Big Little Things:
New research in business and consumer electronics

Behavior, Energy and Climate Change Conference
Washington, D.C.
November 18, 2009

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Research Into Action, Inc.
Electronics: The New Frontier


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Presentation Outline

1. The study
2. The manufacturer’s world view
3. Three behavioral barriers to efficiency
4. Recommendations
SCE Electronics Plug Load Study (2009)

*Electronics and Energy Efficiency: A market characterization of eight business and consumer products*

➢ Talked with 40 manufacturers
Summary of Key Findings

Influencing the electronics market requires . . .

- **Cooperation** across a broad geographic territory
- **Flexibility** to adapt and evolve at the same pace as the products
- **Engagement** with manufacturers
- **Recognition** of each product’s unique supply chain and technical challenges
The Manufacturer’s World View

*We must be able to describe manufacturers’…*

**Decision-making criteria**  “We sell what the consumer wants”

**Attitude towards energy efficiency**  Only a few laggards
Most committed or at least engaged

**Motivation**  Control costs
Sell products
Make a profit
AND meet sustainability goals
Decision-making: Who Is the Customer?

- **End Users**
  - Direct: End user customizes product when ordering directly from manufacturer
  - Indirect: Features selected based on market research, attempt to satisfy retailer demands

- **Retailers**
  - Private Label: Retailer works directly with manufacturer to select product features

- **Business-to-Business**
  - Contract Manufacture: Buyer provides product specification to manufacturer, identifying required product features

- **Manufacturers**
  - Servers
  - PCs
  - Game consoles
  - Power strips
  - Imaging equipment
  - TVs
  - Audio equipment
  - UPSs
  - External power supplies
  - STBs
Attitudes toward Energy Efficiency

- Committed but Detached
- External Power Supply
- Display
- Imaging Equipment
- PC
- UPS
- Power Strip
- TV
- Satellite
- STB
- IPTV
- Game Console
- Home Audio Equipment
- Cable
- Considering
- Lagging

Engagement with energy efficiency efforts

50%

ENERGY STAR specification applies, size indicates penetration rate

ENERGY STAR specification applies, no penetration data

ENERGY STAR specification in development

No ENERGY STAR specification

Pay-TV providers
Three Key Behavioral Issues
(For Us and Them!)

Timing  When to intervene?
Planning  How far ahead to plan?
Standards  What type of efficiency goals or requirements should be set?
Timing: The Product Design Process
Timing: Time-to-Market

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>External power supplies</td>
<td>Minimum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCs</td>
<td></td>
<td>Minimum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TVs</td>
<td></td>
<td></td>
<td>Minimum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set top boxes</td>
<td></td>
<td></td>
<td></td>
<td>Minimum</td>
<td></td>
</tr>
<tr>
<td>Audio equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Minimum</td>
</tr>
<tr>
<td>Power strips</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPSs</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Servers</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Imaging equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Game consoles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Minimum</td>
</tr>
</tbody>
</table>

- Minimum: Initial release
- Maximum: Maximum release
Planning: How Far Ahead?
Planning: Why Is It Important?

*Quotes from manufacturers:*

If standards don’t look [far enough] ahead, we won’t change things.”

Anything that happens this year is already planned.”

We need aggressive limits for the future so we can drive our suppliers.”
# Standards: The Importance of Roadmaps

## Roadmap Schematic

<table>
<thead>
<tr>
<th>Milestone 1</th>
<th>Now</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
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</thead>
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<tr>
<td></td>
<td>10</td>
<td>10</td>
<td>15</td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Milestone 2</td>
<td>200</td>
<td>200</td>
<td>225</td>
<td>225</td>
<td>275</td>
<td></td>
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<tr>
<td>Milestone 3</td>
<td>X</td>
<td>X+3</td>
<td>X+4</td>
<td>X+5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Long-term**
# Standards: Climate Savers’ Roadmap

**Climate Savers Volume Server Requirements**

<table>
<thead>
<tr>
<th>Efficiency Targets &amp; Definition</th>
<th>Purchase Commitment Levels (% of Total Annual Purchases)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Member’s 1st Year</td>
</tr>
<tr>
<td><strong>Bronze</strong></td>
<td></td>
</tr>
<tr>
<td>85% efficient PSU or most recent ENERGY STAR spec</td>
<td>≥10%</td>
</tr>
<tr>
<td><strong>Silver</strong></td>
<td></td>
</tr>
<tr>
<td>89% efficient PSU</td>
<td></td>
</tr>
<tr>
<td><strong>Gold</strong></td>
<td></td>
</tr>
<tr>
<td>92% efficient PSU</td>
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</tbody>
</table>

## Standards: ENERGY STAR TV Specification – Take 2

*Specification for TVs < 275 square inches*

<table>
<thead>
<tr>
<th></th>
<th>May 1, 2010</th>
<th>May 1, 2012</th>
<th>May 1, 2014</th>
<th>May 1, 2016</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Version 4.0</td>
<td>Version 5.0</td>
<td>Estimated</td>
<td>Estimated</td>
</tr>
<tr>
<td>Max consumption in on mode (W)</td>
<td>0.190*A + 5</td>
<td>0.130 * A + 5</td>
<td>0.11 * A + 5</td>
<td>0.085 * A + 5</td>
</tr>
<tr>
<td>Max consumption in sleep mode (W)</td>
<td>1.0</td>
<td>1.0</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Peak luminance in “home” mode, as % of “retail” mode</td>
<td>65%</td>
<td>65%</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Max consumption in download acquisition mode (kWh/day)</td>
<td>0.08</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>User interface design in accordance with IEEE 1621</td>
<td>Recommended</td>
<td>Recommended</td>
<td>Required</td>
<td>Required</td>
</tr>
</tbody>
</table>
Standards: ENERGY STAR TV Specification – Take 2

Actual ENERGY STAR spec language

6) **Future Specification Revisions**: EPA reserves the right to revise the specification should technological and/or market changes affect its usefulness to consumers or industry or its impact on the environment. EPA expects to make these revisions in 2013 and 2015.

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*Research into Action*
Standards: Why Are They Important?

Quotes from manufacturers:

“[ENERGY STAR] gave us something to target, to build towards. Before that, it was either extremely efficient, or just as good as you could without affecting the [user’s] experience. [ENERGY STAR] gave us a focus.”

“[ENERGY STAR] regulations have moved the bar substantially. But the specs are too loose.”

“Any time there’s a higher rating because of a more aggressive threshold, we’ll look at it closely.”

“We know that standards are getting tougher, so we’re always looking to do better.”
Standards: What We Need

MANDATORY
Minimum Energy Performance Standards

Aggressive VOLUNTARY Targets

VOLUNTARY Energy Targets

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The Last Word: Recommendations

• Set MEPS for electronics products
• Re-conceive ENERGY STAR voluntary targets
• Reconsider intervention timelines based on product time-to-market
• Fund basic research:
  • Baseline studies for selected product types
  • Electronics saturation survey
  • Electronics end-use metering/load profiling

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