The Problem of Plugs

PLUG LOADS AND THEIR GROWING IMPORTANCE IN ENERGY CONSERVATION
Home energy consumption

Energy consumption in homes by end uses
quadrillion Btu and percent

1993:
- Total: 10.01
- Space heating: 24.0%
- Air conditioning: 18.3%
- Water heating: 4.6%
- Appliances, electronics, and lighting: 13.1%

2009:
- Total: 10.18
- Space heating: 34.6%
- Air conditioning: 17.7%
- Water heating: 6.2%
- Appliances, electronics, and lighting: 32.5%

Source: EIA
Commercial energy consumption

- HVAC
- Plug Loads
- Lighting
- Other

High Efficiency Design
- Standard Commercial Building: ~50% below standard
- High Efficiency Building + Optimized Plug Loads: ~60% below standard
More devices = More power
One third of all commercial buildings electrical energy use is plug loads.
Projected energy use over time

Electricity Use Breakdown for Commercial Buildings

(Graph was created from Annual Energy Outlook data)
The Problem of Plugs is:

We feel we have a fundamental right to plug things in!

Power is “free” to the user.

“But it’s only a ____”

- Cell Phone
- Light
- Computer
- Fan
- Space Heater
- Refrigerator
- Whatever
Identify problem plug loads
- Monitor energy use
- Remove the most egregious energy users
- Turn it off! Including the vampire power!
- Use smart controls
- Use more efficient appliances
- Educate the users that electricity is not free
- Use renewable energy
What home appliance consumes the most energy?

- Coffee Maker
- Hair drier
- TV
- Video Game
- Computer
- Toaster Oven
- Refrigerator
Residential energy use by appliance

But the refrigerators one of the most essential appliances.

So we need to address the non-essential appliances first.

Turn the TV off when you are not watching it! Use the radio for background sound.

Use a laptop instead of a desktop

Use a one cup coffee maker or heat water in the microwave
Two of the biggest office offenders
Efficient work stations
Renewable energy subsystem

A DC subsystem could power almost all of the electronic devices in a typical office. Removing the plug loads completely from the grid.

The Emerge Alliance is proposing such a system for the modern workspace. Power could be distributed via POE over existing data lines. Devices could be controlled from a central source for power management.
Thank you!

Any Questions?

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