**Lessons about Solar – Based Renewable Energy from Using a Solar Water Heater Bag**

Last summer my wife and kids went away to see relatives and so I was home alone for a few weeks. I decided to do all of my showers with a solar water bag – the type that many people take when they go desert camping. It has a capacity of a couple of gallons, is black inside and clear on the outside, and can be hung on anything that can support its weight when containing water. In this essay I will first discuss observations about the experience, and then reflect on the lessons that might be learned, **in bold print**.

To do this experiment I had to get a new solar water bag. My old one had a leak, so I spent around $10 on a new one. I realized immediately that I would not save any money at all on my showers over the next few weeks, as the cost of heating the water would be less than the price of the bag**.** The energy is free, the technology is not. **Most forms of renewable energy are captured with technology, which generally is paid for up front. Consequently, fossil fuels can seem cheaper in the short run at least, especially if their provision infrastructure is already in place.**

My first dilemma was where to hang the water bag. I generally like to shower in the evening, so I found a place with good southern exposure and sheltered from breezes. My neighborhood has few trees, so this was easy. In many neighborhoods, it would not be so easy. **Geography matters with renewable energy**.

So the first evening when I brought the bag in to my bathroom to take a shower, I noticed that the water was not that hot. It probably had been hotter near the end of the time when it was in the sun. To solve this heat loss problem the next day, I put it in an empty ice box that I take camping sometimes, and closed the lid. I put it in the box around 6 pm just as I began to eat dinner. The water was perfect when I took my evening shower. **Energy storage may be needed with intermittent sources of renewable energy**.

The next day I went about my activities and noticed that it was not that sunny or warm. The water in the bag ended up just barely lukewarm, so I microwaved about a quart of water and added to the bag to make the water nice and toasty. **A back up source of energy to supplement or replace the renewable source can be useful**.

The next day I notice that it was supposed to be sunny by afternoon, after a cloudy morning. So I put about half as much water in the bag as usual, hoping that the smaller volume would heat up more readily than would my usual larger volume. My strategy worked. **Sometimes using less total resources makes renewable energy more useful**.

One day that summer I forgot to put out the water when I left in the morning, and didn’t come back in time to put the water bag in the sun. So rather than heating up the entire water tank that normally supplies the whole house, I decided to tough it out and take a shower without turning on the hot water tank. Poor me! But guess what, the water was warm. Why? It had been hot over the past few days, and since I had never left the garage door open, it had remained pretty hot in the garage where the water tank is. So in a sense, my garage behaved as a solar thermal device. Had a large amount of water been used each day over the previous few days, however, the water would have been cooler as new cold water would have been flowing into the tank on a daily basis and would have not had time to heat up entirely. So in a sense, the same lesson as suggested in the previous paragraph applies: **Sometimes using less total resources makes renewable energy more useful or effective**.