FOUR QUADRANT PROJECT FINANCE

DEMYSTIFYING PROJECT FINANCE MODELS

WWW.LEARNPROJECTFINANCE.COM

INTRODUCTION

Project Finance models play a critical role in all Project Finance transactions. It is where data from a number of sources is brought together to generate a complete economic picture of the project being undertaken. Creating a financial model is also the first step in the debt sizing and structuring process.

Although project finance models look incredibly complex, they are much easier to understand once the basic building blocks and the linkages between them are understood. This paper seeks to demystify project finance models for those who need to work with models produced by others or for those looking to build up skills in project finance modelling. It also provides a road map for the model building process.

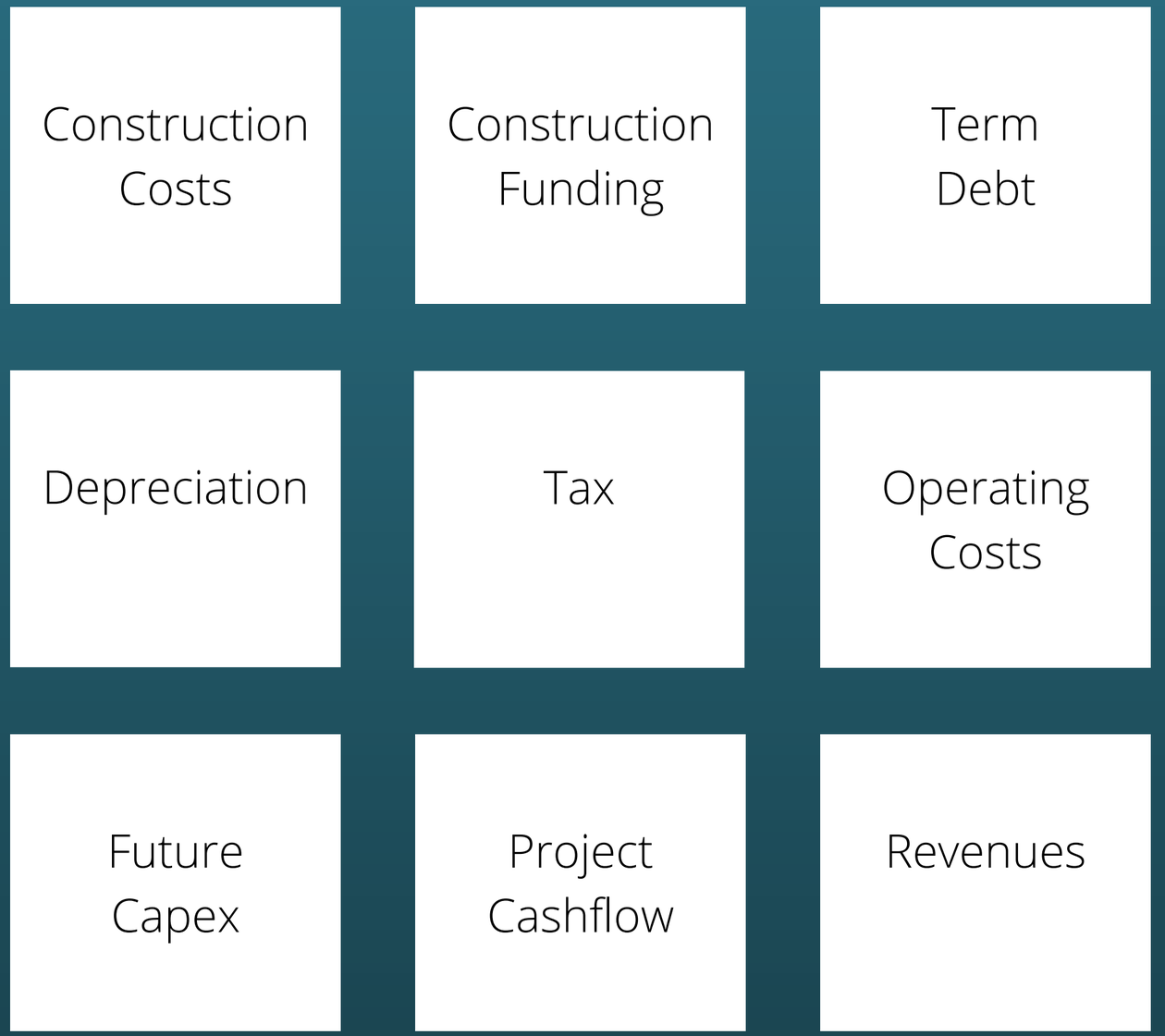
It is a concise summary of the content included in Module 4 of the "Mastering Project Finance Models" course that teaches Excel based project finance modelling.

Building Blocks

9 KEY MODULES

Project Finance models can look very complex. However, the trick to understanding Project Finance models is to:

- break down the model into a number of discrete "Building Blocks" or "Modules";
- understand the purpose of each Module and the logic flow within each Module; and
- understand the linkages between the Modules



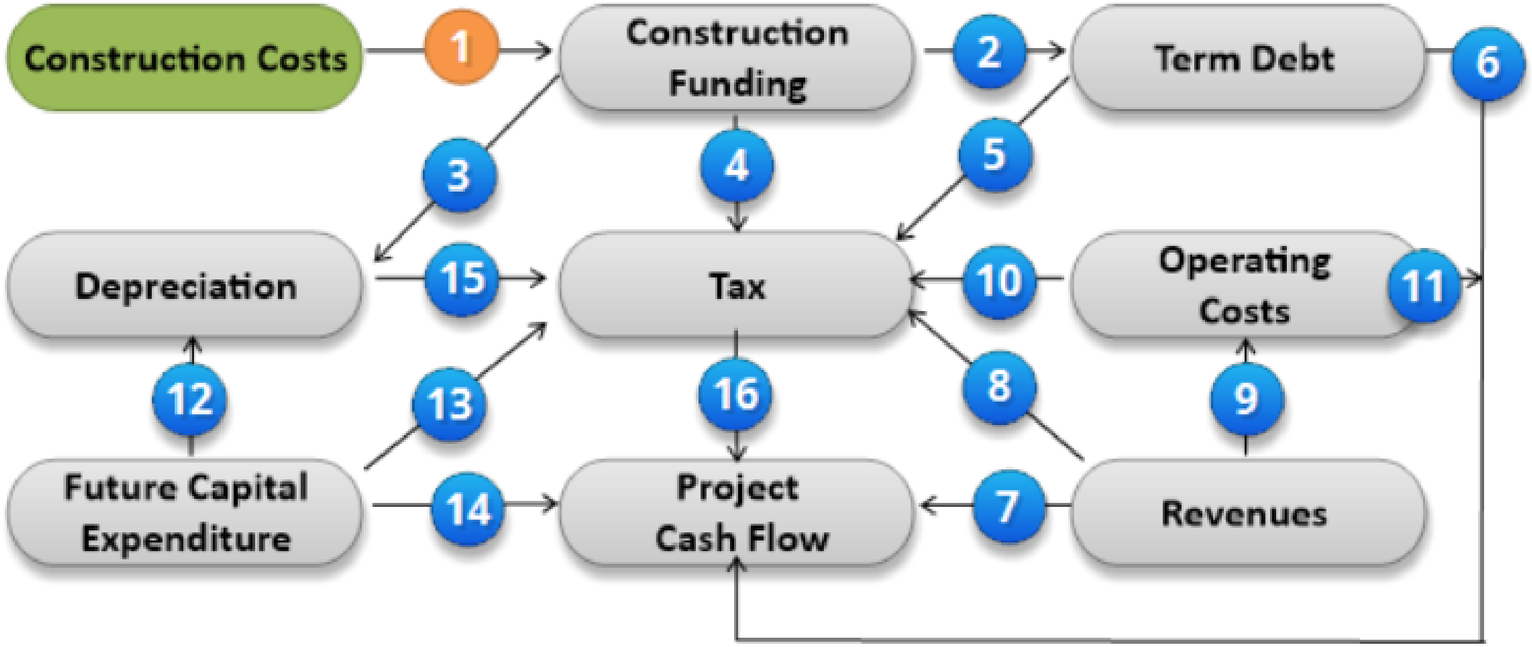
Construction Costs

The first step in building a Project Finance Model is to calculate the construction costs for each month of the construction period.These costs typically include:

- Upfront payments to Sponsors
- Payments to the EPC Contractor
- Mobilisation costs to the O&M Contractor
- Project Company overheads
- Insurance costs
- Upfront Financing Costs

Some of these costs need to be paid at Financial Close. Others need to be paid progressively over the construction period and may also need to be adjusted for inflation.

Step 1: Construction Costs



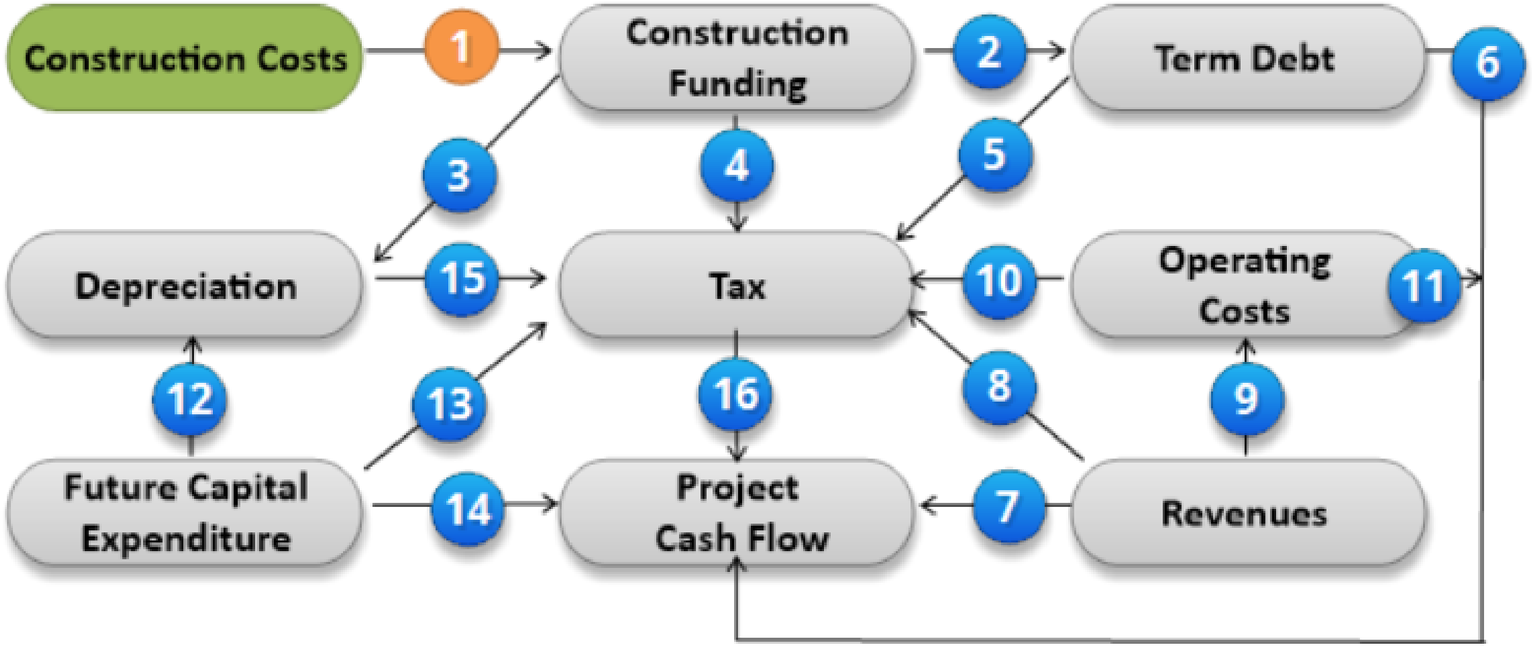
Construction Costs

The Construction Costs Module adds up the various cost inputs, applies appropriate inflation adjustments and generates a month by month cash flow requirement over the construction period.

1. **OUTPUT TO CONSTRUCTION FUNDING MODULE**

The total cash requirement for each month of the construction period is fed from the Construction Costs Module to the Construction Funding Module.

Step 1: Construction Costs

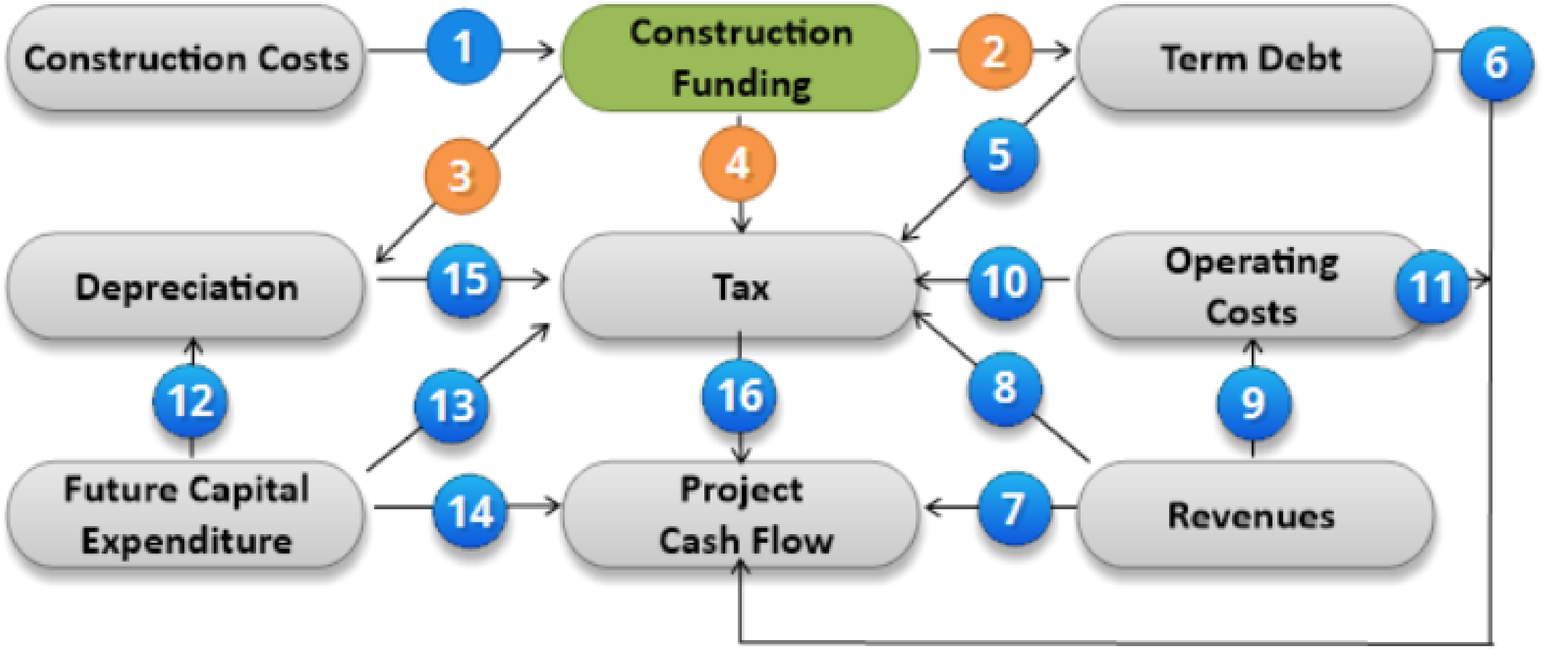


Construction Funding

The next step is to build the Construction Funding Module. The monthly construction expenses from the Construction Costs module are progressively funded with draw down of debt and equity in accordance with the targetted gearing and order of drawdown. This allows interest expense and commitment fees* on the project debt to be calculated for each month of the construction period.

Consequently, the module is able to calculate total costs incurred during the construction phase by adding up the construction costs, interest during construction and commitment fees. The total funding requirement (debt and equity) is a key output from this module.

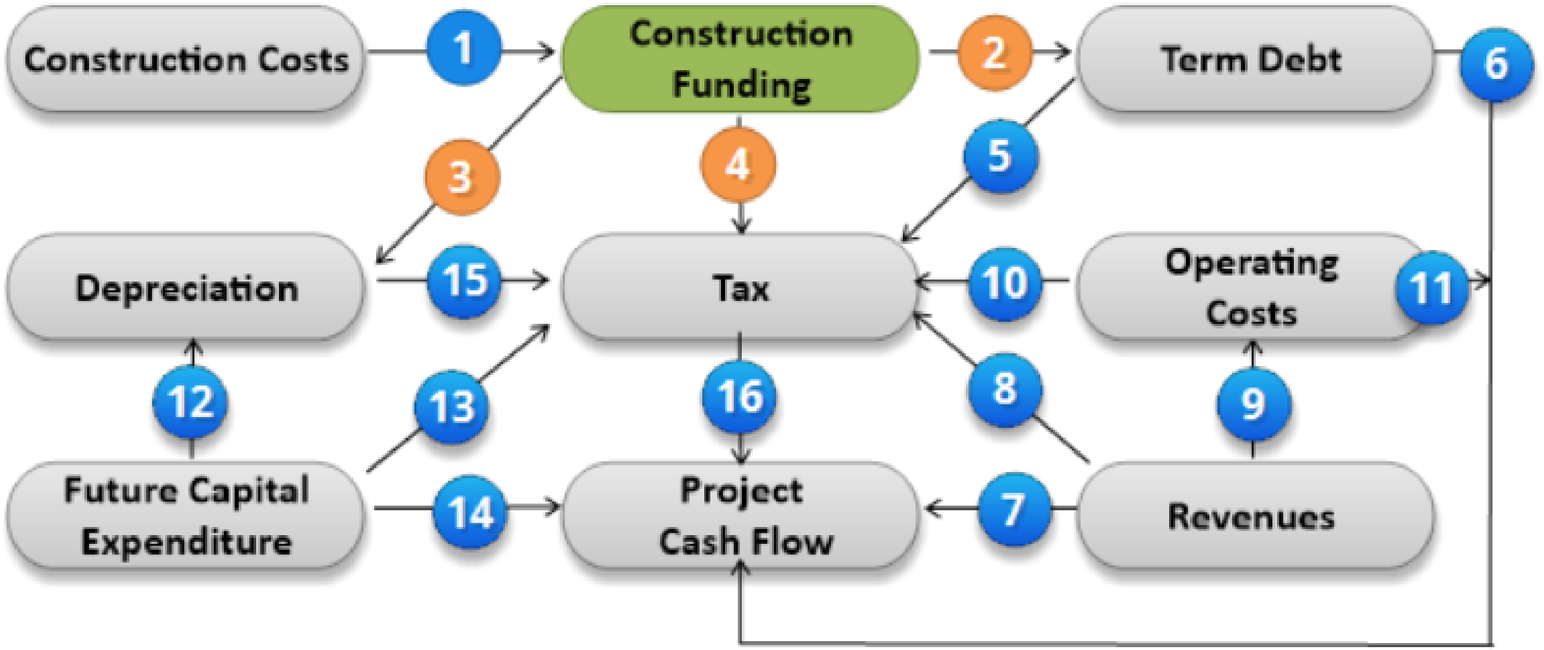
Step 2: Construction Funding



*Commitment fees are fees charged by banks on undrawn loan balances and are calculated monthly. As the loan is progressively drawn down during construction, the undrawn balance reduces. To calculate commitment fees payable each month we need the debt amount at Financial Close and the loan amount drawn prior to the month for which the commitment fees are being calculated. However, to determine the amount of debt required at Financial Close we need to know the commitment fees paid during the construction period. This creates a "circularity" that needs to be "broken" in the model logic.

Construction Funding

Step 2: Construction Funding



2. OUTPUT TO TERM DEBT MODULE

The total of a) construction costs b) interest during construction c)commitment fees; less equity invested over the construction phase of the project equals the Term Debt required. This number is fed from the Construction Funding Module to the Term Debt Module.

3. OUTPUT TO DEPRECIATION MODULE

The total capital costs incurred during the construction phase form the depreciable asset base for the project at the commencement of operations and these "opening" asset values are fed from the from the Construction Funding Module to the Depreciation Module.

4. OUTPUT TO TAX MODULE

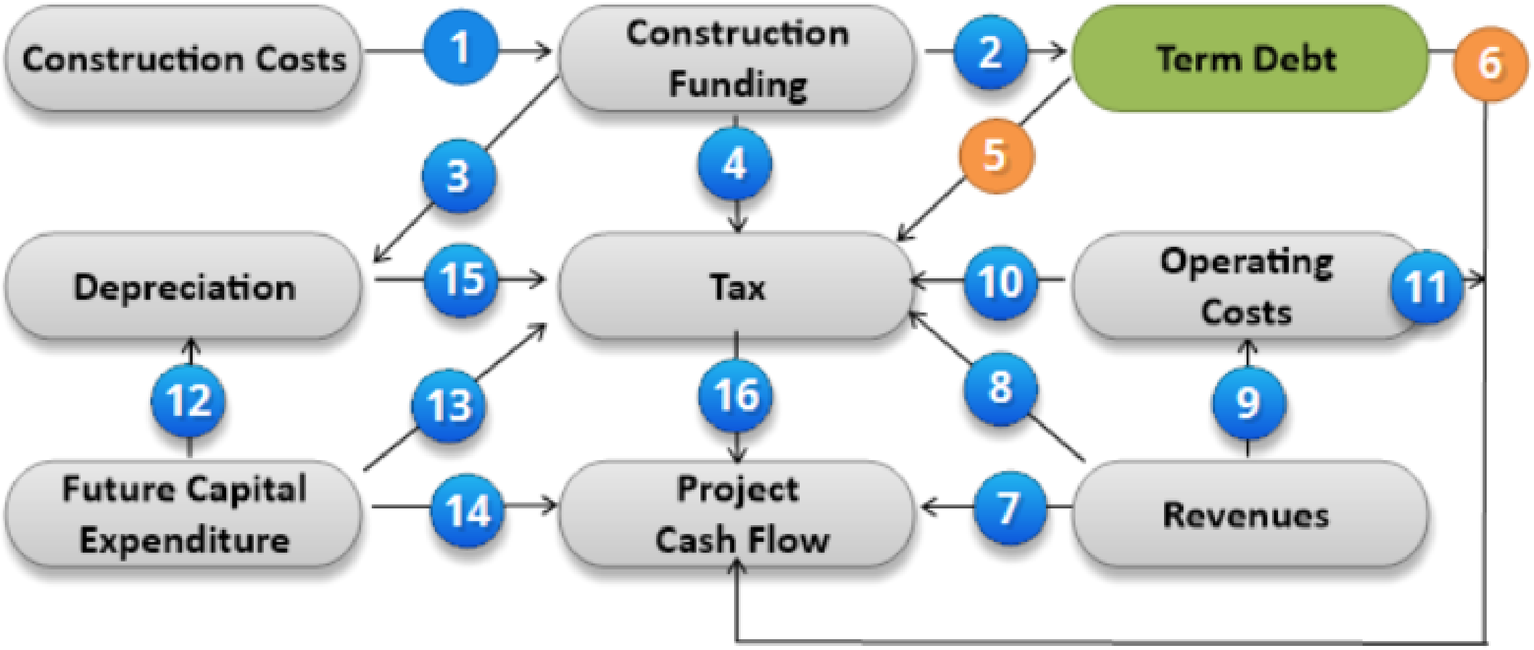
Depending on the applicable tax laws, pre-operative expenses such as Project Company overheads, interest during construction and commitment fees may be expensed as they occur or capitalized and amortised over a set period post Completion. Where these are expensed, this information is an input into the Tax Module and usually puts the Project Company in a tax loss position at the start of Operations.

Term Debt

The third step is to build the Term Debt Module. The total Term Debt requirement calculated in the Construction Funding Module along with the terms of the loan from Lenders' "Term Sheet" is used to generate a schedule of principal* and interest payments over the term of the loan.

In addition, lenders typically require a "Debt Service Reserve". The Debt Service Reserve is held in a Debt Service Reserve Account (DSRA) and is generally a deposit which is equal to a given number of months projected debt service obligations. It provides Lenders an additional buffer for any volatility in cash flows. Calculations for amounts required to be deposited into this account are also carried out in this module.

Step 3: Term Debt



*At this stage the schedule of principal repayments is usually based on a "standard" repayment profile such as a "Mortgage Style" repayment where the sum of principal and interest in each period is the same. The repayment profile is "optimised" to match cashflows once the Project Cashflow module is completed.

Term Debt

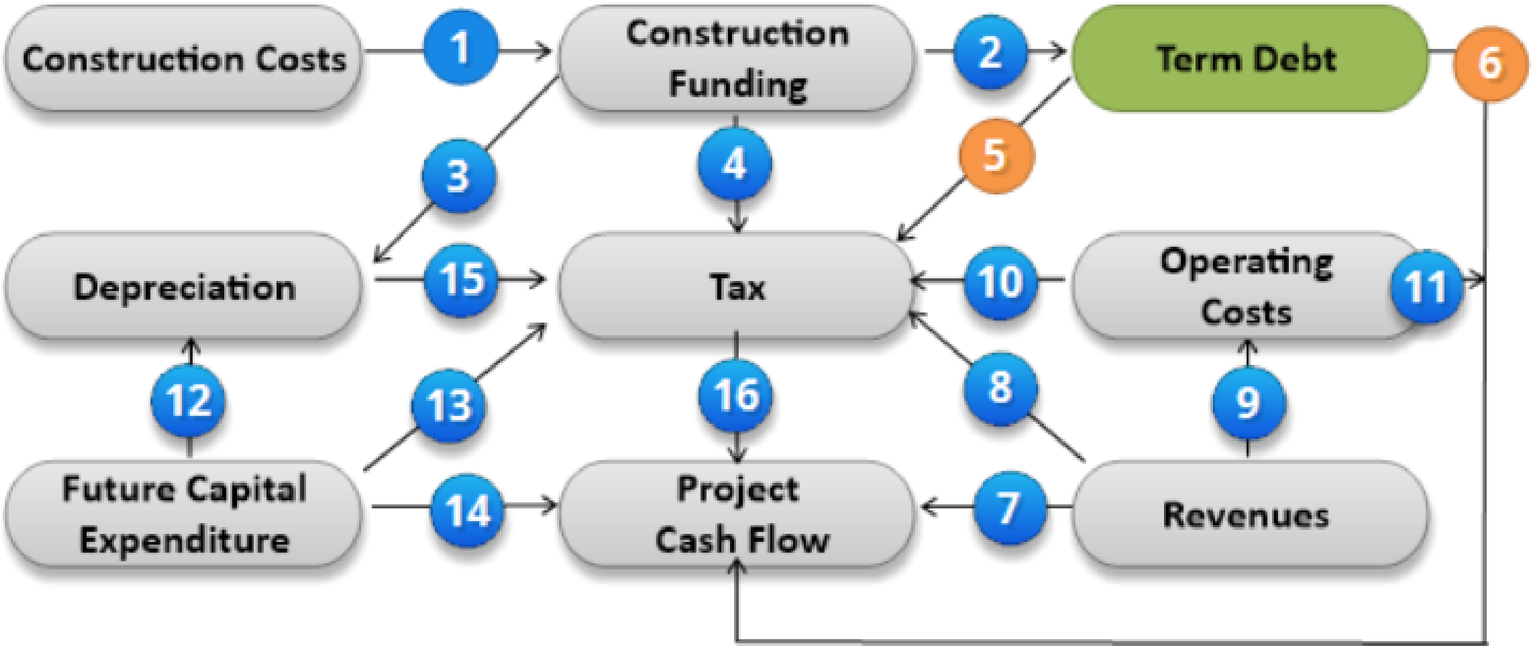
5. OUTPUT TO TAX MODULE

The outputs from this module into the Tax Module include interest expense and interest income (on the debt service reserve account). These are required for the calculation of tax payable by the Project Company.

6. OUTPUT TO PROJECT CASHFLOW MODULE

In addition, interest and principal repayments are fed into the Project Cashflow module. These are then used to calculate various metrics at a later stage.

Step 3: Term Debt

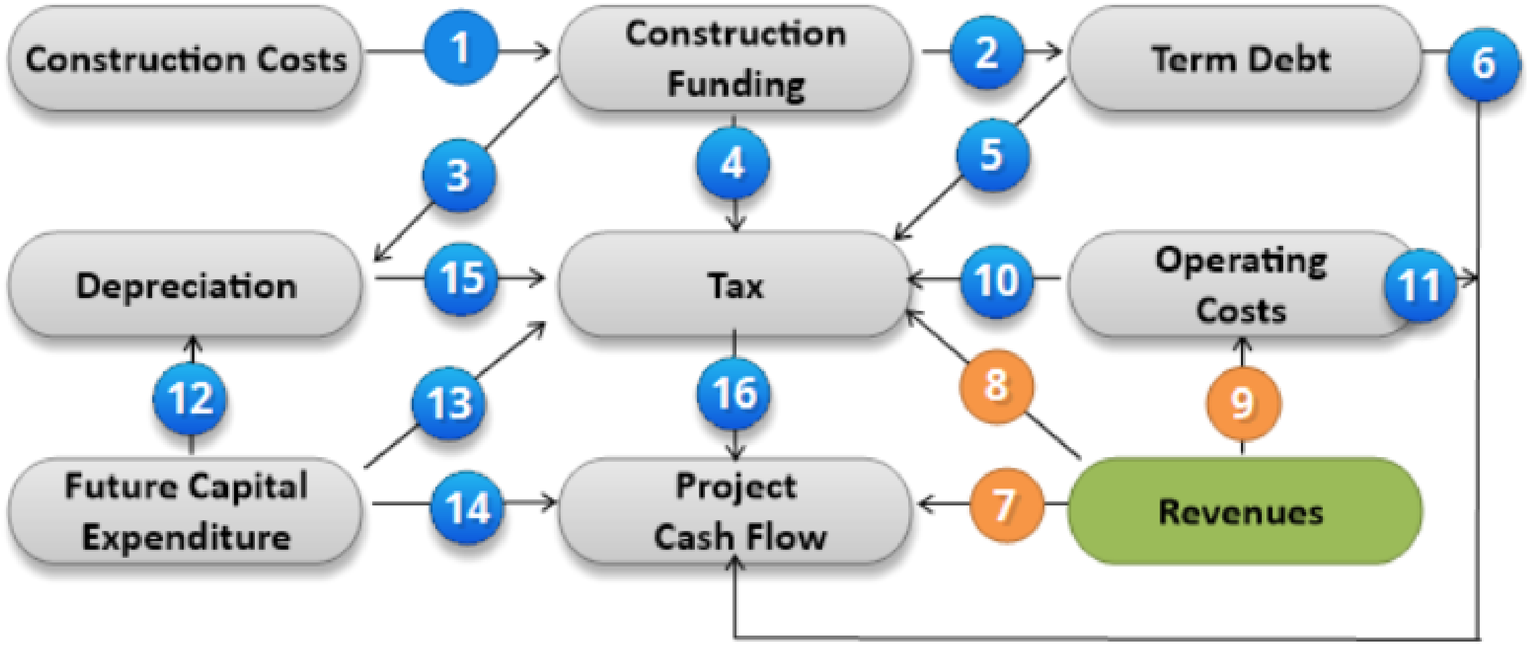


Revenues

The next step is usually to build the Revenues Module.This module usually does not require inputs from other modules. Instead, information for calculations in this module comes from consultant reports and/or revenue contracts.

In order to calculate the revenues, both "Quantity" and "Price" data needs to be calculated in this module. Revenue is simply “Quantity” x “Price” although there may be several quantities and several prices. Moreover, the “prices” may need to be indexed or escalated.

Step 4: Revenues



Revenues

7. OUTPUT TO PROJECT CASHFLOW MODULE

The Revenue for each period is fed from the Revenues Module to the Project Cashflow Module to allow calculation of cash available for debt service in each period ("CFADS") as well as various metrics.

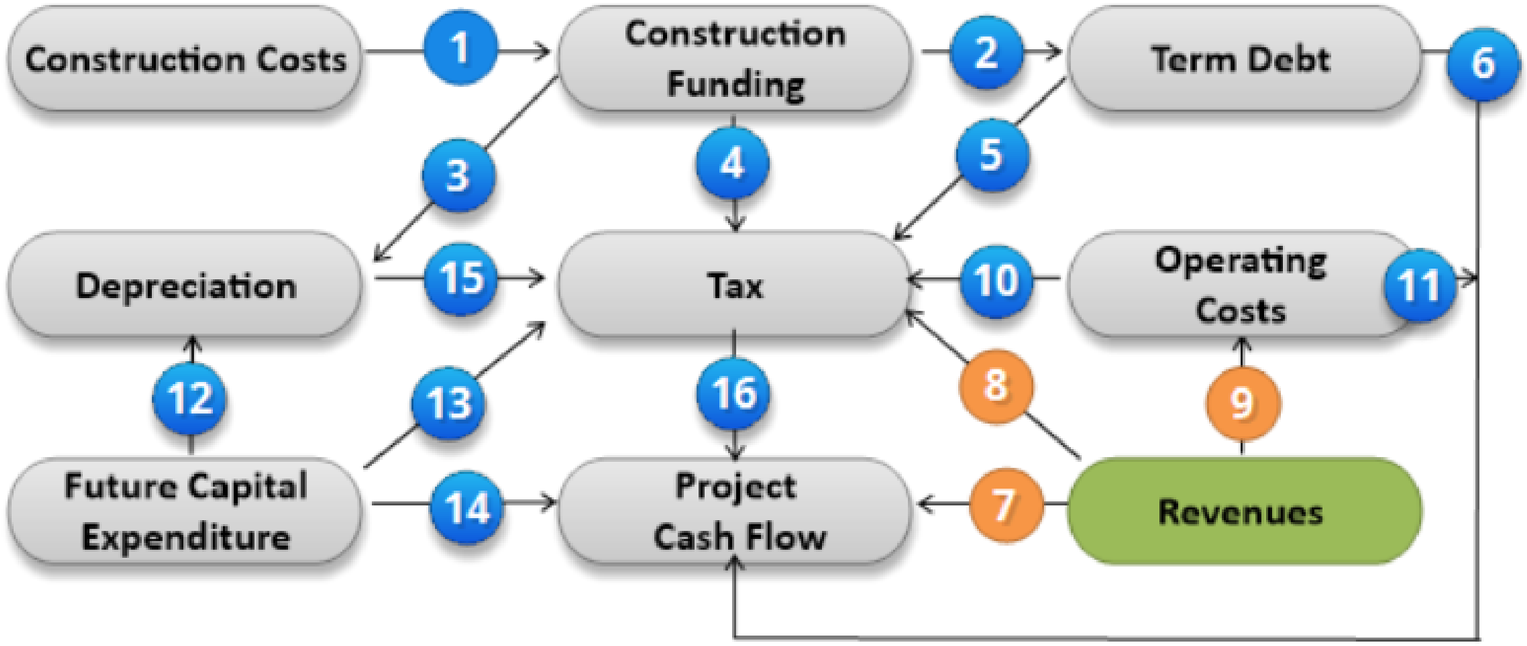
8. OUTPUT TO TAX MODULE

Revenues for each period are fed from the Revenues Module to the Tax Module to allow calculation of tax payable by the Project Company.

9. OUTPUT TO OPERATING COSTS MODULE

The "Quantity" (e.g. power, ore etc.) created or produced in each period is fed from the Revenues Module to the Operating Costs Module to allow calculation of Variable Costs.

Step 4: Revenues



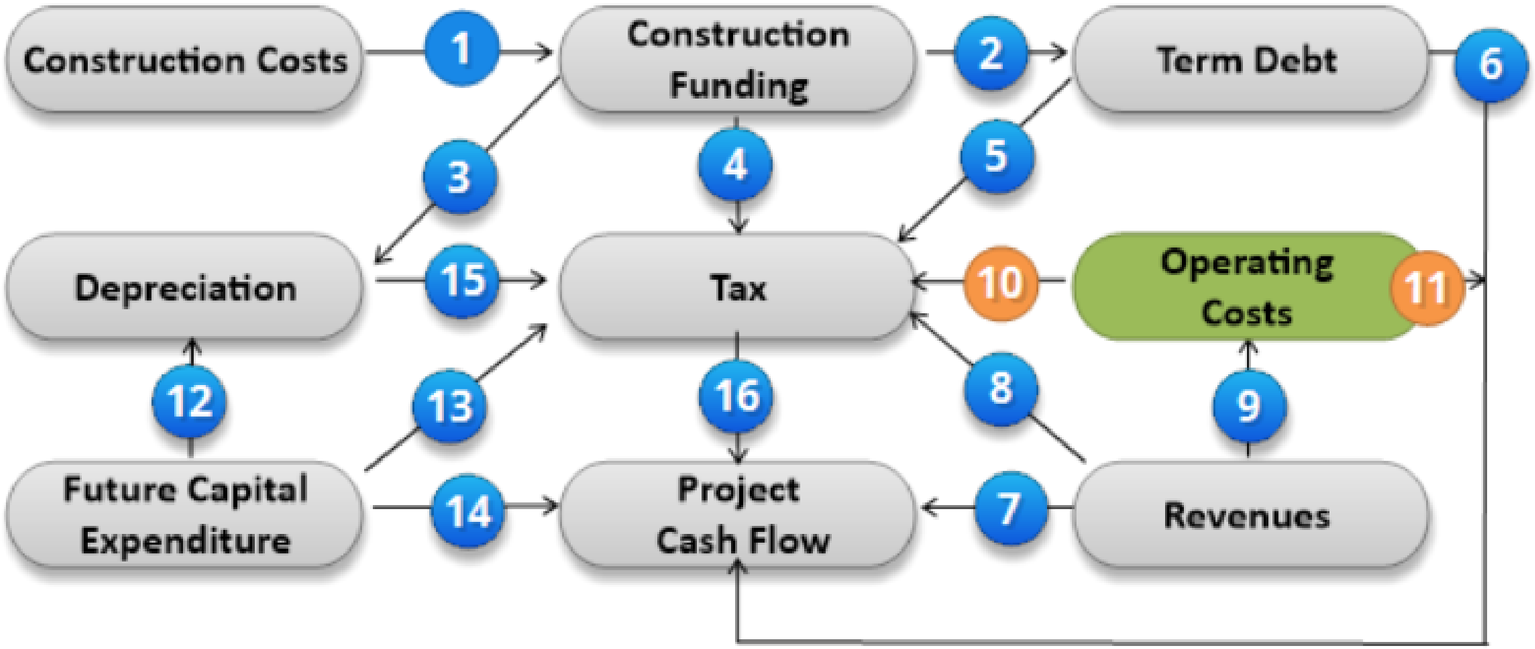
Operating Costs

The Operating Costs Module is built after the Revenues Module. In order to calculate the total operating costs for each period, we need to calculate both the Fixed Costs and the Variable Costs and sum them up.

Variable Costs are calculated by multiplying the variable cost per unit output by the Total Output* in each period. Fixed cost information is derived from consultants reports or contracts and added to the calculated Variable Costs to generate the total costs.

These costs usually need to be indexed to inflation.

Step 5: Operating Costs



*The Total Output in each period is derived from the Revenues Module where it was calculated to generate the revenue projections.

Operating Costs

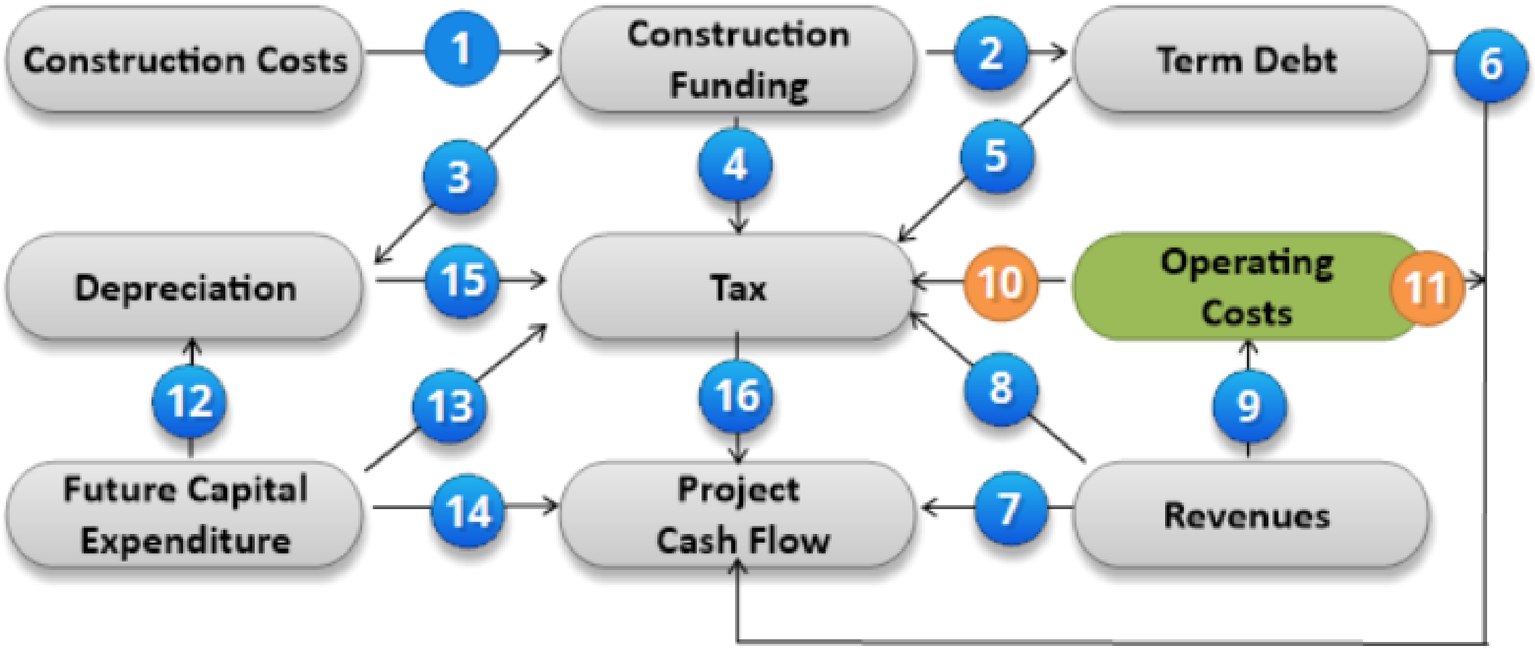
10. OUTPUT TO TAX MODULE

Operating Expenses for each period are an input into the Tax Module from the Operating Expenses Module to allow calculation of the tax payable by the Project Company.

11. OUTPUT TO PROJECT CASHFLOW MODULE

Operating costs for each period to allow calculation of CFADS and various metrics are fed from the Operating Costs Module into the Project Cashflow Module.

Step 5: Operating Costs

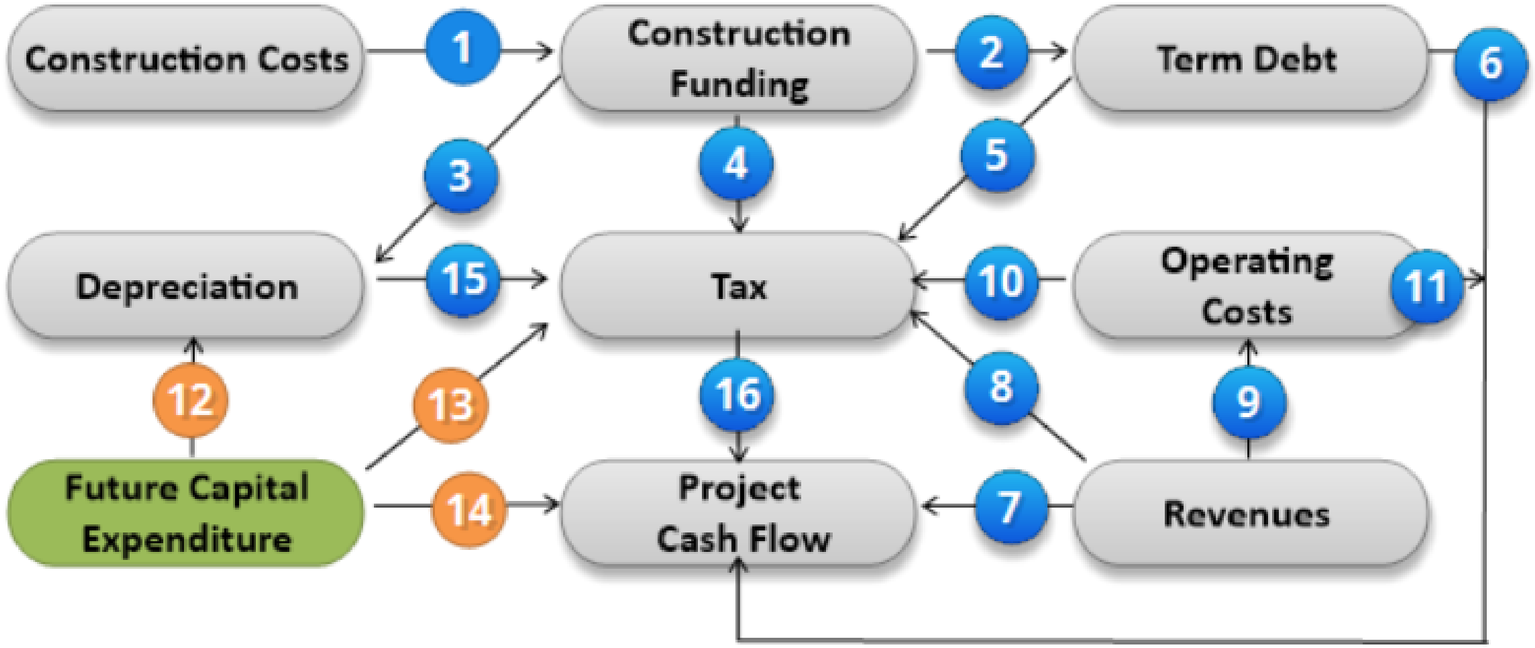


Future Capex

The next step is usually to build the Future Capex Module. During the operational phase of a project, capital investment is required to ensure that the project is able to continue operating as planned (e.g. major overhaul of a generation set). A “Maintenance Reserve Account” is used to accumulate funds to ensure the funds are there when they are needed.

Information (capex estimates) for calculations in this module is sourced from consultant reports. These estimates need to be escalated to allow for cost inflation. This module calculates the actual future capex as well as the amounts that need to be deposited into a Maintenance Reserve Account in each period.

Step 6: Future Capex



Future Capex

12. OUTPUT TO DEPRECIATION MODULE

The Escalated Future Capex values from the Future Capex Module are fed into the Depreciation module to allow calculation of the annual depreciation.

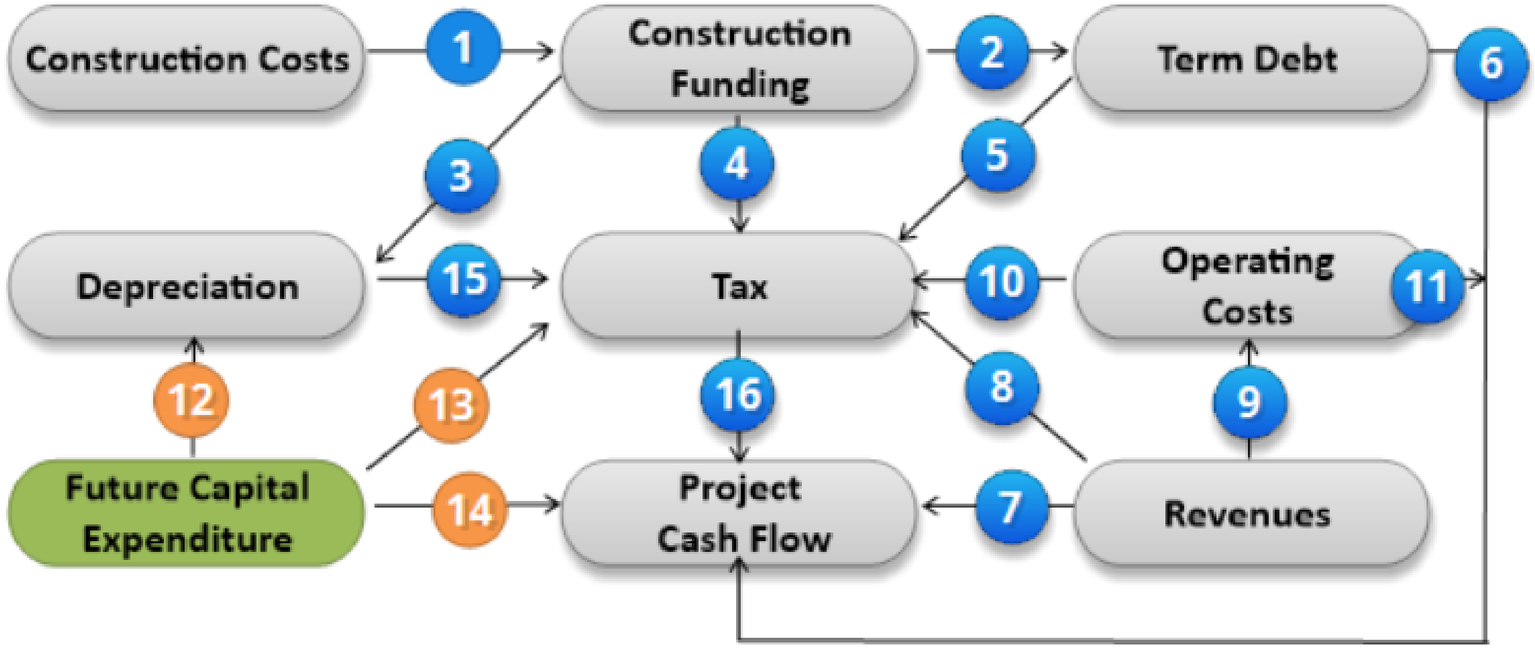
13. OUTPUT TO TAX MODULE

The interest income earned on the Maintenance Reserve Account is fed into the Tax Module to allow calculation of tax payable by the Project Company

14. OUTPUT TO PROJECT CASHFLOW MODULE

The cash deposited and released from the Maintenance Reserve Account is input into the Project Cashflow Module to calculate CFADS and various metrics.

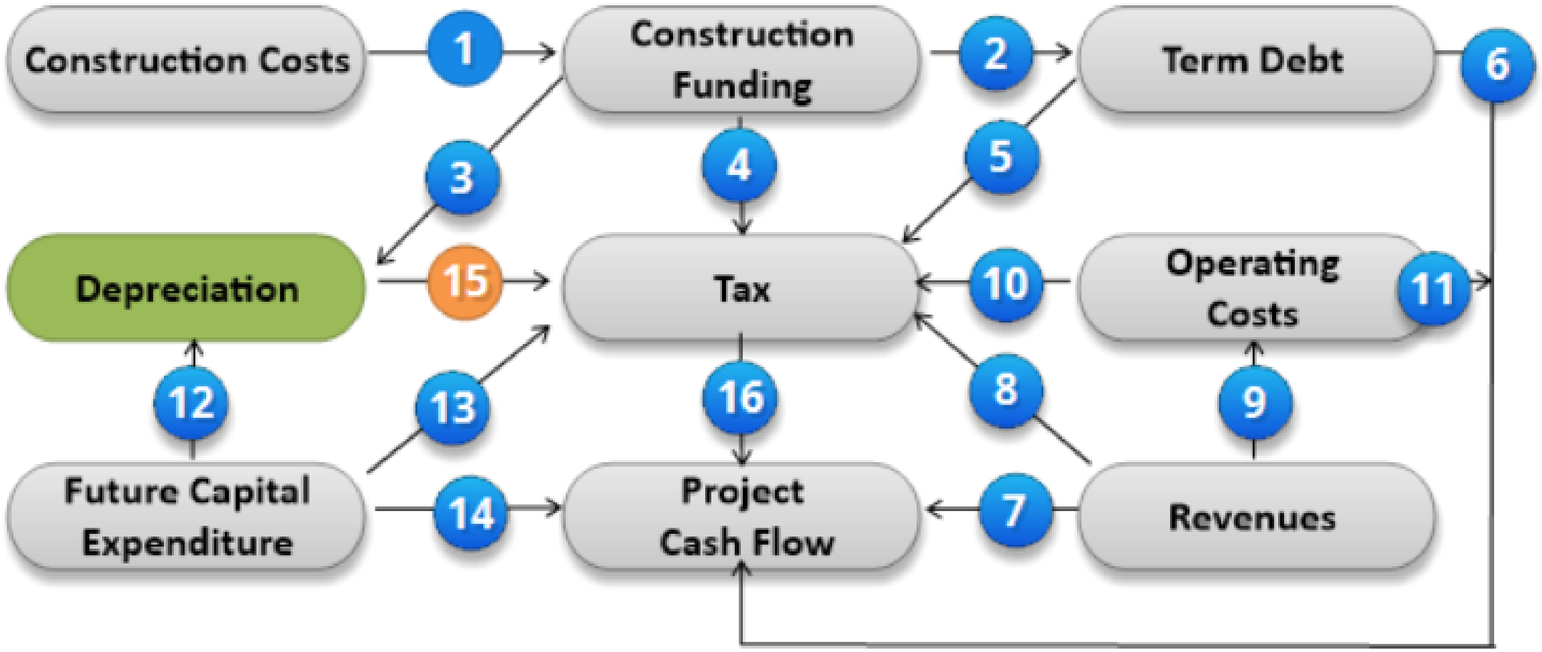
Step 6: Future Capex



Depreciation

At this stage, all the inputs required for the Depreciation Module i.e. capital asset values relating to initial construction of the plant and future capex are available. The actual depreciation rates are sourced from the applicable tax laws and the depreciation can then be calculated.

Step 7: Depreciation

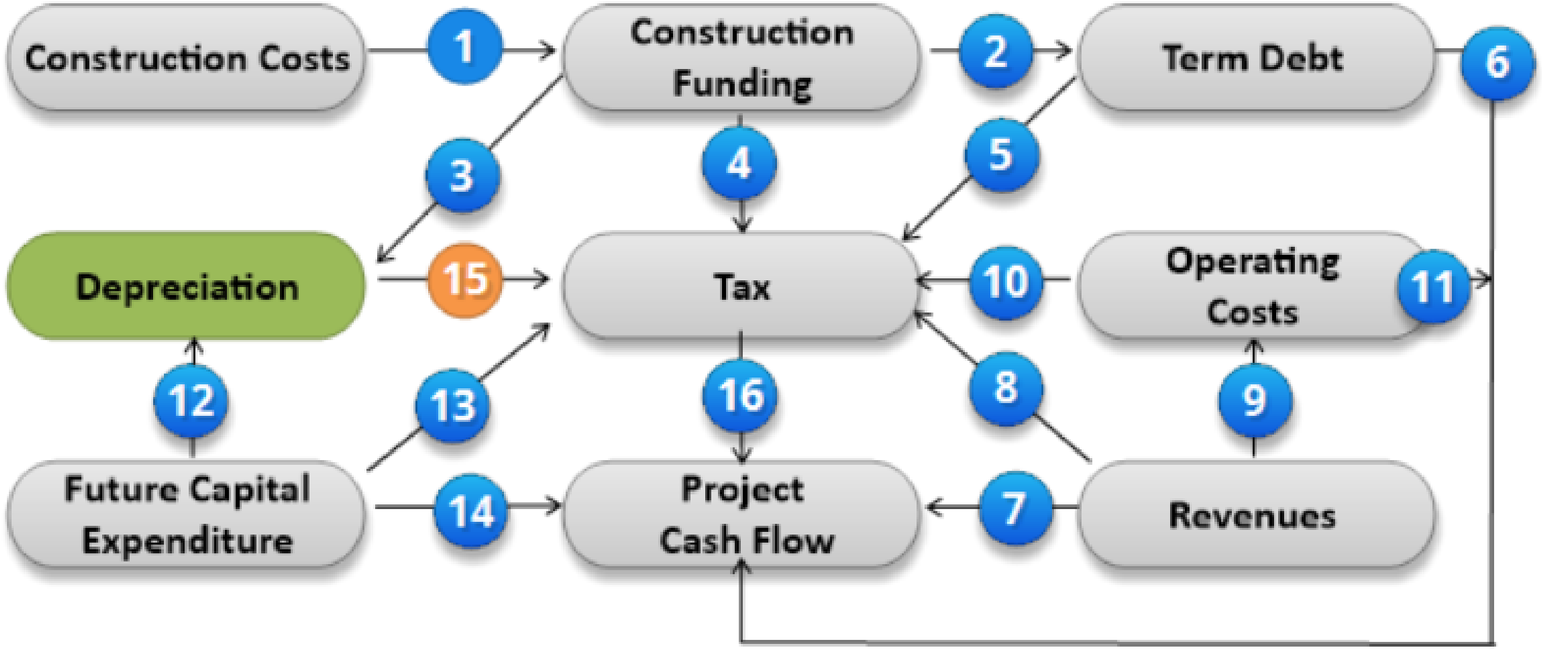


Depreciation

15. OUTPUT TO TAX MODULE

The Annual Depreciation calculated in the Depreciation Module is fed into the Tax Module for calculation of the tax payable by the Project Company.

Step 7: Depreciation



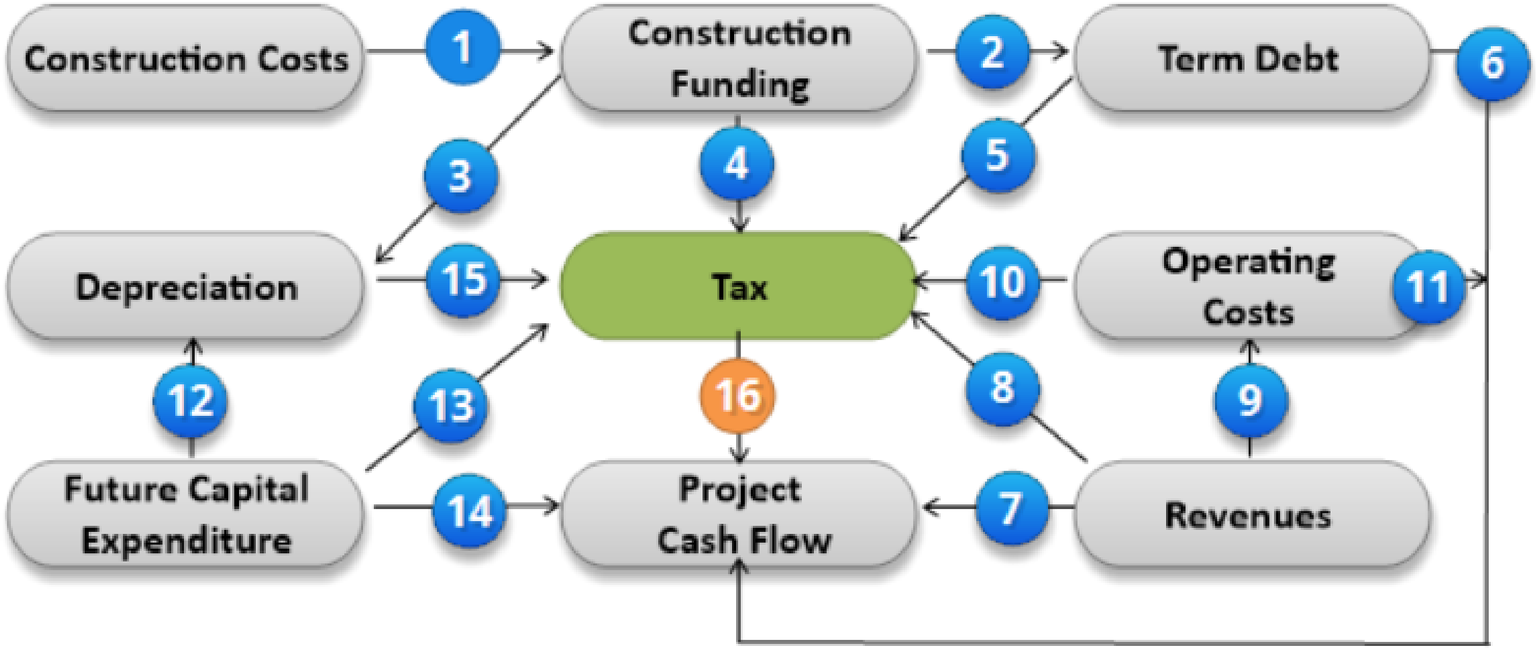
Tax

All the inputs required for the calculations in the Tax Module i.e. income, expenses, depreciation etc. are now available. The actual tax rates are sourced from the applicable tax laws and the tax payable in each period is calculated. An account to track any tax losses for setting off against future income is usually required and calculations relating to this account are included in this Module.

16. OUTPUT TO PROJECT CASHFLOW MODULE

The "Tax Paid" amount is fed from the Tax Module to the Project Cashflow Module to allow calculation of CFADS and various metrics.

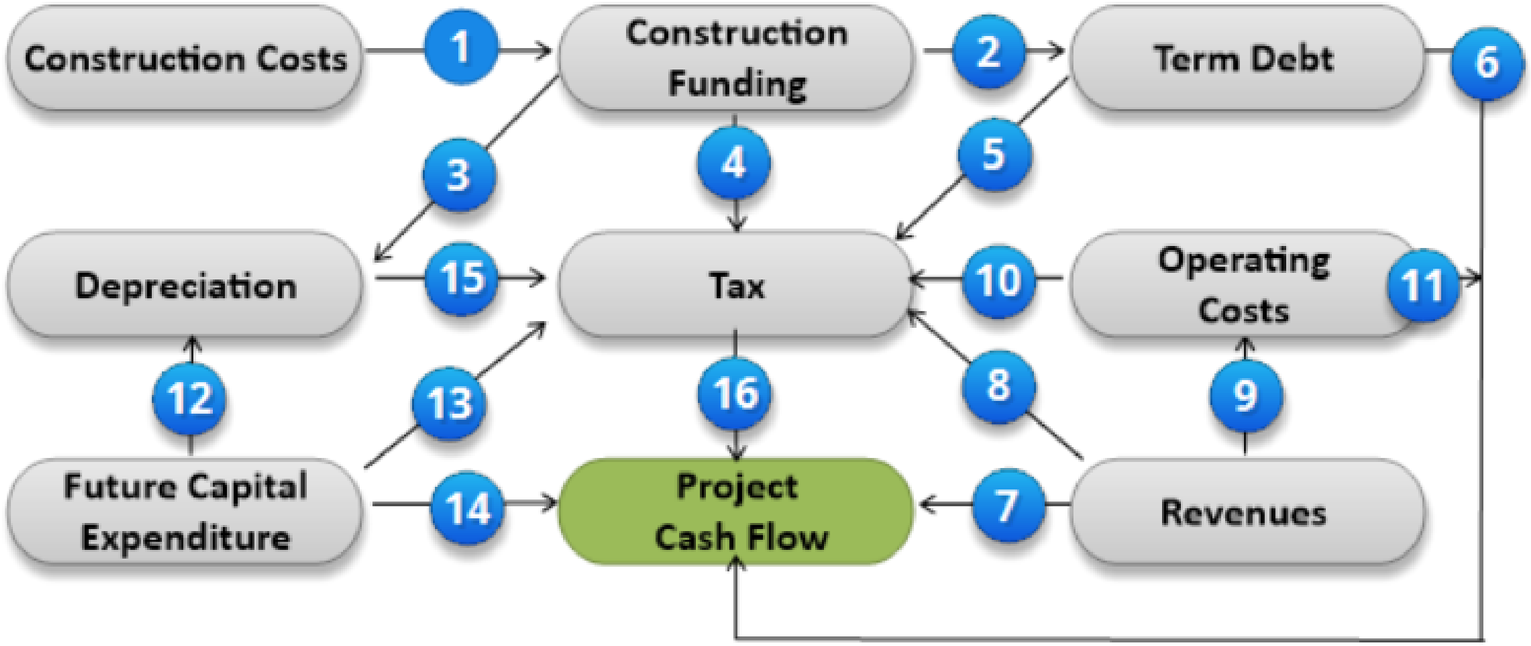
Step 8: Tax



Project Cashflow

All the inputs required to calculate cashflow are now available and the Project Cashflow Module brings all these inputs together to generate a period by period cashflow. This can then be used to calculate CFADS and various debt and equity metrics such as the Debt Service Cover Ratio, Loan Life Cover Ratio, Project Life Cover Ratio, Equity Internal Rate of Return etc. The indicative debt and equity amounts and the principal repayment profile are now adjusted until the required metrics are achieved.

Step 9: Project Cashflow



Mastering Project Finance Models

"Mastering Project Finance Models" is the most comprehensive web based financial modelling course in the market today. Leveraging adult learning principles, the power of multi-media and a structured building block approach, it offers a learning experience that provides a solid foundation in modelling skills for the project finance practitioner.

Find out more at
www.learnprojectfinance.com