**Energy Costs of Refining Aluminum**

The aluminum in ores must be separated from oxygen and hydrogen, and then purified. Although these bonds are quite weak individually, a large amount of electrical energy is required to refine any usable amount of aluminum. For example, processing 1 kg of aluminum from ore requires about 15 kilowatt hours of electricity. Consequently, aluminum refining is profitable only where energy is inexpensive.

The most familiar use of aluminum is for beverage containers. The aluminum in soda cans was extracted, processed, and shipped simply to transport a drink from one place to another. **What are more efficient ways?**

One aluminum beverage can weighs 15 g. **At $0.09/kilowatt hour, what is the cost of refining the aluminum in one can? (Note: the price of electricity fluctuates a lot.)**

**Using the approximation of 1 can/day per person, calculate the cost of the energy used in the refinement of aluminum cans consumed by the ~3200 students, faculty, and staff at Holy Cross in one year.**

The U.S. consumed 4,610,000 metric tons of aluminum in 2010, and of that, 1,120,000 metric tons were recovered from recycled scrap. **At the rate cited above, what was the cost of the energy required to refine that portion of aluminum that was not recovered from recycled scrap?**

It takes only 6% as much energy to recycle aluminum as to produce raw ore. **If all the aluminum in the above question was recycled aluminum, what would have been the cost of energy used to produce it?**

\*\*As of 2010, only about 58% of all aluminum cans are recycled in the U.S.

Data sources: National Grid, US Geological Survey, Earth911