

ENGINEERING ECONOMICS ISE460  
SESSION 13  
CHAPTER 6, June 15, 2011

OUTLINE

- Questions?
- Chapter 6

$$\#5 \quad NPV \equiv P$$

$$\#6 \quad \text{Annual cost} \equiv A$$

$$5 \rightarrow 6 \quad (A/P)$$

## ANNUAL EQUIVALENT WORTH ANALYSIS

- THE ANNUAL EQUIVALENT (**AE**) IS THE ANNUAL PAYMENT THAT IS EQUIVALENT TO THE PRESENT VALUE:

$$A = P \left[ \frac{(1+i)^N - 1}{i(1+i)^N} \right]^{-1}$$

- YOU MAY RECALL THAT THIS IS ALSO CALLED THE CAPITAL RECOVERY FACTOR
- IF THE AE IS POSITIVE, WE ACCEPT THE INVESTMENT
- DECISIONS WITH AE ARE THE SAME AS WITH NPV

## ANNUAL EQUIVALENT WORTH ANALYSIS (CONTINUED)

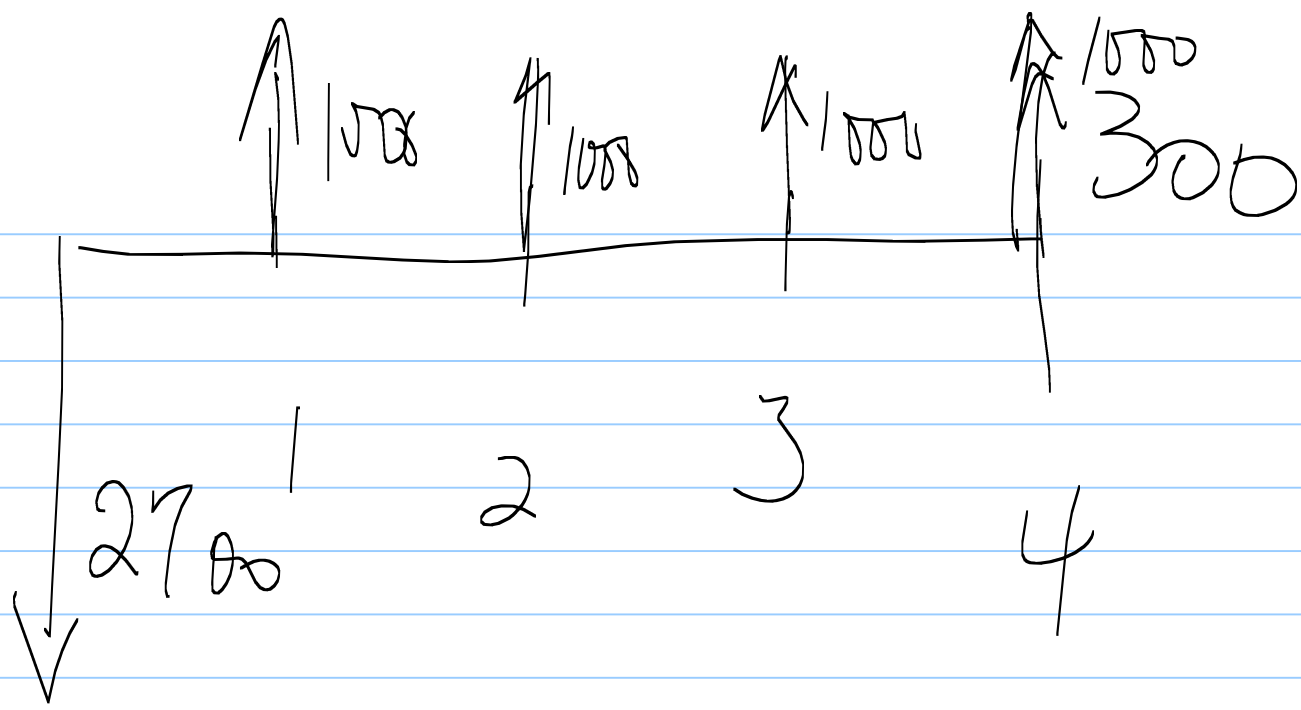
- REASONS FOR AE:
  - IT IS CUSTOMARY TO WORK WITH ANNUAL FIGURES IN OTHER FINANCIAL AREAS
  - NEED UNIT COSTS AND UNIT PROFITS
  - MAKE OR BUY DECISIONS
  - USEFUL TO COMPARE UNEQUAL PROJECT LIVES

\$45

\$55

## DEFINITIONS

- **OPERATING COSTS** - RECURRING COSTS THAT DO NOT RESULT IN THE ACQUISITION OF AN ASSET
  - TELEPHONE BILLS
- **CAPITAL COSTS** - ONETIME COSTS USED TO PURCHASE ASSETS
  - LAPTOP PC
- **CAPITAL RECOVERY COST** - THE ANNUAL EQUIVALENT OF A CAPITAL INVESTMENT



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## DEFINITIONS (CONTINUED)

- LET **I** BE THE INITIAL CAPITAL INVESTMENT
- LET **S** BE THE SALVAGE VALUE
- THEN:
- CAPITAL RECOVERY COST (**CR**) =  $I(A/P, I, N) - S(A/F, I, N)$
- WE ARE ANSWERING THE QUESTION:
  - WHAT ANNUAL PROFIT WILL GET US BACK THE MONEY THAT WE INVESTED

*No income or expense*

## UNIT COST OR PROFIT

- FIND THE NUMBER OF UNITS PRODUCED PER YEAR
- DETERMINE THE CASH FLOW
- CALCULATE NPW
- DETERMINE AE
- DIVIDE AE BY THE NUMBER OF UNITS PRODUCED