Lowering the Cost of Play:
Improving the Energy Efficiency of Video Game Consoles

Today, more than 40 percent of all homes in the United States contain at least one video game console. And all that gaming is adding up to serious energy use.

After conducting the first ever comprehensive study on the energy use of video game consoles, NRDC and Ecos Consulting found that game consoles consume an estimated 16 billion kilowatt-hours per year—roughly equal to the annual electricity use of the city of San Diego.[1] Because this estimate is based on the assumption that half of all users leave their device on all the time, gamers can significantly reduce the energy consumed by their consoles through simple steps like turning off the console when not actively playing a game or watching a movie and enabling power management features when available. But bigger changes in the industry are also needed, including the incorporation of more user-friendly power management features by console manufacturers and game designers.

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New Gaming Systems Are Popular, Often More Power Hungry

For our study we measured the power use of the latest and prior generation game consoles offered by Microsoft (Xbox), Nintendo (Wii), and Sony (PlayStation).[2] Among the most popular consoles, the Nintendo Wii uses one-seventh as much power as the Sony PlayStation 3 and one-ninth as much power as the Microsoft Xbox 360 during game play. Each console does, however, offer a different set of features and a different game play experience, with the Xbox and PlayStation both offering high-end 3-D graphics that require more power to generate. To their credit, Sony and Microsoft continue to optimize their systems after their initial launch, resulting in significant energy savings.

Through the incorporation of more user-friendly power management features on gaming consoles we could save approximately 11 billion kWh of electricity per year, cut our nation's electricity bill by more than $1 billion per year, and avoid emissions of more than 7 million tons of CO_2 each year.

Manufacturers, Developers, and Users Can All Improve Video Game Console Efficiency

Significant energy savings can be realized immediately if console and game manufacturers and developers adopt simple energy-saving technologies and if users make minor changes in how they use their consoles. Because consoles consume nearly as much power when left in Idle mode as when actively playing, building in an automatic power-down feature that would put a gaming console into a low-power mode following a defined period of inactivity is the single change that would bring the greatest savings in annual electricity consumption, especially for the estimated 50 percent of users who likely leave their machines on all the time. Implementing a power-down feature with a one- or three-hour delay in new gaming systems—and systems already in homes via software update—would bring significant savings and should be encouraged by users, retailers, and manufacturers alike.
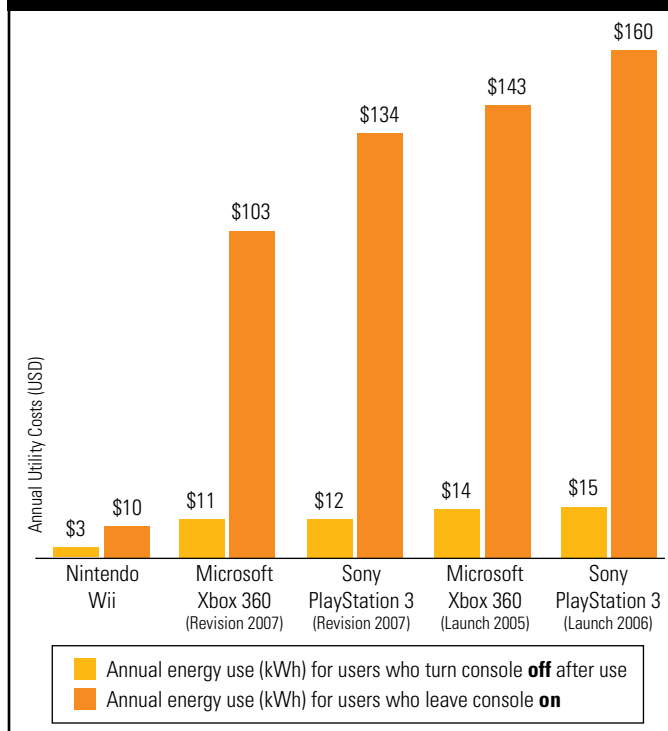
The Price of Play: Annual Energy Use and Costs for Three Popular Gaming Systems[3]

Annual Utility Costs (USD)

- $3 Nintendo Wii (off)
- $10 Nintendo Wii (on)
- $11 Microsoft Xbox 360 (Revision 2007) (off)
- $103 Microsoft Xbox 360 (Revision 2007) (on)
- $12 Sony PlayStation 3 (Revision 2007) (off)
- $134 Sony PlayStation 3 (Revision 2007) (on)
- $14 Microsoft Xbox 360 (Launch 2005) (off)
- $143 Microsoft Xbox 360 (Launch 2005) (on)
- $15 Sony PlayStation 3 (Launch 2006) (off)
- $160 Sony PlayStation 3 (Launch 2006) (on)

■ Annual energy use (kWh) for users who turn console **off** after use
■ Annual energy use (kWh) for users who leave console **on**

A Quick Look at the Most Popular Consoles

Nintendo Wii

Using an average of just 16 watts in Active mode, the Wii is the juice sipper of the group. Attracting buyers with novel, interactive game play rather than power hungry, high-end graphics, the Wii uses far less power to operate than its competitors.

Microsoft Xbox 360

Consuming an average of 119 watts in Active mode, the Xbox 360 sits in the middle of this widely spaced field. The Xbox does offer users a built-in auto power-down option, but the feature is disabled by default and buried deep in the system menu.

Sony PlayStation 3 (PS3)

Burning through an average of 150 watts in Active mode, the Sony PS3 draws the highest amount of power of the video game consoles on the market in 2007. In October 2008 Sony introduced a power management feature via online update, but it too is disabled by default.

Note: Wii, Xbox, and PlayStation are the respective registered trademarks of the Nintendo Corporation, the Microsoft Corporation, and Sony Computer Entertainment Inc.

How To Save Energy in Your Own Home Immediately

The single most effective way to save energy is to power down your system—after saving your game if necessary—when not actively playing. If you own a console with a power-saving feature such as auto power-off after a preset time, use it. To learn more about setting up this feature, visit **www.nrdc.org/energy/consoles/contents.asp**.

Conclusion and Recommendations

We must ensure that the next generations of consoles use less power than their predecessors, even while offering more features. In order to significantly reduce video game console energy consumption and the associated emissions of global warming pollution, extensive collaboration among the video game console manufacturers, the component suppliers, and software companies that design the games will be required. NRDC makes the following recommendations:[4]

■ Console manufacturers, game designers, retailers, gaming websites, and efficiency advocates should work together to develop and roll out a campaign to encourage users to turn off their video game consoles after use and to take advantage of the auto power-down feature on their console when available.

■ The next generation of game consoles should be shipped with an auto power down feature enabled by default that would go into effect after one to three hours of inactivity.

■ Game publishers and video game console manufacturers should cooperate to develop standard auto-save features in games similar to those used in computer software, so that the user experience is not disrupted when a power-down occurs.

■ Video game console designers are encouraged to include a "sleep button" on the controller.

■ New video game console designs should be optimized to dramatically lower the amount of power consumed during movie playback.

■ Video game console manufacturers should equip their products with the most efficient processors and power supplies available.

[1] Many users do not turn their video game console off. A game console that is left on 24/7 will use approximately 10 times more annual energy than one that is turned off after use. Due to the absence of any studies, we based our calculations on the assumption that 50 percent of users leave their device on when they are finished playing a game or watching a movie.

[2] Wii is a registered trademark of the Nintendo Corporation. Xbox is a registered trademark of the Microsoft Corporation. PlayStation is a registered trademark of Sony Computer Entertainment Inc.

[3] All utility cost estimates assume typical retail electricity rates of $0.10 per kWh.

[4] For more detailed recommendations, please read the full issue paper at www.nrdc.org/policy.