

Purpose:

- Project evaluation
- Profitability
- Break even and shutdown point
- Tax and depreciation

Basic Data:

Production capacity (ton/year)	50,000
Price of PE (NOK/ton)	9800
Fixed capital cost ¹ (MNOK)	300
Working capital (MNOK)	15

Operating Cost:

Ethylene consumption (ton/ton PE)	1.03
Ethylene price (NOK/tonn)	2400
Catalyst price (NOK/ton PE)	180
Other chemicals (NOK/ton PE)	330
Annual maintenance (% of fixed capital)	5
Operators, no of shifts	5.5
Operators per shift	5
Operator salary, including social expenses (NOK/year)	400,000
Laboratory cost (% of operator cost)	20
Supervision and daytime labor(% of operating labor)	50
Property taxes and insurance (% of fixed capital)	0.7
Electric power consumption (kWh/ton PE)	640
Electric power price (NOK/kWh)	0.35
Steam consumption(ton/ton PE)	10
Steam price (NOK/ton steam)	140
Water consumption (m ³ /ton PE))	400
Water price (NOK/1000 m ³)	80
Packing material (NOK/ton PE)	60
Packing and storage (NOK/ton PE)	60
Sales cost (MNOK/year)	5
Royalties (% of revenues)	5
Main administration (MNOK/year)	15

¹Includes ISBL and OSBL

Declining balance depreciation should be applied with a rate of 20%. The taxation is 28% of taxable income. The economic lifetime is set to 10 years and no new investment during the 10 year.

Problem 1

- a) Group the costs in the categories: variable operating costs and fixed operating costs (incl. operator salaries). Specify which of the fixed costs are “Basic cost”.
- b) Calculate revenues at full capacity production
- c) Calculate operating costs, divided in categories as specified in a) at full capacity production.
- d) Draw the Cumulative Net Cash Flow diagram
- e) Calculate the Return on investment (ROI) and Payback time for the project
- f) Calculate the Internal interest rate for the project at full capacity.
- g) Find the production capacity at Break Even and Shut-down for the plant