

CH0401 Process Engineering Economics

Lecture 5a

Balasubramanian S



Department of Chemical Engineering
SRM University



Process Engineering Economics

- 1 Economic Analysis of a complete process
- 2 Operating Plants and Proposed Plants



Process Engineering Economics

1

Economic Analysis of a complete process

2

Operating Plants and Proposed Plants

Process Engineering Economics – *Economic Analysis*

Determination of value of a company or process plant

Example Problem The following data are available on the operations of a company as a results of surveys made made by engineers and accountants. The plant is 9 years old, and the straight line depreciation is used on a 15 year service life.

Data*

Current fixed asset value or cost of fixed asset (except land)	=	900,000
Land Value	=	5,000
Going value of the company including all preliminary financial, legal, design and construction	=	100,000
Other Assets (Good will, patents etc.)	=	1
Working Capital	=	400,000
Annual net profit	=	110,000

* All datas are in US dollars

Questions to be answered

- ① what is the *appraised value*?
- ② what is *capitalized earning* value based on earning rate earning rate of 11%?
- ③ what is the *annual risk earnings* in dollars if the normal expected earning rate of this company is 6%

Process Engineering Economics – *Economic Analysis*

The data given in the problem represent the actual present value of the company's assets except the value of fixed assets which will depreciate for the years of service. Thus, the present value of the fixed asset is

$$\frac{9}{15} \times 900,000 = \$540,000$$

i.e. for 15 year life (or service) = \$900,000 means

$$\frac{9}{15} \times 900,000 = \$540,000$$

For 9 years the value of company =

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① Appraised Value of the company

Present value of fixed assets	=	\$540,000
Land	=	\$ 5,000
Going Value	=	\$100,000
Working Capital	=	\$400,000
Other Assets	=	\$ 1
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Therefore, total appraised value	=	\$1,045,001
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Process Engineering Economics – *Economic Analysis*

② Capitalized earning value or earning value

$$\text{Capitalized earning value} = \frac{\text{Annual net profit}}{\text{Investment (or) interest rate (or) earning rate}}$$

Therefore, the capitalized value of the annual net profit at an interest rate of 11% is

$$\text{Capitalized earning value} = \frac{110,000}{0.11} = \$1,000,000$$

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③ Annual risk earning or earning rate

The expected earning rate is 6% based on capitalized value is

$$0.06 \times 1,000,000 = \$60,000$$

Hence, the annual risk earning is

$$\begin{aligned} &\text{Net profit – Expected earning based on capitalized value} \\ &= 110,000 - 60,000 = \$50,000 \end{aligned}$$

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