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MELs: Context, Past Success, and Future Directions

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DOE MELs Workshop

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MELs Have Been Called Many Things

- “Other” (Meier, 1987)
- “Miscellaneous” (Meier, 1992)
- The subset of standby:
 - “leaking electricity” (Sandberg, 1993)
 - “vampire loads” (anon. ~1999)
 - “wall warts” (anon. ~1998)
 - “lopomo” - LOw POver MOde—energy use (Meier ~2004)
- Plug Loads (many conflicting definitions)
- “MELs”
 - “Miscellaneous Electrical Loads” (NREL, ~2010)
 - “Miscellaneous & Electronic Loads” (Nordman, ~2006)
- Residual or not otherwise categorized
- Base Load (utility perspective)
- “Minor”

Slicing the MELs Pie: Some Examples

- High usage / low saturation
 - Well pumps, aquariums, hot tubs, cell base stations
- Extensions of traditional end uses
 - Local space & water heating, portable fans, cooking appliances, task lighting
- Electronics incl. information technology infrastructure
 - TV/video, displays, printers, modems, servers, routers
- Health, safety, security, infrastructure
 - Emergency lighting, alarms, controls, transformers
 - Exercise machines, medical equipment
 - Code-required
- Principal-Agent
 - Builder installed, service provider owned, occupant provided

Comings and Goings: MELs are constantly changing

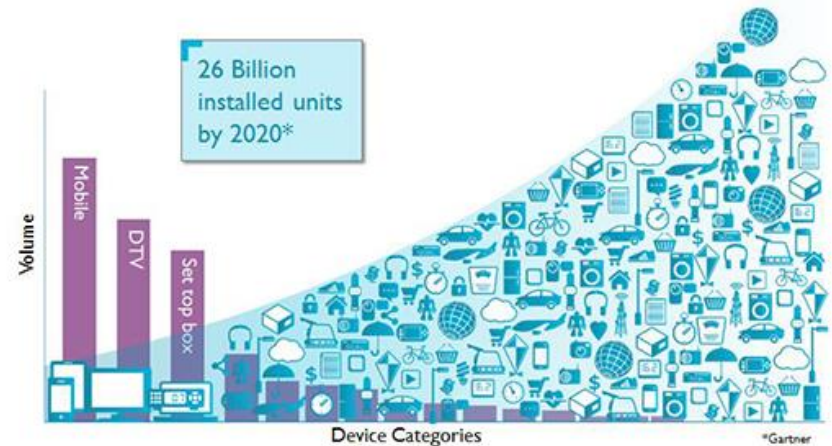
Gone and going

- Waterbeds
- Lava lamps
- Irons
- Fax machines
- TV standby (instant on)
- “Bricks” (linear external power supplies)



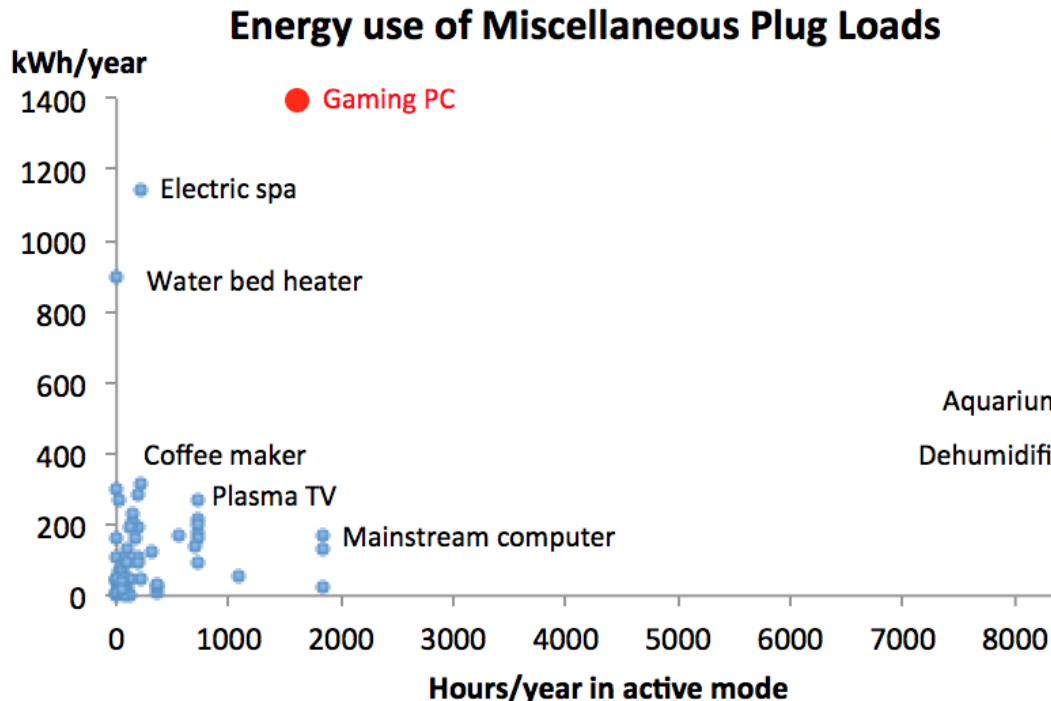
New and arriving

- Residential elevators
- Home health
- Cartridge coffee makers
- Robots (vacuum, pool cleaner)
- IoT
- Gaming PCs

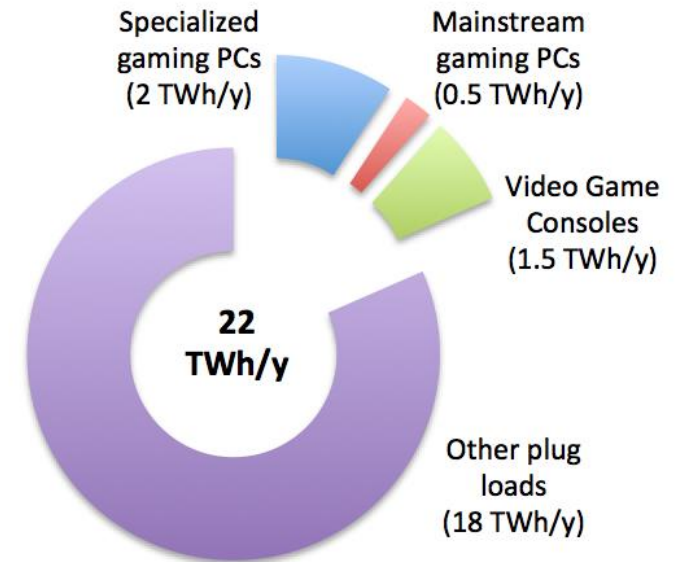


Ever Changing MELs: The example of Gaming PCs

- Barely existed 10 years ago; now may represent 5% of residential electricity use
- Sales growth at ~5%/yr



California gaming electricity in context with other residential miscellaneous plug loads



Examples of successful reductions in MELs energy use

- Voluntary Standards (Energy Star)

- Monitors, PCs, TVs, Printers, Dehumidifiers, ...



- Appliance Standards

- TVs, EPS, DTAs, Pool pumps, Spas, ...



- Technology (Open) Standards

- Energy Efficient Ethernet, ACPI



- Sustainable Procurement

- 1W executive order, EPEAT, 80 Plus



A Proposed Classification System*

- **Traditional**
HVAC, Water heating, Refrigeration, Lighting, Cleaning & Cooking
- **Electronics**
Audio, Point-of-sale, Computer, Display, Imaging, Networking, Peripherals, Security, Set-top, Telephony, Video
- **Miscellaneous**
Business equipment, HVAC, Electric Housewares, Hobby/leisure, Infrastructure, Lighting, Major Appliances, Other, Outdoor Appliances, Personal Care, Power, Transportation, Utility, Water heating

*Nordman and Sanchez, Electronics Come of Age: A Taxonomy for Electronic and Low Power Mode Products, ACEEE Summer Study, 2006.

Proposed Research Strategies

- Supply more **information** to the user
 - Self-metering, energy reporting, test methods
- Improve **network** coordination
 - Communications protocols, technical standards
- Develop more efficient **components**
 - Circuitry, motors, materials, insulation, power scaling, power distribution
- Enable better user **control**
 - Power management
 - User interface standards
 - Output matched to user needs

The unique nature of IT devices and the scale / heterogeneity of MELs require a different approach than traditional end uses

Thank You!

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MEL