ENGR290: Renewable Energy

Quiz 2: Energy Calculations

May 20, 2014

Problem 1: Household Energy Usage

You have decided to save money by reducing your power consumption in your home. After reading the labels on all of your appliances you came up with the following table. Fill in the energy and costs in this table. PNM's electric rates are $\$0.13/kWh$

Appliance	Power	Usage $\frac{hours}{day}$	kWh/day	$/day	$/month
Refrigerator	600W	8hr			
TV	100W	4hr			
Computer	300W	4hr			
Dishwasher	1kW	1hr			
Clothes Dryer	4kW	30min			
Water Heater	4kW	4hr			
AC (refrigerated air)	2kW	6hr			
Lights	300W	4hr			

Problem 2

So you want to save money. Where is the best place to do it? The largest costs are your air conditioner and water heater so start there.

Gas is cheaper for heating than electricity so lets say you convert your water heater to gas. The current price for gas is $\$4.413/millionBTU$ and $1kWh = 3400BTU$

1. How much money per day would the gas water heater cost to run?

2. How much money per month would this save you?

Problem 3

Instead of gas you decide to go green and use a solar water heater. The solar heater does most of the heating, but you still have a smaller electric heater for cloudy days or days when you use too much water for the solar to keep up. So now you only have a 1kW water heater that runs an average of $10 min/day$.

1. How much does your water heating cost per day?

2. If the solar water heating system cost $3000, how long will it take to pay it off based on how much you save each day?