M010. Economic Indicators

+ **Total investment costs = equity + loans (+ subsidies)**

+ **Equity = share of own capital**

+ **Payback time =** time until the investment costs have been paid back □ break-even

+ **ROE:** return on equity = effective annual "interest rate" paid on the equity

+ ROI: return on investment

✦ **IRR:** internal rate of return = effective annual "interest rate" paid on the total investment

✦ **WACC:** weighted average cost of capital = average interest rate on the total investment taking into account different interest rates (Ke, Kd) for different fractions of the investment; e.g. equity (E) and debt (D)

$$\text{WACC} = \frac{D}{D+E}K_d + \frac{E}{D+E}Ke$$

Return, risk, and inflation

✦ **Basic Rate**

- pure compensation for deferring consumption

- even if there is no risk or inflation

✦ **Risk**

- of the particular investment

- the 'risk premium''

✦ **Inflation**

- expected fall in the value of money over time

Converting cash flows to their present value - Discounting....

✦ You can convert future year cash flows to their present value using a "discount rate" that incorporates:

▪ Desired return on investment

▪ Inflation

✦ The discount rate calculation is simple — mathematically, it is the reverse of an interest rate calculation

Assuming a 5% return €10,500 in one year´s time would be worth €10,000 today.....

Discounting future revenue flows
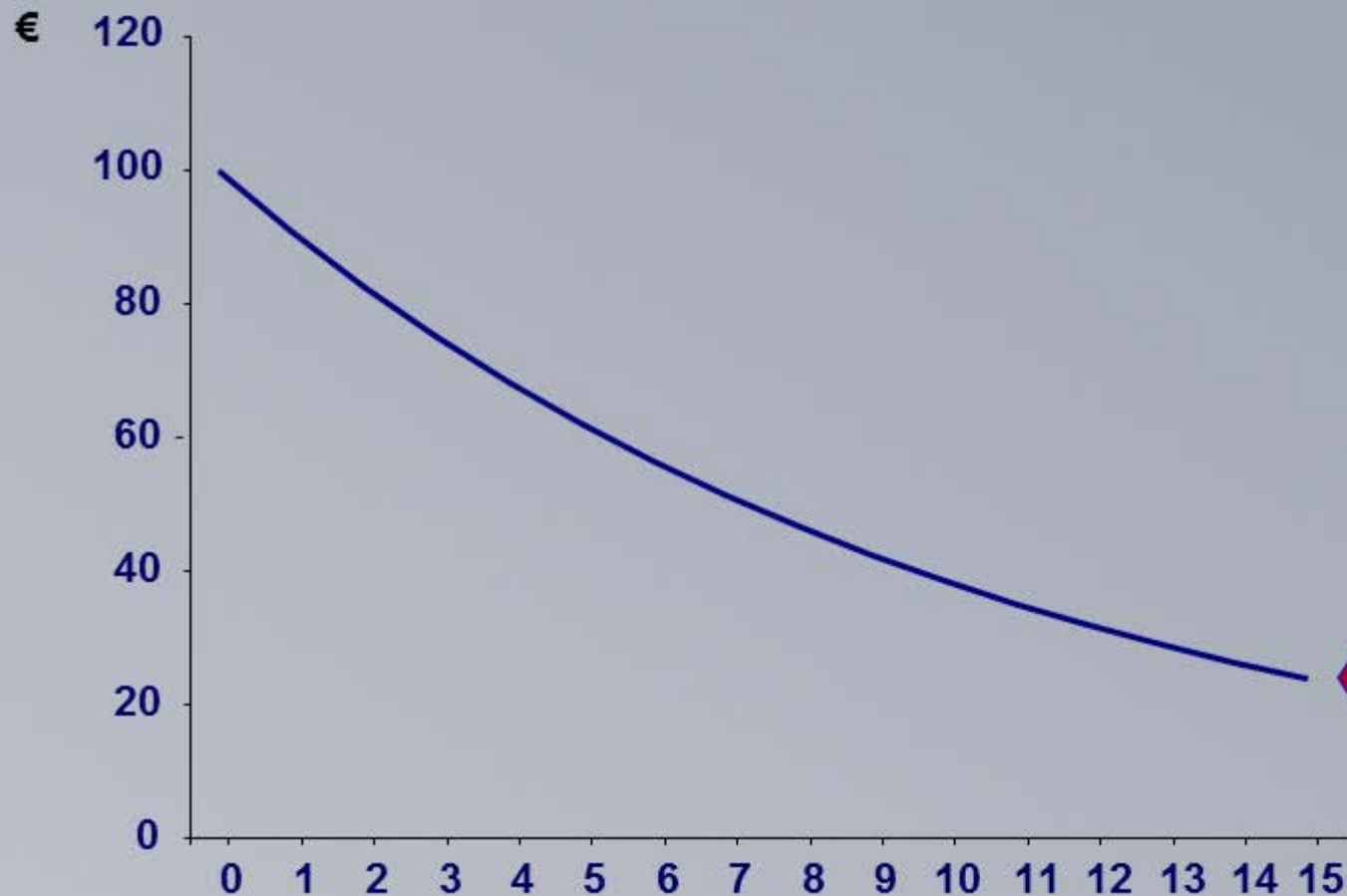
Year 15: Annual revenue of €100 is worth €24 in present value terms (4.2 times less than €100 today)

Net Present Value

+ Most projects are more complex and have cash flows over different years….......

+ Net Present Value (NPV) is the sum of the present values of all the project's cash flows

+ Cash inflows are positive numbers

+ Cash outflows are negative numbers

+ If NPV is more than zero, the project is profitable since it will increase total company value

+ If NPV is less than zero, the project is not profitable since it would destroy value

Financial Parameters

NPV Example

Year	Cash Flow (€)	Discount Factor (4.75%)	Present Value (€) (CF x DF)
0	- 600,000	1.00	-600,000
1	+75,000	0.9546539	71,599.04
2	+100,000	0.9113641	91,136.41
3	+150,000	0.8700374	130,505.61
4	+200,000	0.8305846	166,116.92
5	+210,000	0.7929209	166,513.39
6	+150,000	0.7569650	113,544.75
Total	285,000		NPV =139,416

Source: renac

Payback (simple)

✦ The project could have to finish early for any of several possible reasons, e.g.:

- The equipment wears out through use

- Company's lease on the property expires

- New environmental regulation makes the equipment obsolete

- Market demand decreases

- Etc.

✦ **Example:** Initial investment: € 1,800,000

✦ Annual cash inflow of € 360,000 is equivalent to € 30,000 per month

✦ It will take € 1,800,000 / € 30,000 = 60 months (= 5 years) for the project to pay back to the company its initial investment

Payback (simple)

Conclusion:

- The company is at risk of losing money on the project if it comes to an end before 60 months

- The shorter the payback period, the lower the risk

+ Note: this method is called simple payback, since it is calculated without first discounting the future cash flows

Discount rate

+ The rate at which the Net Present Value is zero (e.g. 15%) is the project's internal rate of return (IRR)

+ The company should implement the project only if it can raise the money needed to finance it at a lower rate than this

+ If it has to pay more than 15 % in this case to raise finance, the project will destroy value

Internal Rate of Return (IRR)

Once the IRR is found, it is compared with the company's pre-set threshold investment rate (the 'hurdle rate')

The hurdle rate is usually at least the company's opportunity cost of capital – e.g. the interest it could make on money saved in a bank account

The IRR decision rule:

IRR > hurdle rate → accept

IRR < hurdle rate → reject

The IRR provides a simple investment decision framework for managers

Net Present Value (NPV)

= net amount of discounted future
cashflows <u>less</u> initial investment

☺ reflects amount (in €) added by
project to total company value

☺ recognizes time value of money

☹ complex to calculate

☹ needs prior estimate of cost of
raising capital

Internal Rate of Return (IRR)

= discount rate at which NPV = 0

☺ basis to compare with costs of

different sources of finance

☺ recognises time value of money

☹ complex to calculate

☹ does not directly reflect impact

on value

Internal Rate of Return (IRR)

= discount rate at which NPV = 0

☺ basis to compare with costs of

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6. Financial analysis steps

Financial analysis steps

+ Characterize project risk

+ Estimate cash flows

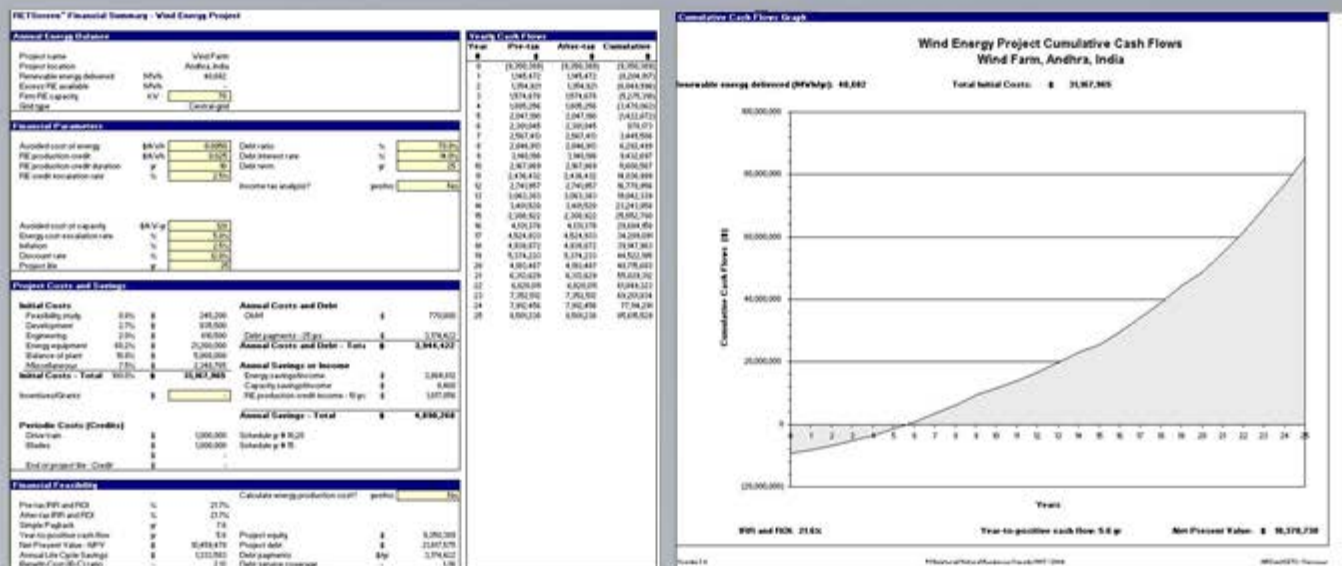+ Select required rate of return on project

+ Calculate project profitability

7. Calculation Tools

Calculation Tools

Software Example: Ret Screen http://www.retscreen.net

Short video: http://www.retscreen.net/ang/video.php

Calculation Example: 475kW Biogas Plant in Belize

Source: DBU

+ Calculation Exercise RETScreen

+ Step by Step example

Thank you

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