

FINPLAN

Hands-on 7: Setting up a case study for a nuclear power plant

Useful references:

- 1) [Download the FINPLAN software](#)
- 2) [Introduction to FINPLAN](#)
- 3) [Glossary of Financial Terms](#)
- 4) [Completed Hands-on 7 Case Study](#)
- 5) [Video Tutorials](#)
- 6) [FINPLAN Google Group](#)

Learning outcomes

This exercise will help you obtain some hands-on experience on how to use the FINPLAN interface by creating a complete case study to analyze the financial viability and financial structure of power projects. It is similar to the previous hands-on exercise, just this time without screenshots guiding you through it. Thus, please do refer to the previous exercise for guidance.

The financial viability of a nuclear power plant will be examined in this exercise.

By the end of this exercise, you will be able to independently:

1. Set up a new case study in FINPLAN and interpret the results
2. Check Intermediate results
3. Create a Cash Flow Statement
4. Check Operating Account
5. Check the Balance Sheet
6. Calculate Financial Ratios
7. Estimate Shareholder Return

Activity 1

Set up a new case study in FINPLAN

Background information

A utility would like to assess the financial viability of a nuclear power plant from 2018 – 2060, financed with a mix of equity and debt instruments in both local currency and US Dollars. After a construction time of 8 years, the 1000 MW plant will generate 7,450 GWh from 2029 onwards until the end of its lifetime (as currently anticipated by the regulator) in 40 years. The plant will cost 5000 million USD, with expenditures distributed 5%, 10%, 20%, 20%, 15%, 15%, 10% and 5% over the construction time. It is depreciated linearly over 30 years. Electricity can currently (2018) be sold at 0.34 local currency units (LC) per kWh (9 USD cents/kWh), increasing with inflation. O&M costs are expected to amount to 450 million LC (equals 120 million USD). Fuel costs amount to 69.5 million USD. Over the lifetime of the project, an external trust fund should be set up to accumulate 1000 million USD to pay for decommissioning costs.

Economic information

- Inflation USD: 2%
- Inflation Local Currency: 4%
- Exchange rate: 3.75 units of local currency per USD for 2017 and 2018; exchange rate reflects inflation rates
- Income tax: 20%, losses to be carried forward, no losses in start year.

Financial information

- Sources of financing - USD: 68% export credit over 18 years with uniform principal and interest repayment at an interest rate of 5.0%, with no IDC financing. (For simplicity, all investments are entered in USD. In reality, some of it will be in LC. If it is assumed that 80% of the total investment is in USD and 85% out of this could be financed with an export credit, this multiplies to $80\% \times 85\% = 68\%$. Due to inflation, the amount to be paid in the first year of construction in 2021 will be).
- Equity: from 2021 to 2028, the following amounts in LC are injected: 400, 900, 1950, 2250, 2000, 2200, 1850 and 1400. No limit to dividends being paid out.
- Short term deposits: interest rate -1% over inflation

- Stand-by facility: interest rate 4% over inflation. The stand-by facility is the most expensive financial instrument available in FINPLAN that is used to cover any financial shortfalls in a given year and with an annual tenor (i.e., it is expected to be paid back at the end of the year).
- Shareholder's targeted return data: 10% approx. average return, disposal year 2060 (in which the assets are assumed to be sold), discount rate: 8%
- Terms of project finance loan: 6% discount rate (to calculate the net present value of the cash available in the future), 12 years average loan term, 1.4 security ratio for loan period, 30 years expected life, 1.6 security ratio for project life, 2029 first year of debt service.

General hints when setting up a FINPLAN case study:

1. Check cash available in short term deposits and flows from and to short term deposits. Further, check the stand-by facility (also its balance under Intermediate Results – Stand-by Facility). During construction they should be close to zero (in comparison to the investments), due to high interest of the standby facility and the low interest of the short-term deposit. Adjust funding sources if necessary, e.g., increase or decrease the required equity or debt to ensure the flows are close to zero during construction. Note that for this case the entry data was selected to result in a balanced case and no further adjustments are required.
2. In general, if the short-term facility is still being used after the power plant went into operation, this is a sign that running costs cannot be covered. This is also shown by the debt service coverage ratio (<1) and by the breakeven point (>1) during the years from 2020 onwards (see Results – Financial Ratios). This means that either the sales are too low, or the financing costs too high. The costs of financing can be reduced by increasing the equity and decreasing the debt. The sales can be increased by increasing the price for which the electricity is being sold, in case this is an option. However, as mentioned no adjustments are required for this case.
3. (Check the fees of an Export Credit Agency (ECA), such as the US EXIM bank's Long-term exposure fee calculator, available at www.exim.gov. Alternative ECAs are available at www.oecd.org/trade/xcred/eca.htm and include, e.g., the German EXIM Bank Hermes, which provide a calculator in German on agaportal.de, or the French EXIM bank COFACE at www.coface.fr



Did you succeed to set up your FINPLAN case with the data provided in this Hands-on exercise? Should you face any difficulties, please go back and have a look at the descriptions and screenshots of the previous exercises, which follow a very similar logic. If you are unsure about your results or want to cross check those, you can restore the solution file (see link at the beginning of this exercise and Hands-on 5 on how to restore a case in FINPLAN). You can also follow a step-by-step video tutorial on YouTube for this Hands-on (see link at the beginning of this exercise).

Once you are confident with your FINPLAN case, try to answer the questions listed under the following activities. Answers are provided at the end of this document.

Note: There is also a FINPLAN Google Group for further support. Please sign up to the group and ask or answer any FINPLAN-related questions [here](#).

Activity 2

Intermediate results

Questions:

1. What is the exchange rate in the year 2026?
2. The fuel costs were entered in constant monetary terms without applying inflation. What are the actual fuel costs in USD that FINPLAN applies in the year 2031?
3. What is the electricity price in the year 2028?

Activity 3

Cash Flow Statement

Questions:

1. As a shareholder, when would I get my first money back once the project is operational, i.e., when is the first year dividends are being paid out?
2. We entered a percentage for the export credit under Plant Data – Sources of Financing. Is this percentage applied to the initial investment amount that we entered, or to the inflated amount? How does it affect the share of the equity in the total investment in 2021?

Activity 4

Operating Account

Questions:

1. Why is there a foreign exchange loss?
2. In what year does the foreign exchange loss become zero?
3. What is special about this year? Why is it zero from that year onwards?

Activity 5

Balance Sheet

Questions:

1. When is the first year without negative retained earnings (i.e., without accumulated loss)? What happens in this year when looking at the Cash Flow Statement?

Activity 6

Financial Ratios

Questions:

1. Many financial ratios are only useful from a certain point in time onwards. The Breakeven Point is one of them. What does it mean?
2. From which year onwards is the Breakeven Point a useful indicator? Why not earlier?
3. What generation reduction would be acceptable in 2029 in order to still cover all costs?
4. Mention another indicator that is also useful in the years before the plant goes into operation and explain it in a few words.
5. Lenders said they would not accept a minimum Debt Service Coverage Ratio (DSCR) below 1.35 in any year after the construction. Is this condition fulfilled?

Activity 7

Shareholder's Return

To answer some of the following questions, please create a copy of your case study as you will need to change the data we entered.

Questions:

1. How is the IRR affected if the loans are increased and equity decreased? To find out about this, try to decrease the equity injection in a given year and increase the export credit in the same year by the same amount. Note that the equity is in local currency and the export credit is in USD. You would thus need to apply the correct exchange rate.
2. Stakeholders would wish to see a higher Internal Rate of Return (IRR) of around 15%. How would you calculate the required electricity prices (2 decimal digits) for the first year if the price would escalate at 3%?

Answers

Activity 2: Intermediate results

1. Answer: 4.3
2. Answer: 91.7 million USD
3. Answer: See online quiz

Activity 3: Cash Flow Statement

1. Answer: see online quiz
2. Answer: It is applied to the initial amount without inflation to calculate the loan drawdown. It is assumed that this amount is contractually fixed and does not increase with inflation. As the investment is however inflated, this means that the share of the export credit gets smaller. Thus, more equity is needed, and the share of equity increases.

Activity 4: Operating Account

1. Answer: Investments in foreign currency may cause foreign exchange losses if the local currency depreciates compared to the foreign currency: Let's assume you

borrow 100 USD for 75 EUR and for some reason 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 is 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.

2. Answer: 2047
3. Answer: It is exactly the year when our longest debt is fully repaid. As we do not have a debt in foreign currency any longer, there is also no foreign exchange risk any longer.

Activity 5: Balance Sheet

1. Answer: 2032. We chose to have tax losses carried forward. As this is the first year without accumulated loss, it is also the first year that dividends get paid to the shareholders.

Activity 6: Financial Ratios

1. Answer: Break-even analysis calculates what is known as a margin of safety, the amount that revenues exceed the costs associated with receiving the revenues. 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.
2. Answer: 2029. Not earlier because the power plant is being built and there are no revenues.
3. Answer: If the Breakeven Point for 2029 is 0.64, this means that the revenues could fall by 36%. Thus, the quantity of electricity sold could be reduced by 36%. (If you would wish to verify this in FINPLAN, do not forget to reduce both, the electricity sold and the associated fuel costs. Now check the Breakeven Point again, which should have increased to (almost) 1. Also check the Cash Inflows and Outflows for 2029. As this year is now completely balanced, there should be basically no inflow from the stand-by facility and outflow to the short-term deposit.)
4. Answer: For example, the Debt Equity Ratio is important during the construction phase, as it is a key indicator to evaluate the financing of a project from the point of view of a lender. A lender will use the Debt Equity Ratio to check if sufficient equity is in the project and if the shareholders are sufficiently committed to the project and will cover some risk with their own money.
5. Answer: See online quiz.



Activity 7: Shareholder's Return

1. Answer: IRR goes up. IRR improves from a shareholder's perspective.
2. Answer: Initially we entered a local inflation of 4%. If the electricity price should increase with only 3%, we have to enter a standard change in addition to inflation of '-1%' when entering the Sales Data. We then need to change the electricity price manually and recalculate the results.