

**Answer on Question #74222 - Economics / Microeconomics**

**Question:** A state department of transportation is considering replacement of a bridge at a cost of 200 Million. The life of the new bridge is 30 years, and it is estimated that improved safety and reduced congestion would be valued by bridge users at Rs. 30 Million per year. The Department uses an interest rate of 10 Percent to evaluate capital projects.

(a). Should this proposal be implemented?

**Answer:**

Cost of bridge project = 200 Million

Life of new bridge = 30 years

Annual benefit from new bridge = 30 Million per year

Discount rate = 10%

To check feasibility of this proposal, there is need to calculate NPV (net present value) of this project. The calculation of NPV is as follows:

$$NPV = \sum_{t=1}^n \frac{Cash\ Flow_t}{(1+i)^t} - Initial\ cash\ investment$$

$$NPV = \sum_{t=1}^{30} \frac{30_t}{(1+0.10)^t} - 200$$

$$NPV = \frac{30_1}{(1+0.10)^1} + \frac{30_2}{(1+0.10)^2} + \frac{30_3}{(1+0.10)^3} + \dots \dots \dots \frac{30_{30}}{(1+0.10)^{30}} - 200$$

NPV = 82.8 Million

NPV of the proposal is positive. As per the rule, if NPV is positive than investment project should be accepted. So, the proposal of be bridge should be implemented.

(b). if not, what is the maximum cost of new bridge that could be justified by the benefits?

*Answer:* The expected cost of replacing the existing bridge with new bridge is 200 Million and it could be justified by the annual benefit of 30 Million. So, the given cost of 200 Million is the acceptable level of initial investment for the proposal. It is because the proposal of new bridge is economically feasible at this level of cost.

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