Technology Paper

Energy-Efficient Electronics Gain Momentum in the Home

Introduction

Technology has become an integral part of our lives. Plasma TVs, cable boxes and computers increasingly fill our homes. Growing numbers of consumers are turning to personal media centers and digital video recorders (DVRs) to store and play their favorite movies and TV shows, with consumers spending more money each year to enhance and upgrade these technologies. A recent Forrester Research survey estimates that 29 percent of Generation-X households—more than 18 million homes—own a DVR, and 32 percent own an HDTV.[1]

Homeowners are paying a higher balance each month on their electricity bills to fuel these "always-on," power-hungry consumer electronics. The amplified demand for electricity and rising energy costs have triggered awareness of global environmental changes among consumers, who have begun to demand that products and services—particularly technology providers—demonstrate practices that are ecologically defensible and sustainable. In November 2007, Forrester conducted a study that showed 53 percent of 5000 American consumers made up the so-called "green consumer" market—roughly equivalent to 115 million Americans.[2]

As homeowners embrace rich multimedia in their homes, and environmental responsibility becomes more mainstream, consumers are demanding more eco-friendly consumer electronics for the home that will minimize the impact on the environment—and their wallets. Original equipment manufacturers and hardware manufacturers can embrace this cultural shift by designing components and hardware that meet consumer demand for environmentally responsible products while offering an enjoyable home entertainment experience.

1 *Forrester Releases Largest Technology Survey Of North American Consumers*, Forrester Research (2008), http://www.forrester.com/ER/Press/Release/0,1769,1217,00.html.

2 Christopher Mines, Remy Fiorentino, Eric G. Brown, and Christina Lee, *In Search Of Green Technology Consumers*, Forrester Research (2007), http://www.forrester.com/Research/Document/Excerpt/0,7211,43729,00.html.

Energy-Efficient Electronics Gain Momentum in the Home

Rising Electricity Costs Call for Energy-Efficient Equipment

The demand for electricity in the residential market has grown to the extent that energy efficiency is becoming a prominent concern for the average household. In the United States, the Energy Information Administration (EIA) predicts that the demand for electricity will grow by 27 percent in the residential sector by 2030.[3]

Annual Electricity Sales by Sector 1980 to 2030 (billion kWh)

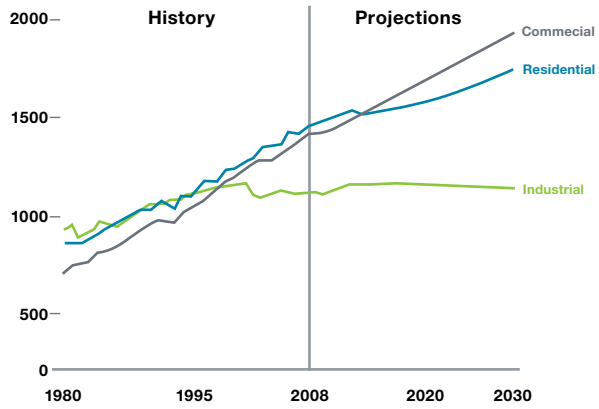

Figure 1. Rise in energy consumption from 1980 to 2030[4]

The EIA also expects electricity costs to jump anywhere from 18 percent to 39 percent between now and 2030.[5] The rises in energy costs and demand are encouraging homeowners to invest in energy-efficient equipment.

Household electronics, computers and peripheral always-on devices such as DVRs use varying amounts of power. Table 1 presents typical media center and home entertainment devices and an estimated average of how much power each consumes.

Device	State	Watt Hours
Cable box	Active	80
42-inch plasma TV	Idle	20
	Active	350
DVR	Idle	9
	Active	40
External USB hard drive	Active	11
Desktop Computer	Idle	78
	Active	124
Laptop Computer	Idle	23
	Active	33

Table 1. Average power consumption for typical household devices

The U.S. national average for electricity costs for the home is approximately US$0.09 per kilowatt hour (kWh). Today, it is common to leave electronics on 24 hours a day, 7 days a week. A DVR, for instance, uses 40 watts per hour. Assuming it is in active playback and record data mode for six hours a day, it will consume around 12.23 kWh a month, which is equivalent to US$13.56 a year. Nielsen Media Research states that the average American household watches on average 4 hours and 35 minutes each day, but leaves the TV on for approximately 8 hours per day.[6] If a 42-inch plasma TV consumes 350 watts per hour—or 94.9 kWh each month—when turned on for 8 hours a day, this adds up to US$105.34 a year. In other words, powering an entertainment system—complete with set-top boxes, video game consoles, speakers, DVDs and DVRs—can add nearly US$200 to an annual energy bill.[7]

3 *Short-Term Energy Outlook*, Energy Information Administration (2008), http://www.eia.doe.gov/steo

4 *Annual Energy Outlook 2008 with Projections to 2030*, Energy Information Administration (2008), http://www.eia.doe.gov/oiaf/aeo/electricity.html.

5 ibid.

6 Katherine Westphal, *Nielsen says TV watching at record levels: Two simple strategies to reclaim some of your family time from the TV*, Buzzle.com (2006), http://www.buzzle.com/articles/tv-watching-reclaim-family-time.html.

7 Rebecca Smith, *That Giant Sucking Sound May Be Your New TV*, The Wall Street Journal Online (2007), http://www.realestatejournal.com/homegarden/20071214-smith.html.

Energy-Efficient Electronics Gain Momentum in the Home

Curb Electricity Costs With Power-Efficient DVR Drives

Among the complement of devices that comprise a typical entertainment system, high-speed, high-capacity DVR drives consume measureable quantities of power, generating significant amounts of heat when actively reading and writing data. Cooling fans help disperse the heat away from critical drive components but consume more energy, and fan noise can detract from the entertainment experience of the user. The challenge is to create a drive that uses less power, produces and retains less heat, and has quieter acoustics—all without compromising performance.

To help consumers and device manufacturers reduce the environmental impact of high-intensity, always-on devices such as DVRs, Seagate Technology LLC has created the Seagate® Pipeline HD™ drive, a drive that uses significantly less power than previous generations without hindering performance. Spinning at 5900 RPM, the drive reduces friction-induced heat and uses perpendicular recording and optimal storage density to store more data on fewer spinning disk platters—reducing the drive's overall power consumption. Applying this design, the drive consumes as little as 4.7 watts of electricity and retains 40 percent less heat than similar drives.

Seagate built the Pipeline HD drive for DVRs to efficiently read and write data at lower disk-spinning speeds, delivering energy efficiency without performance decline. When streaming media to a TV or computer monitor, the average DVR will revisit glitches in a file—even a single pixel in a single shot—resulting in choppy, poor-quality video. Using an ATA-7 interface standard, the Pipeline HD drive ignores the glitch to provide an uninterrupted flow of favorite movies and TV shows. The drive monitors its activity and reduces power draw during idle modes, resulting in lower power consumption and improved system reliability. In addition, the Pipeline HD drive is made of 75 percent recyclable parts.

Seagate not only drives green initiatives in its products, but also encourages eco-friendly practices within the company. Seagate has taken steps to ensure that its factories practice environmental sustainability as well. In 2007, the company used 17 percent less power than the previous year to power machinery and manufacture hard drives while increasing overall production by 34 percent—an overall net improvement of 51 percent in efficiency. On average, that savings is enough to power 4370 homes in the Unites States, 6304 homes in Japan or 7285 homes in Germany for one year.[8] Seagate has also gained ISO 14000 certification for all its factories and sponsors science fairs around the world, helping educate students about the importance of energy conservation.

8 Based on a reduction of 1.93 kWh per each of the 25 million consumer electronics hard drives produced in 2007. Annual household electricity consumption is 11,040 kWh, according to 2006 figures from the Energy Information Administration.

Energy-Efficient Electronics Gain Momentum in the Home

Cost Savings Combined With Environmental Benefits

Hardware manufacturers have uncovered the tangible, practical benefits, along with the environmental and financial advantages, of using energy-efficient hard drives. People can reduce energy consumption without the need to actively monitor their power use.

By using hard drives that dramatically reduce energy consumption, hardware manufacturers can contribute to environmental improvements that also make good business sense. Seagate is enabling long-term environmental advantages for original equipment manufacturers that are interested in both cost savings and environmental sustainability. These companies will appeal to a growing customer base and have the potential to attract new customers that prefer an environmentally sound technology provider over less-green competitors. Seagate can help companies and consumers reduce the environmental load of their activities and IT operations, reduce energy costs associated with powering hard drives, and support our fragile environment while delivering high-capacity, high-performance drives.

AMERICAS Seagate Technology LLC 920 Disc Drive, Scotts Valley, California 95066, United States, 831-438-6550
ASIA/PACIFIC Seagate Technology International Ltd. 7000 Ang Mo Kio Avenue 5, Singapore 569877, 65-6485-3888
EUROPE, MIDDLE EAST AND AFRICA Seagate Technology SAS 130–136, rue de Silly, 92773, Boulogne-Billancourt Cedex, France 33 1-4186 10 00