Budget Facility for Infrastructure

FINANCIAL MODEL

USER GUIDE

national treasury

Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

2030 NDP

TABLE OF CONTENTS

Any queries in respect of this User Manual can be addressed to infrastructure@treasury.gov.za.

1. USER GUIDE AND PURPOSE

The BFI Financial Model has been designed in order to appraise the affordability of any infrastructure project's proposal submitted to the BFI. Such model provides the financial information which are deemed to be delivered for any primary submission made by sponsors to the BFI, i.e.: the Budget Statements and the Risk-Sensitivity Analysis.

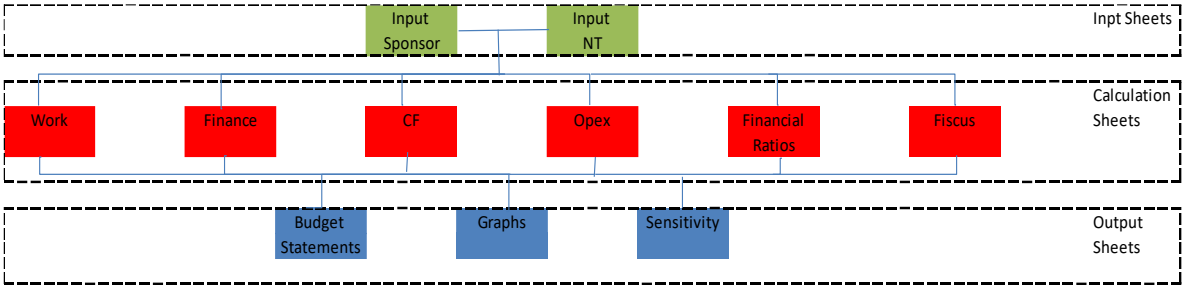
The user guide is designed to aid the user of the BFI Financial Model in setting up the model and to step them through where and how to populate model with data. In addition, this guide explains the use of output sheets and scenarios.

2. MODEL ARCHITECTURE

The table and diagram below set out the model architecture. Sheets shaded green represent inputs; red – calculations; and blue – outputs.

The Inputs Sheets (Green label)	2 Inputs sheets: one for the Sponsor and one for National Treasury. All the information on costs and revenues related to the project must be fulfilled in such sheets**, <u>and ONLY in these 2 sheets</u>**. In other words, **the users should not enter any data in the other sheets of the model.**
The Calculation Sheets (Red label)	Calculation Sheets provide "intermediary" calculations which don't need to be displayed to most users. The Calculation Sheets are used to fill the Output Sheets. Calculation Sheets may be used by users needing to enter into the technical aspects of the BFI Financial Model.
The Output Sheets (Blue label)	The 2 Output Sheets provide the information required for the affordability appraisal of the project (BFI submission): 1. the Budget Statements and Financial Ratio, 2. the associated Graphs . 3. the Sensitivity sheet

Model's Architecture diagram



3. INPUT OF DATA

The model allows for data to be inputted in various formats. The user must first select the format of input data they wish to use (in the section titled Input Sponsor and NT Input) and then enter the input data in the blue input cells in the sections below.

"Input Sponsor" Sheet:

Input Sheet Cells	Data to enter
Columns E to G	Each column represents different data assumptions, thus allowing to conducting sensitivity analysis. *(See part 5 on how to run sensitivity analysis)*
Column B	This is the unit in which the data are expressed. Such unit shall only be inputted for "Total Capacity" and "Unit Price" in Revenue. **The other units in Column B shall not be modified**. All Amount value should be expressed in Rand.
Timing	
Base Date	All the values on revenue and costs will be inflated by the model since the Base Date.
Date Start of Construction	Expected date at which the construction should start.
Construction Period	Duration in months of construction period (i.e. period between the date of construction start and the date of operation start).
Project life	Number of years the project will operate (since the end date of the construction).

Input Sheet Cells	Data to enter
A. REVENUE AND EXPENDITURE STATEMENT	**(DATA AS OF DATE OF FEASIBILITY STUDY)** It is assumed in the model that revenues and costs values will be put in the input sheet at the value assessed at the date of the feasibility study. Hence the model will inflate such data since such feasibility study date.
1. Revenues 	The user can choose between 2 options: 1. "NO Operation during Construction". In such case, revenues and capex will start running from completion date. 2. "Operation during Construction" period. In such case the Revenues and Opex are running during the construction and are function of the yearly completion rate.
[Source Revenue x]	Put names of the revenue's source in column A
Total Capacity	On Column E to G: Maximum capacity volume of production per year for each source of revenue. For instance: • Water : Million litres/year • Electricity : MWh/year • Hospital: number of beds • Toll Road: km of the built road. • Public Transport: Number of payable fares by years. On Column B : The unit is free but should be consistent with the Unit Price chosen (*see below*).
Unused Capacity Rate (% of production)	The Unused Capacity Rate (%) represents the part of the maximum production capacity (as set above) which is either unused or lost in the distribution system. For instance : • Water: leak rate, • Electricity: loss rate of electricity in the grid between the plant and the user. • Hospital: % of unused bed (=1-occupancy rate) • Toll road : % of unusable road, • Transport: % of unpaid fares (Evasion rate).

Input Sheet Cells	Data to enter
Unit Price	The unit price set in column E to G should be consistent with unit set for "Total Capacity" in order to calculate a **revenue in Rand**. For instance: • Electricity: if Total Capacity (annual volume) is set in MWh/ year, price unit should be expressed in R / MWh • Water : if Total Capacity (annual volume) is set in Million Litre / year, Unit Price should be expressed in R / Million Litre • Hospital : price in R / Beds • Toll road: Unit Price = tariff applicable per driven km if Total Capacity is expressed in driven Km per year. • Transport: tariff by fare if Total Capacity if expressed in number of fares per year.
2. OPEX p.a.	
Variable Costs	Variable costs are function of the real production of the project (Total capacity * Unused Capacity Rate * Rate of Completion).
Operation & Maintenance	As of feasibility study date, this the annual expected value of the operation and maintenance costs (including labour cost) of the project to run its infrastructure (building, dam, roads, railroads, etc…). Operation and maintenance cost of the project will be inflated by the model on CPI and function of the real production.
Machinery & Equipment	As of the feasibility study date, this is the annual cost of the operation and maintenance (including labour cost) of the project's machinery and equipment (turbines, pipes, medical equipment, buses, trains).
Utilities	As of the feasibility study date, this the annual expected cost of utilities, consumables (water, electricity, fuel, drugs) used to run the project.
Fixed Costs	
Fixed Cost	Total annual value in Rand of any fixed cost incurring from start of operation period, but unrelated to the unused capacity.
Insurance Cost	Annual value in Rand of any fixed cost incurring from start of **operation period**, but unrelated to the unused capacity

Input Sheet Cells	Data to enter
3. CAPEX – Total	
Fixed Construction Price (not inflated) No	Choose "YES" if the EPC contract is "Fixed Price", i.e. the EPC contractor is bound to deliver the infrastructure at a set price (not inflated during the construction period). Choose "NO" if construction prices will be inflated during the construction period.
Capital Expenditure	Value in Rand of the total capital expenditure expected for building the infrastructure.
Other	Value in Rand of the other capital expenditure in relation with the project.
Assumption of Capex timing	The model is assuming the Capex will be spread equally over the construction period. For instance, if the construction period is 5 years, Capex will be disbursed by 20% per year. It is however possible to change such assumption, by changing the rate of completion in the sheet "Work", Timing lines 82 and 83.
Scheduled Maintenance	Major maintenance, renovation, refurbishment works of the project to be undertaken within its lifecycle. These costs are capitalised.
Frequency (every X year)	Frequency in year for scheduled maintenance. For instance, if it is expected the project will required major maintenance's work every 10 years, the value will be 10.
Cost in % of Capex	Major maintenance is usually expressed as a % of the initial capex value. If the sponsor has however set a nominal value in the feasibility study, then the value to enter into column E to G will be: Expected cost of Scheduled Major Maintenance / Total Capex.

Input Sheet Cells	Data to enter
B. FUNDING STATEMENT	**(FIGURES AS OF DATE OF CONSTRUCTION)** To the contrary of assumption made for revenue and cost data, it is assumed in the model that the values related to funding are set at the start of construction date. Such data are assumed to come from the MTEF baselines for the NT contributions or from up-to-date term-sheets from Banks or DFI.
Contributions covering Capex	Put all the annual public contributions which will be budgeted yearly to the funding of the Capex during the construction period. In case a contribution's source is not provided in the labels below, the user can gather several contributions in one line.
Department Baseline	Put the average annual budgeted (MTEF or Capital Plan) amount for Department Baseline for the period of construction. Such amount is assumed to be available for each year of the construction period, and **won't be inflated**.
External Organisation Grant	E.g. Official development assistance
Capex Grant	Idem
Provincial Treasury Instruction	Idem
Debt	
Total Amount	Maximum private debt amount committed by investors (Banks, DFI) to finance the project.
% Guaranteed by NT	% of private debt, the investors are requesting to be guaranteed by National Treasury.
Grace Period in year	Number of years after the end of construction date before the debt starts amortizing.
Repayment Period (Years)	Number of years the debt will be repaid (including the grace period). Amortization is assumed to be straight line. **Warning:** the Repayment Period cannot be longer than the Project Life (Cell B62 checks such condition).
Interest rate % p.a.	Annual interest rate accruing on the private debt.

Input Sheet Cells	Data to enter
Arranging Fee	Fee that may be invoiced by the bank for providing the loan. The fee is assumed to be paid upfront at the construction start date and expressed as of percentage to the loan Total Amount.
'Commitment Fee in % p.a.	Fee that may be invoiced by the bank and computerized on the annual undrawn amount of the loan during the construction period.
Contributions covering Opex	Put all the annual public contributions which will be budgeted yearly for the funding of the opex during the operational period of the project. In case a contribution's source is not provided in the labels below, the user can gather several contributions in one line.
Department Baseline	Put the expected annual budgeted (MTEF) amount for Department Baseline to cover Opex during the period of operation. Such amount will be assumed to be available for each year of the operation period, and will be **inflated** by CPI every year.
Provincial Grant	Idem
Provincial Treasury Instruction	Idem
Municipal Grant	Idem
Municipal Counsel Funds	Idem
Levy	Idem
Tax and Accounting Data	
Corporate Tax rate	Corporate tax rate applicable to net revenues of the project.
Depreciation Period (=< Project Life)	Number of years the project asset (capex) will be depreciated as per accounting and tax rules. The Depreciation Period should be no more than the Project Life (Cell 74 checks such condition).

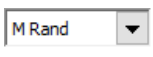
"Input NT" Sheet

Macroeconomic Data	
CPI Inflation p.a.	Annual Consumer Price Index Inflation rate expected since the feasibility study date and until the end of the project
Capex Inflation p.a.	Annual Capex Price Inflation rate expected since the feasibility study date and until the end of the project
Discount Rate (nominal)	Discount Rate used to calculate the PV of values for Financial Ratio.

	Usually the Discount Rate is equal to the interest rate paid on Treasury Bonds. To note: a "volume" discount rate is calculated by the model = (1-Discount Rate)/(1+CPI) -1, which is used for calculating the PV of values expressed in volume.
BFI	
Concessional loan interest rate p.a.	Interest rate per year on loans provided by DFIs to the National Treasury to finance the Project. Alternatively, it could be the interest rate on debt denominated in foreign currency. The exchange rate set below will apply to the calculation of such interests.
Domestic interest rate p.a.	Interest Rate (or coupon rate) paid on Treasury Bond issued on the domestic market.
Domestic fund / Concessional Loan	Ratio of domestic fund (Treasury loan or bond) over concessional loan used to fund the project. For instance, if there is no loan provided by DFI, the value of ratio is 1. Alternatively, this could represent the ratio of Domestic / International debt (currency denominated debt).
Exchange Rate: Rand / $	Value of the exchange rate of 1$ for X Rand. Such value can be modified during the project life in order to simulate the impact of a Rand appreciation (value of X reduced) or depreciation (value of X increased) against the dollar. Impact is simulated on interests and BFI outstanding values.
Accuracy	Is used to define the acceptable discrepancy between outcomes which should be equal in Tests.

4. OPERATION OF THE MODEL

The Budget Statement Sheet:

All amounts can be displayed either in Rand (as per amounts filled in the Input Sheet) or in Million Rand, by using the box in cell A6: 

A. EXPENDITURE STATEMENT	
CAPEX	
Capital Expenditure	From column F: yearly value of Capex (inflated or not, depending of the chosen option in input sheet, cell B5) Column C : sum of all annual capex over the construction period If inflated: the rate of inflation is the Capex Inflation rate.
Other Capex	Idem
Total Capex (a)	= total of above lines
Finance Charges (b)	Shows the sum of interest, commitment and arranging fees accruing during the construction period.
Scheduled Maintenance (c)	Shows the value of Scheduled Maintenance, which is equal to the proportion of the initial value of capex set in Sponsor Input Sheet, but inflated at the year of occurrence of the scheduled maintenance.
Total Capex (incl Finance & S Maintenance) (d)	**d = a + b + c**
Real Capex	= d but uninflated (volume value)
Basis for Depreciation Depreciation on Material Assets	Value of capex to be depreciated for tax. Annual value of depreciation = Basis of depreciation / years for depreciation Such value is used for the calculation of corporate taxes.
OPEX & FINANCIAL CHARGES	
Variable Costs	
Operation & Maintenance	Value of annual O&M, inflated by CPI • Times the rate of completion during construction period, if such option is chosen in cell B15 in Input Sponsor sheet. • Otherwise starts to accrue from completion date.
Machinery & Equipment	Idem
Utilities	Idem
Fixed Costs	
Fixed Cost	Fixed cost, inflated by CPI, starts to accrue from start of construction date.
Insurance Cost	Idem
Corporate Tax	Tax to be paid on positive net taxable earning (i.e. after depreciation) by the project
Finance Charges on Debt	Displays the sum of interest, commitment and arranging fees accruing during the operation period.
Finance Charges on BFI	Displays the interests paid on the BFI drawdowns (Treasury Bonds: domestic and concessional / international).
Total Operating & Finance Costs (e)	Sum of the above
Real Total Operating & Finance Cost	Value of “e” but not inflated (volume)
TOTAL EXPENDITURES (f)	**f. = d + e**
REAL TOTAL EXPENDITURES	**Equals f but uninflated (volume)**

B. FUNDING STATEMENT	
	The model assumes the following cash waterfall for funding the Capex: + Capex - Operating Balance (if <0 => increase funding need) - Contribution for Capex - Private Debt drawdown - BFI drawdown (last resort)
Total Capex (a)	Same value as "Total Capex" in Expenditure Statement.
Arranging Fee Interests Commitment Fee	Displays the details of the financial charges "" ""
Finance Charges on Debt (b)	=sum of the above accruing during the construction period
Operating Balance (c)	=Operating Balance accruing during construction period
Corporate Tax (d)	Tax to be paid on positive net taxable earning (i.e. after depreciation) by the project
Funding Requirement for Capex (e)	e = a + b + c +d
Funding Resources	Expected drawdown amounts of public resources (as planned in the MTEF) to be used to fund the Funding Requirement for Capex (e).
Contributions covering Capex	First line (Department Baseline) is used first and the second line is drawn in case of a remaining funding need, and so on, until all lines have been depleted (waterfall drawdown).
Department Baseline	Expected drawn amount of the annual Department Baseline
External Organisation Grant	Idem
Capex Grant	Idem
Provincial Treasury Instruction	Idem
Drawdown on Contributions for Capex (f)	Sum of public contributions for capex
Funding Gap after Contributions (g)	g = e – f, such gap to be fund by the Private Debt and the BFI (last resort funding)
Private Debt	
Debt available	Amount of debt available at beginning of period = Total Debt – sum of previous drawdowns on debt.
Total Debt (Beginning of Period)	Debt outstanding at beginning of period.
Drawdown on Debt (h)	Debt drawn during the period: is equal to the max of "g" and the "Debt available".
Debt Amortization	Debt amortizing (principal payment) during the period
Total Debt (End of Period)	Debt outstanding at the end of period
Total Funding (i)	*i = f + h, sum of drawdown of Contribution for Capex and Private Debt.*
Drawdown on BFI for Capex (j)	j = e - i , BFI drawdown equals the funding gap for capex after public contribution and debt drawdown, i.e. ***last resort funding*****.**

C. CASH FLOW STATEMENT	
Total Revenues	Value of all annual revenues
Less Total Opex	Value of all Opex
Operating Balance (a)	= Total Revenues – Total Opex
Less Capex	Value of all Capex
Less Scheduled Maintenance	Value of Scheduled Maintenance
Less Corporate Tax	Tax to be paid on positive net taxable earning (i.e. after depreciation) by the project
Less Finance Charges	Value of Finance Charges (Interest and Fees on Private Debt)
Less Principal Repayment	Value of Principal payment (Debt amortization)
Net Cash Flow after Capex (b)	b = a – sum of the above = Funding requirement for Capex less Net Operating Cash flow
Contributions covering Opex	Lines below display the expected annual value of public contributions covering Opex. The Model assumes a cash waterfall: each year, the first line must be depleted before the following one is drawn, and so on.
Department Baseline	
Provincial Grant	
Provincial Treasury Instruction	
Municipal Grant	
Municipal Counsel Funds	
Levy	
Total Contributions covering Opex (c)	**= sum of the Contributions covering opex**
Net Cash Flow after Contribution covering Opex (d)	d = c - b
Contributions covering Capex	Lines below display the expected annual value of public contributions covering Capex The Model assumes a cash waterfall: each year, the first line must be depleted before the following one is drawn, and so on.
Department Baseline	
External Organisation Grant	
Capex Grant	
Provincial Treasury Instruction	
Total Contributions covering Capex (e)	**= sum of the Contributions covering the capex**
Total Net Cash Flow before Debt (f)	f = d – e
Debt drawdown (g)	Displays the value of the expected drawdown of private debt to cover the capex
BFI Funding required (h)	h = f – g. BFI funding is the amount required to make up the annual Cash Flow shortfall over the project lifecycle, i.e. the **last resort funding to make up residual funding gap**.

D. Fiscus Contribution	
Contingent Liability	= % of private debt guaranteed by National Treasury
BFI Contribution	Displays the drawdowns on BFI and the interests paid on such drawdowns. This represents the total project's cost for the BFI.
Public Contributions	Displays the sum of all the public contributions (covering capex and opex) made to fund the project.
Annual Net Fiscus	= Public Contribution + BFI Contribution – Corporate Tax with BFI Contribution = Interest paid on BFI + BFI drawdown. It shows the net project's cost for the budget (public fund).
Annual Net Fiscus + Contingent Liability	Represents the total commitment (balance sheet and off-balance sheet) for the Fiscus related to the project.

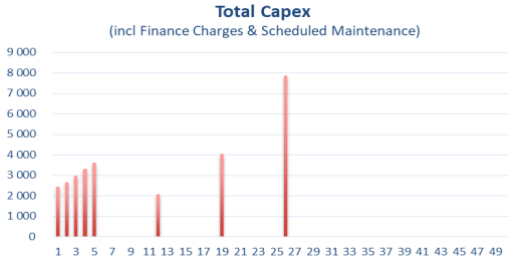
E. Financial Ratios	
Expenditure Ratios	
Cost per Unit (with finance charges, BFI)	= PV of Total Expenditures (incl. Finance and BFI charges) / PV of Output Volume; The ratio asses the total cost of producing one unit. For instance: • cost of production of one MWh for electricity; • cost of one m3 for water; • cost of one Km of built road, • cost of one bed for hospital.
Cost per Unit (without finance)	= PV of Total Expenditures (exc. Finance Charges) / PV of Output Volume; • The ratio asses the cost of producing one unit, but not including the finance charges of the private debt and of the BFI. • Not including the finance charges (BFI and private debt) allow a comparison between projects with different share of Public Contribution. • I.e. a project with higher share of public contribution in its funding structure will benefit from a lower Cost per Production ratio when including finance charges.

Operation Ratios	
Sustainability Ratio (without Scheduled Maintenance)	= PV of Revenues / PV of Opex • If > 1, Project's revenues cover the Opex, i.e. the operating balance is positive over the project's lifecycle (and inversely). • This ratio does not take into account the impact of scheduled major maintenances occurring during the life of the project, nor the debt service.
Sustainability Ratio (inc Scheduled Maintenance)	= PV of Revenues / PV of Opex • If > 1, the operating balance of the project is positive over its whole lifespan. • This ratio takes into account the impact of the scheduled maintenances occurring during the project's lifespan. However debt service is not included.
Comment	if Sustainability Ratio (inc Scheduled Maintenance) > 1 => "Project Sustainable", since the project won't have to rely on public contributions and BFI to cover its operation and maintenance over its lifecycle. if Sustainability Ratio (inc Scheduled Maintenance) < 1 => "Project Unsustainable"
Fiscus Efficiency ratios	
Fiscus over Capex	= PV of Net Fiscus Costs / PV of Capex • It asses the net cost for the Fiscus per investment unit. • For instance: if the ratio is 2, this means the project's cost born by the budget (over it full lifespan) is twice the value of the initial investment (asset).

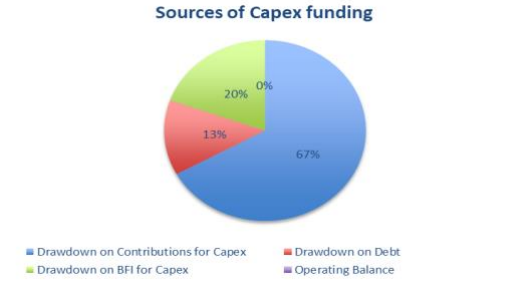
Fiscus over Unit	= PV of Net Fiscus Cost / PV of Output Volume;
	• The ratio asses the total Fiscus cost of producing one unit.
	• For instance:
	  ○ Fiscus cost of production of one MWh for electricity;
	  ○ Fiscus cost of one m3 for water;
	  ○ Fiscus cost of one Km of built road,
	  ○ Fiscus cost of one bed for hospital.

Bankability Ratios	
Debt Coverage Ratio	= PV (Net Operating Cash Flow – Scheduled Maintenance – Corporate Tax) / PV Debt Service • The ratio asses the ability of the project to pay its debt service (interest + principal) with its operating profit only over the loan's duration (Loan Life Cover Ratio (LLCR)).
Comment	• If Ratio > 1.10: "PPP eligible". I.e. the project may be eligible for a **"PPP – Concession"** type procurement, since the project is expected to generate sufficient net cash flow to cover its debt service over its lifecycle (with a 10% buffer). • If Ratio < 1.10: "Not eligible for PPP". The expected solvency of the project is not sufficient for a PPP-Concession procurement.
Debt Coverage Ratio (with Public Contributions)	= PV (Net Operating Cash Flow – Scheduled Maintenance – Corporate Tax + Public contributions) / PV of Debt Service • The ratio asses the project's ability to pay back its debt service with its net operating revenues and public contributions over the loan's duration (LLCR).
Comment	• If Ratio > 1, the expected project's operational revenues together with public contribution should be sufficient to cover the debt service. **No NT guarantee should be required**. **The project may be also eligible for a "PPP-Public Payment"** type. • If Ratio < 1, the expected project's operational revenues together with public contribution should NOT be sufficient to cover the debt service. **NT guarantee should be required**.

The Graphs Sheet:



"Total Capex" graph shows the amounts of Capex, included Scheduled Maintenance over the project lifecycle.



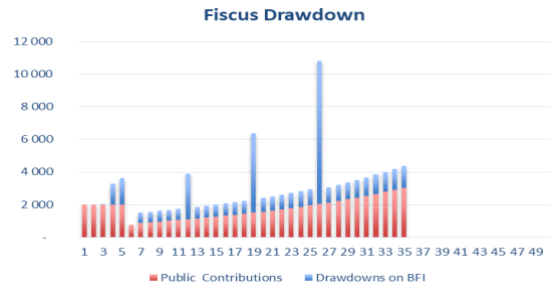
"Sources of Capex Funding" graph shows how the capex (during the construction period only) will be financed: Public Contribution for Capex, Private Debt, BFI and the Operating Balance if positive during the construction period.

"Sustainability" graph shows the evolution of operating revenues and opex (left axis) during the project lifecycle. The difference between the 2 curves shows the Operating Balance.

Bars represent the amounts of Scheduled Maintenance (right axis) during the project lifecycle.

"Total Operating and Finance Costs" graph shows the evolution of all project's costs during the operational phase.

"Outstanding Private Debt" graph shows the evolution of the total amount of Private Debt during the project lifecycle.



"Fiscus Drawdown" graph shows how the budget will contribute to the funding of the project during its full lifecycle.

Fiscus drawdowns are split between Public Contributions (capex and opex) and the BFI.

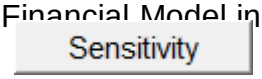
5. KEY USER SENSITIVITIES

The Input Sponsor sheet allows defining 3 scenario: Sponsor Case, the Base Case, and the Worst Case. The BFI Financial Model will be run based on of each scenario data, depending of the option chosen in the box located on cell B5 of the "Input Sponsor" sheet: 

The "Sponsor Case" is defined as the scenario based on the assumptions provided by the project's sponsor.

The 2 other cases can be defined freely, depending on the risks' perception for each project. An example of risk-sensitivity analysis may consist in running the following 2 scenario:

The Base Case	Such scenario may be defined as a modified Sponsor Case where costs (opex and capex) and construction period are increased and. revenues decreased. Assuming the over-costs, delays, revenue drop are set at the <u>average value</u> occurring for this kind of project. For instance: - It has been witnessed on past projects for hospital construction, that in average: the capex has been increased by 50%, Opex by 30% and construction period by 100%, against the initial value set out in the feasibility study. - Then, the model run on Base Case scenario will be based on costs 50% and 30% higher for Capex and Opex respectively and with a construction period 100% longer than in the Sponsor Case. Since such scenario is based on average observations, it means there are 50% chances of having actual figures either 50% higher of lower than the one forecasted into the Base Case scenario. Assumptions on revenues (volumes and prices) can also be modified in a similar manner.
The Worst Case	Such scenario may be defined as the case run with over-costs (opex and capex), delays and revenue drop which has been witnessed in the worst case for this kind of project in the past. If there are enough available observed data for similar past projects, it is then customary to fill the Worst-Case scenario with the data (over-cost, delay, revenue drop) for the 90 or 95% observed worst cases.

The BFI Financial Model includes a macro button in the Input Sponsor sheet 

(cell D3).

By pushing such button, the model will automatically run the 3 scenario as set in the Input sheets and fulfil the “Sensitivity” sheet which will then display the outcomes of the 3 scenario.

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FINANCIAL MODEL

USER GUIDE

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