ENERGY STAR®

Version 8.0 Computers
Draft 1 Specification Webinar

U.S. Environmental Protection Agency
April 16, 2019
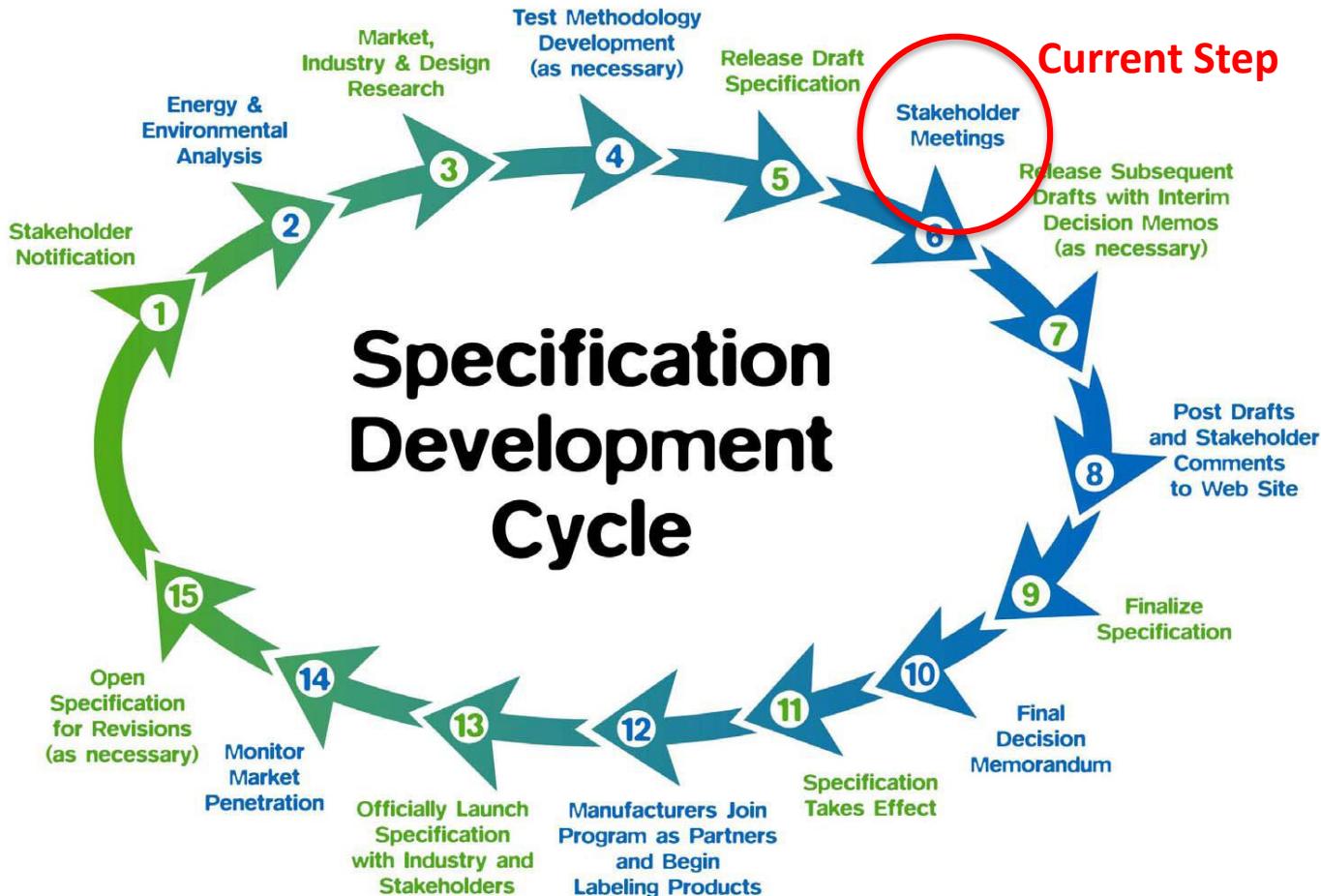
Introductions

- Ryan Fogle – EPA, Computers Product Lead

- John Clinger – ICF

Review of Specification Development Cycle

Specification Development Cycle

Current Step

1. Stakeholder Notification
2. Energy & Environmental Analysis
3. Market, Industry & Design Research
4. Test Methodology Development (as necessary)
5. Release Draft Specification
6. Stakeholder Meetings
7. Release Subsequent Drafts with Interim Decision Memos (as necessary)
8. Post Drafts and Stakeholder Comments to Web Site
9. Finalize Specification
10. Final Decision Memorandum
11. Specification Takes Effect
12. Manufacturers Join Program as Partners and Begin Labeling Products
13. Officially Launch Specification with Industry and Stakeholders
14. Monitor Market Penetration
15. Open Specification for Revisions (as necessary)

Outline

- Definitions and Scope
- Internal Power Supply Requirement
- Energy Efficient Ethernet Requirement
- Updated Mode Weightings
  - Desktops and Integrated Desktops
  - Notebooks
  - Workstations
  - Thin Clients
- Desktop Requirements
- Workstation Requirements
- Test Method Updates
- Timeline & Next Steps

Definitions and Scope

- New Definition:
  - Multi-Screen Notebook

- New Scope Exclusion:

  - Handheld slates/tablets which contain cellular voice capability
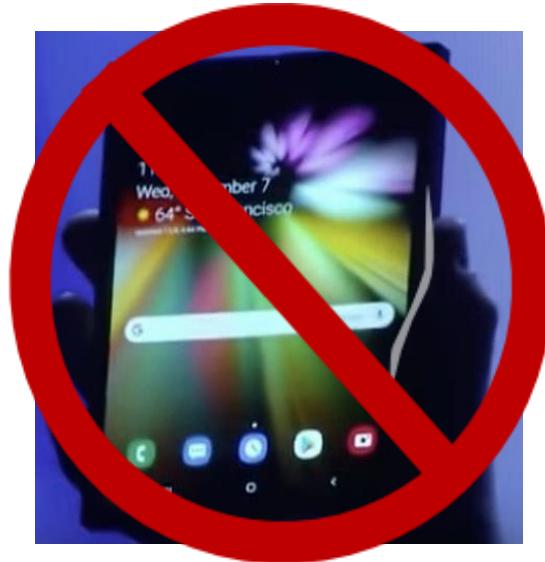
Internal Power Supply Requirement

- EPA received feedback regarding potential subpar efficiency at lower load operating levels (e.g. 5% load). Conflicting feedback stated that current requirements are sufficient and testing at low load would increase testing burden.

- EPA reviewed recent data provided by EPRI and found that most 80Plus Gold and above power supplies perform well at lower load operating levels.

- As a compromise, EPA is proposing that the 80Plus Gold equivalent requirement introduced in Version 7 for products with greater than 500 watt nameplate rating be extended to all products with IPSs.
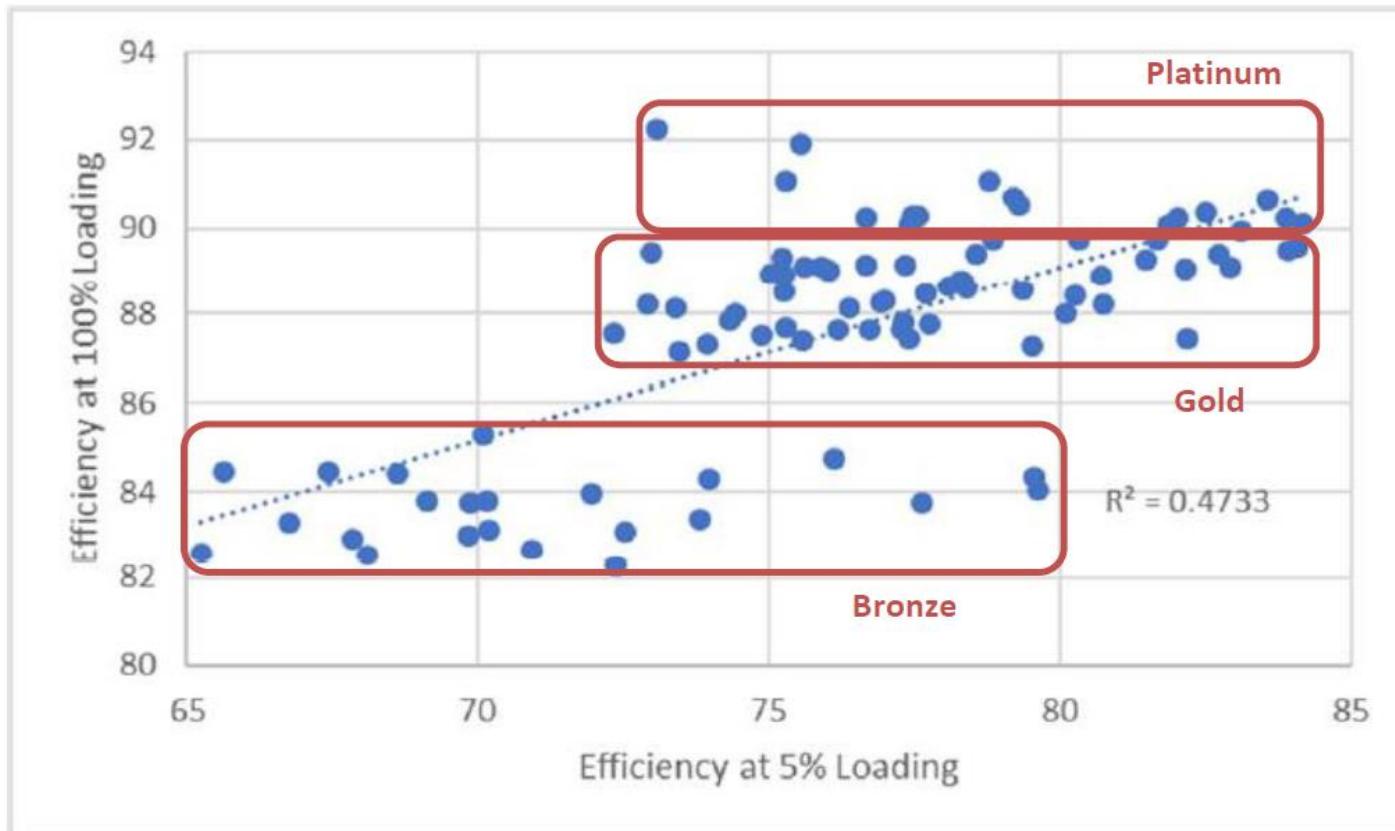
Figure 3. Efficiency at 5% Loading versus Efficiency at 100% Loading.

Chart above provided in written comments from NRDC

Internal Power Supply Requirement

Table 1: Requirements for all Internal Power Supplies

Loading Condition (Percentage of Nameplate Output Current)	Minimum Efficiency	Minimum Power Factor
20%	0.87	-
50%	0.90	0.90
100%	0.87	-

Energy Efficiency Ethernet (EEE) Requirement

- EPA has observed that a majority of computer products, across all subtypes, are currently sold with Ethernet ports with a throughput capability of 1Gb/s or greater.

- All available data suggest that most if not all 1Gb/s or faster Ethernet ports support EEE.

- As such, EPA is proposing that all Ethernet ports in a product with a throughput of 1Gb/s or higher must ship with EEE enabled.

Mode Weightings for Desktops and Integrated Desktops

- EPA received over 700,000 individual desktop and integrated desktop data points across multiple:
  - Manufacturers
  - Product types
  - User profiles (commercial & residential)
  - Geographies

- This additional data allows EPA to separate long and short idle from sleep, allowing further refinement of the values proposed in the discussion guide.

- The scale of breadth of the data set provides confidence that these values are representative of aggregate current behavior of deployed desktops in the field.

- EPA welcomes additional large scale data sources that suggest these values are not accurate.

Mode Weightings for Desktops and Integrated Desktops

Table 3: Mode Weightings for Desktops and Integrated Desktop Computers

Mode Weighting	Conventional
T_{OFF}	15%
T_{SLEEP}	45%
$T_{LONG\ IDLE}$	10%
$T_{SHORT\ IDLE}$	30%

Mode Weightings for Notebooks

- EPA also received over 1.2 million individual desktop data points with a variety and breadth equivalent to the desktop data referenced in the previous slide.

- Given the recent finalization of Version 7.1, and the complications with translating the current notebook mode weighting results to new mode weightings, EPA is proposing to solicit feedback on the new mode weighting values, but delay implementing them until Version 9.

Mode Weightings for Notebooks

- Data EPA received on notebooks computers indicates that the following mode weightings could be used in Version 9:

Mode Weighting	Conventional
T_{OFF}	10%
T_{SLEEP}	60%
$T_{LONG\ IDLE}$	10%
$T_{SHORT\ IDLE}$	20%

Mode Weightings for Workstations

- EPA received a smaller set of workstation mode weighting data comprised of roughly 8,000 data points which shows usage behavior somewhat similar to desktop computers.

- EPA is proposing to update the old workstation mode weightings with new values informed by this new data. EPA analysis shows that revising these mode weightings allows 96.2% of existing certified workstations to still meet the Version 7.1 requirements.

Table 9: Mode Weightings for Workstations

T_{OFF}	T_{SLEEP}	$T_{LONG\ IDLE}$	$T_{SHORT\ IDLE}$
10%	35%	20%	35%

Mode Weightings for Thin Clients

- EPA tried to apply the new desktop mode weightings to the thin client data set, but found that the result drastically reduced the number of certified products which can meet the existing levels.

- As a result, EPA has decided to retain the existing desktop, integrated desktop, and thin client mode weightings from Version 7.1 for thin clients only, and has created a new table in Draft 1 as a way to carry over those existing mode weightings.

Table 10: Mode Weightings for Thin Clients

T_{OFF}	T_{SLEEP}	$T_{LONG\ IDLE}$	$T_{SHORT\ IDLE}$
45%	5%	15%	35%

Desktop Requirements – Base Allowances

- EPA analysis yielding the following conclusions:
  - Data set supports consolidating the previous I1 and I2 categories into a single category and renaming the existing I3 category I2.
  - Data set supports maintaining the distinct D1 and D2 categories
  - Switching the performance score boundary between Category I1 and I2 from 9 to 8 results in a slightly better distribution of system scores.
  - Separating desktops from integrated desktops did not provide meaningful differentiation within the proposed base and functional adder allowances.

Desktop Requirements – Base Allowances

Table 6: Base TEC (TEC$_{BASE}$) Allowances for Desktops and Integrated Desktops

Category Name	Graphics Capability[iii]	Desktop or Integrated Desktop	
		Performance Score, P[iv]	Base Allowance
0	Any Graphics	$P \leq 3$	10.0
I1	Integrated or Switchable Graphics	$3 < P \leq 8$	18.0
I2		$P > 8$	37.0
D1	Discrete Graphics	$3 < P \leq 9$	30.0
D2		$P > 9$	40.0

Desktop Requirements – Functional Adders

- Based on data and stakeholder feedback EPA is proposing the following changes to functional adders in Draft 1:
  - Applying the Version 7.1 memory adder across all product types
  - Applying the CEC desktop discrete graphics adder to desktop and integrated desktop products
  - Creating consistent storage device adders across all product types which cover four storage types for which EPA has data to support
  - Aligning the integrated display adder for integrated desktops with the ENERGY STAR Version 8 Displays specification
- EPA received feedback on other adders but lacked sufficient data to include them in the Draft 1 specification. EPA has advised those stakeholders to provide additional supporting data to consider them in Draft 2.

Desktop Requirements – Functional Adders

Table 8: Functional Adder Allowances for Desktop, Integrated Desktop, Thin Client, and Notebook Computers

| Function		Desktop	Integrated Desktop	Notebook
TEC_{MEMORY} (kWh)[v]			$2.4 + (0.294 \times GB)$	
$TEC_{GRAPHICS}$ (kWh)[vi],[vii]			$58.6 \times \tanh(0.0038 \times FB\_BW - 0.137) + 26.8$	$29.3 \times \tanh(0.0038 \times FB\_BW - 0.137) + 13.4$
$TEC_{SWITCHABLE}$ (kWh)[viii]			18	N/A
$TEC_{STORAGE}$ (kWh)[ix]	3.5" HDD		26	
	2.5" HDD		2.6	
	Hybrid HDD/SSD		1.0	
	SSD (including M.2 port solutions)		0.5	
$TEC_{INT\ DISPLAY}$ (kWh)[x]	$A < 190$	N/A	$[(4.00 \times r) + (0.172 \times A) + 1.50] \times (1 + EP)$	$8.76 \times 0.30 \times (1+EP) \times (0.43 \times r + 0.0263 \times A)$
	$190 \leq A < 210$		$[(4.00 \times r) + (0.020 \times A) + 30.4] \times (1 + EP)$	
	$210 \leq A < 315$		$[(4.00 \times r) + (0.091 \times A) + 15.4] \times (1 + EP)$	
	$A \geq 315$		$[(4.00 \times r) + (0.182 \times A) - 13.2] \times (1 + EP)$	
$TEC_{MOBILEWORKSTATION}$ (kWh)[xi]			N/A	4.0

Desktop Requirements – Draft 1 Pass Rates

- Data set includes 570 unique desktop and integrated desktop families from:
  - Version 7.1 computers QPL
  - CEC public computers data set
  - Additional non-certified computer models submitted by stakeholders
- The combination of base allowance and functional adder changes proposed in Draft 1 across the ENERGY STAR desktop and integrated desktop data set yield the following pass rates
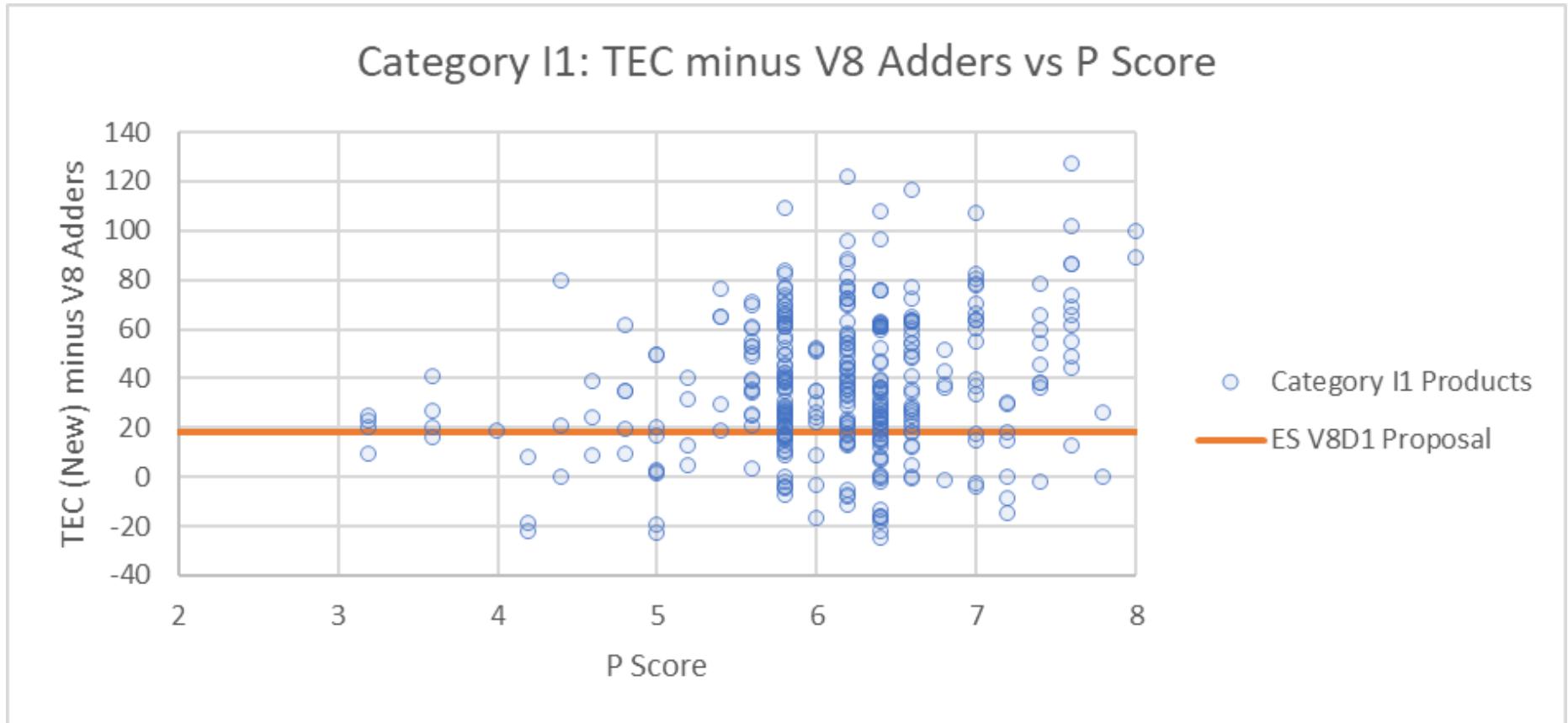
Performance Category	Pass Rate
0	55%
I1	25%
I2	26%
D1	25%
D2	31%

Category 0 Scatterplot Summary

Category 0: TEC minus V8 Adders vs P Score
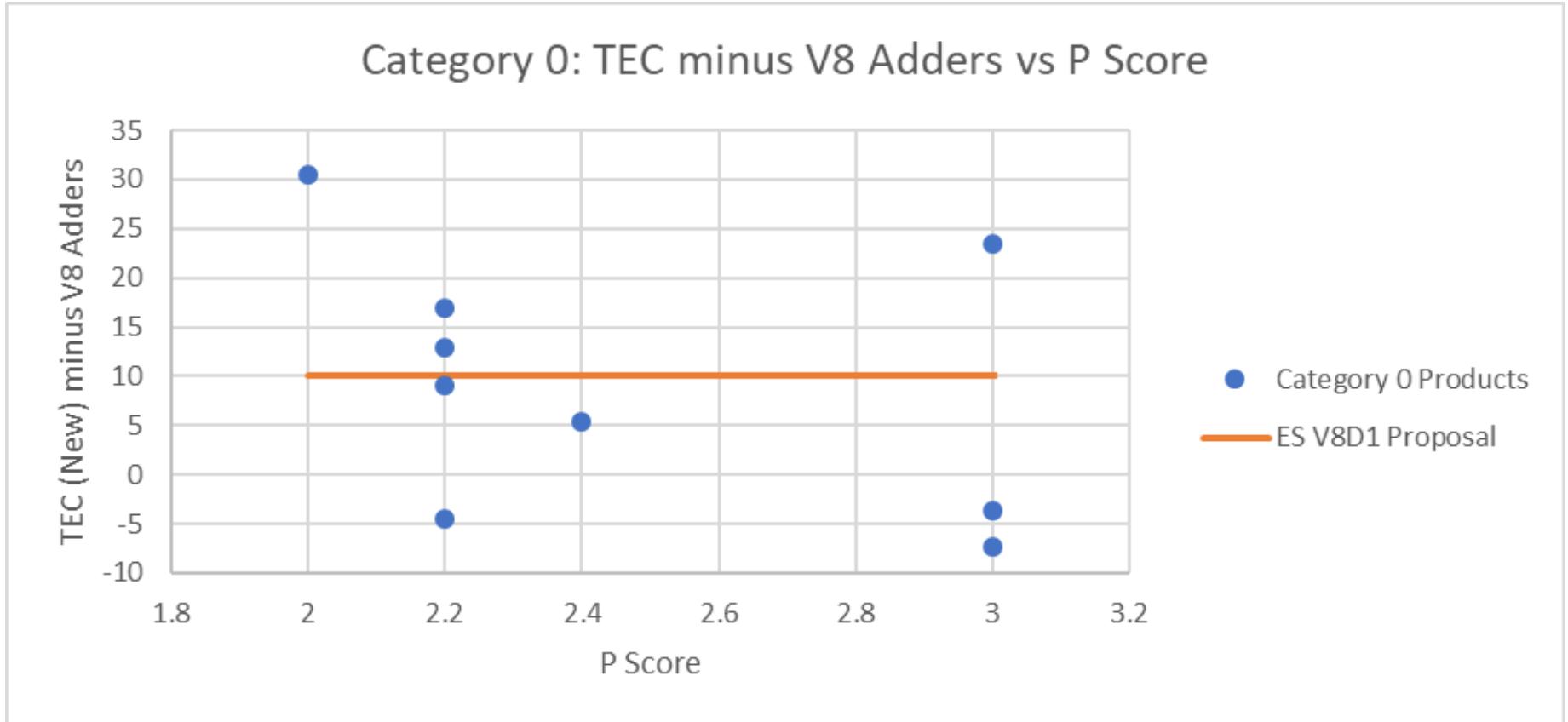
Category I1 Scatterplot Summary

Category I1: TEC minus V8 Adders vs P Score

○ Category I1 Products

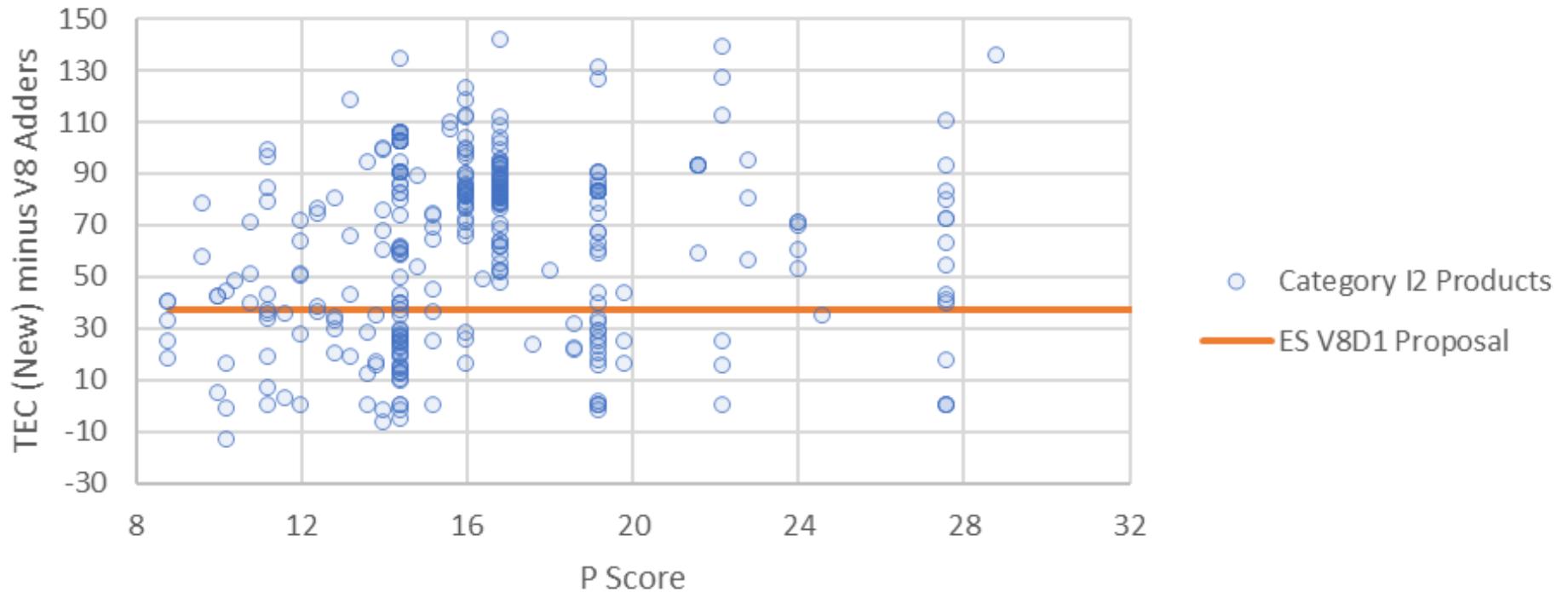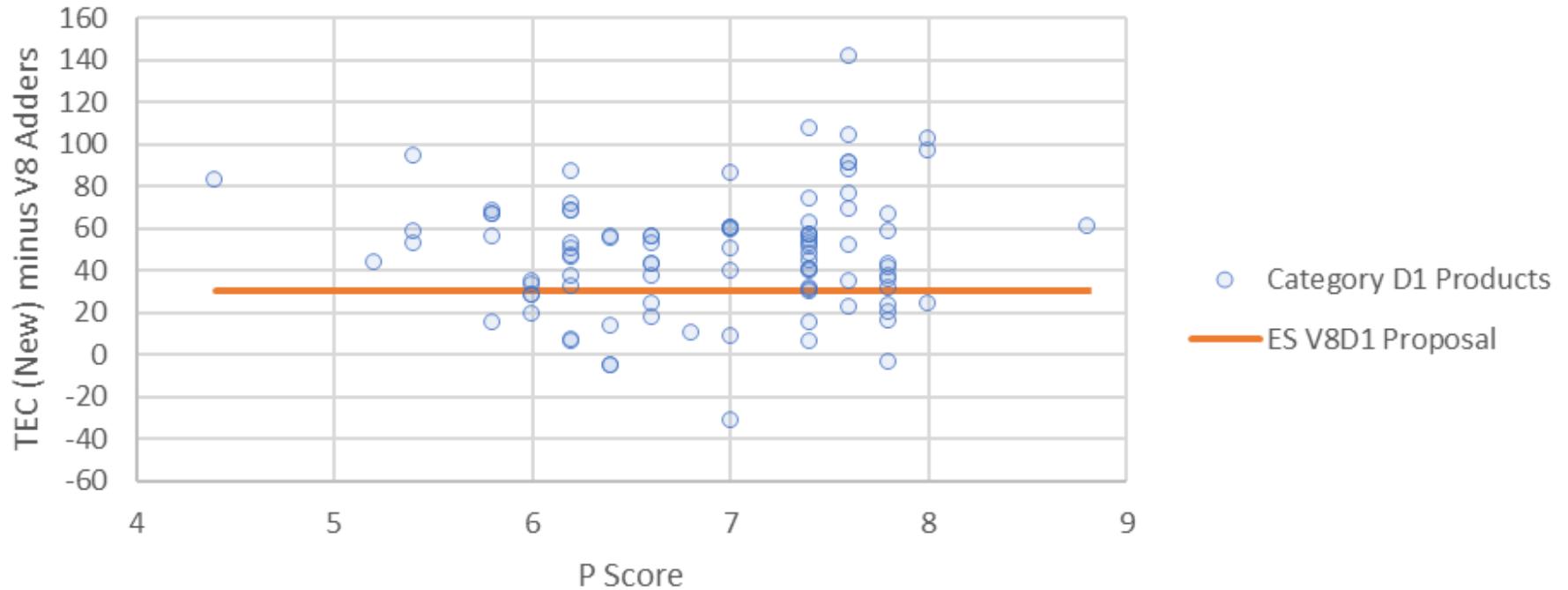— ES V8D1 Proposal

Category I2 Scatterplot Summary

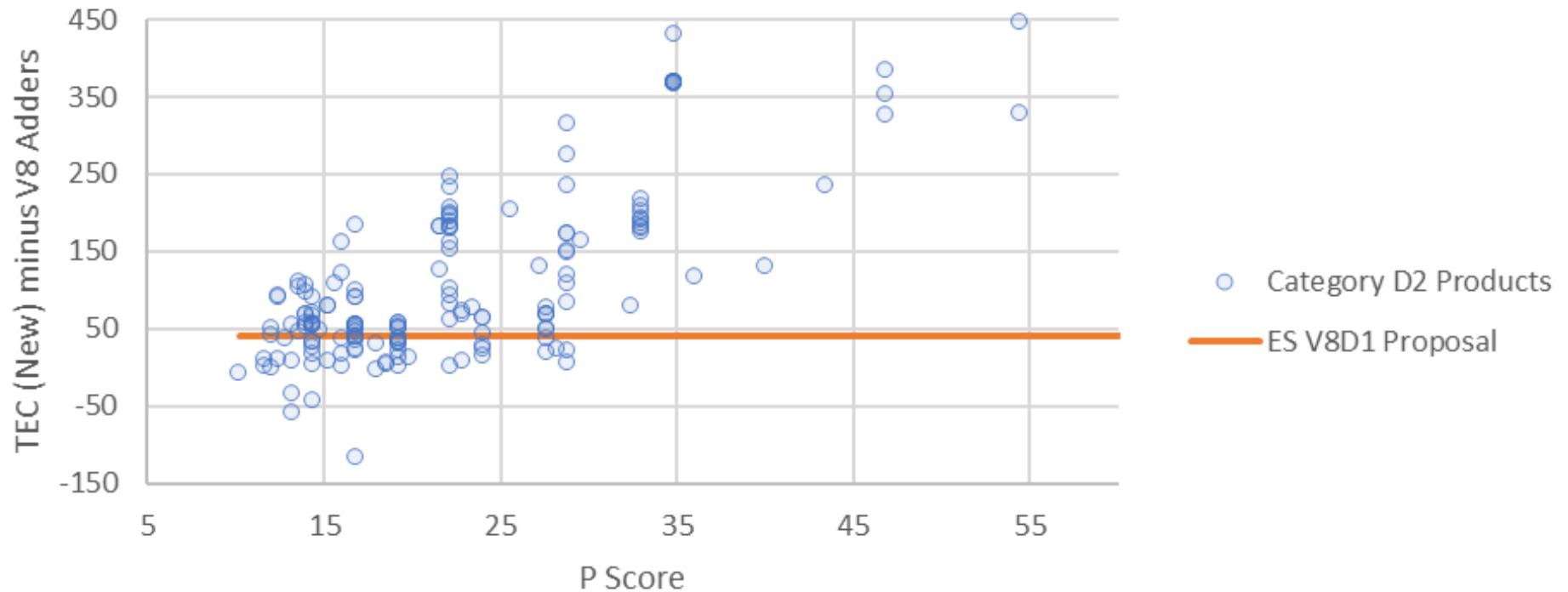Category I2: TEC minus V8 Adders vs P Score

Category D1 Scatterplot Summary

Category D2 Scatterplot Summary

Category D2: TEC minus V8 Adders vs P Score

Workstation Requirements

- Due to low ENERGY STAR workstation market share, EPA is proposing to maintain the existing workstation energy requirements from Version 7.1 in Version 8.

- EPA is planning on adopting the new mode weightings summarized in the previous section of this webinar.

- EPA has also removed the EEE adder as EEE is now a requirement for all Ethernet ports with a throughput of 1Gb/s or higher.

- EPA and DOE continue to seek feedback on whether the current active state testing is still relevant and/or whether newer benchmarks may be more appropriate.

Test Method Updates

- Added new language clarifying how to test products which exhibit cycling behavior over long periods of time (e.g. charging cycles for notebooks).

  – Includes requiring use of IEC 62301 to capture one or more complete cycles during testing if product shows cyclical behavior.

  – Battery no longer needs to be disabled

- Proposing that secondary drives may be spun down in some instances for short idle testing.

- Added a test to measure sleep to wake latency

Timeline

- Draft 1, V8.0 Specification Webinar – Today

- Draft 1, V8.0 Specification Comment Deadline – May 3

  - EPA is planning an in-person meeting on June 18 in Washington, DC at ITI to discuss comments received and pathway to Draft 2.

- Draft 2, V8.0 Specification – July 2019 target.

- Final Draft V8.0 Specification + Final Specification Release – Q3/Q4 2019

- V8.0 Specification Effective – July 2020

Any Questions?

Draft 1 Specification Comment Deadline

- Send written feedback to computers@energystar.gov

- **Please include any supporting data for additions or revisions to proposed requirements and/or adders with your written Draft 1 specification feedback.**

Comment Deadline
Friday, May 3, 2019

Thank You!

- Questions on specification development:

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