

Plug and process loads (PPLs) consume about one-third of primary energy in U.S. commercial buildings, equating to approximately \$56 billion dollars in energy expenditures per year.<sup>1</sup> Covering a wide variety of electronic, computer, refrigeration, cooking, information processing, medical treatment, and food service equipment – there is an enormous opportunity to better control PPLs and achieve significant energy savings. Advanced power strips (APSs) enable this opportunity, as they are similar to conventional power strips, but have built-in technology to reduce PPL runtimes and save energy when the devices are not in use.<sup>2</sup>

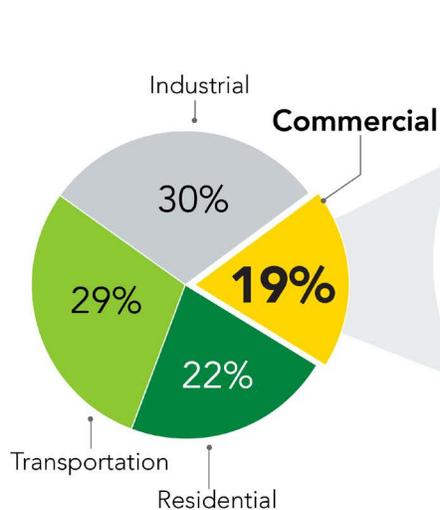
There are some misconceptions on how APSs work and their actual savings potential. This document was created to help bust some of these myths, get to the facts, prove what’s right and wrong, and encourage wider adoption of these cost-effective, energy-saving devices.

### MYTH: Plug loads DON'T matter.

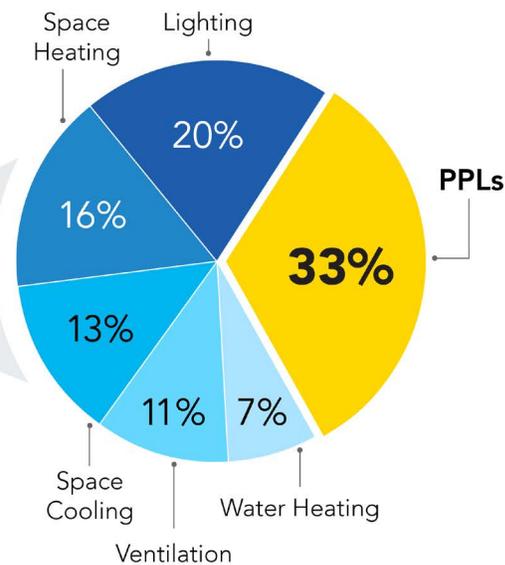
#### Plug loads DO matter.

PPLs consume approximately 30% of commercial building energy consumption<sup>3</sup> – costing U.S. commercial buildings billions of dollars each year! At the same time, commercial buildings, on average, are only occupied **one-third** of the time.<sup>4</sup> This leaves a significant opportunity to turn PPLs off at night, on weekends, during holidays, and whenever workspaces and common areas are not in use. To help control PPLs during these unoccupied times, APSs present a cost-effective solution, ranging between \$10-\$80 from multiple manufacturers. To help choose the right APSs and control types for building applications, the U.S. Department of Energy published a [Technical Specification for Advanced Power Strips](#).<sup>5</sup>

U.S. Primary Energy Breakdown



Commercial Buildings Energy Use Breakdown



PPLs account for 33% of the total energy consumed by commercial buildings.

Source: DOE (2010)

1 DOE 2010  
 2 DOE 2014  
 3 NREL 2013a  
 4 NREL 2011  
 5 DOE 2014

## MYTH: I don't have control over plug loads.

### I CAN have control over most of my plug loads.

There are many ways to assess and reduce PPL energy use, no matter your building type. Numerous documents, such as the National Renewable Energy Laboratory's (NREL's) Assessing and Reducing Plug and Process Loads in [Office](#) buildings and [Retail](#), can help guide you through this process. [APSs](#) offer an affordable and simple way to automate controls for numerous electronic devices in many space types.<sup>6</sup> Figure 2 provides an example of commercial space types that would benefit from APSs in various building types.

	Office Desk Area	Conference Room	Printer Room	Break Room	Computer Lab	Electronic Display Area	Cashier Aisle	Entertainment Center	Business Center	Gym	Party Room
Commercial Office	✓	✓	✓	✓						✓	
Medical Office	✓	✓	✓	✓							
Higher Education	✓	✓	✓		✓			✓		✓	
Retail						✓	✓				
Grocery							✓				
Food Service							✓				
Hospitality/Lodging								✓	✓	✓	
Multifamily	✓									✓	✓

To maximize the energy savings potential of electronic devices in these spaces, it's important to select an APS with (1) minimal parasitic loads and (2) optimal built-in control functionality for a given application. To navigate these control types, we recommend reading the Energy Saving Functionality section of the [Technical Specification for Advanced Power Strips](#). For quick reference, a summary of the five major APS control types and their functionality can be found in Figure 3.



#### Timer Power Strip

Power strip automatically turns off outlets based on a pre-set schedule.



#### Master-Controlled Power Strip

When a primary device (such as a computer) is turned off by the user, the power strip automatically turns off the controlled outlets where the peripheral devices (such as monitors or printers) are plugged in.



#### Masterless Power Strip

When all of the controlled devices are turned off, the power strip turns off power to those outlets completely, eliminating all of the vampire loads.



#### Remote Switch Power Strip

Power strip can be turned off by the user via a remote switch.



#### Activity Monitor Power Strip

Power strip looks for signs of activity and turns off outlets if none is detected.

6 NREL 2013b

## MYTH: Controlling plug loads is expensive and doesn't save money.

### Controlling plug loads does not have to be expensive, and it DOES save money.

APSS range from \$10-\$80 and provide an affordable way to control electric equipment and save on your utility bill. There are opportunities to save even more with bulk purchase and installation efficiencies. Additionally, utilities often provide incentives to offset the purchase cost of APSS. A list of utility incentives for APSS can be found on [DOE's Better Buildings Alliance Plug and Process Load Team website](#).

A number of case studies have proven the cost effectiveness of installing APSS in commercial buildings. For example, The Tower Companies, a commercial real-estate company in the Washington D.C. metro area, conducted a study where they installed motion-sensor APSS at workstations and for common area equipment in one of their multi-tenant office buildings. Tower Companies monitored plug load energy use and achieved an average of 9% plug load energy savings per day (Monday through Friday), which accounts for a 6% reduction during working hours and 29% reduction during non-working hours. A 6.5 year payback period was achieved and utility incentives were utilized.

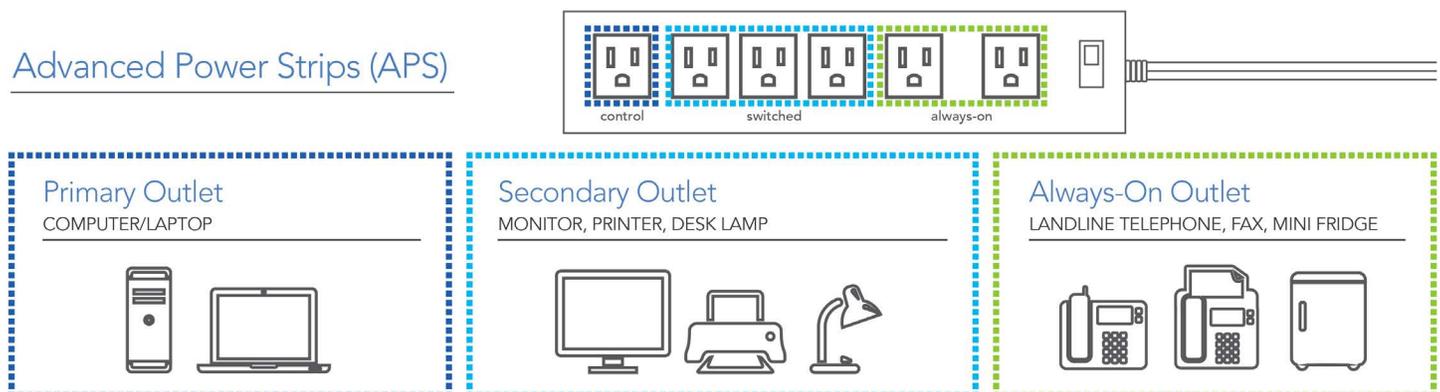
In another example, the [U.S. General Services Administration](#) (GSA) deployed APSS<sup>7</sup> throughout their office spaces through their Green Proving Ground program. GSA found that schedule-based (timer) control power strips were most effective, and they were able to achieve 26% energy savings associated with PPLs at workstations in addition to existing advanced computer management, and 50% energy savings in kitchen areas and printer rooms. A 2-year payback period was achieved.

## MYTH: APSS are confusing and tricky to install.

### With the right information, APSS are quick and easy to install and shouldn't require hands-on work after installation.

A designated "[plug load champion](#)" is recommended to effectively manage PPLs and ensure that PPLs are being operated in the most efficient way possible. The plug load champion should be responsible for educating tenants and occupants on how to use APSS, which should be easy to use and quick to install. APSS are most effective when all relevant stakeholders (including tenants, property managers, facilities engineers, etc.) fully understand the use and benefits. To help with this, NREL has published a 1-page visual graphic [how-to guide](#) that can be printed and handed to building occupants, or put on display in common areas.

Your APSS should be clearly labeled and include instructions that specify how to properly install, set up, and troubleshoot the APSS to maximize energy savings. Some APSS may link to dynamic and interactive web-based instructions, or they may provide labels on the APSS to make it easy for users to look up web-based instructions. Finding these features that enable easy installation and use will increase the likelihood of user acceptance and promote higher energy savings.



## MYTH: My tenants won't agree to control their PPLs.

### There are ways to encourage and incentivize your tenants to control their PPLs.

Getting tenant buy-in to participate in messaging campaigns or competitions to reduce PPL energy use is a key first-step in achieving a reduction in PPL energy use. Once there is buy-in, there are a number of ways to encourage PPL energy reduction behaviors, including trainings, informational letters, emails, signage, videos, periodic updates, utilizing built-in low power states, optimizing space design, and of course, using APSs. As APSs offer a more hands-off approach, the other strategies to encourage PPL energy reduction behavior may be paired with incentive programs that reward tenants or occupants when they meet or exceed PPL energy targets. For example, in GSA's net-zero energy historic Wayne N. Aspinall Federal Building, a portion of the rentable square footage fee that is collected from each agency for utilities is returned to the agency if it meets its plug load energy target.

To be successful over the long-term, continual reminders of PPL reduction efforts and incentive programs are necessary for keeping these goals in reach. Green lease language can also be added to leases for reducing PPL energy use, or maintaining low PPL energy use throughout a lease. Information on green leases can be found at the Institute for Market Transformation's [Green Lease Library](#).

## MYTH: APSs are not safe.

### APSs are safe and there are ways to ensure that your APS meets safety and fire requirements.

DOE's [Technical Specification for Advanced Power Strips](#) outlines a number of safety features that you should look for when procuring APSs. This includes a number of UL safety listings and features that relate to the lifetime expectancy and warranty of the APS. Additionally, look for packaging features and user instructions that include guidance on National Electric Code and International Fire Code compliance. Many industry members update their power strips every 10 years for safety purposes. If your standard power strips are reaching that age, consider upgrading to advanced power strips for your next switch-out!

## References:

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