

# EnergyStar V4 – Draft 2

## Industry “Top 5” Issues with Draft 2 spec proposal

4 May 2006

# Positive Draft2 Spec Items

- Additional time to implement
- Tier I duration (through Jan'09)
  - *January is still a 'tweener' market window, recommend Tier I thru Jun'09*
- Network I/F = Ethernet (802.3)
- WOL required only for 'Enterprise' systems
  - *Consumer PC 'exemption'*
- WOL in Standby now listed as 'not required'
  - *recommend stronger spec language to exempt S5 testing from WOL requirements in all cases*
- Aligned internal power supply requirements across all categories

# Negative Draft2 Spec Items

1. Redefinition of Type A/Type B DT while holding previous Idle power targets niche's ES targets to only very high end and very low end systems;
  - Addition of 'active' network connection to Idle test config w/o adjustment to Idle power.
  - Inclusion of Integrated Computers into DT class targets without adjustment for spec targets or power levels.
  - *Out-of-scope definitions and data set.*
2. Readjusted Sleep power budgets down for no WOL case for DT & NB
  - Contrary to data provided indicating power trending up due to memory technology transitions and non-deterministic nature of PSU 5VSB efficiency.
3. Movement to a line-item power budget for WOL & Memory in Sleep
  - Adds complexity to the spec w/o sufficient power budgets
4. Workstation def'n expanded to include UP and DP but no exemptions for Sleep and Standby, or Idle
  - despite workstation use condition and needs to address persistent availability.
5. Lumping of DDS into DT spec compliance guidelines
  - Idle and standby are biggest rocks due to persistent availability (uptime) requirement, monitoring, and variation in system loads.

**The likely result of all of these changes (primarily in definitions) is very limited DT, Workstation and DDS compliance.**

# Idle White Paper / Data Critique

- Use of and extrapolation from a web report (Silent PC Review) to conclude future dual-core CPU idle power is erroneous:
  - Does not account for type and market share of specific CPU products in '07+ timeframe
  - Does not account for silicon process and leakage power variation
- A linear multiplier to account for efficient power supplies across and existing platform data set is not valid due to unknown PSU efficient starting point.
- **[ REMOVE - No correlation (specific configuration details for every system device – vendor & model number) provided between system data in Idle white paper and new Type A/Type B system configurations; does not account for the degree of variation that different system devices can have on platform Idle power]**
- Incorrect platform information (confusion of HDTV outputs with S-Video or standard TV outputs)
- Idle power document again did not provide sufficient system configuration information to allow correlation with industry data (no data on drive configurations, separation of chipset from video card solution when dealing with integrated vs discrete Gfx.
- Insufficient sample size of system devices (like drives, add-in cards, etc..) to draw general conclusions on wall plug power.
- Insufficient sample size of device variation within a class (interface and speed of HDD, number of HDD's, TV tuners – single or dual, standard def or high def, etc...) to draw general conclusions on wall plug power.
- No systems in the data set actually met (4) of the (6) criteria for a Category A DT – leading to erroneous conclusion that a 75W Idle budget is sufficient.
- **ADD = Skewing of data by:**
  - **Including a preponderance of laptop processors in DT data, configurations which are more expensive and will likely remain extremely rare for the foreseeable future dues to economic and other factors.**
  - **projecting a greater market share for high-end systems rather than working from a base of current system and market data.**

# EnergyStar V4 – Draft 2

## Industry Proposal for Desktop (DT) Client Idle Configurations

4 May 2006

# Guiding Principles

1. Simplicity – Look for a defining attribute that is ubiquitous and intuitive to non-technical PC purchasers
2. Expedience – Focus on an attribute that enables Tier I spec closure vs opening up new debates
3. Relevance - Pick an attribute that represents the DT market reality for Tier I horizon (Jul'07-Jan'09)

# DT Idle Proposal

- Huge variability in type and amount of non-CPU system attributes (Gfx, storage, memory, etc..) permeates all PC system price points
  - Doesn't serve guiding principles 2 or 3
- ES v4, draft1 – delineator used CPU cores + CPU frequency
  - Meets guiding principle 1 but not 2 or 3
  - Frequency is becoming less relevant as an indicator of CPU performance
    - Cores are the new CPU differentiator
- Proposal: use CPU cores as Tier I DT Idle differentiator
  - Basic DT = single package, single core CPU
  - Performance DT = single package, 2+ core CPU
- Defer broader system definitions and Idle targets to Tier II timeframe

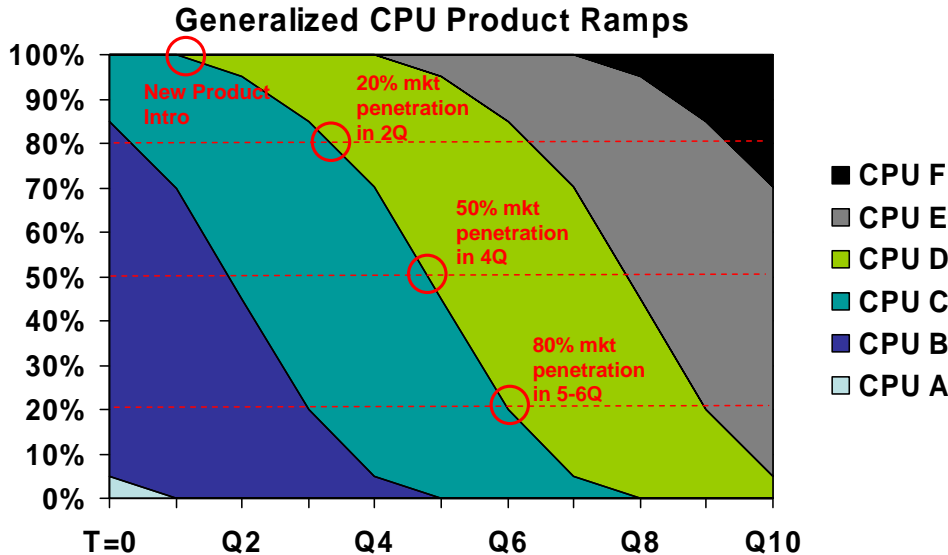
<b>Desktop</b>	50W Idle	75W Idle

# Justification

- CPU cores as defining attribute for Tier I DT system differentiation meets all three guiding principles
- EPA stated goal for ES'07 – compliance limited to top 20% in 2007, 40% by 2010,  $\geq 80\%$  by 2014
  - Dual Core CPU market penetration exiting 2007 could be up to 50%....BUT...
  - Not all Dual Core systems will meet Energy Star...
    - Only some Dual Core system price points will be viable for Gov't
    - Only some Dual Core platforms can meet 75W Idle target
      - Other HW config variables (Gfx, Storage, TVtuner, Drives, etc...) will restrict compliant configuration options
  - Many Single Core systems will not meet Energy Star...
    - Single core platforms will likely be most prevalent in consumer/retail markets
    - Energy Star is considered a modest PC purchase criteria in consumer DT
    - Some limited configuration Single Core platforms may be suitable for Gov't purchase



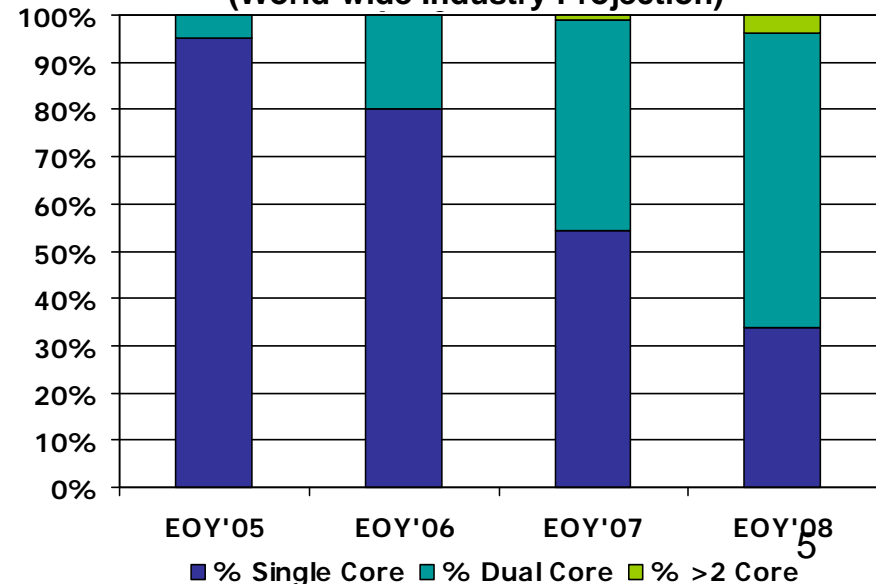
# CPU Market Dynamics



- New CPU products take ~4Q on average to reach 50% market penetration
  - Both Intel & AMD have new dual-core CPU products launching midyear '06
  - By ES07 1st compliance (Jul'07), new dual-core CPU products *maybe* @ 50% market penetration
- Market ramp of new CPU products mkt is a function of:
  - Si manufacturing capacity
  - Complexity of transition to OEM's
  - Pricing strategies vs other products
  - Competitive environment

- Dual core CPU's are bigger die size and more expensive to mfg than single-core CPU's
  - Natural speed limits on how far and fast Si manufacturers push new, larger die products
  - Difficult to maintain positive \$\$ margin structure as PC system prices reduce
    - Dual-core CPU's unlikely to penetrate Entry PC space (<\$400) within Tier I spec horizon

**% PC Market by CPU Cores  
(World-wide Industry Projection)**



# **Energy Star Workstation Requirements**

**Industry Comments on  
Proposed Definitions and Limits in  
Energy Star for Computers, Version 4, Draft 2**

# Energy Star Workstation Definition

General: Must meet all criteria	Requirement
Error-Correcting Code (ECC) Memory	Shipped installed
Buffered or Registered Memory	Shipped installed
Marketed as a “workstation”	Manufacturer markets product specifically as a “workstation”
2 or more GPUs or a single GPU with $\geq 256$ MB VRAM	Shipped installed

Performance: Must meet 3 criteria	Requirement
Ships with 2 or more qualified ISV software packages	Shipped installed
Striped RAID configuration	Shipped with RAID preconfigured
SCSI or SAS hard drives and controllers	Shipped installed
3 or more serial IDE/SATA hard drives	Shipped installed
Stereoscopic Video output (e.g. 3-dimensional display)	Shipped installed
Multi-graphical processing unit (e.g. SLI or CrossFire)	Shipped installed
Dual Gigabit Ethernet	Shipped installed
2 or more processors or single processor with 4+ cores	Shipped installed

Reliability: Must meet 1 criteria	Requirement
Calculated MTBF of 25,000 hours or more	All configs
Mirrored RAID hard drive	Shipped preconfigured

Network Availability: Must meet 1 criteria	Requirement
Grid resource management software	Shipped installed or on CD with system
Remote management client	Shipped installed or on CD with system

# Energy Star Limits V4, Draft 2

Product Type	Standby (off)	Sleep	Idle	Power Supply
Workstation	$\leq 2W$	$\leq 7W$	$\leq 115W$	<u>Internal Power Supply</u> $\geq 80\%$ efficient at 20%, 50%, & 100% rated load Power factor $\geq 0.9$ at 100% rated load

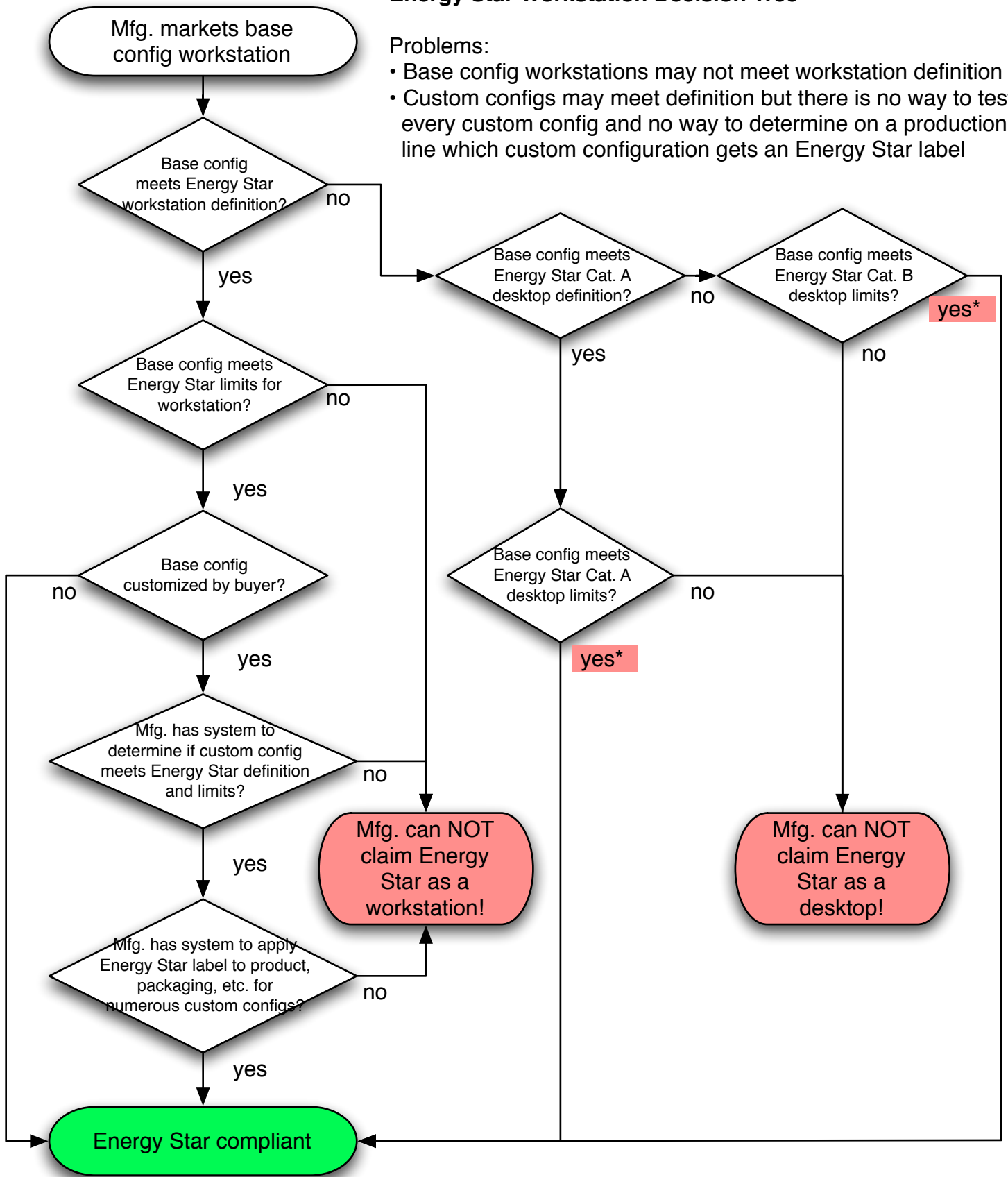
Measurements taken with equipment connected to active Ethernet network at highest supported speed  
 \*Idle measured on integrated systems and notebooks with display in sleep mode

Capability Adders for Standby & Sleep	
Wake on LAN from sleep or standby	add 0.7W to sleep and standby limit
Additional memory	add 0.2W to sleep for each memory module greater than 2

# Energy Star Workstation Decision Tree

## Problems:

- Base config workstations may not meet workstation definition
- Custom configs may meet definition but there is no way to test every custom config and no way to determine on a production line which custom configuration gets an Energy Star label



\*not probable

# Industry Workstation Definition

Workstations Category A - Entry Level (must meet all criteria)	Comments
Manufacturer markets product as "workstation"	
2 or more hard drive bays	number of bays populated with hard drives not specified
4 or more memory sockets (including use of riser cards)	number of slots populated with memory not specified
3 or more PCI/PCI-X/PCIe sockets (including video card socket)	number of slots populated with cards not specified
Power supply output rated $\geq 400W$	

Workstations Category B - High Performance (must meet all criteria)	Comments
Manufacturer markets product as "workstation"	
3 or more hard drive bays	number of bays populated with hard drives not specified
6 or more memory sockets (including use of riser cards)	number of slots populated with memory not specified
4 or more PCI/PCI-X/PCIe sockets (including video card socket)	number of slots populated with cards not specified
Power supply output rated $\geq 600W$	

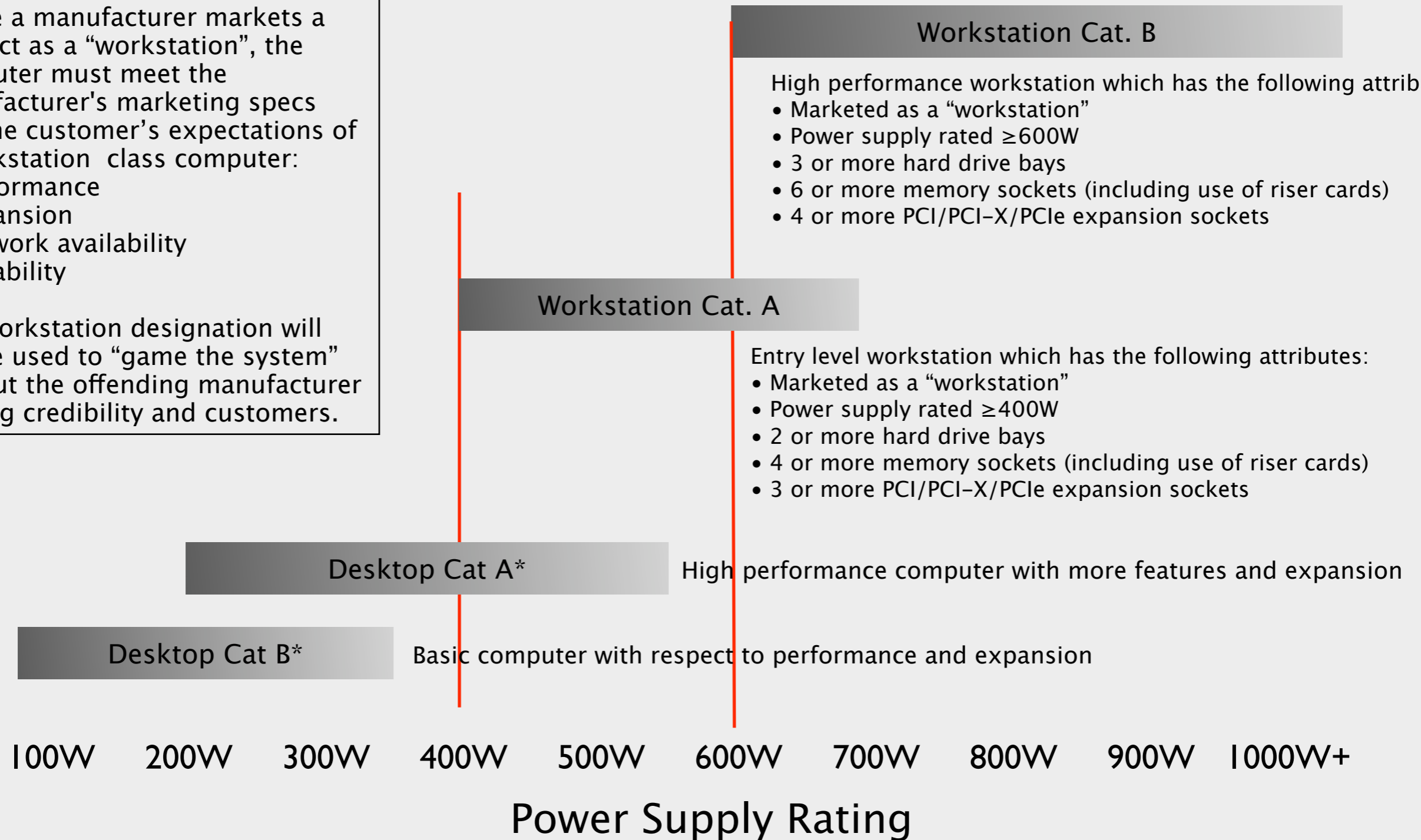
# Differentiating Desktops from Workstations

## Note:

Before a manufacturer markets a product as a “workstation”, the computer must meet the manufacturer’s marketing specs and the customer’s expectations of a workstation class computer:

- Performance
- Expansion
- Network availability
- Reliability

The workstation designation will not be used to “game the system” without the offending manufacturer losing credibility and customers.



\* Category designations should be reversed for desktops

# Industry Proposed Limits\*

Product Type	Standby (off)	Sleep	Idle	Power Supply
Workstation Category A Entry Level	TBD*	TBD*	TBD*	<u>Internal Power Supply</u> ≥80% efficient at 20%, 50%, & 100% rated load Power factor ≥0.9 at 100% rated load
Workstation Category B High Performance	TBD*	TBD*	TBD*	
Measurements taken with equipment connected to active Ethernet network at highest supported speed				

\* Based on testing of early development units of next generation high performance workstations, the 2W standby, 7W sleep, and 115W idle limits appear to be unachievable for most manufacturers. Once the workstation definition is fully defined and more mature test units are available, industry will work with Energy Star to determine achievable limits.

In addition, industry's recommendation is that power limits be selected to allow enough margin to accommodate features and configurations demanded by the typical workstation customer.



# Justification

Workstations should be clearly defined in a way that allows the manufacturer to designate their base configuration product as a workstation without relying upon fluctuating configurations set by the manufacturer's marketing department or by the end customer when they configure their system online for purchase.

Customer confusion will result if the workstation status and corresponding Energy Star approval changes based on a customer selectable configuration (e.g. "If you don't add an extra video card, your workstation becomes a desktop and will not be Energy Star compliant").

Product definitions that change based on the outcome of many possible customer selected configurations is not manageable from a testing and labeling perspective.

Manufacturers need to know the classification of their product up front since marketing materials, spec sheets, user guides, etc. must be prepared to either claim Energy Star or not.

For low volume product categories such as workstations, sales and marketing teams can not support an ambiguous Energy Star marketing claim that is contingent upon the final customer configuration of the product.