

# Introduction to FINPLAN

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This document is meant to provide a concise introduction to FINPLAN, following the steps a user would need to take when setting up a FINPLAN case. It is thus closely aligned with the data entry and results structure of FINPLAN. This document is constantly being developed. Feedback is thus very welcome.

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# Inputs in FINPLAN

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## Inputs: Data Preparations

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In the following, the minimum data requirements are presented that allow developing a FINPLAN case study during a workshop. Before joining a workshop, it is however recommended to go through FINPLAN to check what additional data would be useful. If data for an actual project is not available, assumptions will need to be made. PESS experts will help you to fill the gaps.

### Case Data

- General Information
  - Start and end year of modelling period
  - Currencies involved
- Inflation Information
  - For all currencies
- Currency Exchange Rates
- Tax & Depreciation Information
  - Income tax rate
  - Other tax information (e.g., can tax losses be carried forward? VAT on investments?)
- Sales Data
  - Electricity price in first year
  - Assumptions regarding increases of electricity price (e.g., with inflation)
  - Quantity of electricity sold due to the project analysed

### Plant Data

- General Plant Data
  - Type of power plant (type of fuel used) & unit size
  - First operational year / Construction period / Plant life in years
- Production Data
  - Quantity of electricity generated
- Operation & Maintenance Costs
  - Yearly costs per currency
- Fuel Costs
  - Yearly costs per currency
- Investment Costs
  - Per currencies
  - Distribution over construction period (in %)
- Sources of Financing
  - Is an export credit involved?
  - If so, what percentage of the investment is covered by the export credit?
- Export Credit 1
  - If an export credit is involved, what is its term (years) and interest rate?
- Depreciation
  - How is the investment depreciated? (Type of depreciation / years / depreciation rate)

## FinManager

- New Commercial Loans
  - Interest above inflation
  - Term (in years)

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## Inputs: Case Data

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Please only enter case data as required and do not feel obliged to fill all of the following categories with numbers. Rather think of your project and what you would like to include and – only then – look for the right place to enter the data. As a minimum it is just required to enter everything under *General Data* and also *Sales Data* to account for electricity sales.

### New Case Study

Here, you can enter the name of your study and notes about the study. Using notes to provide a short description of the analysis is very useful when working with multiple case studies, especially when dealing with minor modifications of one and the same case, e.g., for a sensitivity analysis.

The starting year should be (before) the first year that an investment occurs. The ending year should be some time after the plant went into operation, e.g., when the plant life expires. All analyses will be cut off at the ending year.

The study type allows choosing between a single plant, a utility and a power company. (This just serves to describe the case and has no implications on the analysis.)

Please always choose a local currency and at least one foreign currency. The foreign currency will be applied for the export credit. (Should the currency of the export credit be the same as the local currency, simply select “Local Currency” as local currency and select your currency as foreign currency, and apply the same inflation rate and a constant exchange rate of one.)

### General Data

#### General Information

Allows entering general information such as the starting year and the ending year of the analysis, as well as currencies applied. Further, the study type (single plant / utility / power system) can be selected. (This is just for information purposes and will not affect the FINPLAN model.) Sometimes, it is recommendable to have the first year some time before the first construction year. In no case should the first year entered be after the first construction year.

#### Inflation Information

Allows entering inflation rates for all currencies by either selecting a steady rate or by entering yearly values. See *Intermediate Results – Inflation Index* for the inflation multipliers that FINPLAN applies for each year.

Part of the Training Material developed by the **Planning and Economic Studies Section (PESS)** of the IAEA. Refer to [www.iaea.org/topics/energy-planning/energy-modelling-tools](http://www.iaea.org/topics/energy-planning/energy-modelling-tools) for further information

### Currency Exchange Rates

Serves to enter exchange rates to the local currency, either as a steady rate or by defining yearly exchange rates. A third and commonly used option is to select that exchange rates reflect inflation rates. See *Intermediate Results – Exchange Rates* for the final exchange rates that FINPLAN applies.

For example, let's assume that the exchange rate is 1 Local Currency to 3 EUR in the first year. Due to inflation, 1 Local Currency now is worth 2 Local Currency in ten years, and 3 EUR now are worth 4 EUR in ten years. Thus, in ten years the new exchange rate is 2 Local Currency to 4 EUR, or 1 Local Currency to 2 EUR.

## Taxation Data

### Tax and Depreciation Information

*Income Tax:* A constant or a yearly tax rate can be entered that is applied to the taxable income. FINPLAN allows carrying tax losses without a time limit. This means that losses in earlier years are subtracted from the taxable income in future years to reduce the income tax that needs to be paid. This is done until the cumulative taxable income exceeds the cumulative losses of earlier years. If a loss is entered for the start year, it will be included in this calculation (see *Results – Operating Account*). The tax calculations by FINPLAN are shown under *Intermediate Results – Taxes & Royalty*.

*Value Added Tax:* The user can define if VAT needs to be paid on investments during the construction phase, which is then being refunded once the plant goes into operation. The VAT rate entered is applied to a user-defined percentage of the investment, as visible as *Cash Available (VAT)* under *Results – Cash Inflows and Outflows*.

*Depreciation Rate for Historical Assets:* The user may enter a depreciation rate for historical assets from before the modelling period, if historical assets should be considered and are entered under *Case Data – Initial Balance Sheet*. The depreciation method applied is declining balance depreciation. The depreciation rate is applied to the gross fixed assets less accumulated depreciation less accumulated consumer contributions as entered in *Case Data – Initial Balance Sheet*.

Refer to the document which describes the results under the heading *Cash Inflows and Outflows* for further explanations of the tax calculations and VAT.

### Royalty Payment

Allows entering royalty payments, if any, by defining a royalty rate and a percentage of the costs. This can be used to enter payments to an owner for the use of property, especially patents, copyrighted works, franchises or natural resources (e.g., hydropower royalties for the right to use water resources). The royalties are calculated as the royalty rates times income minus the costs multiplied with the percentage factor (see *Results – Operating Account*). For more details regarding these calculations, refer to the explanation of royalties in the document which describes the results in the section on cash inflows and outflows.

## Initial Balance Sheet & History

### Initial Balance Sheet

In this category the initial balance sheet for a utility can be entered. Note that the user needs to ensure that the sum of all assets listed, less accumulated depreciation and consumer contribution, needs to match the sum of all equity and liabilities. (Net bonds and loans outstanding are entered in other categories and thus not visible here, but under *Intermediate Results – Initial Balance Sheet*). (Please refer to other parts within this document and to the document which describes the results for further explanations of the terms listed here.)

### Old Commercial Loans

Allows entering outstanding loans and committed loan drawdowns in all currencies. Note that all outstanding loans and committed loan drawdowns need to match the sum of the repayments. The user can enter an average interest rate which will be used to calculate the interest as shown under *Results – Cash Inflows and Outflows*. Alternatively, the interest to be paid can be defined by the user by entering yearly interest payments. The final payments related to old loans are listed under *Intermediate Results – Old Loans*. Note that currently the old loans are not added to the equity and liabilities shown under *Case Data – Initial Balance Sheet*, which will be the case in a future version.

### Old Bonds

Allows entering outstanding and committed bonds in all currencies. Note that all outstanding and committed bonds need to be listed as repayment at one stage. The user can enter an average return rate which will be used to calculate the interest as shown under *Results – Cash Inflows and Outflows*. Alternatively, the interest to be paid can be defined by the user by entering yearly return payments. The final bond related payments are listed under *Intermediate Results – Old Bonds*.

Note that the entered old bond will be added as a liability to the initial balance sheet. To ensure that the assets equal the equity and liabilities, i.e., to balance the balance sheet, the same amount needs to be added in the list of assets in the left column at *Case Data – Initial Balance Sheet*. However, the old outstanding bond entered is not visible here, as the field is greyed out. Refer to *Intermediate Results – Initial Balance Sheet* to see the final balance sheet.

### Committed Investment

This serves to enter committed future investments for all currencies that are unrelated to the power plants modelled, but required to provide a holistic picture of a utilities investment portfolio. They will be listed as cash outflow under *Results – Cash Inflows and Outflows* and added to the assets shown under *Results – Balance Sheet*, yet without being depreciated.

## **Sales & Purchase Data**

### Consumer Contribution & Deposit

Consumer contribution serves to enter a financial contribution to the asset (i.e., the project) by consumers (e.g., industrial players), e.g., for preferential treatment regarding electricity sales. In the balance sheet, the contribution thus decreases the net fixed assets owned by the utility. The contribution is not tied to any profit or dividends.

Consumer deposit is a deposit paid by consumers, e.g., for receiving the meter. Unlike the consumer contribution, it is listed as a liability (not an asset) in the balance sheet.

As both consumer contributions & deposits are not a yearly operational revenue or expense, they are not listed in the operating account.

In FINPLAN is not expected that consumer contributions or deposits will ever be paid back. (Reducing them by entering a negative value in the input data is possible, but would result in a negative inflow in the cash-flow statement, i.e., effectively an outflow listed under inflows.)

### Fixed Revenues & Other Income

Allows entering continuous revenue streams that are independent from electricity sales and increases with a specified growth rate. Note that this growth rate is already applied to the very first year of the modelling period.

### Sales Data

Required to specify the sales from the project. Different entries for different clients and with different prices are possible. Prices can either be constant, or increase at a fixed or a yearly rate that is added (or subtracted if a negative value is entered) to inflation. Please specify the sales only from the year onwards that the plant goes into operation.

### Purchase Data

Similarly to sales data, this category serves to specify any purchases of, e.g., electricity.

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## **Inputs: Plant Data**

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### **Plant Operation Data**

#### General Plant Data

In this section, basic plant data such as type of plant, unit size and the first operational year are entered. When selecting existing under ownership, the first operational year should be set as equal to the starting year entered under Case Data – General Information and the construction period should be set as equal to zero. For existing plants, FINPLAN will not request any investment costs to be entered. Future and committed plant are treated equally.

#### Production Data

Allows entering the quantity of output (e.g., electricity) that is generated by the plant. Note that the values entered are not used for any calculations in FINPLAN, but are just entered to characterise the plant. The user needs to assure that the quantity of all sales entered under Case Data – Sales Data corresponds to the sum across all plants entered under Plant Data.

#### Operation & Maintenance Costs

Allows entering the related yearly costs in all currencies defined under Case Data – General Information.

#### Fuel Costs

Allows entering the related yearly costs in all currencies defined under Case Data – General Information.

#### General Expenses Data

Allows entering any other yearly costs in all currencies defined under Case Data – General Information.

### **Investment Cost Data**

Investment costs in the different currencies (as specified under Case Data – General Information) are defined in constant prices, i.e., in real terms. This means the investment costs are entered as if the project would happen today. FINPLAN applies inflation to the investment costs entered by the user to calculate the current (nominal) investment costs in those years the investment occur in. For each currency, the user needs to define the percentage distribution of the investments over the construction period (i.e., they vertically, over the years, need to add up to 100%).

## Sources of Financing

In this section, the user can define the sources of financing for each currency that are directly related to the project, such as up to two export credits and a project loan (Equity, commercial loans, bonds, etc. are entered in the FinManager). The horizontal sum across all sources of financing for one year cannot exceed 100%, can however stay well below 100% (e.g., due to other commercial loans or equity contributions).

Project loans are special loans provided by some (development) banks (e.g., by the European Investment Bank) for projects that fulfil certain conditions. FINPLAN treats them equally as commercial loans entered under FinManager.

Note that it is not possible to select an export credit for the local currency, as the export occurs in a foreign country with a foreign currency.

(In cases where the local currency and the foreign currency are identical, it is recommended to select “Local Currency” as the local currency under Case Data – General Information, and then select the actual foreign currency. This would then require to set the exchange rates to 1:1 under Case Data – Currency Exchange Rates.)

Note that in FINPLAN the investments increase with inflation, yet the financing entered under Sources of Financing is frozen to the original investment cost entered (i.e., the costs agreed on at the “time of signature”). As such, even in the unrealistic case that 100% was financed through an export credit or project loan, at the end of the construction period there will be a shortfall in overall available long-term debt (i.e., export credit or project loan) due to the escalation of the actual investment costs. Other sources of financing such as the short term facility would have to cover the remainder. In reality, it could be contractually agreed that the contract price escalation as envisaged in the contractual arrangements will be considered.

## Terms of Financing

### Export Credit 1 & 2

Allows entering the conditions of the export credits. The interest rate can either be defined as constant over the term (in years) or floating above inflation. The repayments can be uniform that the principal and the interest are constant (i.e., comparable to a private loan for buying an apartment, with constant payments throughout all years that include the interest). Alternatively, the user can select to repay the principal in constant amounts and the inflation is added on top of this. This results in higher payments in the initial years.

When using an export credit, repayments of the principal (i.e., the borrowed amount) start once the plant went into operation. Interest payments are however due immediately after the first year of the export credit. Please do not use the option to enter fees or IDC (i.e., interest during construction) options, as this functionality of FINPLAN does not work as of now (e.g., it will create an unbalanced Balance Sheet).

### Project Loans

Allows entering the conditions of the project loans. The interest rate can either be defined as constant over the term (in years) or floating above inflation. FINPLAN treats a project loan exactly like separate commercial loans for each year of the construction period. I.e., both interest and principal repayments start immediately after the year the loan was drawn. Please do not use the option to enter fees, as this functionality of FINPLAN does not work as of now.

## Depreciation Data & Decommissioning

### Depreciation

Allows selecting the depreciation methods and the number of years and rate. This is required for calculations in the Operating Account (i.e., the Income Statement). Depreciation rates are more or less prescribed with

internationally recognized accounting standards (IFRS, US GAAP, etc.) and accountants, auditors, etc. tend to be very strict with their application. There are three main methods for depreciation (straight line (e.g. linear), declining balance, sum of the year' digits). Auditors keep a close eye on their use (in particular, one cannot change the methodology every year in order to "massage" the numbers).

#### Decommissioning

In this category the user can define payments which are set aside during the operation of the plant to pay for its decommissioning. When selecting internal fund, the money will be set aside within the company throughout the modelling period (i.e., it will not be released, but carried forward as retained earnings in the operating account and the balance sheet). When selecting external trust, the money will leave the company in the specified years, as visible in the cash inflows and outflows.

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## Inputs: FinManager

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### Equity

Allows entering the yearly amount of the funds contributed by the project owners (the shareholders). The initial equity shows the value entered under Case Data – Initial Balance Sheet. The maximum dividend shows the maximum percentage of the total equity that is paid out as a dividend (see *Results – Operating Account*). To set up a FINPLAN model it is often useful not to limit this amount and to enter a very high value instead, e.g., 999. This will ensure that all profit as calculated in the Operating Account is paid out as dividends.

### New Commercial Loans

Allows entering yearly loans drawn in both local and foreign currencies, including term (i.e., number of years) and an interest spread that is added to the inflation. Loans are repaid from the year after the loan was drawn in equal yearly instalments, simply by dividing the loan over the term. Interest payments are added in addition to these repayments. For details of the loan calculations, see also Intermediate *Results – New Commercial Loans*.

### New Bonds

Allows entering yearly bonds drawn in both local and foreign currencies, including term and the expected interest rate. A bond is repaid at the end of its term. Yearly interest payments apply. Note that for project finance, it may be difficult to access a bond during the construction, but rather once the project is in operation and is generating positive cash flows. For details regarding the bond calculations, see also Intermediate *Results – New Bonds*.

### Other Fin Data

Allows entering the spread above the local inflation for the short term deposits and the stand-by facility. The short term deposit is a deposit to park any additional cash for a short period of time. It does has the lowest interest rate (comparable to a private bank account which has a lower interest rate than if money is bound for a few years). It is recommended to, e.g., enter a negative rate of -1. If the local inflation was 3%, this would mean that the interest received is  $(3\% - 1\%) = 2\%$ .

Similarly, the stand-by facility is the last resort for FINPLAN to borrow money, if more debt is required to balance Cash Inflows and Outflows (see *Results – Cash Inflows and Outflows*). As such, the highest interest rate should be entered for the stand-by facility (e.g., higher as the export credit and commercial loans).



Finally, initial outstanding short loans from before the modelling period can be entered here, to which the rate of the stand-by facility will be applied (in addition to inflation). Note that the entered initial loan will be added as a liability to the initial balance sheet. To ensure that the assets equal the equity and liabilities, i.e., to balance the balance sheet, the same amount needs to be added in the list of assets in the left column at *Case Data – Initial Balance Sheet*. However, the outstanding loan entered is not visible here, as the field is greyed out. Refer to *Intermediate Results – Initial Balance Sheet* to see the final balance sheet. (In *Results – Cash Inflows and Outflows*, repayments in the very first year are not shown as *Repayments: Stand-by facility*, but as *Cash Available (VAT)*.)

### Shareholders' Return Data

Data entered in this category will only be used for calculations shown in *Results – Shareholder's Return*. Refer to the document which describes this part of the results for further explanations.

Entering an approximate average return is only required to initiate the calculations of the Internal Rate of Return (IRR) (as in theory there could be two possible solutions from a mathematical perspective, one of which would not be realistic). It is recommended to enter 10, which will then be used as a starting value for the IRR calculations.

The disposal year is the year in which it is assumed that the entire project was sold.

The discount rate is required for the calculation of the Net Present Value (NPV) from a shareholder's perspective (i.e., looking at equity and dividends).

### Terms of Project Finance Loan

Data entered in this category will only be used for calculations shown in *Results – Project Finance Analysis*. Refer to the document which describes this part of the results for further explanations.

In this section the discount rate, the average loan term and the expected project life can be entered. The discount rate will be used to calculate the present value of the (future) cash available during both, the loan term and the project life. Further, a security ratio can be entered for both, the loan period and the project life. This ratio is applied to the present value of the cash available to calculate the maximum project finance in each year, which can then be compared with the loans and bonds outstanding.

## Results in FINPLAN

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### Cash Inflows and Outflows vs. Operating Account vs. Balance Sheet

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CFS for Cash Flow Statement (i.e., Cash Inflows and Outflows), OA for Operating Account (i.e. Income Statement or Profit & Loss Statement), BS for Balance Sheet

In the OA all financial transactions are logged which are made by a corporation (be they + or -) during a financial year (FY). However, companies can raise (or receive) invoices and be paid (or pay), say three months later. While the business flows are registered in the OA upon the issuing of bills or the receipts of invoices (i.e., the *accrual basis* of accounting), the flows of cash subsequently spent or received in connection with such bills or invoices can be delayed. These actual cash flows are registered in the CFS. This is referred to as the *cash basis* of accounting.

The difference between those two flows (i.e., business and cash) is due to the effect of time elapsing. One could also say somehow that the OA is virtual to some extent, while the CFS is more fact- (i.e., cash-) based. However, both are eventually reconciled with the spanning of time, and the Balance Sheet ("BS") gives a snapshot of the financial situation of a corporation on a precise date.

Another key reason for the difference between the OA and the CFS is the accounting of the depreciation and amortization charges in the OA, while the CFS accounts for the investments and the debt repayment schedule. In most cases, the assets depreciation schedule has a different profile compared to the one for the repayment of a (long-term) debt. This is because a building (for example) will typically be depreciated over, say 30 years. This is the time limit, also called economic life, beyond which the building would arguably need to be refurbished before one could continue using it. However, a loan taken to partly finance its construction will be repaid during, say 20 years. Therefore, the 10 year difference in the profile "mechanically" introduces a difference in the flows. (Similarly, one might borrow money over 5 years to buy a car, which could be depreciated over, say 10 years.).

Depreciation rates are more or less prescribed with internationally recognized accounting standards (IFRS, US GAAP, etc.) and accountants, auditors, etc. tend to be very strict with their application. There are three main methods for depreciation (straight line (e.g. linear), declining balance, sum of the year' digits). Auditors keep a close eye on their use (in particular, one cannot change the methodology every year in order to "massage" the numbers).

Based on the above, the profit before tax calculated in the OA is the basis upon which the amount of corporate tax is computed. Another key difference between the OA and CFS comes from the taking into account of the working capital and its variations in the CFS (e.g. the variations between acc. payables less acc. receivable).

Due to the differences in CFS and OA, there is often a difference between: (a) the net result, i.e., the profit/loss as calculated in the OA, and the net cash-flow as calculated in the CFS. The net cash-flow equals the flows from the stand-by facility, if money needs to be borrowed due to a loss, or flows to the short-term deposit, if too much cash is available at the end of the year. This money that is available when subtracting all yearly cash outflows from inflows is as well referred to as working capital. It can only be seen in the CFS and is an important indicator of the financial viability of the project or company.

## Results: Cash Inflows and Outflows

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- Cash Available in Short Term Deposits (at end of previous year): value of very first year is as entered in Case Data -> Initial Balance Sheet; Sums up the flow from and to the Short Term Deposits as listed in the Cash Inflow and Outflow table

### Inflows

- **Revenues:** from electricity sales (& other incomes)
- **Interest Earned:** from short term deposit
- **New Equity:** as defined in input data
- **Bonds Issue:** converted to local currency (based on current year's exchange ratio)
- **Loans Drawdowns:** export credits and commercial loans, converted to local currency (based on current year's exchange ratio), the loans are **not inflated** (i.e., as entered by the user)
- **Stand-by Facility:** money that is missing in a year and thus needs to be made available (usually by an expensive short term credit) -> **long-term financing should be structured to minimise this amount, which should only be drawn on to finance short-term expenditures!**<sup>1</sup>

### Outflows

- **Investment:** inflated local and foreign investments (converted to local currency)
- **O&M + Decommissioning Cost / Fuel Expenses:** inflated costs
- **General Expenses:** as entered under Plant Operation Data, but inflated
- **Interest Paid:** all interest to be paid, e.g., for export credit, loan, bonds, or stand-by facility
- **Repayments:** Loans & Bonds and Stand-by facility: all repayments without interest, e.g., the principal repayment for the export credit
- **Equity Repayment:** as entered in the FinManager under equity. **No inflation is applied.**
- **Taxes & Royalties:** Income Tax + Royalties
  - **Income Tax:**
    - If tax losses cannot be carried forward (as entered in Case Data -> Taxation Data):
      - Tax rate \* Taxable Income
    - If tax losses can be carried forward, the taxable income equals the income for the year plus any losses brought forward. This is calculated as the smaller of the following two:
      - Tax rate \* Taxable Income
      - Tax rate \* Cumulative Taxable Income, i.e., the sum of all Taxable Incomes up to this year
    - **Taxable Income:** From Results -> Operating Account: Total Income – all expenses listed except Income Tax. **If income tax = 0 it equals the Profit**
  - **Royalties:** Using inputs from Case Data -> Taxation Data (in bold) and from Results -> Operating Account. Calculated as: **Royalty Rate** x (Total Income – % of Cost x operational costs in cash (i.e., General Expenses + Expenditure on Purchases + Fuel Costs + O&M Costs + Contribution To external Decommissioning Trust Fund [yet not including any internal decommissioning reserve]))

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<sup>1</sup> It is a key principle in financing that long-term resources should be used to finance long-term uses, while short-term resources should be used to finance short-term uses. Mixing the two would be considered as “bad” financial management.

- **Dividend:**
  - Only paid if there is a Taxable Income.
  - The maximum amount paid is the equity from the previous year times the dividend rate as entered in the FinManager under Equity.
  - Calculated as the Taxable Income – Income Tax + any negative Retained Earnings of the previous year, e.g., negative Taxable Incomes of previous years.
  - Any negative Retained Earnings of previous years are calculated as:
    - Sum until current year of (Taxable Income – Income Tax – Dividends)
- **Flow to short term deposit:** money that is left over at the end of the year (and usually set aside with low interest) -> **financing should be structured to minimise this amount!**

### Cash Available (VAT)

- When selecting a VAT on Investment in the Tax Information provided under Case Data. This VAT payment is not listed as an outflow, as it is retrieved once the plant goes into operation. Instead, FINPLAN makes sure the inflows are higher than the outflows and lists the difference as Cash Available, which is used to pay the VAT during construction. In the first year of operation, the summed up VAT paid is retrieved, which is again not listed as an inflow, but as a negative amount in the line Cash Available (VAT). To balance this cash flow statement, in every year Total Inflows equal the Total Outflows plus the Cash Available (VAT).

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## Results: Shareholder's Return

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- Just assesses equity and dividends, not overall project
- IRR and NPV are calculated based on the "Total Flow", i.e., purely from a shareholder's perspective, not an overall project perspective, which would consider all yearly costs (e.g., investments, O&M) and benefits (e.g., electricity sales).
- Final Disposal: Assumes the entire project was sold in the disposal year as entered in the FinManager, i.e., equity is being paid out. (It is calculated as all the total of the assets from the Balance Sheet (which considers depreciation) from which all of the following is subtracted: all the outstanding bonds and loans, any consumer deposits and decommissioning reserves and current maturities)
- Return on Equity: Yearly ratio of dividends to equity, as given in the Balance Sheet

## Results: Operating Account (Income Statement/Profit & Loss Statement)

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- Theoretical account during financial year – does not reflect “cash reality”.
- It is an operating account – it does not include the yearly financing requirements for new investment.
- Required to calculate income dependent cash outflows such as taxes and dividends.

### Income (Revenues)

- Includes the same values like in Cash Inflows (and Outflows), but no financing listed. I.e., it does not include new equity, bond issued, loans drawn, or inflows from the stand-by facility.

### Expenditure

- Includes the values like in Cash (Inflows and) Outflows, but no repayments of loans, bonds, stand-by facility or equity.
- Instead, the depreciation and foreign exchange losses are listed.
- Foreign Exchange Loss: Investments in foreign currency may cause such foreign exchange losses if the local currency depreciates compared to the foreign currency: Let's assume you borrow 100 USD for 75 EUR. You do not need to pay any interest. When you pay back the money 5 years later, the exchange rate has changed and 100 USD are now 100 EUR. So you will have to pay back 25 EUR in addition, which is the foreign exchange loss. Any interest for borrowing the money would have to be added to this. In the Cash Inflows and Outflows table the foreign exchange loss does not need to be listed, as real cash payments are considered for every year. I.e., the 100 EUR you have to pay back would be listed.
- Depreciation Expenses: are calculated based on the sum of the total investments (see also Balance Sheet – Gross Fixed Assets).
  - Linear depreciation: asset value is depreciated as a straight line over the depreciation period. I.e., the total investments are simply divided by the number of years to calculate the yearly depreciation.
  - Declining balance: asset value is depreciated with a constant percentage.
  - Declining switching to linear: a mix of declining balance and linear depreciation. The switch to linear occurs when the linear depreciation in a year is larger than what is calculated with declining balance depreciation.
  - Sum-of-the-years' digits: asset value depreciated by (remaining life time) / (sum of each year of life time). E.g., over 3 years: 3/6 depreciation factor in first year, 2/6 in second & 1/6 in third.

### Profit/Loss, Dividends & Retained Earnings

- A profit & loss in the operating account is a theoretical profit & loss, which has no direct representation in the Cash Inflow and Outflow statement. There could be years where a profit is reported in the Operating Account, yet money is drawn from the stand-by facility in the Cash Inflow and Outflows table. In this case it might be worth to revisit the chosen depreciation method.
- Dividends are then calculated based on the profit minus any retained earnings. Retained earnings are the *accumulated* net income that is kept within the company. If retained earnings are negative, they may also be called retained or accumulated losses.

- Note that FINPLAN does not show the *accumulated* amounts, but the yearly amounts.
- In FINPLAN, earnings will be retained for two reasons:
  - (1) Previous losses (shown as negative values) have not yet been covered by any profits in subsequent years.
  - (2) The profit is higher than the maximum amount of dividends that is being paid, based on the maximum dividend ratio entered under “FinManager – Equity”. The maximum amount of dividends to be paid is then calculated by multiplying this ratio with the total equity given in the Balance Sheet.

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## Results: Balance Sheet

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- Summarises a company’s assets, liabilities and shareholders’ equity at a specific point in time, e.g., 31 December.
- As opposed to the previous results table, it therefore does not show the values for each year, but the accumulative amounts
- All items are calculated on the accrual basis of accounting, i.e., revenues and expenses are reported when they occur, and not when the cash-flow occurs (which would be referred to as the cash basis of accounting).
- Is of interest, e.g., if someone would wish to buy the company.

### Assets

- **Gross Fixed Assets:** accumulated total inflated investments after construction period
- **Net Fixed Assets** are calculated as the Gross Fixed Assets – Accumulated Depreciation – the Balance of the Consumer Contribution
- **Work In Progress:** accumulated total inflated investments during construction. Practically speaking, this refers to an asset under construction that has not yet been commissioned. Therefore it has not yet started its commercial operation and is not yet being amortised or depreciated.
- **Receivables:** accumulated VAT paid on investments (VAT to recover)

### Equity and Liabilities

- **Equity:** accumulated equity
- **Retained Earnings:** Taxable Income (i.e., Total Income – all expenses of Operating Account except Income Tax) – Income Tax – Dividends
- **Bonds and Net Loans Outstanding:** the principal that needs to be paid in the future, i.e., excluding interest.
- **Consumer Deposits + Decommissioning:** consumer deposits, if any, and funds set aside within company to pay for decommissioning
- **Current Maturity:** Repayments of loans and bonds due next year + ending balance of stand-by facility

## Results: Financial Ratios

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Green indicates recommended indicators

Greyed out are less important indicators

### Working Capital Ratio (or current ratio)

- Is a liquidity ratio commonly defined as the relative proportion of an entity's current assets to its current liabilities.
- It is intended to show the ability of a business to pay for its current liabilities with its current assets. When current assets exceed current liabilities, the firm has enough capital to run its day-to-day operations. In other words, it has enough capital to work.
- Important to creditors because it shows the liquidity of the company. A value of one is considered as ok, neither good nor bad.
- Calculation in Finplan is assets to liabilities, i.e., not current (= this year's) assets to current liabilities – refer to balance sheet:
  - $(\text{net fixed assets} + \text{work in progress}) / (\text{equity} + \text{retained earnings} + \text{bonds and net loans outstanding})$
  - $0 \leq \text{WCR} \leq 4$
  - Warning if  $\leq 1$

### Leverage

- The ratio of debt to equity in a given year – refer to balance sheet:
  - Generally speaking, the higher the value the worse is the financial condition of the project, as it depends more on debt and has a higher danger of bankruptcy. However, what leverage is acceptable strongly depends on whether a project is assessed on a standalone basis, or as one out of many projects being summarised in the balance sheet of a company.
  - $(\text{Bonds and net loans outstanding}) / (\text{equity} + \text{retained earnings})$
  - $0 \leq \text{Leverage} \leq 15$
  - Warning if larger than 1.3

### Equipment Renewal

- Indication of when most of the costs are depreciated and investment may need renewal. Refer to balance sheet:
  - $(\text{Net Fixed Assets} + \text{Work In Progress}) / (\text{Gross Fixed Assets} + \text{Work In Progress})$
  - Warning if smaller than 0.5

### Gross Profit Rate

- Gross profit / net sales (does not consider investment costs or debt repayments). States how much the net sales can be reduced without incurring any loss:
  - $(\text{Sales} - \text{Operational Costs in Cash}) / (\text{Sales} - \text{Variable Costs associated with Electricity Sales})$

- $(\text{Sales} - \text{Operational Costs in Cash}) / (\text{Sales} - \text{Expenditure on Purchases} - \text{Fuel Expenses})$
- $\text{Operational Costs in Cash} = \text{General Expenses} + \text{Expenditure on Purchases} + \text{Fuel Expenses} + \text{O\&M Costs} + \text{Contribution To external Decommissioning Trust Fund}$  (yet not including any internal decommissioning reserve)
- $0 \leq \text{Gross Profit Rate} \leq 1$
- Warning if smaller than 0.2

### Debt Repayment Time

- The time to repay current debt assuming this year's revenues would remain constant – refer to Balance Sheet and Cash Inflows and Outflows:
  - $(\text{Bonds and net loans outstanding}) / (\text{Total Revenues} - \text{Operational Costs in Cash} - \text{Royalties} - \text{Income Tax})$  (yet not including any internal decommissioning reserve)
  - $0.2 \leq \text{Debt Repayment Time} \leq 40$
  - Warning if larger than 4

### Exchange Risk

- Local Cash vs. foreign expenditures:
  - Identifies the risk for foreign financiers.
  - $\text{Local Cash} / (\text{foreign loan and bonds repayments, interest charges and operating costs} [\text{minus any swap flow in foreign currency}])$
  - $\text{Local Cash} = \text{Revenues}$  (refer to Cash Inflows and Outflows) plus local bonds and loans issued minus all local expenditures (incl. income tax, excluding dividends, retained earnings, and excluding earned interest)
  - $0.1 \leq \text{Exchange Risk} \leq 15$
  - Warning if smaller than 1.2, i.e., a security margin of 20%.

### Break Even Point

- Break-even analysis is used to determine the point at which revenue received equals the costs associated with receiving the revenue. Break-even analysis calculates what is known as a margin of safety, the amount that revenues exceed the break-even point. This is the amount that revenues can fall while still staying above the break-even point.
- $\text{Fixed Costs} / (\text{Sales} - \text{Variable Costs associated with Electricity Sales})$
- A value of 1 means that costs can be covered. A value of 0.5 means that even if the plant would only generate 50% of the revenues (sales minus fuel costs), it would still cover its costs.
  - $(\text{Operational Costs in Cash} - \text{Fuel Costs} - \text{Purchases} + \text{Repayments: Loans and Bonds} + \text{Interest/Swap to be paid} - \text{Interest due}) / (\text{Sales} - \text{Expenditure on Purchases} - \text{Fuel Expenses})$
  - $\text{Operational Costs in Cash} = \text{General Expenses} + \text{Expenditure on Purchases} + \text{Fuel Costs} + \text{O\&M Costs} + \text{Contribution To external Decommissioning Trust Fund}$  (yet not including any internal decommissioning reserve)
  - $0.1 \leq \text{Break Even Point} \leq 10$
  - Warning if larger than 0.8

### Interest Charge Weight

- Interest as a share of  $(\text{Sales} - \text{Variable Costs associated with Electricity Sales})$  – refer to Cash Inflows and Outflows
  - $(\text{Interest Paid} - \text{Interest Earned}) / (\text{Sales} - \text{Expenditure on Purchases} - \text{Fuel Expenses})$
  - $0.01 \leq \text{Interest Charge Rate} \leq 2$



- Warning if larger than 0.2

### Global Index

- $\text{Weight} \times \text{"Warning Value"} \times \text{Break Even Point Value} + \text{the same for Interest Charge Rate}$
- $0.1 \times 0.8 / \text{Breakeven Point} + 0.05 \times 0.2 / \text{Interest Charge Rate}$

### Self-Financing Ratio

- Indicates the ability to finance planned investments from the company's own resources – refer to Intermediate Results -> Sources & Application of Funds:
  - $(\text{Pre Investment Cash} + \text{Net Increase in Consumer Contributions} + \text{Consumer Deposits} - \text{Total Interest Paid} - \text{Total Repayment (of Loans and Bonds)} - \text{VAT to Recover}) / (\text{the average of this and next year's Global Investment})$
  - **Pre Investment Cash** = Sales - Operational Costs in Cash – Royalties – Income Tax
  - Warning if smaller than 0.3

### Debt Equity Ratio

- The share of debt to debt plus equity – refer to balance sheet and explanations to the indicator "Leverage":
  - $(\text{Bonds and net loans outstanding}) / (\text{equity} + \text{retained earnings} + \text{Bonds and net loans outstanding})$
  - Warning if larger than 0.6

### Debt Service Coverage (Ratio) - DSCR

- Cash available / debt services – refer to Intermediate Results -> Sources & Application of Funds:
  - Enough cash should be on the account to repay all debt (principal and interest).
  - $(\text{Pre Investment Cash} + \text{New Equity}) / (\text{Total Interest Paid} + \text{Total Repayment})$
  - Warning if smaller than 1.3, i.e., a 30% security margin.
  - The higher the risk, the higher the DSCR should be. In regulated business around 1.4 – 1.45, otherwise (with offtake agreement) 1.5 – 1.8, in less risky region maybe 1.2 – 1.4

### ROR on Rev Assets

- Net Income / Total Assets – refer to Balance Sheet:
  - $(\text{Total Income} - \text{Interest Earned} - (\text{Total Expenses} - \text{Interest Paid})) / (\text{the average of this and next year's Net fixed assets} + \text{Work in Progress}) * 100$
  - This equals:  $(\text{Taxable Income} + \text{Interest Paid} - \text{Interest Earned} - \text{Income Tax}) / (\text{the average of this and next year's Net fixed assets} + \text{Work in Progress}) * 100$
  - Warning if smaller than 8

## Results: Project Finance Analysis

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- Helps to analyse if there is (more than) enough cash available to service the debt when taking a security ratio into account. For this analysis, the present value of cash available in the future is taken into account. The analysis is performed both over the loan term and the project life.
- The main output is the maximum project finance, which needs to be compared to the loans and bonds outstanding.
- Input data for this analysis is entered under FinManager -> Terms of Project Finance Loan.
  
- **Loans and Bonds Outstanding:** Bonds Outstanding and Net Loans Outstanding as given on the Balance Sheet
  
- **Cash available during Loan Term:** Pre Investment Cash, starting from one year after the first year of debt service until the average loan term has passed (see input data)
  - **Pre Investment Cash** = Sales - Operational Costs in Cash – Royalties – Dividends
- **PV of Cash available during Loan Term:** Net present value of all future Cash available during Loan Term, starting from and discounted to the Study Year (given in the column header)
- **Maximum Project Finance during Loan Term:** PV of Cash available during Loan Term divided by Security Ratio for Loan Period
  
- **Cash available during Project Life:** like Cash available during Loan Term, but until expected life expired, starting from one year after the first year of debt service (see input data)
- **PV of Cash available during Project Life:** Net present value of all future Cash available during Project Life, starting from and discounted to the Study Year (given in the column header)
- **Maximum Project Finance during Project Life:** PV of Cash available during Loan Term divided by Security Ratio for Project Life

### Acknowledgements

Xavier Rollat for his contribution to highlighting the differences in the main financial statements of Finplan and for clarifying in detail the specifics of export credits.

## **Annex – Export Credit**

This annex explains how to model an export credit in the absence of already agreed terms and conditions. An export credit is directly linked to an export contract, e.g., for a technology, and can only be used to finance expenditures within this contract. The key defining aspects of the export credit are its term (i.e., the repayment period) and the interest rate applicable to the principal. The principal is the total amount financed by debt through the export credit. It may thus include interest during construction (i.e., the draw-down period), if this interest is debt financed and capitalised.

The terms and interest rate are defined by the OECD “Arrangement” and its export credit sector understandings<sup>2</sup>. However, the Arrangement is a gentlemen’s agreement between Australia, Canada, the European Union, Japan, Korea (Republic of), New Zealand, Norway, Switzerland and the United States. As such, it is not binding and does not include important players such as Russia and China. Nevertheless, it serves as a very useful starting point to look for the terms and interest rates for an export credit.

Export Credit Agencies (ECAs) include European ECAs, the US EXIM, the Canadian EDC, the Japanese JBIC and NEXI, the Russian EXIAR, or the South Korean KSURE. An ECA basically provides three products: (1) direct loans, (2) guarantees and / or (3) insurances.

Under a direct loan with an ECA, the ECA is providing a credit facility to the borrower, which is characterised by the principal and its term.

For a guarantee or an insurance, three parties are commonly involved: (1) the borrower itself, (2) a financial institution (e.g., the lender) lending money at preferential rates (e.g., the commercial interest rate of reference (CIRR) defined on the OECD Export Credit website) and (3) the ECA that provides the guarantee or insurance to the lending institution. Sometimes, the ECA acts as well as the lending institution and thus combines these two functions.

The main difference between a guarantee and insurance is that with a guarantee the lender knows that the ECA will repay them in case of default, whatever the reasons for such a default (i.e., in any case the borrower fails to fulfil its commitments. As such, a guarantee can be considered as signing a blank check.

The insurance on the other hand usually has a set of conditions that need to be fulfilled for it to be paid. It is therefore not paid in instances where the ECA can demonstrate that certain clauses of the insurance policy were not complied with. As such, it is very similar to, e.g., a home insurance. An insurance usually does not cover 100% of the export contract. This is to ensure that the lending institution has an incentive to support the borrower in his efforts to meet his obligations, but the same set-up could also be used for a guarantee.

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<sup>2</sup> [www.oecd.org/tad/xcred](http://www.oecd.org/tad/xcred)

## Premium or Exposure Fee

For both guarantee and insurance, a premium or exposure fee has to be paid. This is a compensation for the financial risk undertaken when providing coverage to an export credit. It covers the overall export credit period, e.g., up to 18 years for a new nuclear power plant. The premium is due as a condition precedent to the drawdown of the export credit. It may be charged in its entirety upfront at the start of the insurance period, or alternatively it may be charged during the drawdown period, i.e., during the construction period. This alternative is slightly more expensive to reflect the time-value of money (i.e., as the export credit agency receives the total premium at a later stage). A lower coverage on the other hand (i.e., if a lower percentage of the export contract is covered, which is very common for an insurance as mentioned before) reduces the premium which has to be paid by the borrower for the guarantee or insurance. This is because a lower coverage reduces the financial risk involved for the ECA.

The premium is usually calculated based on a risk assessment of the borrower (see, e.g., OECD country risk assessment on its Export Credit website) and the total amount of coverage provided by the export credit agency. This total amount comprises the principal and may as well include the estimated amount of interests ("i") during the construction and repayment period (i.e., the sum of the yearly i), in case the ECA has agreed to cover the interest as well.

The amount of the premium due can be borrowed and repaid once the plant goes into operation, if the borrower does not have the cash to pay for it. In this case, the rate to calculate the premium increases<sup>3</sup>. This is as a compensation to cover the higher risk of a financed premium, as opposed to a premium that is paid in cash upfront or during construction. The amount of this premium is then added to the total amount of the principal covered by the export credit. As the principal is increased by this premium, obviously also an interest needs to be paid as the ECA is basically granting a loan to the insured party.

In the balance sheets of a company, the premium is usually added to the gross value of the assets which is covered by the export credit. The gross value of the assets would therefore comprise the complete costs of the project, including the costs of goods & services, owner & development costs, any interest capitalised during construction and the premium.

The homepages of export credit agencies are a good source of more detailed information.

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<sup>3</sup> If the premium is borrowed, it's calculation may require some circular iterations, as the premium is calculated as a share of the principal to which it is then added, thus increasing the principal and thus requiring a new calculation of the premium, which is then added to the principal again, etc.

### Escalation of Investment Costs During Construction

Note that in Finplan, the investments increase with inflation, yet the export credit is frozen to the original investment cost entered (i.e., the costs agreed on at the “time of signature”). As such, even if 100% was financed through an export credit, at the end of the construction period there will be a shortfall in overall available long-term debt (i.e., export credit) due to the escalation of the actual investment costs. Other sources of financing such as the short term facility would have to cover the remainder. In reality, it could be contractually agreed that the contract price escalation as envisaged in the contractual arrangements will be considered by the export credit by:

- (a) making an estimate of the total amount to be financed with debt, including any price escalation during the construction period.
- (b) increasing the amount of export financing required accordingly upfront. The insurance provided by the export credit agency will then be based on the escalated price of the contract.
- (c) including a price escalation mechanism for automatic adjustments, e.g., based on inflation.
- (d) fine-tuning the total amount of debt to be repaid at the end of the construction period.

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