

### Answer on Question #81182 - Economics – Finance

Big Blue Granite (BBG) needs to purchase a new saw for creating their top quality countertops. Saw A costs \$345,000 with \$6,500 of annual maintenance costs for the first year that will increase by 7.0% each year for the 7-year life of the saw. Saw B costs \$210,000 with \$15,000 of annual maintenance costs for the first year that will increase by 12.0% each year for the 4-year life of the saw. Which saw should BBG choose? What is the annualized cost of this choice? Assume a discount rate of 9.5%, and ignore all taxes.

#### Solution

In order compare two projects with unequal lifespans and to make decision about purchasing the one or another saw we can use the Equivalent annual cost. It can be calculated by multiplying the NPV by the loan repayment factor:

$$EAC = NPV * \frac{r}{1 - (1 + r)^{-t}}$$

where r - the discount rate; t - the number of years. The Net Present Value of project is calculated as follow:

$$NPV = -IC_0 + \sum_{t=1}^N \frac{CF_t}{(1 + r)^t}$$

Considering the increase in annual maintenance costs from the second year of the project, we can calculate the present value of invested and maintenance costs:

$$NPV = IC_0 + \sum_{t=1}^N \frac{AMC * (1 + i)^{t-1}}{(1 + r)^t}$$

where IC – invested capital, AMC - annual maintenance costs. Equivalent annual cost for saw A:

$$\left( \$345,000 + \sum_{t=1}^7 \frac{\$6,500 * (1 + 0.07)^{t-1}}{(1 + 0.095)^t} \right) * \frac{0.095}{1 - (1 + 0.095)^{-7}} = \$77,544$$

Equivalent annual cost for saw B:

$$\left( \$210,000 + \sum_{t=1}^4 \frac{\$15,000 * (1 + 0.12)^{t-1}}{(1 + 0.095)^t} \right) * \frac{0.095}{1 - (1 + 0.095)^{-4}} = \$87,905$$

Purchasing saw A is the more cost effective decision, with a net savings of \$10,361 a year, compared to saw B.

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