Computer Lab Power Scheme Cost Analysis

It seems that the computers in many of the Duke computer clusters are not set to Standby at any time. Therefore, it is worth detailing the energy costs of an Always-On scheme:

1) Always-On Power Scheme

A 230 watt computer tower draws .230 kW per hour.
If left on 24/7 for one semester (14 weeks), it will consumer 541 kWs of electricity.
Duke pays about 5 cents per kilowatt hour, so the cost is **$27 per semester for one computer.**

2) Standby Power Scheme

Let's assume a computer that is set to Standby after 1 hour of non-use would go into Standby mode for 6 hours a day (most likely during the night time).[1]
6 hours x 7 days a week x 14 weeks = 588 hours.
So, 588 hours a semester the computer would be using approximately 46 watts (20% of 230 watts) rather than the full 230 watts.
This represents a saving of 184 watts per hour for those 588 hours = 108 kW.
The *savings* on energy would be $**5 per semester for one computer.**

That may not seem like much, but across 1,000 computers, that is a savings of $5,000 per semester. And keep in mind that we have not included the monitors in this analysis. CRT monitors average 90 watts while LCDs average 40 watts. When on standby, they both use only about 5 watts.

3) Hibernate Power Scheme[2]

For those 588 hours a semester that the computer hibernates, the energy savings would be: 230 watts * 588 / 1000 = 135 kWs
That represents a *savings* of **$6.75 per semester for one computer**.

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[1] That is actually a fairly conservative estimate when one considers the many labs in academic buildings that are not heavily frequented overnight, if at all.

[2] Hibernation differs from Standby in that it writes the contents of memory to a file on disk and shuts the computer completely off. When it restarts, it reads the contents of the file back into memory in order to return the computer to its state before hibernation. Standby, on the other hand, does not shut the computer down. It simply powers down energy consuming devices like the hard disk and monitor before entering a low power state.