Staking Savings on Reduced Vampire Loads

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Presentation Outline

• How do we define plug loads?
• Why are plug loads important?
• What is being done in California to address plug loads?
• Research and Development Efforts
• Title 20 Appliance Standards
• Vision for the Future

How Do We Define “Plug Loads”

• Plug loads are devices that plug into electrical outlets (as opposed to being hard-wired)
• They do not fall into other traditional end-use categories (appliances, lighting, HVAC, etc.)
• Can be residential or commercial
• Contain internal or external ac-dc power supplies, some or all of their energy is used in the form of low voltage dc
• Can have digital displays/timers, remote and/or soft touch controls, rechargeable batteries, etc.

Why are Plug Loads Important?

• Annual energy use estimates vary, but plug loads currently are responsible for about 15% of residential and about 10% of commercial electricity use
• Plugs loads in California are anticipated to grow from about 15% to about 30% of household consumption by 2030

Plug Loads Become More Important as Building Efficiency Improves

![Graph showing electricity and natural gas consumption over time]

Average Share of Residential Plug Load Energy Use by Product Category

- Entertainment
- Information Processing
- Home Office
- Other

On average, plug loads represent a significant portion of a typical household’s electricity use in – 17% of the average household’s electricity use.
What is being done in California to address growing plug load?

- **Research and Development**
  - Public Interest Energy Research
  - Proposed Element of the 2012-14 Electric Program Investment Charge investment plan

- **Appliance Standards**
  - Order Instituting Rulemaking (March 2012)
  - Three Phase plan 2012-2014

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Research and Development Efforts

- Battery Charger Test Procedure and Title 20 Standard.
- Revised Energy Star specification for computers.
- Ultra low energy computers.
- Energy Efficiency Ethernet specification IEEE 802.3AZ.

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Current Research

- California Plug Load Research Center at UC Irvine (Cal Plug) established in 2011
  - Focused research for efficient set-top boxes
  - Energy management systems for individual consumers

- EPRI
  - Improving computer efficiency
  - Power factor requirement for electronic loads

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Current Appliance Standards Rulemaking

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Minimum Performance Standards

- **External Power Supplies (2008)**
  - 0.5 Watts
  - ~1190 GWh/yr

- **Televisions (2012)**
  - Scales with screen size
  - ~2180 GWh/yr

- **Battery Charger Systems (2013)**
  - Separated performance metrics for “no-battery” and “full-battery” modes from “charge” mode
  - ~6500 GWh/yr

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Vision for the Future

- Convert power efficiently (power supply)
- Store and retrieve energy efficiently (battery charging)
- Scale power consumption to the level of service provided
- Auto-power down automatically when not in use
- Be shipped with power-saving features enabled by default
- Clearly communicate operating state to users and network