

EE-287 Engineering Economics

Lecture Title:

Foundations of Engineering Economy & Performing an Engineering Economy Study

Instructor:

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Basic Question:

What is Engineering Economy (EE)?

Answer:

In the simplest of terms, EE is a collection of techniques that simplify comparisons of alternatives based on economics.

Counter Question :

What is not Engineering Economy (EE)?

Answer:

EE is not a method or process for determining what the “Alternatives” (i.e. Options for solving a problem or means for doing something) are.

On the flip side, EE begins after all credible alternatives/options have been identified by the Engineer



Question about all Credible “Alternatives/Options”:

What if the best alternative is actually the one that the Engineer has not even recognized as an alternative?

Answer:

In such a case, application of all methods used in EE will not result in “its” selection inside the Engineer’s feasibility report.

Other Factors:

While EE is the sole criterion for selecting the best alternative, Real World decisions may also include other factors such as: e.g. During power generation: Whether to generate from Hydro, Nuclear, Gas, Coal etc.

- Safety
- Air pollution (Carbon Emissions/Global warming)
- Water demand
- Waste disposal
- Public acceptance
- Political hurdles



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Necessary Terms and Concepts

1. Alternatives

An “Alternative” is a stand alone solution for a given situation.

We face alternatives in virtually everything we do – every day e.g. Mode of transportation, choices in food, to buy or rent a house etc.

Similarly, in Engineering practice, several ways can be used for accomplishing a given task. For an Engineer, it is necessary to compare the alternatives in a rational manner so that the most economical alternative can be selected.

Points to be observed while considering Alternatives

1. Purchase Cost (First Cost)
2. Anticipated useful life
3. Yearly cost of maintaining assets (Annual maintenance & operating costs)
4. Anticipated resale value (Salvage value)
5. Interest rate

The above points determine for an Engineer which alternative is best from economic perspective



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Necessary Terms and Concepts

2. Cash Flows

The estimated Inflows (Revenues) and Outflows (Costs) of money in a potential project are called Cash Flows.

Cash Flows are at the heart of Engineering Economic analysis but also represent the weakest part of the analysis – WHY?

Answer: Because estimating them are judgments about what will happen in the future e.g. judging \$ price, oil Price and other commodity prices.

3. Alternative Selection

In Engineering practice, every situational analysis may present multiple alternatives for a solution.

But then there is always a Do Nothing (DN) alternative.

Rationally, if an Engineer selects the DN alternative then it must signify the most favorable economic outcome.



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Necessary Terms and Concepts

4. Evaluation Criteria for an Alternative

e.g. Evaluating route to UET campus

1. Safest
2. Fastest
3. Cheapest
4. Shortest
5. Etc.

All of you evaluate the route based on your situation and select the best option/alternative for you.

But in Engineering Economic evaluation, the alternative with the lowest overall cost or highest overall income is rationally selected.

5. Intangible Factors (Can not touch but will make you make non economic choices)

1. Goodwill
2. Convenience
3. Friendship



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Necessary Terms and Concepts

6. Time Value of Money (TVM)

The change in the amount of money over a given time period is called TVM.

To determine the TVM measure of worth, Rate of Return (RoR) is used and it is used to **Accept or Reject** an alternative.

It is said: **"MONEY MAKES MONEY"** over time.

If invested or borrowed through proper calculated analysis not through blind **RISK**.



Thank You for listening

