Subject: Energy Resources and Utilization

Class Assignment - 01: Economic Analysis for Energy System Session- 2k9

Note: Final submission date is April 18, 2012.

Question # 01

An energy manager has $5,000 available today to purchase a high efficiency air conditioner with a life of six years. She would like to know what energy cost savings would be needed each year to justify this project if the company MARR is 10%.

Question #02

A heat pump is expected to produce energy cost savings of $1,500 per year over a lifetime of 20 years. What is the equivalent present sum or present worth for this series of cash flows, if the company MARR is 10%?

Question #03

An energy manager expects a boiler to last 7 years, and he thinks it will cost about $150,000 to replace at that time. How much money should the company deposit today in an account paying 10% per year in order to have $150,000 available in 7 years?

Question #04

A company needs to begin saving money for the new boiler in Problem # 03. The company will make a deposit each year for 7 years to a savings account paying 10% annually. How large should the annual deposits be if they want to have $150,000 in the bank in 7 years?

Question #05

A high efficiency lighting project for a company is saving $10,000 a year in energy costs. If that $10,000 a year is deposited into an energy management savings account paying 10%, how much money will be available in 5 years to use to replace an old chiller with a new, high efficiency model?

Question #06

A single zone heating unit is being used in a small office building. A variable air volume system retrofit can be purchased and installed for a cost of $100,000. The retrofit system is estimated to save 450,000 kilowatt hours per year for its economic life of 10 years. The company uses a MARR of 10%. If the company pays $0.06 per kWh for electricity, and the system will have a salvage value of $500 at the end of its life, should the new system be purchased?

Question #07

An energy efficient air compressor is proposed by a vendor. The compressor will cost $30,000 installed, and will require $1,000 worth of maintenance each year for its life of 10 years. Energy costs will be $6,000 per year. A standard air compressor will cost $25,000 and will require $500 worth of maintenance each year. Its energy costs will be $10,000 per year. If your company uses a MARR of 10%, would you invest in the energy efficient air compressor?

Question #08

A company has energy costs of $25,000 a year for the next three years. The cost of energy is subject to escalation, and the energy cost escalation rate is 25%. The company's real discount rate is 4%. Find the present worth (PW) of the energy costs using a) constant dollars and b) current (actual) dollars.