Is There a Vampire Lurking in Your Hotel? An Examination of Standby Power Consumption in Virginia Hotel Rooms

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ABSTRACT

Hotels are always looking for ways to cut costs and standby power creates an unnecessary expense for hotels through wasted electricity. As much as 10% of the power in residences is consumed by standby power and older appliances such as televisions are the largest consumers of standby power. The ENERGY STAR program has developed standards for standby power consumption to decrease the energy consumed in standby mode, however older appliances already in many hotels are not ENERGY STAR compliant. Rather than replacing all appliances, hotels must come up with other ways to reduce standby power consumption while considering the needs of customers. It would be easy if hotels could shutoff power to a room when the room is vacant, however multiple hotel rooms are on the same circuit breaker and the cost of a sophisticated energy management system outweighs the cost of standby power.

Keywords: *Standby Power, Energy Management, Sustainability, Energy Conservation, Hotel Utilities*

INTRODUCTION

Modern appliances found in hotel rooms such as televisions, DVD players, and microwaves use electricity even when they are not turned on. This standby mode draws electrical current while the appliance is waiting to be used. This can lead to significant costs of electricity for standby appliances in a hotel depending on the type and number of appliances in each room. In some appliances the electrical current is used by power adapters waiting for signals from a remote control or by digital clocks while in other cases, the power adapter is waiting to turn on the appliance and does not provide any features. Rosen and Meier (2000) studied video cassette recorders in the United States and found that more electricity is used in standby mode than while actively recording. Likewise, a study of New Zealand households reported that over 40% of microwaves used more electricity in standby mode than while cooking food (EECA, 1999). Although the total amount of electricity used by every appliance in standby mode is not nearly the total amount of power used when appliances are on, it has been estimated in residences that standby power can amount to as much as 10% of the power used (Ross & Meier, 2001).

Hotels are constantly monitoring costs and trying to act environmentally conscious. Standby power reduction is one area where hotels can save electricity. Newer appliances are

more energy efficient and are designed to use less standby power than older appliances and thus save on the amount of electricity consumed. The Energy Star program by the United States Environmental Protection Agency requires that appliances can only use a certain amount of watts when turned on as well as when turned off and in standby mode. For example, Energy Star televisions "must not exceed power consumption of 1 watt when in standby mode" in order to use the Energy Star Logo (United States Environmental Protection Agency, 2010).

The goal of this study is to examine standby power consumption in hotel rooms and to determine energy savings that can result from purchasing energy efficient appliances. To our knowledge this is the first study to examine standby power consumption in hotel rooms.

Literature Review

The environmental literature concerning energy usage in hotels is quite significant as hotels continue to look for ways to cut costs and conserve resources (i.e. Redlin, 1979, Gossling 2002; Bohdanowicz & Martinac, 2007; Nizic, Karanovic, & Ivanovic, 2008; Priyadarsini, Xuchao, & Eang, 2009). Deng and Burnett (2000) found that electricity accounted for 73% of the overall energy use in hotels while Becken, Frampton and Simmons (2001) estimated that electricity accounted for 75% of total energy use in New Zealand. Simmons and Lewis (2001) examined a single hotel in Majorca and a single hotel in Cyprus and discovered that electricity accounted for 57% and 70% of energy consumption respectively

The standby power of individual appliances in hotel rooms has not been previously studied; however there are numerous studies of standby power used by household appliances. In households, the standby power of all appliances in a home can represent a significant portion of total energy consumption. Standby power is responsible for about 20-60 W per home according to several studies of developed nations (i.e. Nakagami, Tanaka, & Murakoshi, 1997; International Energy Agency, 2001; Ross & Meier, 2001; Vowles, Boardman & Lane, 2001). This energy usage accounts for 4 – 10% of total residential electricity. (Lebot, Meier, & Anglade, 2000).

Meier and Lebot (1999) suggest a 1-W maximum standby power requirement for household appliances. In one study, annual average standby energy consumption per household was estimated to decrease by 59% if the maximum 1-W standby power proposed by Meier and Lebot was implemented (Fung, Aulenbach, Ferguson & Ugursal, 2003). However, as with many environmental initiatives, action is not taken by society until a regulation is established. The first U.S. regulation of standby power was instituted in April of 1993 when President Clinton issued Executive Order 12845 that required all federal government agencies to buy only Energy-Star qualified PCs, monitors, and printers. (Executive Order No. 12845, 1993). Although it is not a legal requirement for manufacturers to meet these standards, they must conform to these standards to remain eligible for government procurements. As a result, manufacturers modified their products and tested them for Energy Star compliance. This caused Energy Star participation to skyrocket and in 1998 the Energy Star program expanded from office equipment to consumer electronics such as TVs and VCRs (Sanchez, Brown, Webber, & Homana, 2008). Furthermore in 2001, President Bush issued Executive Order 13221 which required that every government agency, "when it purchases commercially available, off-the-shelf products that use external standby power devices, or that contain an internal standby power function, shall purchase

products that use no more than one watt in their standby power consuming mode" (Executive Order No. 13221, 2001).

Methodology

The 19 hotels in the Harrisonburg Virginia Metropolitan Statistical Area were asked to participate in this study and ten hotels volunteered to participate. The hotels were a combination of extended stay, limited service and full service hotels under the flags of Marriott, Hilton, Intercontinental, Choice and Carlson. Five rooms were randomly chosen by each of the hotels for participation in the study. Although most of the rooms in each hotel were renovated at the same time and expected to have the same appliances, the authors felt that replacement appliances that were purchased at times other than during a renovation may be present in many hotel rooms. Each room was visually inspected for electrical outlets and each appliance that was plugged in was measured for standby power. This was done by unplugging each appliance from the outlet and plugging it into a Kill A Watt meter by P3 Corporation. The meter was then plugged into the outlet and the standby power was measured. The model, appliance type, manufacturer, serial number, date of assembly, and standby power in watts was recorded for each item that was plugged into the wall. The data was then arranged and analyzed.

Results

A total of 50 rooms were studied in the 10 hotels with 468 appliances plugged into outlets potentially using standby power. Of the 468 appliances that were plugged into outlets, 233 used standby power. Of the appliances that used standby power, there were a total of 53 televisions, 50 alarm clocks, 50 hair dryers, 40 refrigerators, 35 microwaves and 5 VCR/DVD players. Forty refrigerators were in the 50 rooms and in standby mode the refrigerators used 1 watt or less of power.

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