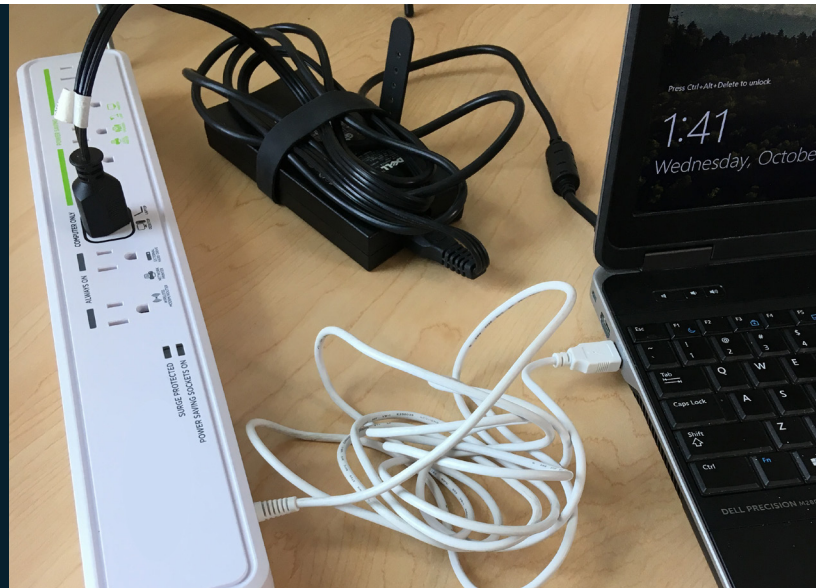


**BEGINNING TO CAPTURE THE UNTAPPED
ENERGY SAVINGS IN OFFICE PLUG LOADS**

Next generation of plug load control— tier 2 advanced power strips



In the quest to reduce energy use in offices, plug loads are becoming impossible to ignore. In Midwest office spaces, plug loads account for approximately 28% of the energy used. However, as we install ever more efficient lighting in these spaces, replace HVAC equipment and commission and tune controls, the fraction of energy use from plug loads increases. In many high performance buildings it is closer to 40–50% of the energy used.

New strategies are available for mitigating plug load energy. We recently conducted research on one of the newest: tier 2 advanced power strips (T2 APS). In Minnesota this solution has the potential to save up to 44 million kWh annually in that state alone.

PERIPHERAL USAGE

T1 and T2 APSs save energy by controlling peripheral loads such as task lights and monitors that are left on when not in use. We found that a lot of people leave this equipment on: night and weekend “unoccupied” workstation power at most of the sites we monitored was at least 25% of the active daytime use.

COMPUTER USAGE

But computers remain the largest energy consuming device found at a workstation. The type of computer plays a role in the energy consumption—with desktops being more

energy intensive than laptops and thin clients. At the three offices that we studied, no companywide computer power management (CPM) policy was implemented, suggesting significant potential for savings through the use of CPM or T2 APS.

New Solution Available

Implementation of effective plug load energy reduction strategies must take into account the many ways plugged in devices are used, as well as the variety of people using them. Previously, tier 1 advanced power strips only controlled peripheral devices. During our study, we tested a new plug load control technology—tier 2 advanced power strips. Tier 2 advanced power strips combine, for the first time, CPM with the control of peripherals.

TIER 2 ADVANCED POWER STRIPS CUT PERIPHERAL AND COMPUTER CONSUMPTION

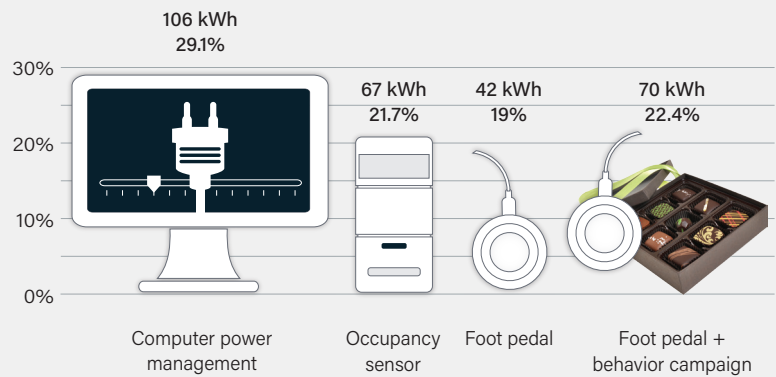
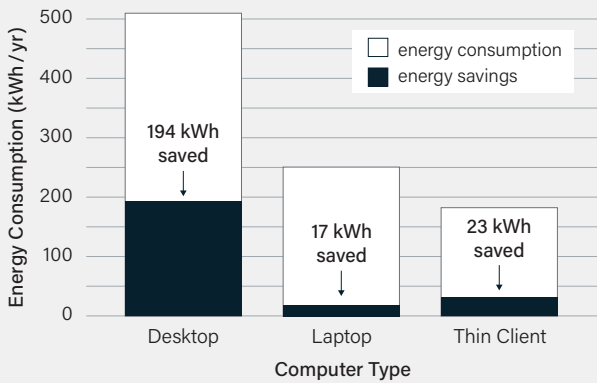
We tested an Embertec 8PC+ T2 APS. This device features a software integration to control CPM.¹

Based on previous research and feedback, we set the CPM delay to 30 minutes.

This device saved on average 30% of the workstation energy use in our tests.

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¹ We also tested a Tricklestar PC Advanced PowerStrip. Results for this device were lower than expected and can be found in the full report.



The average energy impact from implementing the Embertec T2 APS devices on desktop, laptop and thin client computers is shown in the top left figure.

OCCUPANT SATISFACTION

CPM can be challenging to implement in office settings—especially when no policy exists, and users are exposed to CPM for the first time. In our study user feedback on the T2 APS devices was mostly positive. Had we implemented a more aggressive CPM strategy, we would have increased energy savings but generated more negative user feedback.

BEHAVIOR INFLUENCES SAVINGS

Previous research tested an education/behavior campaign built around a T1 APS with foot pedal control technology. That research found that occupant behavior can increase energy savings. The research on T2 APS did not test a behavior campaign but its role cannot be discounted in the implementation and success of these devices. We recommend designating a key individual in the office who understands the device and can provide encouragement or assistance to co-workers. This increases the success and acceptance of these devices greatly compared to a third party or utility program “pushing” a technology onto an office.

SUCCESSFUL IMPLEMENTATION

Because the Embertec 8PC+ requires a 3rd party software to be installed, it is highly likely that the IT department will need to be involved in any such installation. We recommend developing a relationship with the IT department to increase support if any technical issues arise. In today’s office spaces, IT departments often push updates automatically overnight meaning it is crucial that the IT department understands and can work with the T2 APS devices.

ARE THESE STRATEGIES COST EFFECTIVE?

The tested device comes in at a price point of \$100 per device. In a new office, where new power strips will be purchased anyway, the incremental cost is \$85 per device. Life cycle cost analysis yields a break-even cost of \$147 for APSs—any power strip that costs less is cost effective. This corresponds to a payback of just over six years with typical incentives. For existing workstations, where a new power strip purchase was not required, the payback period is under eight years. We highly recommend using these devices in new workstations or when power strips need to be purchased. They could also be recommended for use with existing workstations if the longer payback period is acceptable.

Previous Research Results

This study built on previous Minnesota CARD-funded research that tested other strategies for commercial plug loads including standalone CPM, T1 APS with foot pedal, T1 APS with occupancy sensor and a behavior campaign. Energy savings from the strategies tested in the previous study are shown in the top right figure.

FOR MORE INFORMATION

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Full report to be released March 2019

Research report from previous study:

<https://slipstreaminc.org/research/powering-down-powering>

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