Topic	Subtopic	Comment	Response
Definitions	Graphics Attributes	A stakeholder suggested that the definitions of Graphics Processing Unit (GPU), Discrete Graphics Card (dGfx), and Integrated Graphics (iGfx) be changed back to the language from Version 5.0 because currently, they could allow for misinterpretation. For example, discrete GPUs in a Notebook application are not generally in card format. This commenter proposed new definitions and recommended that additional dGPUs be accounted for in a system with an 80% allowance of the primary GPU.	EPA has revised the proposed definitions per the stakeholder's suggestions to avoid confusion. EPA has decided to not adopt the 80% allowance for a second discrete GPU that is part of the same graphics solution, as these cards are niche products that do not align with ENERGY STAR's intended goal of increasing energy efficiency. EPA recognizes that these cards are produced to meet the demand of a particular sub-segment of consumers, but that segment is not a target for ENERGY STAR. However, EPA is interested in further data collection and discussion surrounding the energy consumption of multi-GPU systems for future revisions, as the market role of these systems may change over time.
Power Supply	Multiple-voltage EPSs	One stakeholder noted that the Level V efficiency rating does not apply to multiple-voltage External Power Supplies (EPSs) and that these cannot be tested using a test method for Internal Power Supplies (IPSs), as stated in Section 3.2.3 and the footnotes to Table 5 in Draft 3.	EPA has updated the multiple-voltage EPS requirements with standard language from other ENERGY STAR specifications, which references the DOE test method for multiple-voltage EPSs and clarifies that the Level V efficiency level shall be met, even if the multiple-voltage EPS does not have the Level V marking.
Reporting		Two stakeholders recommended additional reporting requirements to ensure the effectiveness of the graphics switching incentive. Power supply efficiency information will be beneficial for evaluating the power supplies in qualified products and can assist with developments in future specifications. These commenters requested that the following be reported in the Qualified Product List (QPL): • Does the computer have automatic graphics switching capability in idle mode (Y or N)? • Is graphics switching enabled by default in AC power mode (Y or N)? • Report certified efficiency levels of the power supplies at 10 percent load as well as at each load level specified by the standard external and internal power supply test protocols.	EPA agrees that changes need to be made in the QPL data collection and will be making a series of changes aimed at promoting accuracy and greater resolution of information provided to end-users. EPA also agrees with stakeholders that the operation of switchable graphics by default in AC mode shall be reported as well as power supply operation at each loading point (including 10% of load for those that qualify for the optional incentive).
User Information Requirements		A stakeholder requested that a template be provided to manufacturers with preferred language for the requirement to provide information about ENERGY STAR and the benefits of power management (Section 3.4.2.iii). They also suggested that documentation be posted on the company's website to remove the need for printing or media encoding for inclusion with the product.	EPA recommends the following language: "Computer power management places inactive computers automatically in a low-power “sleep” mode. Tools exist that allow your network administrator to activate “sleep” settings all at once quickly and easily and save up to $50 per computer annually. To learn more about power management and earn recognition for activating sleep settings, please go to www.energystar.gov/powermanagement." Material covering the benefits of power management can be found on the ENERGY STAR Low Carbon IT Campaign's webpage: http://www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_low_carbon General information about ENERGY STAR can be found at the following link: http://www.energystar.gov/index.cfm?c=about.ab_index EPA recognizes that the accessibility of online documentation has increased greatly since Computers Version 5 and that avoiding print and paper waste is a desirable goal. EPA has amended the language in Section 3.4.2.iii to allow manufacturers to provide this information electronically.

Topic	Subtopic	Comment	Response
Typical Energy Consumption	Requirement Levels	Based on a stakeholder analysis of 2011 and 2012 computers that qualified for ENERGY STAR, two stakeholders believed that the proposed Typical Energy Consumption (TEC) requirements are too high for Desktops and Notebooks. This analysis included average adder values derived from the distribution of adders in the Draft 2 dataset and the proposed Draft 3 adder values because the Qualified Product List (QPL) does not contain graphics and storage adder information. As a result, these commenters recommended that the dataset used for setting TEC levels should include 2011 and 2012 models only and exclude those from 2010, as efficiency has improved significantly and 2010 products will most likely not be shipping by 2014 when Version 6.0 will be in effect. The stakeholders' estimated pass rates show that a large percentage of 2012 models will meet the proposed TEC levels. Therefore, these two stakeholders suggested new TEC levels based on their evaluation of the 2011 and 2012 models and a 25% market penetration but noted that striving for 20% qualification now would result in approximately 25% by the time the specification is effective. Another stakeholder believed that switchable graphics could have been enabled during testing, thereby skewing the dataset and base TEC calculations. They recommended an increase by 30% for D1 and D2 category allowances or changing them to be similar to the I2 and I3 allowances.	Due to stakeholder concerns, EPA has performed its own analysis of 2011 and 2012 qualified Notebook and Desktop models and has also tested systems with a variety of discrete graphics cards. The analysis and resulting test data indicated that the combination of Base TEC and Graphics allowance levels proposed in Draft 3 were on the high side and resulted in higher qualification rates for these models. EPA is therefore proposing lower base allowance levels for Desktop D1 and D2 in the Final Draft, in addition to reductions in G5 - G7 Desktop Graphics allowances. These changes will provide qualification rates for both new models and models qualified in prior years that are more in line with the ENERGY STAR Program's goals.
Typical Energy Consumption	Base Allowance Categories	Several stakeholders commented in support of the adoption of the ITI categorization system. A stakeholder requested clarification for handling Desktop computers that do not fall in any category (e.g., products with 2 channels of memory and 1 GB base memory). However, stakeholders also expressed concern regarding the introduction of a third integrated graphics category (I3) because: • Adding a separate category for switchable graphics is more complicated---this third category has a performance score similar to the second category (I2) in the ITI proposal, which was intended for high-end iGfx systems • Due to reporting errors and problems with identifying systems that contain switchable graphics, setting appropriate TEC limits will be difficult. Setting levels based on the dataset could lead to limits for the third graphics category that will disqualify most products.	EPA created the separate I3 category to allow devices with switchable graphics to compete against each other, as they are likely to fill a specific market niche (more powerful and more heavily provisioned) that units without switchable graphics do not occupy. This prevents them from crowding out units in the I2 category which EPA understands to be aimed at a different market area. There is no clear information on exactly where these units will fall, but based on discussions with stakeholders and expert consultants, EPA believes that this additional category will provide a reasonable "firewall" between switchable systems and normal integrated-only systems. Regarding the clarification for Desktop computers that fall outside any Ecma categories: EPA is adopting the ITI category system for Desktops in its Final Draft so this should no longer be a concern. The ITI categories are based on a simple performance score, along with some very straightforward minimum memory and graphics requirements. At this time, there does not appear to be any way a system can fall outside them.
Typical Energy Consumption	All-in-one Desktop Categorization	Two stakeholders commented that EPA should separate Desktops and Integrated Desktops into distinct categories to encourage efficiency for each computer type. Traditional and Integrated Desktops have different power signatures due to size and space constraints. Grouping these two categories together results in too lenient requirements for Integrated Desktops, which leads to higher qualification rates for Integrated Desktops and lower qualification rates for traditional Desktops. These two types of Desktops also provide for different functionality. They provided an analysis of Integrated Desktop pass rates in the QPL and stated that there is enough data to set separate standards. Alternatively, they suggested creating an upgradability adder for traditional Desktops. The commenters agreed with the separation of discrete and integrated graphics to reduce graphics adders being misaligned with the market.	EPA is concerned that splitting Desktops and Integrated Desktops into separate categories will result in a reduced incentive to improve Desktop efficiency. Integrated Desktops generally outperform traditional Desktops, but an analysis of the ENERGY STAR dataset shows they are not sufficient in number to supplant the traditional Desktops in any of the categories. Keeping the two Desktop types together therefore continues to encourage competition in efficiency.
Typical Energy Consumption	Definitions	Two stakeholders requested definitions of CPU cores and CPU clock speed be added and provided a recommendation for these definitions: • CPU cores : The number of physical CPU cores in the Notebook • CPU clock speed : Max TDP core frequency. Not turbo boost frequency	EPA has clarified these terms in the Final Draft specification.

Topic	Subtopic	Comment	Response
Switchable Graphics Incentive		Several stakeholders commented in support of an incentive for using switchable graphics by default in ac power mode, though they expressed the following concerns: • The definition of switchable graphics should contain details such as whether it is automatic or user-initiated and also what graphics rendering conditions should minimally trigger the switch. Their recommendation was to require that the switch between discrete and integrated graphics be automatic and also triggered at minimum in idle mode. Also, they suggested that the graphics be enabled by default as shipped. • A test method should be included to determine which computers have switchable graphics or a reporting requirement from manufacturers should be added into this specification at minimum requesting if the computer has the capability and if so, is it enabled by default in AC power mode. Furthermore, the above stakeholders and another stakeholder disagreed over the amount of the switchable graphics incentive: • Some stakeholders supported the proposal that Notebooks with switchable graphics not claim any graphics adders, as it would provide a strong incentive to enable switchable graphics in AC mode, but requested that EPA clarify this intent. • However, the same stakeholders also accepted a limited incentive of 50% * G1 adder allowance, but no higher. • In contrast, the other stakeholder requested an incentive equal to 50% of the G1-G7 adder allowance. (Example: Systems with G1 dGfx class will get 50% of G1 adder, while systems with G5 dGfx will get 50% of G5 adder Lastly, some stakeholders also commented that the switchable graphics incentive be added to Table 10 (Functional Adder Allowances).	EPA intends that the switchable graphics incentive only apply to automated switching that is enabled by default. However, as no test method for this functionality is currently available, EPA proposes to make this a manufacturer-reported parameter. Regarding the size of the incentive, EPA understands that a switchable system with an idle discrete card (i.e., switched to integrated graphics) will consume some additional power over a purely integrated graphics system. The stakeholder proposal to allow 50% of whatever allowance (G1--G7) the discrete card adder would provide assumes that card idle power is both large and scales with graphics card capability. EPA is not aware of any data showing this and is concerned that allowances of 50% of the G4, G5, etc. allowance will be too high. EPA has provided the "50% of G1" allowance as a reasonable accommodation for switchable systems and has maintained this adder, adding it into Table 10 (Functional Adder Allowances) to clarify its applicability.
Power Supply Efficiency Incentive		A stakeholder asked about the need to measure External Power Supply efficiency when not using AllowancePSU for the ETEC_MAX calculation. Another stakeholder asked if this requirement dictates using a third-party testing lab to be able to use the Power Supply Efficiency Allowance. The stakeholder also stated that categorizing the EPS allowance values by the computer type is incorrect because there is no difference between the requirements or the incentive between the types. Two stakeholder appreciated the addition of the 10% load level addition in the PSU incentive but encouraged EPA to adjust incentive values to ensure that they have a significant impact on the market. The current levels will yield values between 1 and 8 kWh/year for Desktops and between 0.2 and 0.9 kWh/year for Notebooks. These stakeholders stated that is too low to provide an incentive for Notebooks. Another stakeholder commented on the differences between the ENERGY STAR specification and 80PLUS in relation to Internal Power Supplies: • The AC-input voltage range is 115V for Desktops and 230V for servers in 80PLUS. • The efficiency at 20%, 50%, and 100% differ for the silver/gold class in 80PLUS • The efficiency limits at 10% are too high because of greater variation at that loading point. This stakeholder suggested the following 10% limits: 79% for the 1.5% incentive and 81% for the 3% incentive.	External Power Supply efficiency shall meet the power supply requirements in Section 3.2, even if not applying for the additional incentive. The required levels are equivalent to 80PLUS Bronze and it is standard practice to simply show an 80PLUS certificate to demonstrate compliance. Measurement is only necessary in this case if the PSU is not listed by 80PLUS. The Power Supply Efficiency Allowance requires the reporting of efficiency at a 10% loading point, which is not required by 80PLUS Bronze, Silver, or Gold. However, the 80PLUS website lists hundreds of Silver and Gold rated PSUs that report 10% load levels. PSUs that do not report 10% load for 80PLUS will have to be tested in order to receive the efficiency allowance. EPA has increased the incentive for Notebooks in the Final Draft to 1.5% and 3% for higher and lower EPS efficiency levels, respectively, and will therefore continue to separate the incentive levels by computer type.

Topic	Subtopic	Comment	Response
Functional Adder Allowances	Desktop Graphics Adder	Several stakeholders requested that the GPU adder allowances for Desktops be changed because they are too large. They stated that the current adder allowances do not reflect the current market state where many discrete graphic cards use up to 50% less energy than listed in Draft 3. They recommended EPA use a dataset with 2011 and 2012 products and test results from current cards. The stakeholders expressed concern that this could lead to high qualification rates, more high-end graphics configurations than the market would otherwise demand, or the disabling of switchable graphics while on ac power (as a generous adder would allow the computer to keep the discrete graphics powered). Another stakeholder questioned the Desktop GPU adders, noting that the DT2 base plus G5 Graphics adder allowances are greater than the DT3 base allowance. Also, the stakeholder was unclear on the procedure for subtracting the base graphics allowance (G5 for the DT 3 category) before applying further graphics adder allowances. However, another stakeholder commented the proposed adder allowances are too low due to process variation, which could increase the energy consumption of some units of a model. Furthermore, the stakeholder requested that additional dGPUs get 80% of the allowance for the primary dGPU.	Due to stakeholder concerns, EPA has performed its own analysis of 2011 and 2012 qualified Notebook and Desktop models and has also tested systems with a variety of discrete graphics cards. The analysis and resulting test data indicated that the combination of Base TEC and Graphics allowance levels proposed in Draft 3 were on the high side and resulted in higher qualification rates for these models. EPA is therefore proposing lower base allowance levels for Desktop D1 and D2 in the Final Draft, in addition to reductions in G5 - G7 Desktop Graphics allowances. These changes will provide qualification rates for both new models and models qualified in prior years that are more in line with the ENERGY STAR program's goals. Graphics adders are applied based on the characteristics of the card in the system. A card that fits the G7 definition will result in an adder equal to the full G7 adder (157 kWh in Draft 3). No subtraction of G5 or any other graphics adder allowance is necessary.
Functional Adder Allowances	Notebook Graphics Adder	Stakeholders disagreed on the derivation of Notebook graphics adder allowances, with one stakeholder supporting EPA's proposal that Notebook adder allowances be equal to 37% of those for Desktops, with another commenting that EPA had previously agreed to 50%, and that decreases in the graphics allowances are problematic in light of decreases to the base allowance.	In the Draft 2 comment-response document, EPA incorrectly stated that it would set the Notebook graphics adders allowances to 50% of their Desktop values, when in fact the values presented in Draft 3 were based on industry data provided to the European Commission (and which resulted in an average ratio of 37% between Notebook and Desktop adder allowances). In the absence of further data, EPA has retained these allowances in the Final Draft and further notes that any additional decreases in the base allowances were performed to ensure differentiation for ENERGY STAR models.
Functional Adder Allowances	Display Adder	A stakeholder pointed out that only the top performing models within a category should be considered when characterizing integrated displays to assign appropriate Idle Mode power allowances. However, the stakeholder noted that the currently proposed adder allowance is appropriate.	The entire dataset is analyzed in order to evaluate allowances and adders. EPA will not target only the best performing devices in setting these levels but take the 25th percentile of the entire dataset.
Workstations		One stakeholder commented on benchmarking for workstations: • Existing tools (Linpack and SPECviewperf) and the resulting data are sufficient to determine feasibility of benchmark approach • Additional benchmarks are workloads for specific applications and market segments that will not assist in testing feasibility of the benchmark concept • Continue to promote the 3 to 5 year development of appropriate workstation benchmarks • Collect performance and power information on workstations via Linpack and SPECviewperf • Document the standard method of collecting data • Data collection should not be required to go through the product qualification process due to complexity, configuration settings, and access to all workstation hardware configurations • Collected data should be made anonymous and distributed to manufactures but not the public • Collaboration between EPA and stakeholders on agreement regarding which configurations should require benchmark data • Consider a workstation allowance added to the PTECmax for power supply efficiency similar to the approach for Desktops and Notebooks	EPA intends to work with SPEC to develop a new workstation benchmark and hopes that such work can be completed within something closer to a 2 year timeframe. EPA will collect results for SPECviewperf and Linpack, to assist in this workstation benchmark development. Results will not be reported publicly and will be used internally by EPA. An anonymized dataset may be released at a future date to assist in benchmark development. Benchmark test results may be generated by manufacturer testing rather than via CB or accredited lab testing.
Thin Client		A stakeholder asked how to calculate ETEC for thin clients that do not support Sleep Mode. Another stakeholder supported the correction of the base TEC from 55 kWh to 60 kWh with a G1 adder.	EPA has clarified that for thin clients that do not support Sleep Mode the ETEC shall be calculated using Long Idle Power measurement in place of the Sleep Power measurement.

Topic	Subtopic	Comment	Response
Slate Computing Devices		A stakeholder agreed with the decision to not incorporate Slate/Tablets into Version 6.0 of the computer specification.	EPA is continuing to review the relevant definitions, and plans on including revised definitions and requirements in a future update of the specification. Although EPA has excluded Slate/Tablets from Draft 3, EPA intends to include them eventually in a Version 6.1, dependent on an update to the ENERGY STAR Battery Charging System Program Requirements. In the meantime, EPA welcomes further comments on this topic, such as whether using processor type and operating system to differentiate products would be useful or what other characteristics should be used.
Test Method		A stakeholder recommended that the test methods reference IEC 62623 instead of ECMA 383 because it is the international standard for measuring the energy consumption of Desktops and Notebook Computers. This test method has been finalized and published and included the latest updates, besides categorization. A stakeholder requested that the test image should be published by the time the Final Draft is released.	EPA agrees with this and was waiting for the IEC standard to be finalized before referencing it. EPA has updated all references in the Final Draft. The test image is available here (direct link to 3MB image): https://www.energystar.gov/ia/partners/images/ComputerTestingImage.bmp It is also hosted on the ENERGY STAR Computers Version 6 Product Development page (http://energystar.gov/products/specs/node/143) and will be hosted on the main Computers Partner page once the specification is finished.
Timeline		One stakeholder requested a Draft 4 of the specification before moving to the Final Draft. The stakeholder also requested that EPA provide access to the dataset used to establish TEC values. A stakeholder asked whether a product shipped in September 2013 is allowed to obtain ENERGY STAR Version 6.0 third-party certification or if it can only obtain Version 5.3 certification?	EPA will be moving to a Final Draft, but has hosted multiple stakeholder calls to ensure that all concerned parties were kept apprised of what changes will go into the Final Draft. Manufacturers can certify models to the latest version of the specification as soon as it has been finalized and do not need to wait until the effective date.
Optical Communication		One stakeholder commented that some systems may require additional power to convert from copper-based Ethernet to optical for communication over fiber.	EPA plans on collecting data on this topic and will evaluate in a future revision to the specification.
Energy Efficiency Ethernet		Two stakeholders stated that EPA should require or incentivize Energy Efficient Ethernet (EEE) enabled as-shipped for all computers because this technology dynamically adjusts the speed and power consumption of Ethernet ports to data traffic requirements. With EEE enabled, gigabit Ethernet ports can reduce power from 0.7 W to 0.1 W, even in active mode. They pointed out that EEE incentives are already included in the Small Network Equipment Program Requirements.	EPA has included an incentive for EEE in the Final Draft.
Full Network Capability	Incentives	A stakeholder noted that Short Idle weighting for models with proxy capability may serve as a disincentive when calculating the Display Adder and suggested the use of conventional mode weighting for Short Idle (Tables 6 and 7 in Draft 3) in the display adder equations (Table 10 in Draft 3). Another stakeholder requested that the mode weightings for full network connectivity for Notebooks be revised because the off-mode ratio of a full network connectivity product is higher than that of a conventional product and the sleep-mode ratio is lower.	EPA has updated the calculation of the Display Adder allowance to directly reference the conventional mode weightings for Short Idle (35% of the time for Integrated Desktops and 30% of the time for Notebooks). EPA has also revised the Notebook proxy weightings to provide less time in Off Mode and more time in Sleep Mode for products with full network connectivity.
Sleep Mode/Long Idle	Applicability	A stakeholder requested clarification regarding using the Long Idle State power in place of Sleep Mode power for Desktops lacking a discrete Sleep Mode but having a Long Idle State power less than or equal to 10 W. Does this provision apply to Integrated Desktops or only to Desktop computers? The stakeholder preferred this provision apply to both categories.	EPA does not see any drawbacks to applying the provision to Integrated Desktops and has expanded the scope of this provision in the Final Draft.