# Advanced Power Strip

## Description

The measure reduces stand-by equipment energy by turning off the power supplied to equipment that is plugged into a power strip when it’s not in use. Typical uses are home-office and home-entertainment systems. The power strip monitors the power draw on one outlet to control the availability of power on the other outlets on the strip.

This measure applies to new and existing homes.

The savings have been quantified for two power strip sizes: a 5-plug strip and a 7-plug strip.

## Basis for savings

We studied the provided spreadsheets showing savings estimates and the report done for BC Hydro by Power Smart Engineering. We also studied three papers that present the research on phantom energy use. The documents are:

* *Smart Strip Electrical Savings and Usability,* Power Smart Engineering, October 27, 2008
* *Final Field Research Report, Ecos Consulting,* October 31, 2006. Prepared for California Energy Commission’s PIER Program.
* *Developing and Testing Low Power Mode Measurement Methods,* Lawrence Berkeley National Laboratory (LBNL), September 2004. Prepared for California Energy Commission’s Public Interest Energy Research (PIER) Program.
* *2005 Intrusive Residential Standby Survey Report,* Energy Efficient Strategies, March, 2006.

In our search for a comprehensive study done for this measure we found a detailed study done by Navigant Consulting for San Diego G&E, March 31, 2009 titled, *Smart Strip Portfolio of the Future.*

The study done by Navigant compiles findings from various sources including ECOS and LBNL studies referenced above and a home electronics survey done by Hiner and Partners in California, October 2008 titled *Statewide Home Electronics Assessment Survey.*

## Savings analysis

The analysis considers two applications: home entertainment and home office. For each peripheral piece of equipment there are two consumption rates to consider: the standby mode consumption and the off mode consumption. For each of these modes the percent time in that mode is also considered along with the percent time that each peripheral is used with out the control device (TV or computer). The home office computer is assumed to not be in use 85.6% of the time while the home entertainment TV is assumed to not be in use for 77.7% of the time based on the Hiner and Partners survey.

The average savings per peripheral is calculated using the following formula:

Power = [(Power in standby) x (time standby) + (power in off ) x (time in off)] x [1-(%time used without PC/TV)]

The following table presents the values used to calculate the savings per peripheral.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Equipment** | **Power Consumption in Standby Mode (W)** | **Power Consumption in Off Mode (W)** | **% of Time in Standby Mode** | **% of Time in Off Mode** | **% of Peripherals Used Without PC/TV** | **Average Savings Per Peripheral (kWh/year)** |
| Flat panel monitor | 1.36 | 1.25 | 38.5% | 61.5% | 0.0% | 9.66 |
| CRT | 3.95 | 1.47 | 38.5% | 61.5% | 0.0% | 18.13 |
| Printer | 3.44 | 1.435 | 41.3% | 58.7% | 20.0% | 13.54 |
| Multifunction printer no fax | 7.85 | 7.75 | 55.6% | 44.4% | 33.3% | 38.89 |
| Multifunction printer with fax | 7.6 | 7.5 | 69.3% | 30.7% | 42.7% | 32.44 |
| Speakers, subwoofers, bass | 20.44 | 1.62 | 16.7% | 83.3% | 0.0% | 35.55 |
| Scanner | 4.05 | 0.46 | 26.9% | 73.1% | 4.5% | 10.17 |
| Copier | 1.2 | 0.052 | 23.3% | 76.7% | 41.9% | 1.39 |
| Modem | 7.21 | 1.74 | 86.3% | 13.7% | 9.6% | 43.66 |
| Shredder | 0 | 0 | 29.6% | 70.4% | 51.3% | 0.00 |
| Router | 5.85 | 0.06 | 86.5% | 13.5% | 6.7% | 35.34 |
| External hard drive | 4.53 | 0 | 25.0% | 75.0% | 0.0% | 8.46 |
| DVD player | 11.77 | 1.57 | 5.4% | 94.6% | 6.7% | 13.43 |
| VCR | 12.85 | 5.02 | 11.5% | 88.5% | 2.1% | 39.31 |
| Stereo | 27.38 | 2.29 | 7.1% | 92.9% | 49.3% | 14.00 |
| Speakers, subwoofers | 11.07 | 11.07 | 20.7% | 79.3% | 13.8% | 64.74 |
| Video game consoles | 4.05 | 0.88 | 12.0% | 88.0% | 2.0% | 8.38 |
| Computer only used for video/music entertainment | 46.97 | 3.17 | 33.3% | 66.7% | 33.3% | 80.37 |

For the 5-plug strip three equivalent control peripherals have been assumed. For the 7-plug strip five equivalent control peripherals have been assumed. The following table shows the allocation of peripherals and savings per strip for both the home office and home entertainment.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Three Peripherals per Power Strip** | | **Five Peripherals per Power Strip** | |
| **Equipment** | **% of Peripherals plugged into APS** | **Average Savings Per Peripheral Plugged into APS (kWh/year)** | **% of Peripherals plugged into APS** | **Average Savings Per Peripheral Plugged into APS (kWh/year)** |
| Flat panel monitor | 73.4% | 7.09 | 73.4% | 7.09 |
| CRT | 26.6% | 4.82 | 26.6% | 4.82 |
| Printer | 77.8% | 10.53 | 77.8% | 10.53 |
| Multifunction printer no fax | 7.2% | 2.80 | 7.2% | 2.80 |
| Multifunction printer with fax | 15.0% | 4.87 | 15.0% | 4.87 |
| Speakers, subwoofers, bass | 1.3% | 0.45 | 3.8% | 1.35 |
| Scanner | 17.0% | 1.73 | 50.9% | 5.18 |
| Copier | 10.9% | 0.15 | 32.7% | 0.45 |
| Modem | 18.5% | 8.07 | 55.4% | 24.21 |
| Shredder | 29.1% | 0.00 | 87.3% | 0.00 |
| Router | 22.5% | 7.96 | 67.6% | 23.89 |
| External hard drive | 0.8% | 0.06 | 2.3% | 0.19 |
| **Home Office Total** | **300.0%** | **48.53** | **500.0%** | **85.37** |
|  |  |  |  |  |
| DVD player | 100.0% | 13.43 | 100.0% | 13.43 |
| VCR | 40.8% | 16.02 | 100.0% | 39.31 |
| Stereo | 59.2% | 8.29 | 100.0% | 14.00 |
| Speakers, subwoofers | 27.1% | 17.57 | 54.3% | 35.15 |
| Video game consoles | 68.6% | 5.75 | 137.1% | 11.49 |
| Computer only used for video/music entertainment | 4.3% | 3.44 | 8.6% | 6.89 |
| **Home entertainment total s** | **300.0%** | **64.51** | **500.0%** | **120.27** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Five-plug Strip Summary** | | **Seven-plug Strip Summary** | |
|  | Home Office | Home Entertainment | Home Office | Home Entertainment |
| Average savings (kWh/year) | 48.5 | 64.5 | 85.4 | 120.3 |
| Total savings per home (kWh/year) | 113.0 | | 205.6 | |
| **Savings per unit (kWh)** | **56.5** | | **102.8** | |
| Demand savings (kW) | 0.006 | 0.010 | 0.011 | 0.018 |
| Peak demand savings per unit (kW) | 0.008 | | 0.015 | |
| Average demand savings per unit (kW) | 0.006 | | 0.012 | |

The tab labeled “power strips” in the “DSD Input Summary” spreadsheet contains the assumptions and the detailed savings calculations.

## Cost

The pricing for this measure is based on the data in the following table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Smart Strip** | |  |  | 5 plug | 7 plug |
| Supplier |  | Manufacturer | | Cost of Smart Strip | |
| Bits Ltd |  | Bits Ltd |  | $31.95 | $41.95 |
| SmartHome USA | | Bits Ltd |  | $30.95 | $40.00 |
| Ace Hardware | | Coleman Cable, Inc | | $29.99 |  |
| **Average** |  |  |  | $30.96 | $40.98 |
|  |  |  |  |  |  |
| **Power Strip** | |  |  |  |  |
| Supplier |  | Manufacturer | | Cost of Power Strip | |
| Best Buy |  | Spike Master | | $14.99 | $14.99 |
| Circuit City | | Cyber Power | | $14.49 | $14.49 |
| Ace Hardware | | Ace |  | $13.99 | $13.99 |
| **Average** |  |  |  | $14.49 | $14.49 |
|  |  |  |  | 5 plug | 7 plug |
| **Incremental Cost** | |  |  | **$16.47** | **$26.49** |