ECE 333 Green Electric Energy

Homework 9

P401-6.3

(c)

$$\textit{total installtion costs} = 4 \times p_{DC,stc} = 4 \times 2760 = 11040\,\$$$

$$c.r.f.(5\%, 30y) = \frac{0.05\times(1+0.05)^{30}}{(1+0.05)^{30}-1} = 0.065y^{-1}$$

$$\textit{annual payment} = 0.065 \times 11040 = 718\,\$$$

$$\textit{first} - \textit{year tax} = 0.05 \times 11040\,\$ = 552\,\$$$

$$\textit{first} - \textit{year tax saving} = 0.29 \times 552\,\$ = 160\,\$$$

$$\textit{first} - \textit{year electricity costs} = \frac{718-160}{4{,}000} = 0.14\,\$/kWh$$

P401-6.4:

From the form we can know:

$$P = 8{,}000\,\$$$

$$\textit{annual energy} = \frac{380}{0.19} = 2{,}000\,kWh$$

$$MTB = \frac{120}{400} = 0.3$$

$$i = \frac{400}{8{,}000} = 0.05$$

$$c.r.f. = \frac{500}{8{,}000} = 0.0625$$

For the second year:

Payment: $\mathbf{500\,\$}$

Interest: $\mathbf{7{,}900 \times 0.05 = 395\,\$}$

Delta balance: $\mathbf{105\,\$}$

Loan balance: $\mathbf{7{,}900 - 105 = 7{,}795\,\$}$

Tax saving: $\mathbf{0.3 \times 395 = 118.5\,\$}$

Net cost: $\mathbf{500 - 118.5 = 381.5\,\$}$

Electricity cost: $\dfrac{\mathbf{381.5}}{\mathbf{2{,}000}} = \mathbf{0.19075\,\$ / kWh}$

Please review all the examples in slides particularly the University of Illinois solar farm project