

Mine Model User Guide:

Overview:

The model is composed in Microsoft Excel and is intended to be edited and used in Microsoft Excel. There are six worksheets in the model, all of which are linked together by formulas. The general flow of the model starts with the “Key Inputs” worksheet, where the model input variables and assumptions can be adjusted. From there the model moves to the “Ref” tab, where the project economics are detailed and the distribution of economic rents is calculated. The “Low”, “High”, & “Cap Cost Overrun” worksheets provide the same functionality as the “Ref” worksheet, but are used for sensitivity analysis. The “Low” and “High” worksheets specifically account for scenarios where the mineral prices are 10% lower and 10% higher, respectively, than the “Ref” scenario. The “Cap Cost Overrun” worksheet provides sensitivity analysis for a scenario where the mine capital costs are 30% higher than in the “Ref” scenario. Finally, the “Key Outputs” worksheet summarizes the results and provides visual aids.

Editing:

Changes to the input variables can be made by editing the cells highlighted in light blue in the “Key Inputs” worksheet. Changes to the assumptions to and input variables should only be made in the “Key Inputs” tab. Cells in white contain formulas which should not be edited by inexperienced modellers, as changing them may result in the model not functioning properly. In the “Ref” and other analysis worksheets, the cells highlighted in light blue refer back to the cells in “Key Inputs” worksheet. The cells in light green are typically the sum total of a line item over the lifetime of the mine project. These cells not intended to be edited.

Input Assumptions:

Input assumptions play a critical role in the accuracy of the modelled results. Care must be taken to ensure that the values input into the light blue cells in the “Key inputs” worksheet are reasonably accurate and either grounded in forecasted or historical data or based on comparables. The key assumptions are:

Mining Company

Copper Production: The volume of the primary mineral (in this case, copper, in lbs) expected to be extracted and sold annually over the life of the mine. This information would typically be based on proven geologic reserves, mine operating forecasts, and/or comparable mines. Care must be taken to ensure that the units used to measure volume are the same units that are commonly used for the mineral commodity pricing.

Gold Production: The volume of the secondary mineral (in this case, gold, in ozs) expected to be extracted and sold annually over the life of the mine.

Copper Price: The expected sale price of the primary mineral sold. This will typically be based on historical or forecasted commodity price figures; however, if a mine regularly employs non-market pricing strategies such as hedging or offtake agreements, then the commodity price used in the model should reflect this. It is also important to use a Canadian dollar price in the model. A rolling 10 year historical copper price trend has been used for the results presented in the guidebook. The low and high commodity prices are linked to the sensitivity scenarios in the “Low” and “High” worksheets, respectively.

Gold Price: The expected sale price of the secondary mineral sold.

Per Unit Operating Cost: The cash costs of production per pound of the primary mineral produced. This figure would include direct labour, operating materials and supplies, equipment and mill costs, applicable overhead, and any other on-site operating costs. This input is one of the most important variables in the model as the operating costs are the biggest cost a mine has and have a significant impact on a mine’s rent generating ability.

Annual Contribution to Reclamation: The annual amount that the mine sets aside to fund the reclamation liability at the end of mine’s life.

General & Admin Costs: The mine's administrative costs expressed as a percentage of sales.

Treatment/Refining/Transport Costs: The cash costs per pound of the primary mineral produced attributable to off-site activities such as extracting the mineral from the ore and delivering it to the end market. Technical factors such as the grade of ore and logistical factors such as rail and truck capacity will affect these cost figures.

Initial Capital Expenditure: The capital required to build the mine and allow operations to commence. These costs will typically be incurred in the first few years of the mine's life; however, if planned expansions occur at different points in the mine's life cycle these can be incorporated into the model within this field

Cost Overrun Capital Expenditure: The factor by which initial capital costs exceed the normal, or expected, capital costs. This factor is linked to the "Cap Cost Overrun" worksheet to provide sensitivity analysis.

Capital Depreciation Rate: The rate at which mine assets are depreciated (using the straight line method). The 25% figure is based on the standard capital cost allowance for class 41 assets. Note that historically some class 41(a) assets used in a mining operation qualify for accelerated depreciation (up to 100%), but this allowance will be phased out in Canada after 2020.

% Debt Project: The debt percentage of the total capital structure. The capital structure determines how the mine's capital costs are funded.

Interest Rate: The annual interest rate payable on the mine debt

Years to Maturity: The amortization period on the mine debt.

Equity Returns: The annual dividends (expressed as a % return on investment), payable to mine operating company shareholders. Note that this should remain at 0% because a dividend distribution would constitute a distribution of the economic rent generated by the mine and will impact the comparative results.

First Nation Government

A detailed description of the different IBA fiscal instruments can be found in the guidebook. Some of the key points in relation to the modelling of specific fiscal instruments are described below:

Income Based Royalty: The income based royalty utilizes the same two tiered taxation regime as described in the Government section below; however, the model is built so that income based royalties derived from an IBA are paid out after Government royalties are paid. It is assumed that the tier 1 and 2 royalty percentages will typically be the same as the Government percentage.

Equity Share: An equity investment (or, ownership stake) in the mine results in a change in the mine's equity funding structure. The private mine equity amount is proportionally reduced by the amount of the First Nation Government's investment. It is assumed that the equity investment will be made before construction of the mine begins. Corresponding to this investment, it is also assumed that the First Nation Government will take on a loan equivalent to the size of their investment to fund their ownership stake. The model has inputs for the amortization period of the loan, the interest rate of the loan and the targeted cash equity return (ie dividend distributions). The equity return is expressed as a percentage of net income and is proportional to the percent value of the equity investment (i.e. a 20% equity investment with a 50% targeted equity return on \$100,000 in annual net income will result in a cash distribution of \$10,000 annually ($\$100,000 * 50% * 20%$)). It is worth noting that an equity investment is structurally different than the other fiscal instruments as the dividends that are derived from the equity investment constitute a distribution of the resource rents. Furthermore, all or a portion of the capital invested may remain within the mine for as long as the

mine is operational, while the loan would be repaid over the mine's lifetime. This could result in a negative cash flow situation for the First Nation Government. The dividends received from the equity investment may not be sufficient to repay the annual loan obligations.

Lump Sum Deductible from Royalty: If this field is set to "Yes" the lump sum payments will be deducted from the amounts payable via the "Volumetric", "Income Based Royalty", and "Ad Valorem" fiscal instruments. If this field is set to "No", the lump sum payments will not be deducted.

Government

Mining Tax Tier 1: British Columbia imposes mining taxes in two tiers. The first tier is a tax on the mine's "net current proceeds" and is set at 2%. This input should not be adjusted unless the Provincial government updates its taxation regime. The tier 1 mining tax is deductible from the tier 2 tax.

Mining Tax Tier 2: The second tier is a tax on the mine's "net revenue". This input should not be adjusted unless the Provincial government updates its taxation regime.

Corporate Income Tax: The corporate income tax rate used in the model is the combined Federal and Provincial income tax rate

Property Tax: The property, or mineral land, tax is set at the B.C. Provincial mandated tax rate per hectare. This input can be adjusted by determining the size of the mine (in ha) and the corresponding Provincial tax rate per hectare.