and high input cost world
  - Unexpected competition so lower price and volume, together with higher labour costs
- Scenarios should be realistic and internally consistent

## Project risks for Sensitivity Analysis

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### **Sensitivities show the effects of variations to key input assumptions in the Base Case**

#### **May include calculating the effect on cover ratios or returns of:**

- Development and construction risks – e.g. delays, cost overruns
- Sales risk – e.g. will the price and / or volume be achieved
- Input cost risk – e.g. increase in raw material costs
- Operating cost risks – e.g. unexpected changes to operating cost assumptions
- Financial risks – e.g. higher interest rates (where these are not hedged), currency fluctuations

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## Presenting the model and its results

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- Ideally the model should read like a book, with key pages being printable to a sensible size
- The output page could have graphs, linked into output tables, which move together with changes in inputs / sensitivities