



## ENERGY STAR® Notes on Draft 2 Dataset

The levels in Draft 3 were again developed based on manufacturer-supplied component and power data. For Desktops and Notebooks, the Draft 2 dataset was refined as suggested by stakeholders in comments at the in-person stakeholder meeting and other correspondence. The Thin Client dataset was expanded to include data forwarded by industry after the in-person meeting.

Further details on steps taken to refine and analyze the data are below, along with details supporting the calculation of functional adjustments included for Desktops and Notebooks in Draft 3. EPA looks forward to stakeholder comments on the Draft 3 specification. As is standard procedure, manufacturer names have been masked and model numbers have been removed to protect the anonymity of data submitted by industry members.

### ***Desktops and Notebooks:***

Please find attached the dataset for desktops (see worksheets "Draft 3 Levels," "DT – Analysis," and "NB – Analysis").

### **Updates to Dataset**

Stakeholders commented on a few areas for data quality review prior to creation of Draft 3 structure and levels.

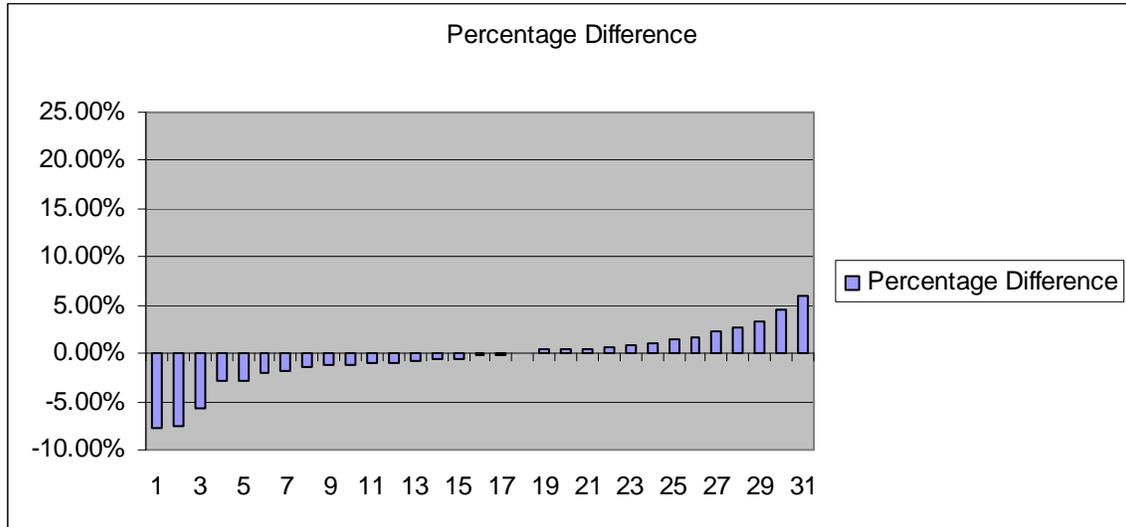
For desktops, these included single models tested and included at multiple voltages, incorrect core counts submitted from stakeholders on certain models, the impact of 230V tested models on TEC, and missing or incomplete data for graphics capability. For Notebooks, stakeholders shared the same comments as for Desktops and also suggested a review of the impact of Netbooks on the Category A levels (such systems were identified).

EPA reviewed the comments above and took steps to address these concerns before levels were set. In the Masked Dataset, duplicate models were removed from level setting – column AY contains no category marker for such systems and the TEC for these systems did not enter the calculation of levels for compliance. While stakeholders provided a list of suspected duplicate models, EPA relied on unmasked data of model names and manufacturers in addition to component characteristics. To address concerns about missing or incorrect core or graphics data, applicable information was reviewed and updated. Since the underlying data was originally provided by stakeholders, these modifications were marked by bright yellow highlighting to allow for further review if it is necessary.

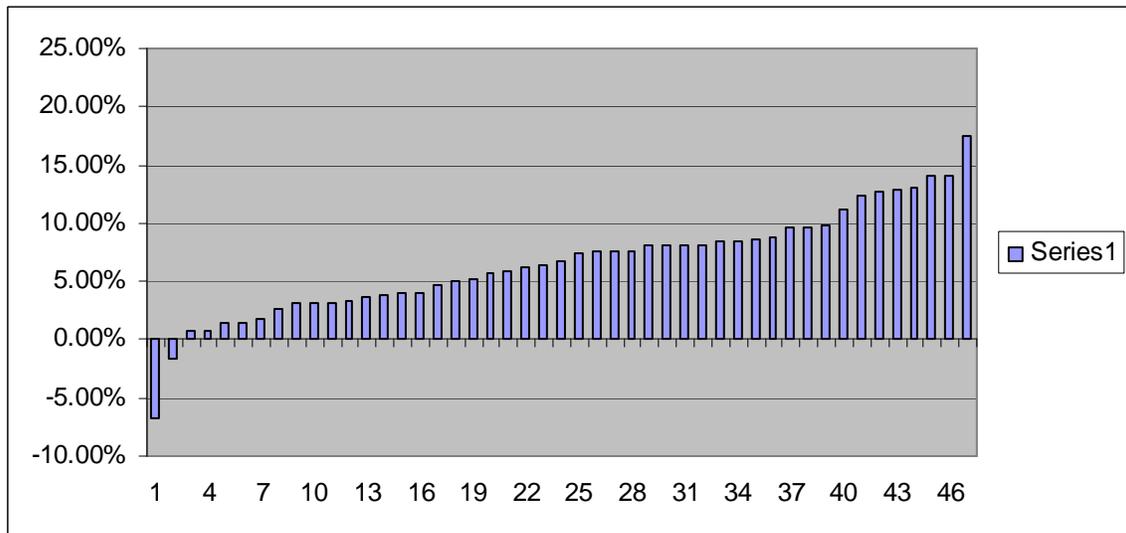
When addressing the 230V concern, it was discovered that removal of duplicate desktop systems removed all but 3 systems tested at the higher voltage. Due to minimal presence of such systems, and an unequal impact of test voltage on TEC, EPA moved forward with the non duplicate dataset for Desktops. For Notebooks, removal of duplicates left 30 models out of 180 tested at 230V. Due to the non-negligible presence of such systems, the duplicate notebooks (submitted at 115 and 230) were analyzed to determine trends in the difference of TEC between the two scenarios. Though there was an uneven impact on tested systems, the average impact was measured to a +6.6% difference between the 230V tested system and 115V. For the purpose of setting levels, the remaining 30 notebooks tested at 230V were scaled down by the 6.6%, and this scaled TEC was used for level setting, scaled as normal and as applicable to any capability adjustments.

See below information on the TEC impact of test voltage in the duplicate dataset.

Desktops, Voltage Delta:



Notebooks, Voltage Delta:



**Functional Adjustments (“Adders”)**

**Desktops**

- *Memory*: Stakeholders presented a 1kWh/GB over a base level of 2GB system memory. This level largely agreed with EPA’s calculations and expectations.
- *Premium Graphics (for Discrete GPUs with specified Frame Buffer Widths)*: In evaluating the systems with Discrete GPUs, it was determined that 55/106 systems with Discrete GPUs had frame buffers in excess of at least 128-bit. Of these, the majority were at 128-bit, itself (42/55). The base level for discrete graphics was set accordingly at 128-bit, with implementation of the adjustment above the 128-bit frame buffer width level. In calculating the amount, at the wall idle data from stakeholders was used to determine an instantaneous wattage delta. The difference between 128-bit and the next most prevalent

FB Width, 256-bit was 8W. Extrapolated to determine impact on TEC (through idle), this led to an adjustment of 28 kWh over base.

- *Additional Storage*: EPA used both Stakeholder and public data to determine instantaneous wattage idle levels for desktop hard drives. The 25 kWh adjustment corresponds to roughly a 7W instantaneous at the wall power draw.

#### **Notebooks**

- *Memory*: Stakeholders presented a 0.4 kWh/GB over a base level. While EPA agreed with this level, Category B contained primarily systems with at least 4GB of memory; as such, the level B base level already took the effect of up to 4GB into account when it was set. The resulting adder amount was 0.4kWh/GB, applied above a base memory estimate of 4GB.
- *Premium Graphics (for Discrete GPUs with specified Frame Buffer Widths)*: EPA agreed with the stakeholder proposal of dual adjustments at the >64-bit and >128-bit levels to account for the separate graphics market for mobile systems. EPA again used stakeholder graphics data to determine the delta between a base 64-bit level and the two adders proposed. With 64-bit resulting in a 5W at the wall idle consumption, the difference to 128 and 256, the next two common levels, respectively, was +3W and +7W, corresponding to the levels proposed in Draft 3 when extrapolated using idle TEC weightings.
- *Additional Storage*: EPA's information on mobile storage idle levels largely corresponded with further Stakeholder proposals and a 1kWh adjustment was included in Draft 3.

#### ***Thin Clients:***

Please find attached the dataset for thin clients (see worksheet "Thin Client"). EPA received additional data from Stakeholders after the in person meeting and added this to the previous submissions, removing published data previously used that lacked configuration information. Stakeholders suggested that local encoding/decoding of graphics was a primary capability that divided systems by both usage pattern and energy use. This approach was included in Draft 3 and systems were divided accordingly before levels were set. Consistent with the 0.7 proposed capability adjustment for thin clients shipped with WOL, Off Power for systems tested with WOL enabled in Off was reduced by 0.7 during the analysis.

***Stakeholders are asked to relay all feedback on this data as well as the Draft 3 Version 5.0 Computer Specification to Katharine Kaplan, EPA, at [kaplan.katharine@epa.gov](mailto:kaplan.katharine@epa.gov) and Evan Haines, ICF International, at [ehaines@icfi.com](mailto:ehaines@icfi.com), by October 16, 2008.***