



Managing Plug Loads

Laptops & Chargers & Fans, Oh My!

Jessica Rivas

Consultant, Technology Assessment Service

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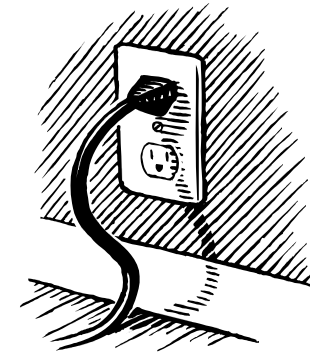
Outline

- What are we talking about?
- How bad is it?
- The elephant in the room – IT plug loads
- IT Peripherals
- Often-neglected plug loads
- Break Room plug Loads
- What you can do
- Resources



Definitions

A **plug load** is the energy consumed by any electronic device that's plugged into a socket.



A **vampire (or phantom) load** is the amount of energy a device consumes while in standby mode or switched “off.”



Which Products are Vampires?

Electronic equipment vampire loads fall into three general categories.

Electronic controls. Appliances that use a remote control or electronic power switch.

Clocks and other always-on components. Appliances that use internal clocks or other components that remain operational even in “off” mode.

Direct-current (DC) power. Anything that relies on DC power will have a power transformer that draws electricity all the time.

Some appliances can draw more than one type of phantom load!

A microwave oven, for example, always keeps an electronic touchpad active and also runs an internal clock.



The Rise of the Machines

Plug loads consume roughly 10-15% of commercial electricity use



There are 3-4 billion individual devices accounting for about 10% of total annual U.S. electricity use.



IT Plug Loads - Peripherals

Appliance	Power Draw Standby/Off (W)	Annual Energy Consumption (kWh)	Operating Cost* (\$/yr)
Computers	3-5 / 2	170-650	\$15-60
Speakers	6	21	\$1.89
Routers	n/a	350	\$31.50
17" Monitor (CRT)	1	186	\$16.74
17" Monitor (LCD)	1	97	\$8.73

*Assumes \$0.09/kWh.



IT Peripherals – Copiers, Printers & Fax Machines

Appliance	Power Draw Standby/Off (W)
Copier	3
Scanner, flatbed	8
Fax Machine, inkjet	9
Printer, inkjet	4
Printer, laser	3.5
Combination Device, inkjet	10
Combination Device, laser	5



Often-Neglected Loads – Space Heaters & Fans

Appliance	Power Draw On (W)	Power Draw Standby/Off (W)	Annual Energy Consumption (kWh)	Operating Cost* (\$/yr)
Personal Space Heater	1000	3	329	\$29.61
Personal fan, 8- to 16-inch	50	1	62	\$5.58

*Assumes \$0.09/kWh.



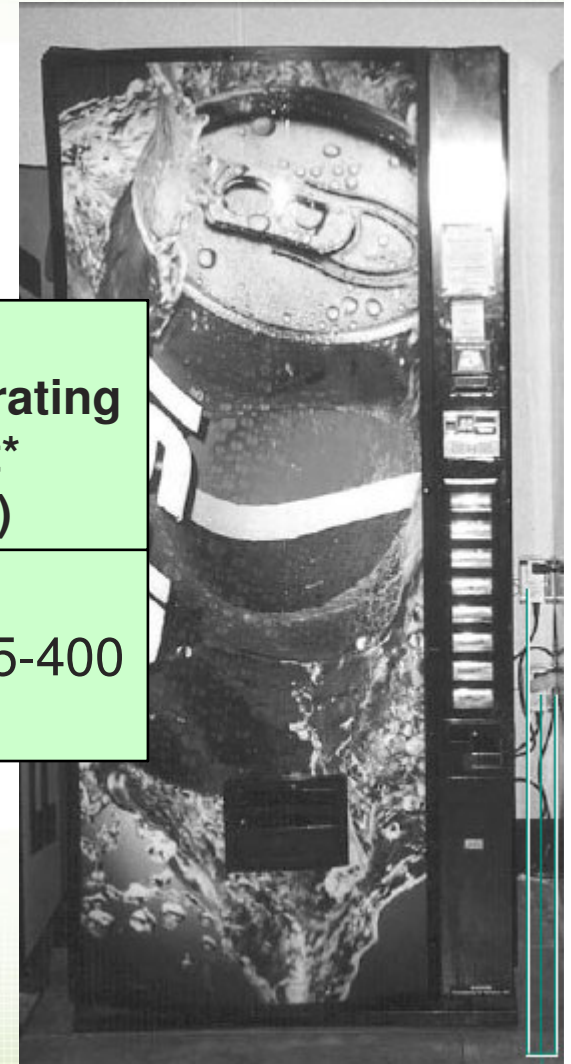
Often-Neglected Loads – Personal Items

Appliance	Power Draw On (W)	Power Draw Standby/Off (W)	Annual Energy Consumption (kWh)	Operating Cost* (\$/yr)
Clock Radio	10	3	30	\$2.70
Small Stereo with Remote	24	6	55	\$5.00
Phone Charger	0.8-2	1	7.2	\$0.70
Digital Photo Frame, 7-inch	0.25-1	0.25-1	6.57	\$1
Decorative Fountain	2	2	6	\$1

*Assumes \$0.09/kWh.



Break Room Equipment – Vending Machines



Appliance	Power Draw On (W)	Power Draw Standby/ Off (W)	Annual Energy Consumption (kWh)	Operating Cost* (\$/yr)
Refrigerated Vending Machine	1000	3	2500-4400	\$225-400

*Assumes \$0.09/kWh.



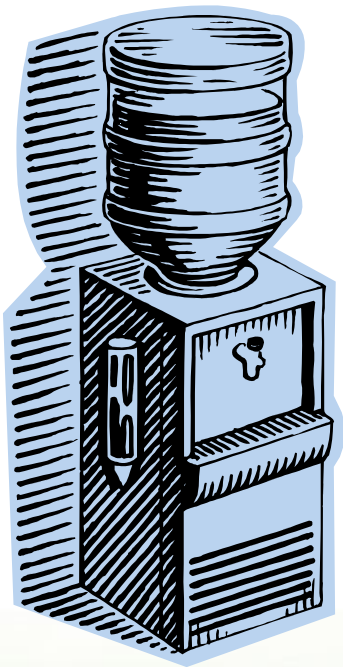
Break Room Equipment

Appliance	Power Draw On (W)	Power Draw Standby/Off (W)	Annual Energy Consumption (kWh)	Operating Cost* (\$/yr)
Coffee Maker, Large Commercial	1100	70/1	1349	\$121.41
Microwave Oven	1310	3	420	\$37.80

*Assumes \$0.09/kWh.



Break Room Equipment – Water Coolers



The average office water cooler consumes **800 kWh** per year!

That's as much as 2 high-power computers or 13 laptops.



Curbing Consumption

Appliance	Cost-Saving Strategies
Computer, desktops & laptops	Use aggressive power-management setting; use power strips
Monitor, CRT	Replace with flat panel monitors; use power strips
Monitor, flat panel	Purchase Energy Star models; purchase the smallest screen possible for a given application; use power strips
Computer speakers & other personal items	Turn off when not in use; attach to a power strip with other computer equipment; Attach to a timer
Copiers & Printers	Purchase Energy Star models; Turn off when not in use



IT Solutions - Laptops

The average laptop draws only about **25 watts** while turned on and **2 watts in standby** and while turned off. And because laptops often have more aggressive power-management settings built in, they will often cost **less than \$10 per year** in electricity to operate.



“Smart” Power Strips

Here are some of the main features you'll encounter when shopping for smart power strips:

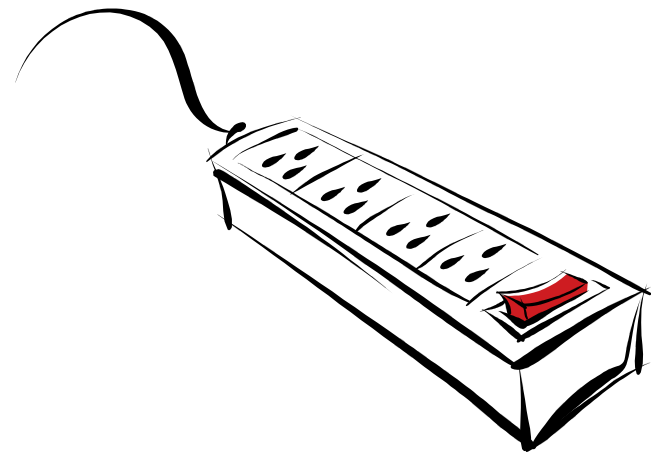
- Occupancy sensors
- Timers
- Monitors
- Bundled together or add-on power strips

Calculating Simple Payback:

Example: Incremental cost = \$20
150 Watts plugged into strip

$$\$20 \div (0.15 \text{ kW} \times \$0.10/\text{kWh}) = 1,333 \text{ hours}$$

Simple payback ~ 10 weeks, assuming equipment would otherwise be left on 24 hours a day.



Curbing Consumption

Appliance	Cost-Saving Strategies
Coffee Maker	Attach to timer so it is not heating water overnight; consider a smaller household model
Water Cooler	Attach to timer to turn off overnight; Choose an Energy Star model
Cold beverage vending machine	Use VendingMiser or other occupancy sensor; replace old, inefficient units



VendingMiser

Business type	General location	Measured energy savings (%)	Projected annual savings (kWh)
Office building	Basement gym	0.50	889
County courthouse	Courthouse front entrance	0.77	1,249
Elementary	Elementary schoolteachers' lounge	0.14	125
Airport hotel	Employee break room	0.06	308
Credit union	Employee break room	0.53	1,550
High school	High school cafeteria	0.08	371
High school	High school faculty room	0.07	178
High school	High school faculty room	0.12	111
High school	High school faculty room	0.30	816
Airport hotel	Hotel hall	0.34	696
Junior high school	Junior high cafeteria	0.53	2,129
Junior high school	Junior high main entrance	0.10	223
Junior high school	Junior high teachers' lounge	0.19	721
Ice rink	Lounge	0.39	1,127
Ice rink	Lounge	0.61	1,614
Community college	Stage	0.43	1,213
Fitness club	Workout room	0.10	371
Averages		0.31	805

Source: Avista Utilities



Resources

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- Lawrence Berkeley National Laboratory, Standby Power, <http://standby.lbl.gov/data.html>
- Ecos Consulting. Database of research on power draws of computers, TVs, set-top boxes, and monitors, www.EfficientProducts.org
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For More Information

Jessica Rivas

Consultant, E Source

Technology Assessment Service

Jessica_Rivas@esource.com

www.esource.com

303.947.5590

