Problem 7-5

Goal: Determine which heat exchanger is cheaper

Given:

Std. Exchanger	$20,000	$V_{initial}$
Nominal interest	0.06	$i_{nominal}$ since annual compounding effective = nominal = per period
Length	6	**n, years**
Scrap value	$0	V_{scrap}
Alt. Exchanger	$34,000	$V_{initial}$
Length	10	**n, years**
Scrap value	$4,000	V_{scrap}

The equation: $K = C_0 + C_r / [(1 + i)^n - 1]$ Prob. 7-4 Capitalized Cost definition

Approach:

ASSUME replacement cost = original cost; annual compounding
Annual interest rate, then i per period, nominal, & effective are same
Compare using capitalized cost from definition in problem 7-4
Replacement cost is Original cost - Scrap Value

Calculations:

(1) Standard Exchanger 0.06 $i_{nominal}$ since annual compounding effective = nominal = per period

Capitalized Cost $67,787.54 $= \$20,000 + \$20,000 / [(1 + 0.06)^6 - 1]$

Answer **$67,788** Total intial Capitalized Investment to replace forever

(2) Alternate Exchanger

Cost to replace $30,000 $= V_{initial} - V_{scrap} = \$34,000 - \$4,000$

Capitalized Cost $71,933.98 $= \$34,000 + \$30,000 / [(1 + 0.06)^{10} - 1]$

Answer **$71,934** Total intial Capitalized Investment to replace forever

Discussion:

Standard (1) exchanger requires intial investment of $20,000 and deposit of $47,788 to generate replacement cost ev
Alternate (2) exchanger requires intial investment of $34,000 and deposit of $37,934 to generate replacement cost ev
IF life of Alt. (2) was 11 years or longer, then it would become the preferred choice
~equal Capitalized Cost at 11 years $67,396.47 $= \$34,000 + \$30,000 / [(1 + 0.06)^{11} - 1]$

Answer **$4,146 Standard Exchanger is less expensive over lifetime**

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