Our Networked Future

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October 7, 2010
Miscellaneous and Electronics

• These are **end uses** of energy
  – Electronics alone already > 11% of buildings elec.

• Significant savings possible through
  – changes in design,
  – changes in usage, and
  – both

• Naming challenging for these devices and modes
  – **Functions** key to making problem tractable
Orientation

• Two approaches to problem
  – present working forward
  – future working back
    (need both – key is balance)

• Actors – approach
  – Technology development — future
  – Utilities / retailers — present
  – Energy Star - both
Core methods to reduce energy use

- **active**
- **low-power mode**
- **idle time or power**

Annual energy; power sorted high->low
How to control Misc. energy?

• Present
  – we don’t know much about them
  – only way to control them is external
  – cutting power entirely OK

• Future
  – we know a lot about them
  – devices are mostly networked for functional purposes
  – devices can manage their own state
  – devices are networked: cutting power entirely NOT OK
Now, consider Electronics

- Many devices
- Multiple displays
- Many connections
- Audio, video separate
- Automatic functions
- Location independence

Internet

Service provider

Other rooms
Electronics

• Devices networked to share content
• May not be obvious (to user) what devices needed at any given time
• Manually powering up/down (even via remotes) only marginally successful
  – not a good use of people’s time/attention
• Power control needs to be automatic
  – “wake up when need to; go to sleep when can”

Goal: deliver more energy savings AND more convenience
Building Networks

everything networked

communicate, cooperate
When everything networked

Devices need to:

• ... have low-power network connections and efficient sleep modes
• ... be able to effectively respond to needs and preferences
• ... share information, capabilities and displays
• ... behave consistently, reasonably
Getting there

- Technology development roadmap
  - network standards (various layers)
  - user interface standards and conventions
    - (power control, display interaction, device behavior, lighting, climate, ...)
- Design user expectations
- Global reach

Also: [iea-4e.org](http://iea-4e.org) – click on News – look for ‘Standby’
More future trends...

- devices reporting energy use over network
  - to building, utility (for rebates), or others
- remote user interfaces
- alternative power distribution
  - low-voltage dc, wireless, ...
  - applies to all electricity, not just misc and electronics
- Nanogrids: very small power distribution systems
  - Single domain for voltage, reliability, administration
  - Gateways may be to AC grid or elsewhere
  - May enable functionalities not otherwise available
Summary - Orientation

• Need to consider future technology / strategy
  – danger of embedding unhelpful ideas in behavior
• Technology can do a lot for us
  – but not immediately, and not inevitable
• Energy Star can play a leading role in getting us to a better future
Thank you