EnergyStar V4 – draft 1 Consolidated Sleep / Standby (Off) / WOL Spec Feedback

14 Feb 2006

Sleep/Standby (Off)/WOL Tier I Targets

General Feedback

- Industry believes the most impactful means of reducing energy consumption on computing platforms is to increase the use of effective power management
  - If successful, Idle power targets will become a secondary, less impactful benefit
  - Ideal case is systems move in/out of Sleep during long periods (>15min) of inactivity vs sitting in Idle
  - Per Tier I proposed specs, DT Sleep target power is 7% of Idle target power; NB Sleep target power is 23% of Idle target power

Enabling Power Management saves 70% more kWh than 80% efficient power supply.

	kWh	Cost
Total Energy Savings using S3 in WHr. per Day (24HR period) from Pilot	**346.0572**	**$18.69**
Total Energy Savings using 80% effic. PS in WHr. per Day (24HR period) calculated	**105.7907**	**$5.71**
Total Energy Savings S3 vs. 80% effic. PS in WHr. per Day (24HR period) from Pilot	**240.2665**	**$12.97**

- In this pilot, **implementing PM was minimal cost and saves 70% more** than an 80% efficient power supply system. Payback is immediate and only requires conviction to enable it.
- 80% efficient power supplies will cost a customer $10-15 additional per unit for a mainstream class desktop system in 2007 - 2008. They are not available today in quality or quantity for mass production.

ITI Data based on Dell call center case study

Catch: If Sleep/Off targets are too aggressive EPA will encourage improper industry and consumer behavior – leaving systems in Idle vs Sleep/Off

Sleep/Standby (Off)/WOL Tier I Targets

General Feedback

- WOL has varying degrees of usefulness based on the computing environment
  - Managed enterprise environments: up to 35% overall Client PC market
    - Useful for asset management, security, and maintenance
    - Not applicable WW where enterprise/IT infrastructure lags US & Europe
  - Consumer PC's (~40% Client PC mkt) have limited current use for WOL functionality
    - Proliferation of enterprise uses (i.e.. VoIP) may change this over time but will require infrastructure changes (service models)
- WOL in environments that value it is only meaningful for WIRED Ethernet LAN (802.3) connections – Energy Star should clarify to avoid confusion
- Long-term risk to WOL power consumption due to link speed migration and real TCO value to IT
  - 100Mb is defacto client standard today ('06); trend toward 1000Mb (2010+)
  - Legacy IT/Comms infrastructure allowed clients to switch to low-power (10Mb) mode in Sleep states; Current and future trends will not allow for this 'down-shift' keeping clients in higher power mode (100Mb) for Sleep
  - Increasing $$ value for IT organizations to manage clients out-of-band or while in Sleep states → drives link/platform performance & power up for systems in Sleep states

Sleep/Standby (Off)/WOL Tier I Targets

General Feedback

- Note: System testing indicates PSU efficiency strongly impacts whether platforms can meet aggressive Sleep/Standby (Off) targets
  - Measured data suggests variability in internal PSU's can swing total system SLEEP and Standby (Off) power by up to **2x**
- Sleep / Standby (Off) references to ACPI Spec definitions is a good thing;
  - Need to be careful detailing which states realistically need to account for 'wake' events
  - Focus on simplicity where possible but clarity as well
- Current 5W Sleep target w/ WOL is not achievable for DT or Workstation class systems
  - Strong dependency on memory config (family, speed, capacity)
  - Silicon integration and increasing capability trend pushes this number up YoY
- Current 2W S5 target w/ WOL is not a valid state definition per ACPI
  - Harmonize S5 target spec with existing FEMP order → 2W, no WOL enabled
- Current proposal for Sleep/OFF system config & measurement metrology is insufficient
  - Will lead to inconsistent, inaccurate data sets which cannot be correlated
  - E.g.. UUT configuration is not specified; test conditions not specified

Sleep/Standby (Off)/WOL Tier I Targets

Recommendations

- Move to three state definitions for Sleep/Standby (Off)/WOL
  - Non-managed sleep state (S3 no WOL)
    - DT Target = 5W
    - NB Target = 4W
    - Workstation – does not apply
  - Managed sleep state with WOL (S3 w/ Ethernet WOL)
    - DT Target = 10W
    - NB Target = 5W
    - Workstation – does not apply
  - Standby/Off state (S5)
    - Align S5 target to FEMP for DT/NB: 2W, no WOL
    - Workstation does not apply
- Update Sleep system config and measurement metrology
  - See Appendix feedback

DT Sleep consumption improves by 33% (~60% PC clients)
NB Sleep consumption improves by 100% (~40% PC clients)

Appendix A Feedback

Test & Measurement for Sleep Mode Power Levels

- Appendix A lacks a methodology for measuring sleep/standby states; industry proposal fixes this
- Following feedback is in relation to industry recommended 3-state proposal for Sleep / Standby (Off) / WOL
  - Managed Sleep State (S3 w/ WOL)
  - Sleep State (S3 w/o WOL)
  - Standby State (S5)
- Key Gaps
  - Appendix A must specify UUT configuration for both Sleep and Standby (Off) state testing
  - Appendix A must be more specific in the test methodology to ensure consistent, reliable, repeatable results

Appendix A Feedback

Test & Measurement for Sleep Mode Power Levels

- UUT Configuration clarifications
  - For all measurement cases, if a battery is present it should be removed (AC wall plug power only)
  - No external devices are plugged into the system (FLASH cards, USB devices) other than the standard configuration
    - Standard configuration consists of keyboard, mouse, monitor
  - System should be configured for test as follows
    - Managed Sleep State (S3 w/ WOL):
      - Ethernet NIC has WOL enabled
      - Ethernet NIC connected to a 100BT/10BT Switch
      - System placed in S3 sleep state
    - Sleep State (S3, no WOL):
      - System placed in S3 sleep state
    - Standby (Off)
      - System placed into the S5 Soft-off state

Appendix A Feedback

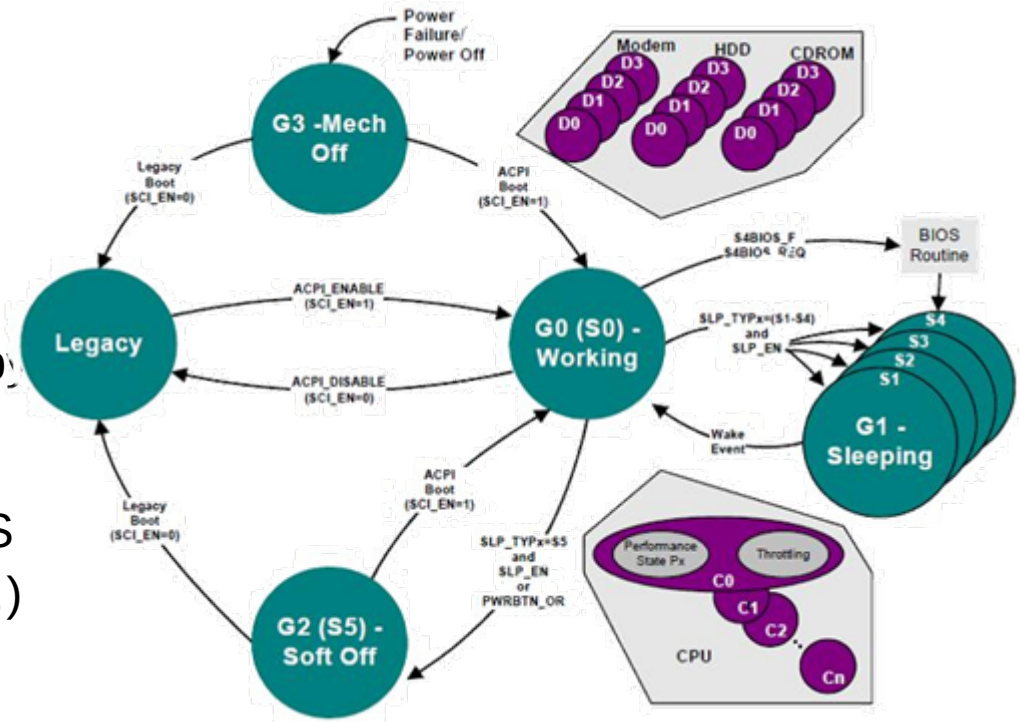
Test & Measurement for Sleep Mode Power Levels

- Measurement Feedback
  - Feedback given in relation to Industry proposal to reduce sleep/standby states to the following:
    - Managed Sleep State
    - Sleep State
    - Standby State
  - UUT is placed into the test condition defined for the sleep/standby state
  - Platform power measured
    - Power is measured and averaged over 5 minutes.
    - Measurements take place anytime after 5minutes of the system transitioning into the tested state.

Appendix A Feedback

Test & Measurement for Sleep Mode Power Levels

- Clarification on ACPI PM states and appropriate wake events
- G1 – Sleeping States
  - OEM will implement a Standby state (S1, S2 or S3) and Hibernate (S4)
  - Sleep States Resume into OS
  - Wake events (WOL, USB, …) are appropriate for any G1 Sleep state
- G2 – Soft off State
  - Also known as S5
  - Soft-off State requires an OS boot to enter G0 Working state
  - Only power button or power failure should exit this state



From ACPI r3.0a spec
http://www.acpi.org