



ENERGY STAR®

Version 3.0 Imaging Equipment Revision Launch

Discussion Document Webinar

March 1, 2017





Webinar Details

- Webinar slides and related materials will be available on the Imaging Equipment Product Development Web page:
 - www.energystar.gov/revisedspecs
 - Follow link to “Version 3.0 is in Development” under “Imaging Equipment”
- Audio provided via teleconference:
 - Call in:** +1 (877) 423-6338 (U.S.)
+1 (571) 281-2578 (International)
 - Code:** 198-920 #
 - Phone lines will remain open during discussion
 - Please mute line unless speaking
 - Press *6 to mute and *6 to un-mute your line



Webinar Agenda

1. Introductions and Recap of ENERGY STAR Process
2. Network Activity Test Method Revision
3. Wi-Fi Priority
4. Paper Usage Assumptions
5. Maintenance Modes
6. Standby Definition and Requirement
7. Professional Products
8. 3D Printers
9. Scope Exclusions
10. Refillable Ink Tanks and other Best Practices

Introductions

Time	Topic
12:00–12:10	Introductions and Specification Development Recap
12:10–12:40	Network Activity Test Method Revision
12:40–12:50	Wi-Fi Priority
12:50–1:00	Paper Usage Assumptions
1:00–1:10	Maintenance Modes
1:10–1:20	Standby Definition and Requirement
1:20–1:25	Professional Products
1:25–1:30	3D Printers
1:30–1:35	Scope Exclusions
1:35–1:40	Refillable Ink Tanks and other Best Practices
1:40–2:00	Timeline and Open Discussion



Introductions

Ryan Fogle

U.S. Environmental Protection Agency

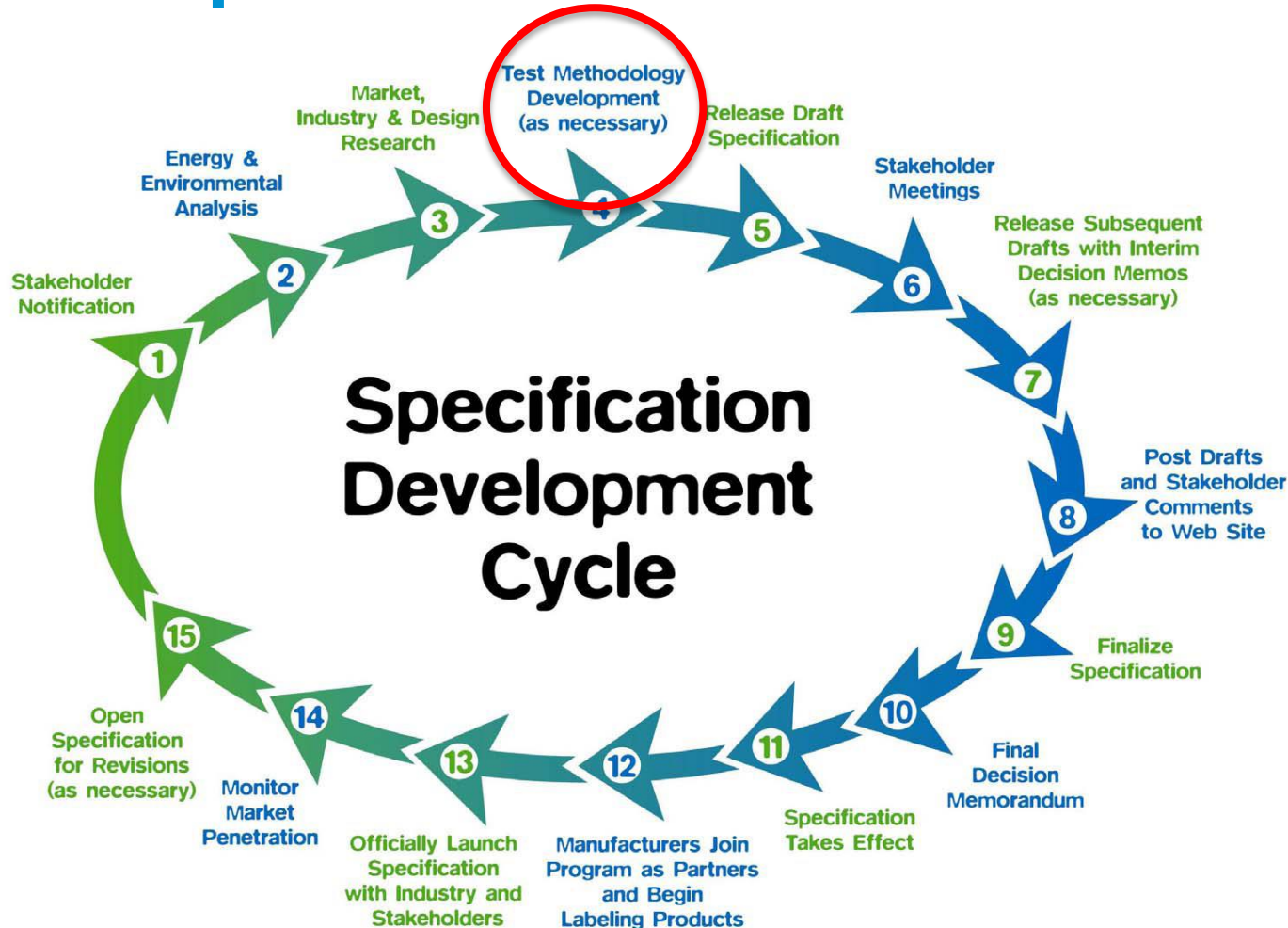
Matt Malinowski

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Ben Hill

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ENERGY STAR Specification Development Process





Topics in V3.0 Discussion Document

- **Test Method and Assumptions**
 - Network Activity
 - Wi-Fi
 - Maintenance Mode
 - Paper usage assumptions
- **Scope**
 - Professional Products
 - 3D Printers
 - Copiers
 - Fax Machines
 - Digital Duplicators
 - Mail Machines
- **Environmentally friendly practices**
 - Refillable ink tanks



Network Activity Test Method Revision

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Network Activity Test Method Revision

- Version 2.0 requires the following:

- D) Network Connections: Products that are capable of being network-connected as-shipped shall be connected to a network.
- 1) Products shall be connected to only one network or data connection for the duration of the test.
 - a) Only one computer may be connected to the UUT, either directly or via a network.
 - 2) The type of network connection depends on the characteristics of the UUT and shall be the topmost connection listed in Table 6 available on the unit as-shipped.



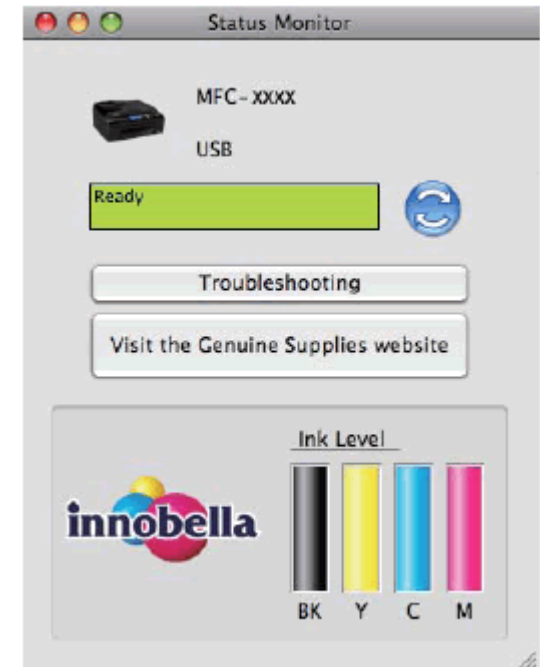
Network Activity Test Method Revision

- Common user and administrative activity can wake products from sleep
- EPA proposes test method revision in Version 3.0
 - Promote optimal product behavior
 - Increased product differentiation

Test Method Revision Options

Option A – Testing typical user requests

- During sleep mode
- Tester sends network requests
 - Requests will be representative of common network activity (e.g., network discovery and toner level check)
- Second computer boots up during test





Test Method Revision Options

Option B – Testing data packet types

- During sleep mode
- Tester sends certain data packet types over network
 - e.g., Simple Network Management Protocol (SNMP) and Simple Service Discovery Protocol (SSDP)
- EPA has concerns about this option
 - Software required to generate particular data packet types
 - Not focused on user behavior



Test Method Revision Options

Option C – Simulating a network environment

- Throughout test procedure
- Product is connected to certain number of computers
- EPA has concerns about this option
 - Additional testing burden
 - Not necessarily representative of network requests and activity



Test Method Revision Options

EPA believes that Option A is the best option for testing against network activity

- Most common and problematic requests tested
- Minimal testing burden



Test Method Revision Options – Discussion

1. What is the easiest, most effective way to generate representative Simple Network Management Protocol (SNMP) requests?
2. Does an increase in the number of devices on the network result in more “wake ups”? If so, by what specific mechanism(s)?
3. What computer or network behaviors negatively impact the imaging equipment’s ability to remain asleep?



Test Method Revision Options – Discussion

4. Will there be any adverse impact on measurements for products with digital front ends (DFEs) if one of the proposed test method revision options is adopted?
5. What specific user actions should be prescribed in option A to ensure that product behavior is tested against SNMP and other relevant data packet types?
6. If option B is chosen, how can testers ensure that the required types of data packets are transmitted? Can this process be done without special software?



Test Method Revision Options – Discussion

7. What proportion of the market can we expect to be impacted by the proposed test method revision options?
- Any remaining questions or comments on the network activity test method revision?

Wi-Fi Priority

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1:40–2:00	Timeline and Open Discussion

Wi-Fi Priority in Test Procedure

- Test procedure specifies type of network or data connection to be used

Table 6: Network or Data Connections for Use in Test

Order of Preference for Use in Test (if Provided by UUT)	Connections for all Products
1	Ethernet – 1 Gb/s
2	Ethernet – 100/10 Mb/s
3	USB 3.x
4	USB 2.x
5	USB 1.x
6	RS232
7	IEEE 1284 ²
8	Wi-Fi
9	Other Wired – in order of preference from highest to lowest speed
10	Other Wireless – in order of preference from highest to lowest speed
11	If none of the above, test with whatever connection is provided by the device (or none)



Wi-Fi Priority in Test Procedure

- Increased use Wi-Fi since release of Version 2.0
 - One stakeholder has informed EPA that between 2009 and 2014, the percentage of their products that use Wi-Fi connection had risen from 27% to 80%.
- EPA is considering giving Wi-Fi higher preference, above USB, for the following reasons:
 - Increasing prevalence
 - Ease of use
 - Potential impacts on energy consumption

Proposed data/network connection order of preference in test method

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Wi-Fi Priority in Test Procedure – Discussion

8. EPA appreciates any feedback and relevant data on this topic, including whether the current set of OM networking allowances are appropriate for current hardware implementations.

Version 2.0 OM allowances for interface

Table 8: Sleep Mode Power Allowances for Functional Adders

Adder Type	Connection Type	Max. Data Rate, r (Mbit/second)	Details	Functional Adder Allowance (watts)
Interface	Wired	$r < 20$	Includes: USB 1.x, IEEE 488, IEEE 1284/Parallel/ Centronics, RS232	0.2
		$20 \leq r < 500$	Includes: USB 2.x, IEEE 1394/ FireWire/i.LINK, 100Mb Ethernet	0.4
		$r \geq 500$	Includes: USB 3.x, 1G Ethernet	0.5
		Any	Includes: Flash memory-card/smart-card readers, camera interfaces, PictBridge	0.2
	Fax Modem	Any	<u>Applies to Fax Machines and MFDs only.</u>	0.2
	Wireless, Radio-frequency (RF)	Any	Includes: Bluetooth, 802.11	2.0
	Wireless, Infrared (IR)	Any	Includes: IrDA.	0.1



Paper Usage Assumptions

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Paper Usage Assumptions

- Stakeholder feedback: paper usage assumptions are outdated
- TEC calculation dependent of assumed pages printed

Equation 4: TEC Calculation for Copiers, Digital Duplicators without Print Capability, and MFDs without Print Capability

$$TEC = 5 \times \left[E_{JOB_DAILY} + (2 \times E_{FINAL}) + [24 - (N_{JOBS} \times 0.25) - (2 \times t_{FINAL})] \times \frac{E_{AUTO}}{t_{AUTO}} \right] + 48 \times \frac{E_{AUTO}}{t_{AUTO}}$$

Equation 5: Daily Job Energy Calculation for TEC Products

$$E_{JOB_DAILY} = (2 \times E_{JOB1}) + \left((N_{JOBS} - 2) \times \frac{E_{JOB2} + E_{JOB3} + E_{JOB4}}{3} \right)$$

Equation 2: Calculation of Number of Images per Job

$$N_{IMAGES} = \begin{cases} 1 & s < 4 \\ \text{int} \left[\frac{(0.5 \times s^2)}{N_{JOBS}} \right] & s \geq 4 \end{cases}$$

Table 7: Number of Jobs per Day (N_{JOBS})

Monochrome Product Speed, s (ipm)	Jobs per Day (N_{JOBS})
$s \leq 8$	8
$8 < s < 32$	s
$s \geq 32$	32

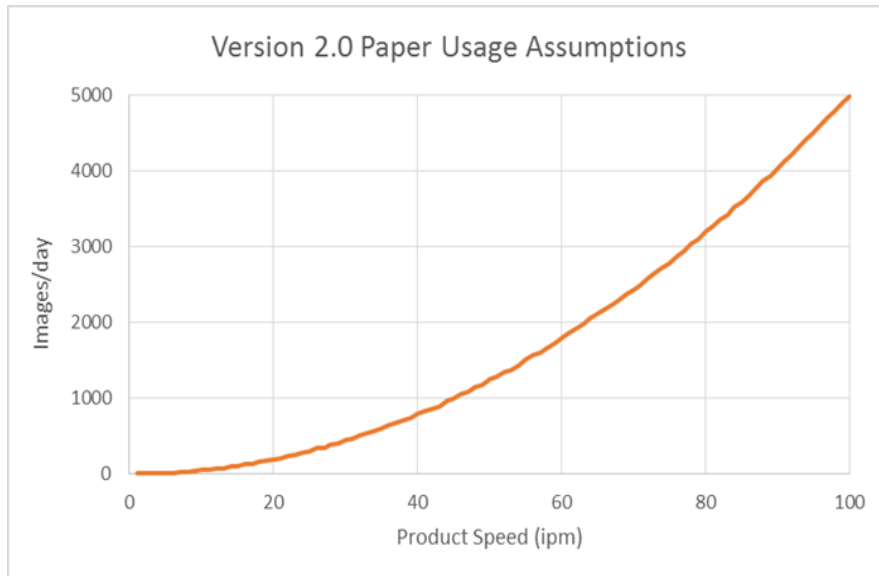
Paper Usage Assumptions

Table 11: Number of Images per Day Calculated for Product Speeds, s, from 1 to 100 ipm

Speed (ipm)	Jobs/Day	Unrounded Images/ Job	Images/ Job	Images/ Day	Speed (ipm)	Jobs/Day	Unrounded Images/ Job	Images/ Job	Images/ Day
1	8	0.06	1	8	51	32	40.64	40	1280
2	8	0.25	1	8	52	32	42.25	42	1344
3	8	0.56	1	8	53	32	43.89	43	1376
4	8	1.00	1	8	54	32	45.56	45	1440
5	8	1.56	1	8	55	32	47.27	47	1504
6	8	2.25	2	16	56	32	49.00	49	1568
7	8	3.06	3	24	57	32	50.77	50	1600
8	8	4.00	4	32	58	32	52.56	52	1664
9	9	4.50	4	36	59	32	54.39	54	1728
10	10	5.00	5	50	60	32	56.25	56	1792
11	11	5.50	5	55	61	32	58.14	58	1856
12	12	6.00	6	72	62	32	60.06	60	1920
13	13	6.50	6	78	63	32	62.02	62	1984
14	14	7.00	7	98	64	32	64.00	64	2048
15	15	7.50	7	105	65	32	66.02	66	2112
16	16	8.00	8	128	66	32	68.06	68	2176
17	17	8.50	8	136	67	32	70.14	70	2240
18	18	9.00	9	162	68	32	72.25	72	2304
19	19	9.50	9	171	69	32	74.39	74	2368

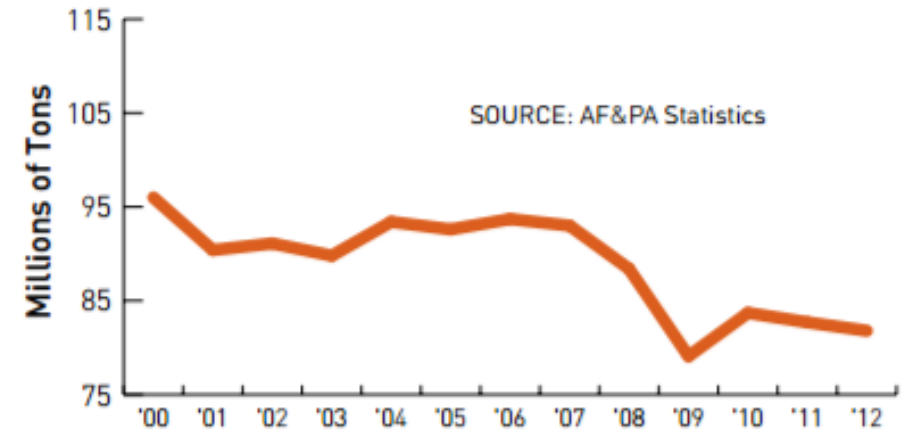
Paper Usage Assumptions

Increased product speeds have caused increased assumed paper usage and TEC values:



But industry data suggests that paper usage hasn't increased*:

Paper Industry Production



Paper Usage Assumptions

- Stakeholder suggested revising daily number of jobs to reduce TEC value without requiring test method change
- EPA is exploring the idea of updating the N_{jobs} value to account for the reduction in paper usage.
 - Considering including a variable or a constant number depending on feedback received.

Equation 5: Daily Job Energy Calculation for TEC Products

$$E_{\text{JOB_DAILY}} = (2 \times E_{\text{JOB1}}) + \left(N_{\text{JOBS}} - 2 \right) \times \frac{E_{\text{JOB2}} + E_{\text{JOB3}} + E_{\text{JOB4}}}{3}$$

Table 7: Number of Jobs per Day (N_{JOBS})

Monochrome Product Speed, s (ipm)	Jobs per Day (N_{JOBS})
$s \leq 8$	8
$8 < s < 32$	s
$s \geq 32$	32



Paper Usage Assumption – Discussion

9. EPA seeks feedback on the validity of this stakeholder's claim and how this usage assumption should be calculated. Data to support claims of other usage assumptions is encouraged.



Paper Usage Assumption – Discussion

10. While the primary objective of the TEC calculation is to create a uniform metric by which imaging equipment can be differentiated, it is important that the values are representative of real-world energy consumption. Any data on the relationship between product speed and paper usage will be greatly appreciated.

Maintenance Modes

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1:40–2:00	Timeline and Open Discussion



Maintenance Modes

- Service/Maintenance modes disabled in Version 2.0
- A stakeholder has informed EPA of a product's high-frequency maintenance mode that adds to energy usage
 - The maintenance mode operates at 50 W and occurs once every 5 minutes, increasing the average power by 2.5 W
- EPA is considering requirement to limit maintenance modes':
 - Frequency
 - Duration
 - Energy consumption



Maintenance Modes – Discussion

11. EPA requests feedback from stakeholders on the prevalence of this issue and encourages any available data on the frequency, duration, and power consumption of typical maintenance modes.



Standby Definition and Requirement

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Standby Definition and Requirement

- In definitions:

- 4) **Standby:** The lowest power consumption state which cannot be switched off (influenced) by the user and that may persist for an indefinite time when the product is connected to the main electricity supply and used in accordance with the manufacturer's instructions.^{1,2} Standby is the product's minimum power state. For Imaging Equipment products addressed by this specification, the "Standby" Mode usually corresponds to Off Mode, but may correspond to Ready State or Sleep Mode. A product cannot exit Standby and reach a lower power state unless it is physically disconnected from the main electricity supply as a result of manual manipulation.

- In requirements:

- 3.4.5 **Standby Power Consumption:** Standby Mode power, which is the lesser of the Ready State Power, Sleep Mode Power, and Off Mode Power, as measured in the test procedure, shall be less than or equal to the Maximum Standby Power specified in Table 9, subject to the following condition.
 - i. The Imaging Equipment shall meet the Standby Power requirement independent of the state of any other devices (e.g., a host PC) connected to it.

Table 9: Maximum Standby Power Requirement

Product Type	Maximum Standby Power (watts)
All OM Products	0.5



Standby Definition and Requirement

Stakeholders have proposed to rename Standby to “Lowest Power Mode.”

Alternatively, EPA is considering:

- Renaming “Standby Power Consumption” in 3.4.5 with “Lowest Power Consumption”
- Removing Standby definition in 1.C.4

This more accurately represents the test condition and eliminates confusion with Off Mode



Standby Definition and Requirement – Discussion

12. Do stakeholders believe that this changes would add clarity to the ENERGY STAR specification
13. EPA's understanding is that Standby and Standby Power Consumption are definitions that are used globally. What concerns exist regarding potentially changing the name of Standby Mode to Lowest Power State?



Professional Products

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Professional Products

- Models used for production printing (thicker, coated paper)
 - Stakeholders have proposed potential criteria to better identify professional products (see Discussion Document)
- Concerns about applicability of ENERGY STAR to these products (e.g. higher duty cycles)
- EPA is inclined to remove these products from scope in Version 3.0.
 - EPA would consider the ISO test method, once available, to potentially reintroduce these products.



Xerox Versant 2100Press

Professional Products stakeholder criteria proposal

Products must have a, b and c and at least four of the optional items

<u>Item</u>	<u>Required Contents</u>	<u>May be sold as accessory unit</u>	<u>Required / Optional</u>
a. Output	Print outputs are distributed or sold	No	Required
b. Print Speed	Monochrome Product : $\geq 86\text{ipm}$ Color Product : $\geq 50\text{ipm}$ (Color Print)	No	Required
c. Paper Weight	Basis Paper weight : $\geq 141\text{g/m}^2$	No	Required
d. Paper Capacity	$\geq 8,000\text{Sheets}$	Yes	Optional
e. Paper Size	$\geq \text{SRA3}$	No	Optional
f. DFE	Meet DFE requirement under ENERGY STAR Ver. 2.0	Yes	Optional
g. Hole Punch	Selectable from 2hole punch and other hole punch	Yes	Optional
h. Finishing	Case binding or Ring binding	Yes	Optional

Professional Products stakeholder criteria proposal (cont.)

Products must have a, b and c and at least four of the optional items

<u>Item</u>	<u>Required Contents</u>	<u>May be sold as accessory unit</u>	<u>Required / Optional</u>
i. Print job management	Job management function (Ex. Change of the print option, Change of the print order, Showing of preview, save/retrieve of detailed print job.)	Yes	Optional
j. Data memory	Retrieve post-print job (1,000+ documents/5,000+ pages of setting information--- folding/punch/finishing etc.)	Yes	Optional
k. Color Certification	Obtain third party certification (US, EU, or JP) in color products.	Yes	Optional
l. Paper compatibility	Coated paper	No	Optional



Professional Products – Discussion

- 15. Do the stakeholder criteria proposal effectively differentiate professional products from commercial products for the purposes of the ENERGY STAR scope?
- 16. What data are stakeholders able to share related to the duty cycle of professional products?
- 17. Are there any other initiatives that EPA should consider that would allow ENERGY STAR to continue including these products within the scope of the program?



3D Printers

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3D printers



18. Is there stakeholder interest in ENERGY STAR expanding the category to include 3D printing within the scope of the specification?

In order to pursue the addition of 3D printers to the scope of ENERGY STAR Imaging Equipment, EPA requires feedback on the following topics:

- Industry-standard test method(s) for idle and active power
- Energy consumption data
- 3D printing market data
- Other challenges
- Other environmental considerations (e.g., material usage/recycling)



Scope Exclusions

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Scope exclusions

19. EPA is interested in stakeholder feedback on the potential to exclude standalone fax machines, standalone copiers, digital duplicators, and mailing machines within the ENERGY STAR product scope, particularly additional data regarding the market for these products, the potential for innovation in this space, and other considerations that EPA should take into account.



Refillable Ink Tanks and other Best Practices

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Refillable Ink Cartridges and Other Best Practices

20. EPA is aware of products on the market today that no longer utilize a cartridge, but rather refillable ink tanks, which are believed to reduce waste and be more sustainable.

EPA is interested in learning more about these products as well as potential ways that ENERGY STAR could encourage or highlight the adoption of these products.



Refillable Ink Cartridges and Other Best Practices

- EPA remains interested in other best practices that would encourage the adoption and expansion of energy-efficient and sustainable practices, such as:
 - User Alerts: Would notify the user that a change in setting would result in increased energy consumption.
 - Maximum Delay Time for TEC Products: Would require a max time limit before TEC product must go to sleep.

21. Are there other best practices that ENERGY STAR could encourage or adopt within the imaging specification, such as alerts for users and/or limiting the maximum machine delay time for TEC products?



Other

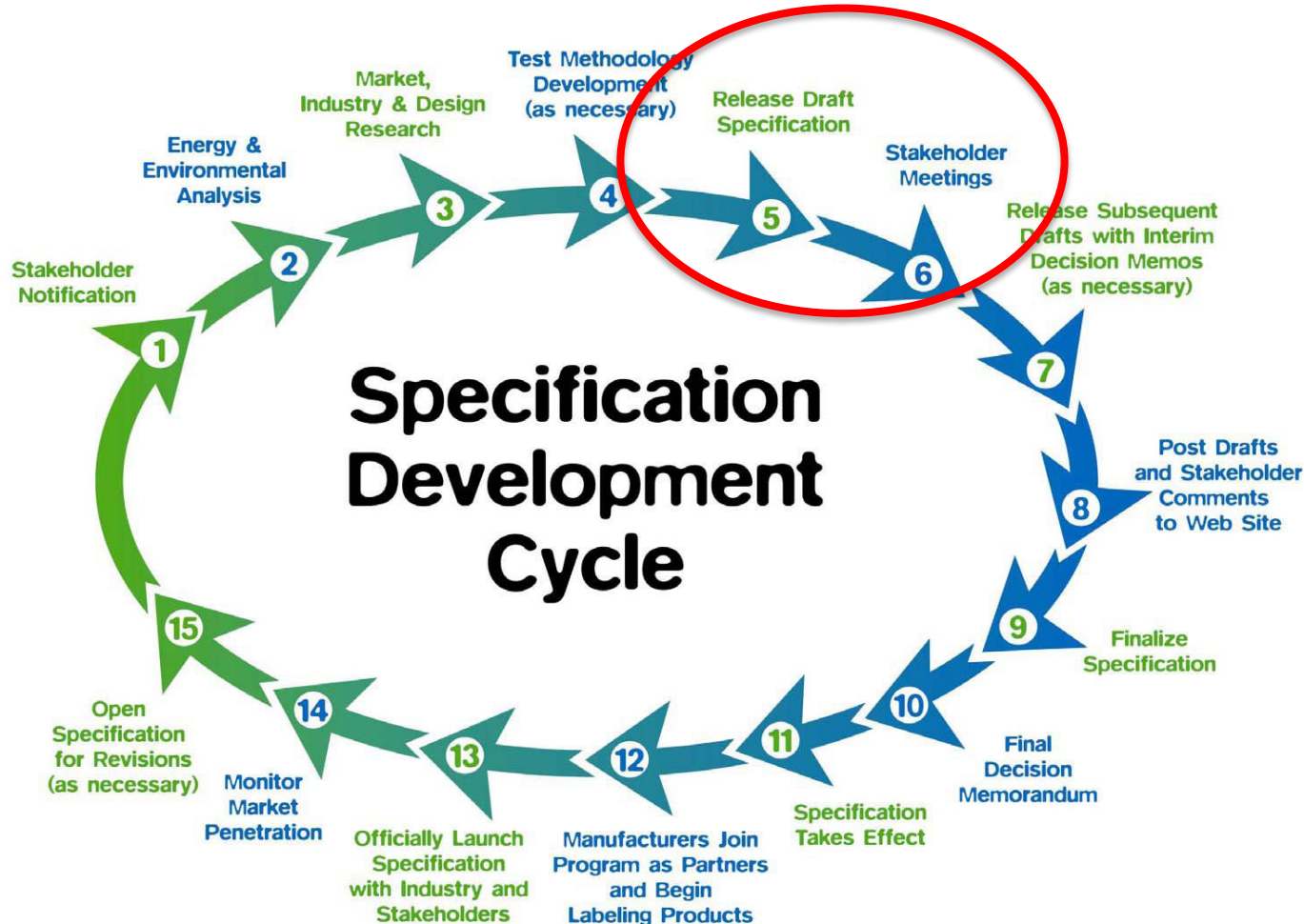
- Any remaining questions or comments on test method revisions, usage assumptions, or scope?



Timeline and Open Discussion

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ENERGY STAR Specification Development Process





Timeline for Version 3.0 Development

- April/May 2017: Test method development and Draft 1 release
- May/June 2017: In-person meeting to discuss Draft 1



Final Questions or Comments



Written Comment Submission

Please send any data and written feedback on the discussion document to imagingequipment@energystar.gov no later than **March 22, 2017**

Unless marked as confidential, comments will be posted on the Imaging Equipment Version 3.0 product development page at www.energystar.gov/products/spec/imaging_equipment_specification_version_3_0_pd

also accessible through www.energystar.gov/revisedspecs



Thank You!

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