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Managing Army Plug Load Equipment Energy Use: *Breakroom Appliances*

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Overview

Breakroom equipment is the third highest energy-consuming plug load category in Army buildings.¹ In addition to the vending machine measures described in a companion document, improved purchasing and control measures for breakroom appliances can save the Army more than 9 million kWh and \$550K per year in the building types evaluated.

Savings Potential

A variety of breakroom appliances help sustain the Army workforce. Beyond the large savings potential of vending machines, several other significant opportunities exist.

Refrigerators: Full-size breakroom refrigerators are the sixth-highest energy-consuming device type identified by the study. The annual electricity use across the nine refrigerators in the non-barracks buildings averages 660 kWh and ranges 260–1,120 kWh per device. Energy use is strongly correlated to appliance age; the average consumption for the oldest refrigerators (20–35 years) is more than twice the average for newer units. Replacing the oldest refrigerators across the Army with standard ENERGY STAR® models sized for the intended use could save more than 6.3 million kWh and \$380K per year within three building categories.

Personal mini-refrigerators also contribute to building energy use. A total of 21 units were identified within office areas, including one for every 3.4 occupants in the Admin building and one for every 5.1 occupants in the BNHQ. On average, these use a third of the electricity of full-size refrigerators yet provide less than one-fifth of the volume and are therefore significantly less efficient.

Army Regulation 420-1 prohibits refrigerators in private offices and workspaces with limited exceptions. The Army should emphasize the regulation and discourage the use of personal refrigerators in most settings, favoring the use of more efficient shared refrigerators in breakrooms. Further, many of the observed smaller refrigerators appear to have been rescued following removal from a barracks that was upgrading its stock. Evaluate policies governing excessing and recycling old equipment to minimize repurposing inefficient plug load devices in other buildings on the installation.

Coffee Makers: Coffee is essential to the workplace, and coffee makers are found within most breakrooms. However, the type of appliance can have a significant impact on energy use. This study found that commercial drip units consume 14 times more energy than single serve or small drip models due to the combination of a much higher standby load (50W vs. 1.3W) plus heating elements that operate intermittently to keep the large, brewed pots warm. For areas lacking significant coffee demand throughout the day, single brew devices are more energy efficient (but produce more solid waste when non-reusable or non-compostable pods are used). In applications where commercial drip devices are



Breakroom Appliance Best Practices

Recommendations for managing energy use from common breakroom appliances include:

- Replace old refrigerators (20+ years) with ENERGY STAR models of appropriate size and features for the application
- Communicate policies limiting personal mini-refrigerators in the workplace and encouraging the use of efficient, shared refrigerators
- Discourage the re-purposing and continued use of removed inefficient equipment via appropriate excess and recycling practices
- Evaluate coffee maker selection based on coffee demand, energy use, and waste; consider single serve or small drip machines where appropriate
- Use timers or similar controls to turn commercial coffee makers off each night and over weekends and other unoccupied periods
- Follow ENERGY STAR guidelines when purchasing water coolers; use cool-only units unless heated water is required for the application
- Educate users on best practices for operating appliances in a safe and efficient manner.

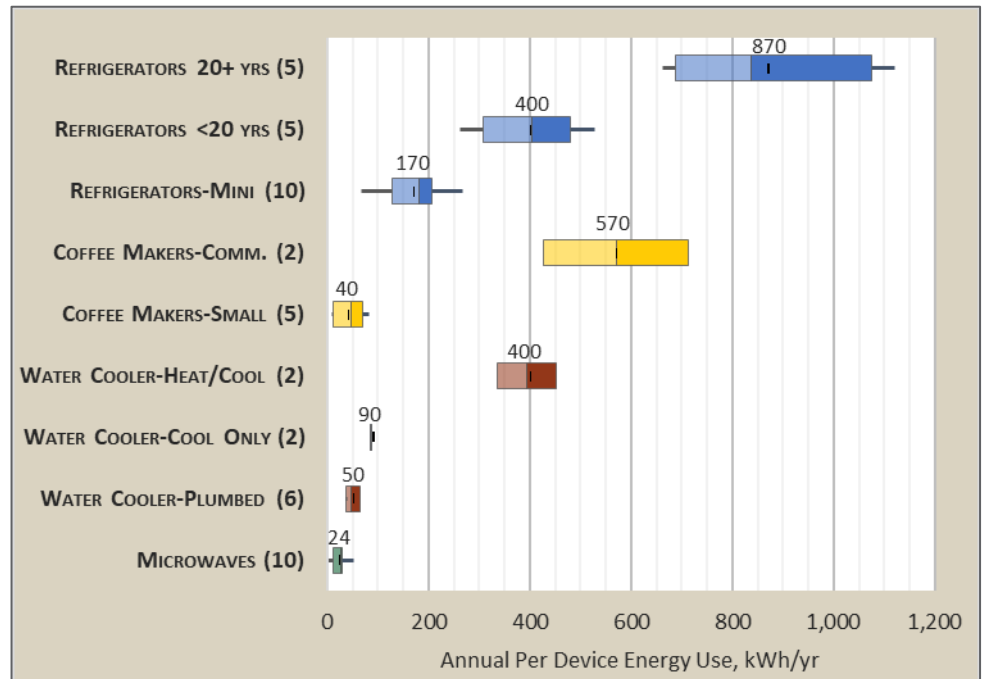
warranted, the use of timers or similar controls to consistently turn off the appliance each night and weekend can save over 3 million kWh and \$160K per year within Administration General Purpose buildings while also reducing fire hazards.

Water Coolers: There are several types of water coolers. Direct-plumbed wall-mounted units consume an average of 50 kWh per year, compared to 90 kWh for bottled water coolers, and 400 kWh for versions that dispense both hot and cold water. When considering water coolers, consult ENERGY STAR for recommended models and avoid units with heaters. Unplug the devices when unused for extended periods or when water has run out. Increase staff awareness of operation and ask that they use non-chilled water to make coffee.

Other Appliances: Breakrooms often contain microwave ovens, toasters, and other appliances. Microwave ovens often have a peak power exceeding 1,300W but are efficient at heating foods, operating for short duration with each use. Newer microwaves usually have near zero standby load and average less than 25 kWh/yr of electricity use. Other devices are typically used intermittently and best practice dictates turning off and unplugging when not in use.

Equipment Energy Use

Ranges of energy use for several types of breakroom appliances are highlighted in the chart at right. This reveals the significant variation in energy use that exists across many equipment types, e.g., the higher energy use of older refrigerators and commercial coffee makers. These results highlight the importance of monitoring to understand actual consumption patterns plus potential savings from improved purchase, operation, and control measures.



Distribution of annual energy use for breakroom appliances. Vertical lines and values indicate average 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 420-1](#)
- [ENERGY STAR: Refrigerators](#)
- [ENERGY STAR: Water Coolers](#)

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.

