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Managing Army Plug Load Equipment Energy Use: *Office Equipment*

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Managing Army Plug Load Equipment Energy Use: Office Equipment

Overview

Office equipment covers a large and diverse group of plug load devices. Policies focused on equipment purchase, power management, and usage limitations can save the Army more than 10 million kWh and \$620K per year within just four building categories. This represents a top opportunity for energy- and cost-savings identified by a recent Army plug load study.¹

Savings Potential

Non-computer office equipment consumes 14% of the energy from all evaluated plug load devices, and 24% in the Admin building alone. The savings potential from easy-to-implement measures is large.

Copiers, Printers, and Multi-Function Devices:

Bigger is not better when it comes to multi-function print and copy devices. In fact, the study shows that smaller networked devices (as shown in the left photo) use 90% less electricity on average than their larger counterparts (right). The measured energy use for large devices ranges from 420–850 kWh/yr. Most of this energy is to keep the machines warm in active standby mode, with a 20–80W base load, even over nights and weekends. During the study, only one of these large devices entered a 10W standby state, and only for six hours each night, reverting to 60W active standby at all other times. Another building had just replaced these larger devices in favor of smaller equipment; this behavior should be replicated in purchase decisions for most office applications.

Per Army Regulation (AR) 25-1, all printers, plotters, and copiers must be configured to enter energy-saving mode after no more than 30 minutes of inactivity or be turned off when not in use. DA PAM 25-1-1 further designates the NEC as responsible for setting up equipment and ensuring existing devices adhere to the sleep settings. Regular monitoring is important to confirm desired operation; PNNL's experience with large multi-function devices indicates that identical machines can behave differently under similar settings. Turning off unused devices can also save energy. For instance, pulling the plug on a plotter with a 60W idle load avoids 525 kWh of wasted electricity over a year.

Findings from the plug load study suggest that nearly 50% of the energy used by large multi-function devices (and 14% for smaller printers) can be saved through proper and consistent application of their embedded sleep settings. Army wide, savings from implementing and sustaining appropriate power management on these devices can save 8.5 million kWh and more than a half million dollars annually within the four building categories. This is a first and simple step to reduce the energy used by these devices.

Projectors: Enabling auto-off features that consistently power projectors down after use can save the Army over 750,000 kWh and \$45K per year in electricity while also reducing lamp replacement costs. Of the five projectors in the studied buildings, two were left on all the time. One was not used but left in standby and consumed twice the electricity (110 kWh/yr) as another that was used frequently yet had auto-power-off enabled. Another that was used frequently consumed 140 kWh/yr but relied on inconsistent manual control.



Office Equipment Best Practices

Office equipment (e.g., copiers, printers, projectors, televisions, shredders, and personal space heaters) use significant energy in many Army buildings. Opportunities for improvements include:

- Review technology selection and procurement against needs and intended use (encourage smaller, centralized equipment when appropriate)
- Enable and maintain power management features according to AR 25-1
- Educate and empower staff to identify and remedy or report issues that may prevent equipment from entering sleep mode
- Turn equipment off when not in use
- Limit personal space heater use per AR 420-1
- Monitor and validate equipment settings and operation on a regular basis.

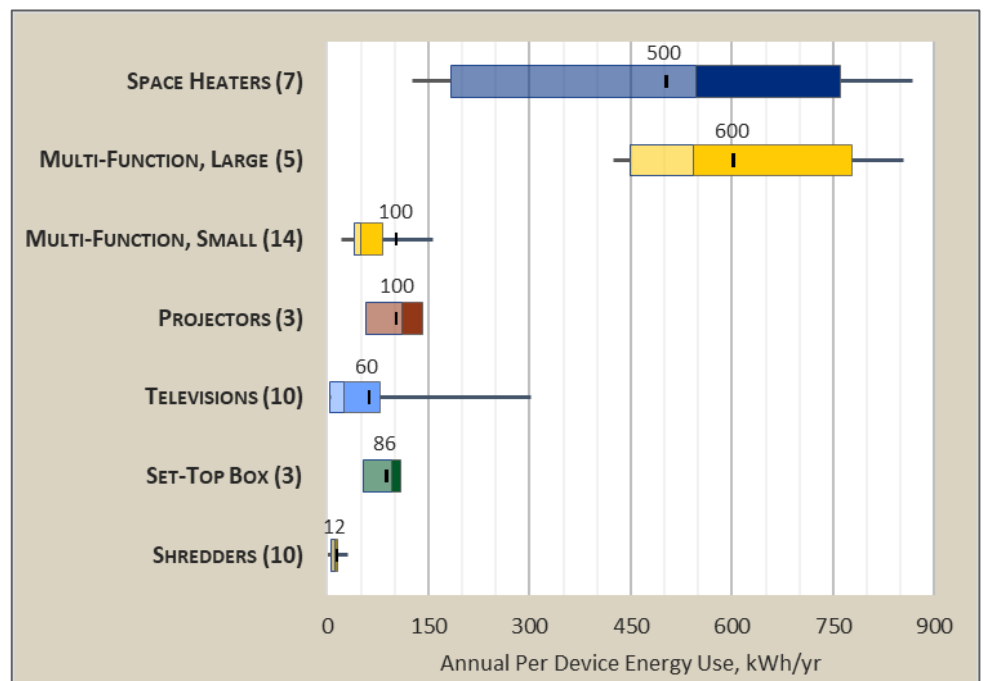
Television Displays: Modern TV phantom power loads are quite low. New 55-inch UHD models typically use between 50 and 130W in operation, and near zero when off. The biggest energy-saving opportunities are to purchase based on need, be aware of the energy impact of display settings, adjust the brightness as low as reasonable for the space and viewing conditions, and turn them off when not in use. Set top boxes, however, can use 8–20W of power even when “off”, and depending on use, can consume more energy over time than the TVs they serve. Where possible, unplug these devices when not needed for extended periods or control with a power strip.

Space Heaters: Personal space heaters may operate in Army buildings only under select conditions with supervisor approval (per AR 420-1 Chapter 22). Individual comfort needs contribute to highly variable use and significant energy consumption. Together, the 11 heaters observed in this study use an estimated 5,000 kWh/yr. Pursue alternative solutions to occupant comfort and productivity concerns prior to granting policy exceptions, and regularly reinforce safe and compliant heater operation as observed during the study.

Other: Paper shredders are abundant in many Army buildings, yet typical energy use is very low (10–30 kWh/yr). Peak loads reach 50–600W when active. Most use no power when idle; however, 30% draw a small load (<2W). Given the large quantity of devices and no difference in function, prioritize purchasing units with zero standby power.

Equipment Energy Use

The energy consumption for several types of office equipment is shown in the chart at right. Variations in occupant use and the settings of some devices contribute to a wider range of results. This is most evident for space heaters, large multi-function devices, and TVs, and it highlights the importance of active monitoring for understanding plug load energy use and reduction potential.



Distribution of annual energy use for office equipment. Vertical lines and values indicate average device consumption. The interface of horizontal bars highlights the median between 2nd and 3rd quartiles. Numbers in parentheses are the number of devices monitored for each type.

Resources:

- [Army Regulation 25-1](#)
- [Army Regulation 420-1](#)
- [ENERGY STAR: Office Equipment](#)
- [ENERGY STAR: Electronics](#)
- [GSA Plug Load FAQs](#)

About the Study

This fact sheet highlights best practices and savings opportunities for common plug load equipment identified by a study to examine their operation and energy use in typical Army buildings. The findings are intended to raise awareness, inform policies, and encourage actions to drive savings. This is one of four fact sheets that present recommendations offering significant savings to the Army, as well as other organizations. Additional detail regarding the study methods and results may be found within the technical report.

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¹ Characterizing Plug Load Energy Use and Savings Potential in Army Buildings. PNNL-29914. December 2022.

