Regional Workshop on:
« Developing a Regional Energy Efficiency Investment Pipeline »

Somme basics on project financial analysis

19-20 June 2014
Content

- Economic and financial basic concepts
- Net Present Value (NPV)
- Payback period
- Internal Rate of Return (IRR)
- Profitability Index
- Profitability conditions
Economic and financial basic concepts

Inflation
- Inflation rate is the annualized percentage change in a general price index (normally the consumer price index) over time.
- Inflation reflects a reduction in the purchasing power per unit of money

Business plan are usually made without inflation

Discounting rate
- Discounting is the act of determining how much less tomorrow one unit of money is worth.
- To compensate for shortfall and the future risk, investors require remuneration from such future cash flows as a fraction $t$, named discount rate.
- The discount rate generally reflects the cost of capital, so it will take the market interest rate for a comparable term increase possibly with a risk premium (financial market
Weighted Average Cost of Capital

\[
WACC = \frac{D}{D+E} K_d + \frac{E}{D+E} K_e
\]

Where D is the total debt, E is the total shareholder’s equity, Ke is the cost of equity, and Kd is the cost of debt.
Net Present Value (NPV)

NPV : Discounted sum of the net cash flows of a project

\[ NPV = -I + \sum_{i=1}^{n} \frac{CF_i}{(1+t)^i} \]

i: The year of the cash flow

t: The discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.) or the opportunity cost of capital

CFi: cash flow of the year i

If CFi are constant,

\[ NPV = -I + \frac{CF}{Ka} \]

= Cost Recovery Factor

\[ Ka(t,n) = CRF = \frac{t(1+t)^n}{(1+t)^n - 1} \]

Project is not profitable if NPV < 0
Payback period

Simple payback period (SPB)
- Number of years required to cover the initial investment
- Investment cost / annual average cash flow

Discounted payback period (DPB)
- Number of years required to cover the initial investment
- Investment cost / annual average discounted cash flow

Project profitable if: SPB < 1/ka

Project profitable if: DPB < n
Internal rate of return (IRR)

- IRR is the discount rate that makes the NPV equal to zero.
- The project is profitable if its IRR is higher than the WACC.
- Otherwise, the project will generate a negative NPV and it should therefore not be carried out because it would lead to an impoverishment of the investor.
- The IRR is an indicator pleases particularly to financiers because it gives the image of potential profitability from the project by comparing it to the profitability that would be obtained by placing the funds corresponding to the initial investment $I$ in $n$ years at a rate of interest equal to the WACC.

Project profitable if : IRR > WACC
Profitability Index (PI)

Profitability index (PI) is also known as profit investment ratio (PIR) and value investment ratio (VIR),

It is a useful tool for ranking projects because it allows quantifying the amount of value created per unit of investment.

\[ PI = \frac{PV}{I} \]

If \( PI > 1 \) then accept the project

If \( PI < 1 \) then reject the project
Profitability conditions: summary

- Net present Value > 0
- Simple Payback Period < $1/K_a(t,n)$
- Discounted Payback Period < $n$ (economic observation period)
- Internal Rate of Return of the project > WACC
- Profitability Index > 1
Thanks