



WattStopper®

California Energy Efficiency Strategic Plan

R&D Panel

Plug Load Solutions

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WattStopper

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Plug Load Controls



Plug load equipment accounts approximate 14% of electricity usage in an office building, 1,500 Kwh or \$150 per office employee annually

- Computers & Monitors
- Task Lighting
- Fax machines
- Printers
- Coffee makers
- Fans
- Vending machines

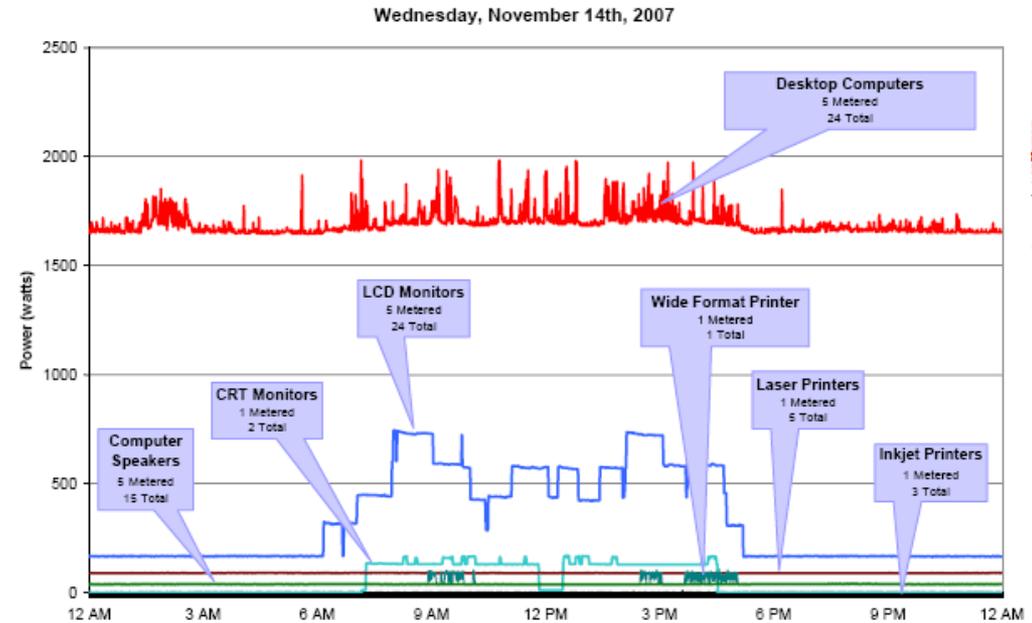


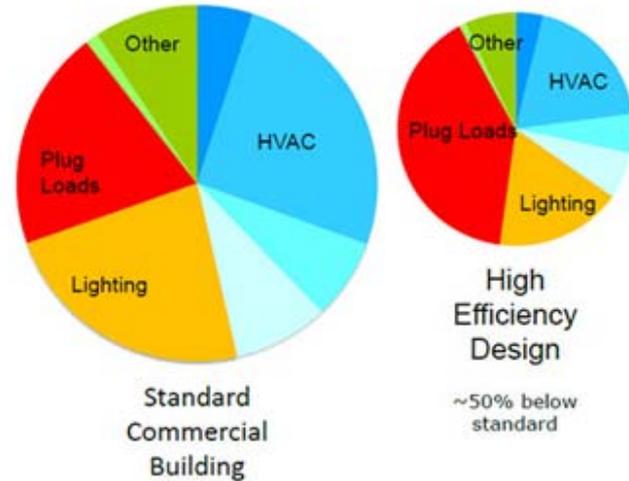
Figure 7. 24-Hour Snapshot of a Metered Site

http://newbuildings.org/sites/default/files/Ecos-Office-Plug-Load-Report_14Jul2009_DRAFT.pdf

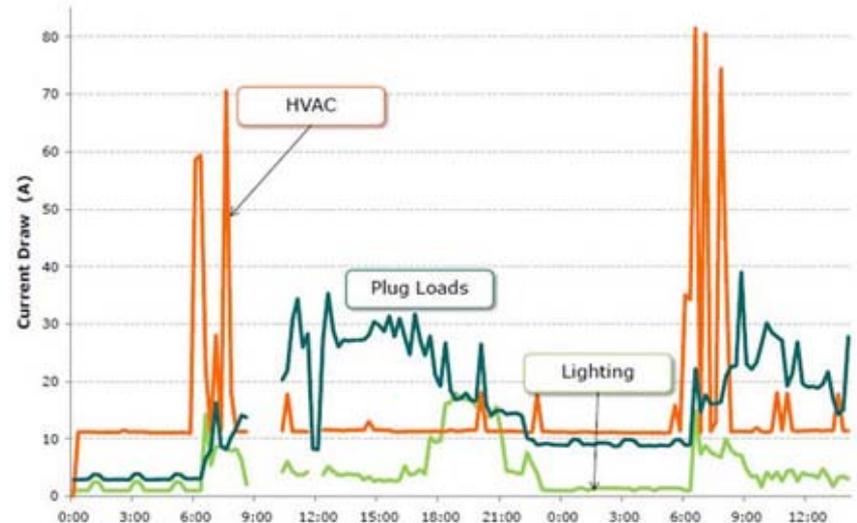
Plug loads in high efficiency designs

"Designs have become more efficient in lighting and HVAC. Now we're looking at how buildings actually use energy and we find that plug load is a higher and higher proportion."

- David Kaneda, Integrated Design Associates (IDeAs) in San Jose, Cal.,



IDeAs Office - Electrical Loads



Overview

Existing conditions

- Plug load types;
 - controlled, uncontrolled and monitored
- Existing plug load solutions
- Barriers and strategies to address gaps to improve existing and new technologies

Key Themes for Future

- Plug load savings, not receptacle control.
- Integrating into building design.
- Provide actionable information (metering)
- KW savings through passive and active DSM programs.

Plug Loads...Applications

Occupancy Control
Passive DSM



Metered /
alarmed

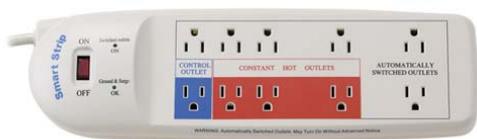


Scheduled / Active DSM



Uncontrolled

Existing Plug Load Solutions



Stand Alone Solutions



Wireless Control



Wired / Integrated Solutions

Barriers

- Existing conditions.
 - Wiring in walls, modular furniture, floor poke-thru's
 - Installers / Electricians; need simple solutions.
 - Quantity of devices with small consumption each... ROI?
- Technology
 - Integration to schedules, occupancy, DSM
 - Integration to Building Management
 - Power monitoring – what is being used / when?
 - Active and Passive DSM
- Construction coordination
 - Integration to lighting controls.
 - Reflected ceiling plans and power distribution.
 - Electrical and Mechanical control integration



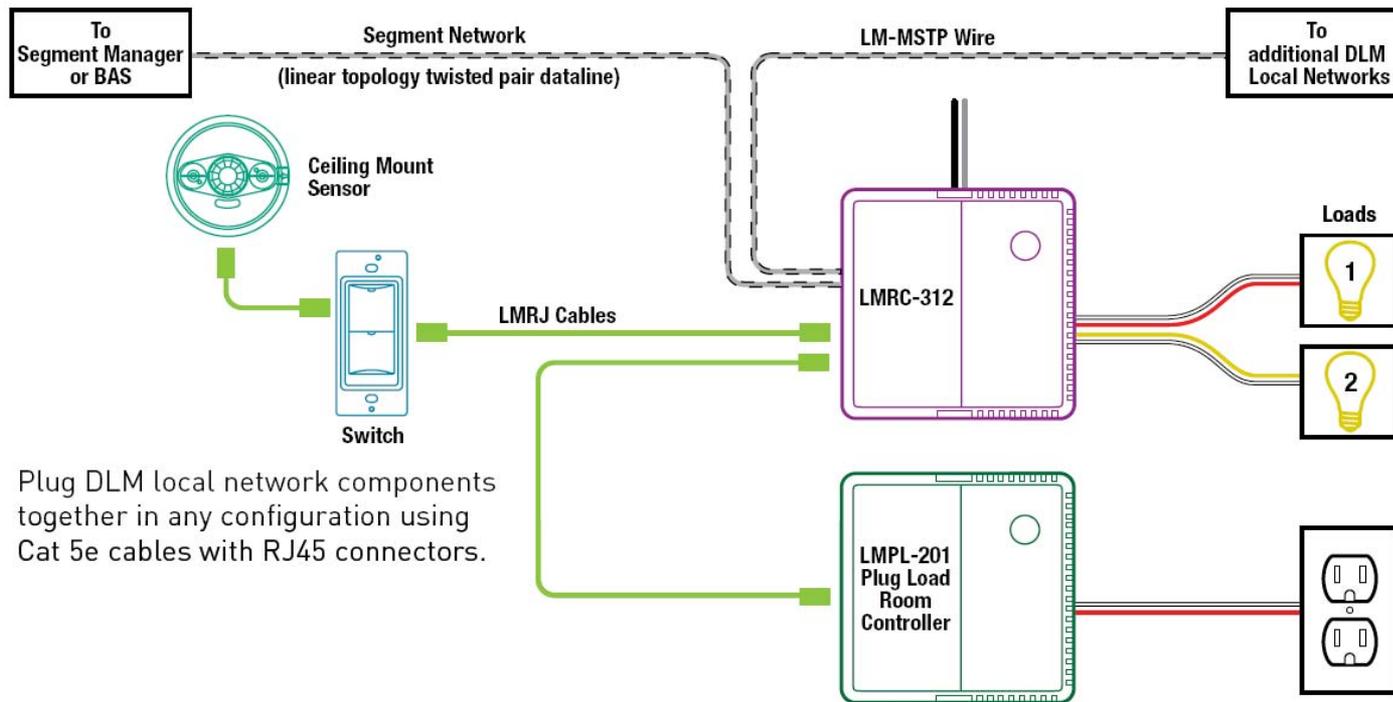
Accelerating Adoption

- Demonstration sites using existing solutions.
 - Scheduling, Occupancy, DSM, power monitoring.
 - Demonstrate how it works and how people react.
- Research projects ideas:
 - Integrate into modular furniture and poke-thru's
 - Retrofit applications using no new wires.
 - Assist with next generation solutions.
 - Technology / components / value proposition.
 - Demonstrate owner value proposition
 - Installation and maintenance costs versus savings.
 - Improved appliance performance / embedded controls; sensors, timers
 - Rigorous performance matrix for building types (wH / SF / year)



Demonstrate Performance, Document Results

Existing products for Plug Load control, power monitoring and BACnet networking.



Plug DLM local network components together in any configuration using Cat 5e cables with RJ45 connectors.

Summary

Key Take Aways

1. Plug loads have to be addressed for ZNE buildings.
2. Energy codes will drive demand.
3. Many applications will be complex using under floor wiring and furniture integrated power.
4. Solutions have to be effective and simple for the electrical contractor to install and commission.
5. Existing solutions can demonstrate scheduling, occupancy sensing, power monitoring and demand response for plug loads.
 - These case studies are required to demonstrate best practices.
 - Need solutions that are proven to deliver cost effective performance (KwH and KW) savings.
6. Industry needs research on next generation of plug load solutions and smart appliances.
 - Retrofit solutions need technology to address existing wiring limitations