



ENERGY STAR[®] **Room Air Cleaners Version 2.0 Draft 1** **Specification**

Stakeholder Webinar

April 4, 2019



Meeting Details

- Slides and related materials will be available on the Room Air Cleaner Product Development Web page:
 - www.energystar.gov/RevisedSpecs
 - *Follow link to “Version 2.0 is in Development” under “Room Air Cleaners”*
- Audio provided via teleconference:
 - Call in:** +1 (877) 423-6338 (U.S.)
+1 (571) 281-2578 (International)
 - Code:** **773-366 #**
 - Phone lines will remain open during discussion
 - Please mute line unless speaking
 - Press *6 to mute and *6 to un-mute your line



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Introductions

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Introductions

Time	Topic
1:00–1:10	Introductions and Background
1:10–2:00	Version 2.0 Draft 1 Specification <ul style="list-style-type: none">- Contaminant Selection- Data Analysis- Product Size Bins- Efficiency Metric- Partial On Power- Test Methods
2:10–2:30	Other Comments Received on Discussion Guide and EPA/DOE Responses
2:30–2:45	Savings & Payback
2:45–3:00	Timeline and Open Discussion



Webinar Goals

- Refresh stakeholders on ENERGY STAR principles and specification development process
- Engage with stakeholders on proposals shared in the Draft 1 Specification
- Respond to stakeholder feedback on the Discussion Guide
- Present estimated energy savings from Draft 1 proposals
- Share expected next steps and schedule





ENERGY STAR Guiding Principles

- ENERGY STAR criteria are designed to balance a varied set of objectives, including:
 - Significant energy and/or water savings
 - Product performance maintained or enhanced
 - Purchasers can recover investment in increased efficiency within a reasonable time period
 - Efficiency can be achieved by more than one manufacturer
 - Energy/water consumption can be measured and verified with testing
 - Label provides meaningful differentiation
- For more information see [ENERGY STAR Products Program Strategic Vision and Guiding Principles](#)

ENERGY STAR® Products Program Strategic Vision and Guiding Principles

Strategic Vision

The ENERGY STAR product labeling program reduces greenhouse gas emissions by removing barriers in the market that deter consumers and businesses from easily identifying the financial and environmental benefits of purchasing the most energy-efficient product model that otherwise meets their needs. Historically, these barriers have included confusion about what constitutes an energy-efficient product, difficulty identifying which products are highly efficient and a lack of appreciation of the value efficient products offer. In particular, the program seeks to reduce greenhouse gas emissions using the following approach:

- Establishing a common, objective basis for defining what constitutes high efficiency for a particular product type
- Providing the market with an easy way (i.e. the ENERGY STAR label) to identify products that qualify
- Helping build and sustain demand for highly efficient products through education and outreach and by ensuring that the products deliver on consumer expectations

Program Design

The ENERGY STAR product labeling program overlays the consumer perspective as part of an ongoing process to identify and promote products that reduce greenhouse gas emissions by meeting the highest energy conservation standards. These standards (aka performance specifications) are established to recognize products that: are cost-effective from the purchaser standpoint; offer at least equivalent functionality and features as standard products; and are proven and broadly available.

As the market responds to consumer demand for ENERGY STAR qualified products in a particular category, sales of highly efficient products increase, locking in more and more energy savings and environmental benefits over the life of those units. In the process, because of technological advances and/or reduced production costs, opportunities present themselves to raise the bar over time in terms of what constitutes a highly efficient product in a given category. In conjunction with the steady progress this approach delivers, the U.S. Environmental Protection Agency (EPA) will continue to explore ways to leverage the ENERGY STAR platform to bring generational change through initiatives such as ENERGY STAR's Most Efficient and the ENERGY STAR Emerging Technology Award.

EPA uses a systematic framework built on a foundation of transparency and collaboration with a range of stakeholders to: (1) assess the feasibility of applying the ENERGY STAR label to a product category; (2) develop performance specifications that must be met in order to earn the label; and (3) reassess performance specifications as market conditions change. This process relies on rigorous market, engineering, and pollution savings analyses as well as input from other programs in EPA, industry and other stakeholders.

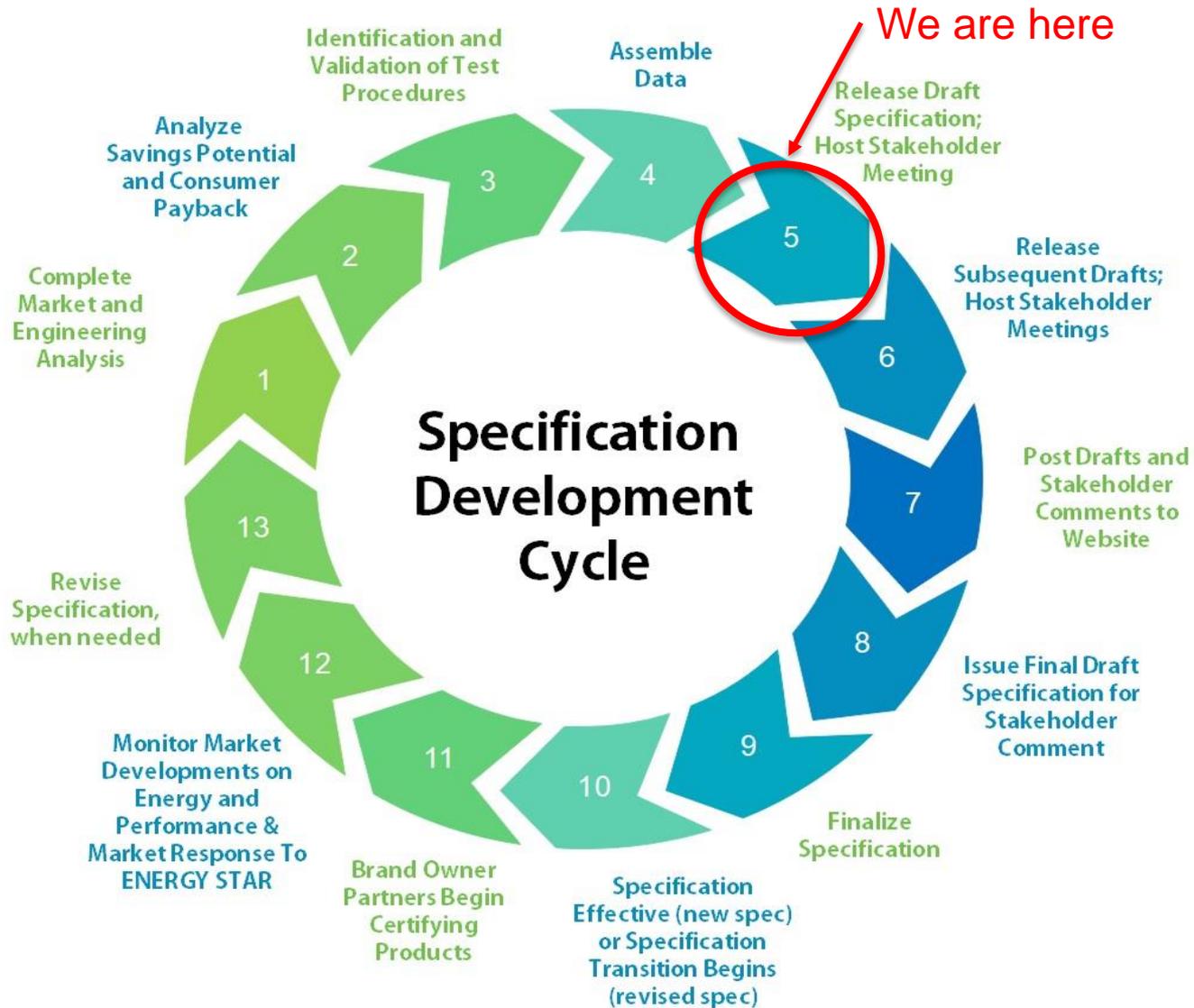
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Specification Development

- When developing or revising a specification, EPA balances:
 - The need to keep pace with evolution among leading products and continue to effectively differentiate for consumers
 - Production cycles, other factors important to the industry
- Key elements of the stakeholder process:
 - Consistency, transparency, inclusiveness, responsiveness, and clarity
 - Stakeholder engagement is a vital aspect to the success of the ENERGY STAR program
- For more information on revising or establishing an ENERGY STAR product specification see [EPA's Standard Operating Procedure](#)





ENERGY STAR Room Air Cleaner (RACL) History

- EPA finalized the V1.0 RACLs specification in 2004.
 - The energy efficiency performance requirements have remained unchanged.
 - Currently, there are 44 manufacturers participating, with about 60 brands, and 235 total products.
- EPA released a Version 2.0 Discussion Guide on October 18, 2018 to discuss a revision to the specification.
 - A webinar was held in November and stakeholder feedback was due in December.
- EPA released a Draft 1 Specification on March 18.

Room Air Cleaners Version 2.0

The ENERGY STAR specification for Room Air Cleaners (RACLs) is currently under revision. Materials related to this revision received past communications related to development of Version 1.0 will continue to receive updates on this development. We are encouraged to contact roomaircleaners@energystar.gov with their contact information to be added to the list.

Monday, March 18, 2019

Room Air Cleaners Version 2.0 Draft 1 Specification

[Room Air Cleaners Draft 1 Specification Cover Memo](#) (PDF, 243 KB)
[Room Air Cleaners Draft 1 Specification](#) (PDF, 291 KB)
[Room Air Cleaners Discussion Guide Comment Response Document](#) (PDF, 145 KB)
[Room Air Cleaners Draft 1 Specification Data Package \(OFFICEDOCUMENT, 117 KB\)](#)

Thursday, December 6, 2018

Room Air Cleaners Version 2.0 Discussion Guide Stakeholder Comments

[3M Comments](#) (PDF, 1.0 MB)
[AHAM Comments](#) (PDF, 489 KB)
[Blueair Comments](#) (PDF, 134 KB)
[Helen of Troy Comments](#) (PDF, 445 KB)
[NEEA, NEEP, PG&E, and SMUD Comments](#) (PDF, 1.1 MB)
[NEEP Comments](#) (PDF, 113 KB)

Tuesday, November 13, 2018

Room Air Cleaners Version 2.0 Discussion Guide Webinar

[Discussion Guide Webinar](#) (PDF, 2.0 MB)

Thursday, October 18, 2018

Room Air Cleaners Version 2.0 Discussion Guide

[Room Air Cleaners Version 2.0 Discussion Guide Cover Memo](#) (PDF, 207 KB)
[Room Air Cleaners Version 2.0 Discussion Guide](#) (PDF, 529 KB)

Applicable Specifications:
 Heating & Cooling: Room Air Cleaners & Purifiers

Version 2.0 Draft 1 Specification Proposals

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1:00–1:10	Introductions and Background
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Contaminant Selection – Stakeholder Feedback

- The Version 1.2 criteria are based on dust CADR only, but the ANSI/AHAM AC-1-2015 test procedure measures CADR for smoke and pollen particles as well.
- EPA asked stakeholders in the Discussion Guide if EPA should consider efficiency criteria based on smoke and/or pollen in Version 2.0.

Five stakeholders supported the use of smoke CADR measurements, instead of dust CADR, to set energy efficiency criteria because smoke:

- Is used to estimate the appropriate room size for a given room air cleaner.
- Has the smallest particle size of the three pollutant types tested.
- Is typically used for internal testing because it provides repeatable/reproducible results.

Room Size Calculator ✕

Step 1: Calculate Room Size
Input the dimensions (width, length) of the room you're determining the size of, then press the 'Enter' button.

x = square feet

Step 2: [Search for air cleaners that have a room size of at least](#)

Important information on selecting an air cleaner:
The AHAM seal (usually found on the back or the side of an air cleaner's box) will list three clean air delivery rate (CADR) numbers - one for tobacco smoke, one for pollen and one for dust. The CADR indicates volume of filtered air delivered by an air cleaner. The higher the tobacco smoke, pollen and dust numbers, the faster the unit filters the air.

Follow AHAM's 2/3 Rule:
You'll always want a unit with a tobacco smoke CADR at least 2/3 your room's area. For example, a 10' x 12' room - 120 square feet - would require an air cleaner with a tobacco smoke CADR of at least 80. If your room size is smaller, the unit will simply clean the air more often or faster. *If you have ceilings higher than 8', you'll want an air cleaner rated for a larger room.*



Contaminant Selection for Efficiency Analysis

- EPA understands that smoke pollutants can have the greatest health risk for the general population (all ages, all degrees of allergenicity).
 - The Association of Home Appliance Manufacturers (AHAM) Verification Program calculates the appropriate room size for room air cleaners based on Smoke CADR.

Room Size (square feet) = cigarette smoke CADR x 1.55

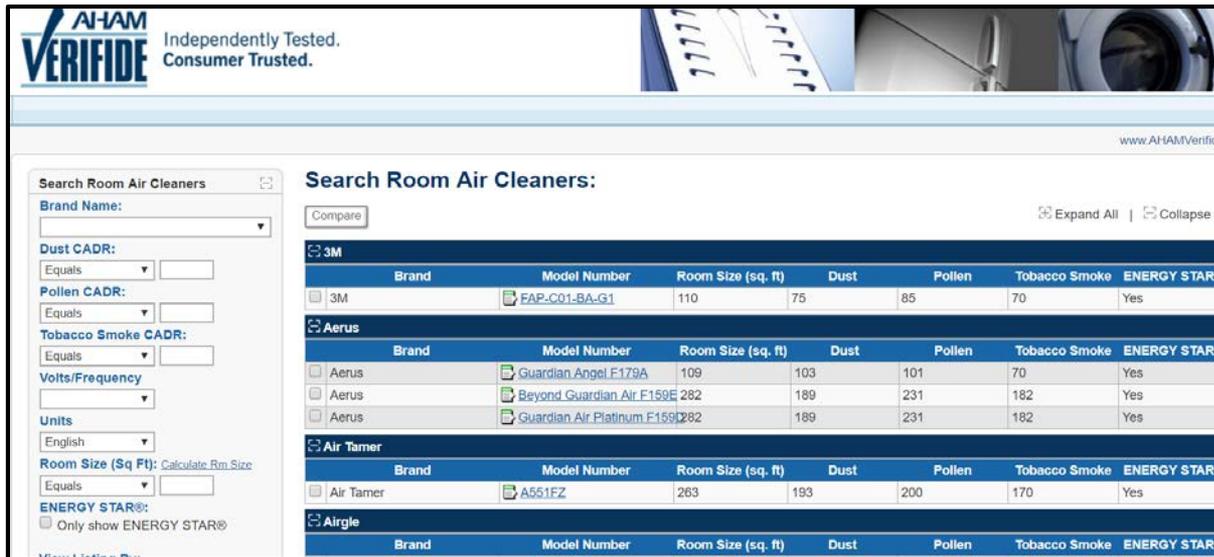
Room Size (square meters) = Room Size (square feet) x 0.093

- Smoke has the smallest particle size of the three pollutants tested to the ANSI/AHAM AC-1-2015 standard and is typically the most energy intensive to remove as it takes longer to remove the smallest particle.

Due to these considerations and stakeholder feedback, EPA believes that smoke is an appropriate pollutant to use as the basis for an efficiency evaluation of room air cleaners. EPA will continue to report the CADR for all three pollutant types.

Draft 1 Data Analysis

- In order to develop proposed Draft 1 levels, EPA first built a dataset:
 - EPA combined all non-ENERGY STAR models on the AHAM Verified website, all non-ENERGY STAR models found through web scraping, and ENERGY STAR certified models to determine the total number of models on the market.
 - EPA found that 45% of base models on the market are ENERGY STAR certified.



The screenshot shows the AHAM Verified website interface. The top header includes the AHAM Verified logo and the text "Independently Tested. Consumer Trusted." Below the header is a search bar and a "Compare" button. The main content area displays search results for "Search Room Air Cleaners:" with a "Compare" button and "Expand All" / "Collapse" options. The results are organized into sections for different brands: 3M, Aerus, Air Tamer, and Airgle. Each section contains a table of models with columns for Brand, Model Number, Room Size (sq. ft), Dust, Pollen, Tobacco Smoke, and ENERGY STAR certification status.

Brand	Model Number	Room Size (sq. ft)	Dust	Pollen	Tobacco Smoke	ENERGY STAR
3M	FAP-C01-BA-G1	110	75	85	70	Yes
Aerus	Guardian Angel F179A	109	103	101	70	Yes
Aerus	Beyond Guardian Air F159E	282	189	231	182	Yes
Aerus	Guardian Air Platinum F159E	282	189	231	182	Yes
Air Tamer	A551EZ	263	193	200	170	Yes
Airgle						



Draft 1 Data Analysis

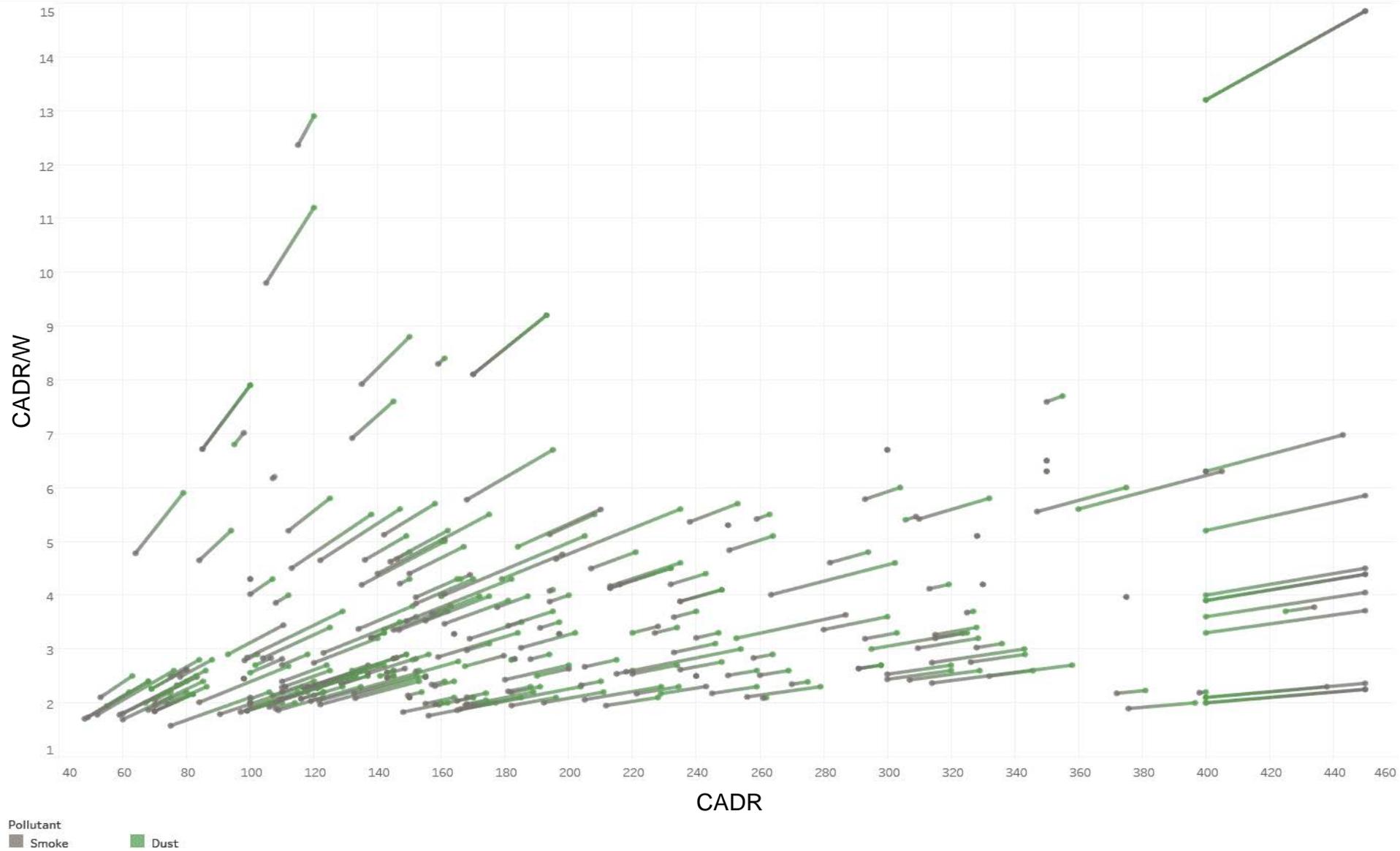
- Next, EPA examined how to determine Smoke CADR/W values for each model:
 - AHAM indicated that power consumption during the test for Dust CADR will mirror the power consumption during the test for Smoke CADR.
 - EPA calculated Smoke CADR/W for each model on the ENERGY STAR qualified products list.

ENERGY STAR® Room Air Cleaner Data and Analysis

Enclosed are the ENERGY STAR Room Air Cleaner data and analysis supporting the proposed requirements in the Draft 1 Version 2.0 ENERGY STAR specification. The following tabs are included in this workbook:

- 1. Introduction:** Includes Introduction, table of contents and contacts.
 - [Table 1: Draft 1 Efficiency Requirements](#)
 - [Chart 1: Draft 1 V2.0 Proposal and ENERGY STAR Models](#)
- 2. Key Product Criteria:** Displays key data for new specifications and major revisions.
 - [Table 2: Annual Unit Energy, GHG, and Cost Savings](#)
 - [Table 3: Lifetime Unit Energy, GHG, and Cost Savings](#)
 - [Table 4: National Lifetime Savings Estimate](#)
- 3. Energy and Cost Savings:** Summarizes consumers' energy and cost savings, as well as national savings, associated with the Version 2.0 levels.
- 4. Product Availability:** Provides model counts of available product at each proposal level per CADR bin.
 - [Table 5: Product Availability and Percentage of Total](#)

1. Introduction | 2. Draft 1 Version 2.0 Criteria | 3. Energy and Cost Savings | 4. Product Availability | 5. Incremental Cost and Pay ...





Product Size Bins – Stakeholder Feedback

- In the Discussion Guide, EPA asked stakeholders if EPA should consider evaluating efficiency criteria based on a product's size.
 - Stakeholders noted that it's more difficult to meet the ENERGY STAR criteria for smaller products, because larger capacity room air cleaners are inherently able to achieve higher efficiency.

- Numerous stakeholders stressed the importance of ensuring that there are ENERGY STAR certified models across all unit sizes to serve all types of consumers.
- Five stakeholders supported the initiative to separate products by CADR size in order to reflect inherent differences in efficiency associated with CADR size.
- Three stakeholders were opposed to differentiating ENERGY STAR criteria based on the size of CADR units, noting that it could result in manufacturers being incentivized to cap performance to be placed in a lower size bin.

Product Size Bins

- EPA heard from stakeholders that smaller-CADR products, which offer a lower cost option for small rooms, currently have more difficulty achieving ENERGY STAR than larger-CADR products. *Note this chart only reflects ENERGY STAR models

Popular Size Bins	# Products per Bin	Average Efficiency (Smoke CADR/W)
$30 \leq \text{CADR} < 100$	35	2.69
$100 \leq \text{CADR} < 150$	65	3.08
$150 \leq \text{CADR} < 200$	54	3.43
$\text{CADR} \geq 200$	81	3.54
Total	235	3.26

After analyzing the relationship between Smoke CADR and Smoke CADR/Watt, EPA believes it would be appropriate to set efficiency criteria based on CADR size bins.



Product Size Bins

- The CADR bins were determined in consideration of clusters of CADR values seen on the market and after evaluating the efficiencies of models at different CADR sizes.

CADR Range
$30 \leq \text{Smoke CADR} < 100$
$100 \leq \text{Smoke CADR} < 150$
$150 \leq \text{Smoke CADR} < 200$
$200 \leq \text{Smoke CADR}$



Efficiency Metric – Stakeholder Feedback

- Five stakeholders recommended the ENERGY STAR criteria be made more stringent since there are many models at or much higher than the current efficiency criteria.
- Two stakeholders stated ENERGY STAR should evaluate new efficiency levels based on shipment weighted data, not on model data alone.
- One stakeholder recommended that ENERGY STAR models be required to claim room size.

- EPA has updated the efficiency criteria to target the top 25% of available models.
- Shipment-weighted data runs the risk of failing to support the intent of recognizing leadership in energy efficiency performance in models.
- EPA will include the room size for each model, as defined by AHAM, on the ENERGY STAR Certified Product List.



Efficiency Metric

- In setting the efficiency criteria, EPA targeted the top 25% of models available on the market in each CADR bin, set the criteria based on Smoke CADR/Watt, and binned products by size:

Table 1: Minimum Smoke CADR/W Requirement

Smoke CADR Bins	Minimum Smoke CADR/W
$30 \leq \text{CADR} < 100$	2.1
$100 \leq \text{CADR} < 150$	2.4
$150 \leq \text{CADR} < 200$	2.9
$\text{CADR} \geq 200$	2.9

Efficiency Level	Count of Models	% of Total
Non-ENERGY STAR	280	54.4%
ENERGY STAR V1.2	235	45.6%
Draft 1 V2.0 Proposal	124	24.1%



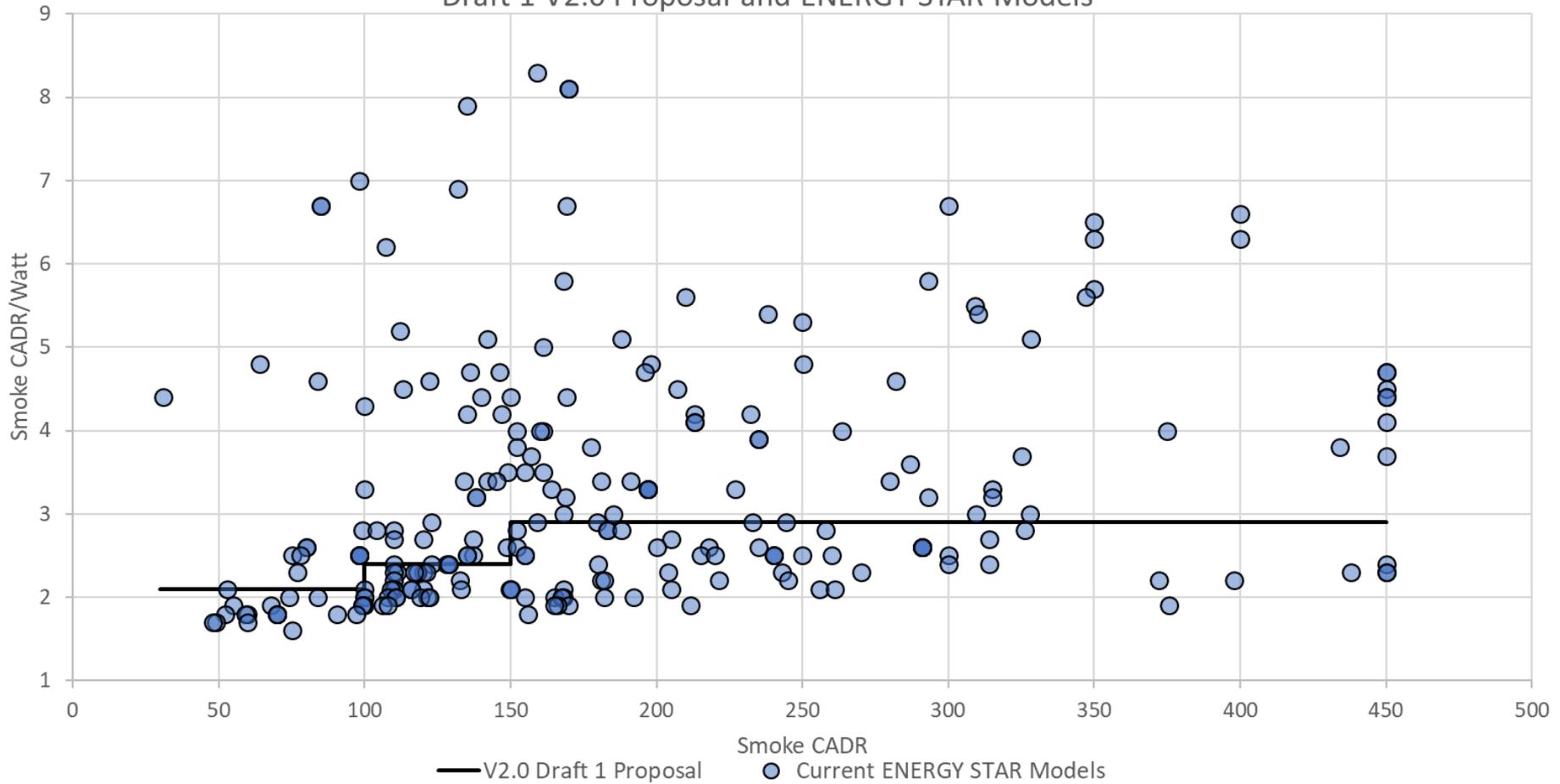
Efficiency Metric

- The breakdown of products based on size bin and the Draft 1 proposal, as well as the estimated pass rates can be seen below:

Draft 1 V2.0 Proposal Smoke CADR/W	CADR Range	Count of Models	Count of Models Estimated to Meet Draft 1 V2.0 Proposal	% of Total within CADR Bin
2.1	$30 \leq \text{Smoke CADR} < 100$	77	17	22.1%
2.4	$100 \leq \text{Smoke CADR} < 150$	142	33	23.2%
2.9	$150 \leq \text{Smoke CADR} < 200$	118	29	24.6%
2.9	$200 \leq \text{Smoke CADR}$	178	45	25.3%



Draft 1 V2.0 Proposal and ENERGY STAR Models





Standby/Partial On Mode Power Definitions

- EPA added in definitions to describe room air cleaner functions and modes to align with the IEC 62542 Glossary of Terms and the IEC 62301 test procedure.
- EPA believes this will add clarity when describing Partial On Mode – which now encompasses the previously used terms of Standby Mode and Network Mode.

C. Room Air Cleaner Functions:

1. Primary Function: Actively removing particulate matter from the air.
2. Secondary Function: Function that enables, supplements or enhances a primary function. For Room Air Cleaners, Secondary Functions may include network connection, clocks, remote controls, or other programmable functions that may continue to be enabled when the primary function is inactive.

D. Operational Modes:

1. Partial On Mode²: The condition during which the equipment provides at least one secondary function but no primary function. This term encompasses the Standby Mode and Network Mode terms from IEC 62301.
2. On Mode: The condition during which the equipment provides the primary function. Secondary functions may also be enabled.



Standby/Partial On Mode Power – Stakeholder Feedback

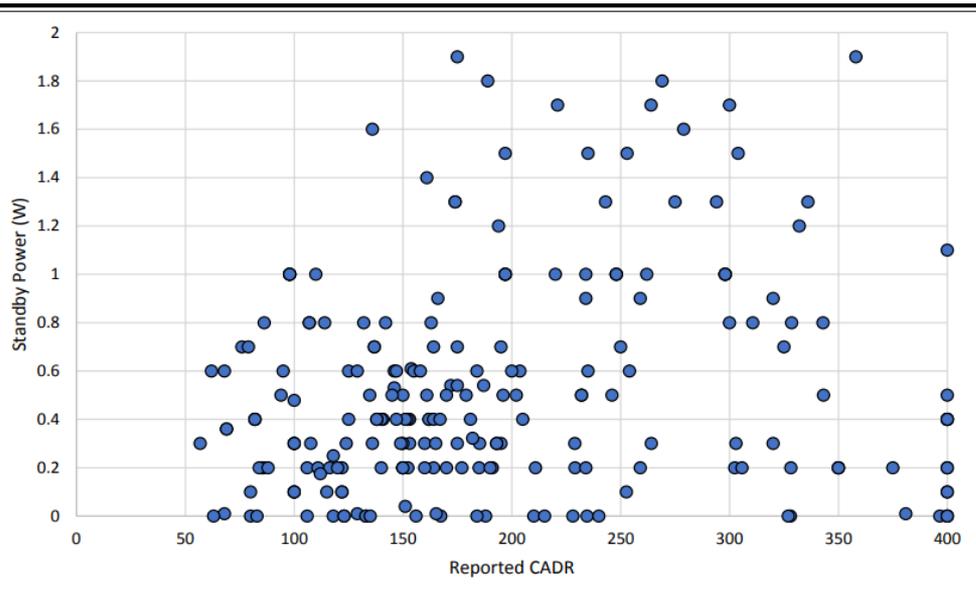
Three stakeholders requested that EPA provide an allowance for network connected products, since they provide functionality for the consumer but may cause an increase in standby power.

- Given the growing prevalence of network capability among room air cleaners on the market and the benefits it may offer consumers, EPA has included a Partial On Mode Network Connected power allowance of 1 Watt in the Draft 1 Specification for products that have Wi-Fi capability enabled during testing.
- EPA has lowered the Maximum Partial On Mode power requirement from 2 Watts to 1 Watt in Draft 1.



Partial On Mode Power Requirements

- The current Version 1.2 maximum standby power is 2 Watts. EPA has lowered this maximum to 1 Watt for non-connected products based on certification data.



Equation 1: Calculation of Maximum Partial On Mode Power Requirement

$$P_{Maximum_Partial_On} = P_{Base_Allowance} + P_{Network_Connected}$$

Where:

- $P_{Maximum_Partial_On}$ is the Maximum Partial On Mode Power Requirement, in watts;
- $P_{Base_Allowance}$ is the Partial On Mode Base power allowance for all products; and
- $P_{Network_Connected}$ is the Partial On Mode Network Connected power allowance.



Partial On Mode Power Requirements

- Recognizing that network capabilities might consume extra power, EPA included an allowance of 1 Watt for products tested with Wi-Fi network connection enabled (maintaining the same limit for network-connected products as Version 1.2).

Table 2: Partial On Mode Power Allowances

	Partial On Mode Power Allowance for models with Wi-Fi network connection enabled during testing	Partial On Mode Power Allowance for models without Wi-Fi network connection enabled during testing
$P_{Base_Allowance}$	1.00	1.00
$P_{Network_Connected}$	1.00	0



Test Methods

- EPA has updated the test method references in Table 2 to the most recent version of those standards.

Table 2: Test Methods for ENERGY STAR Certification

ENERGY STAR Requirement	Test Method Reference
Cigarette Smoke CADR	<i>ANSI/AHAM AC-1-2015: Method of Measuring the Performance of Portable Household Electric Room Air Cleaners</i>
Measurement of Operating Power	
Ozone Generation	<i>UL 867 Ed. 5.0 Electrostatic Air Cleaners</i>
Measured Partial On Mode Power ($P_{\text{Partial_On}}$)	<i>IEC 62301 Ed. 2.0 Household electrical appliances – Measurement of standby power</i>



Other Discussion Guide Stakeholder Comments and EPA/DOE Responses

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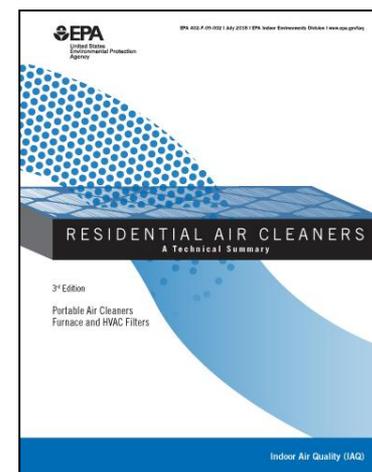
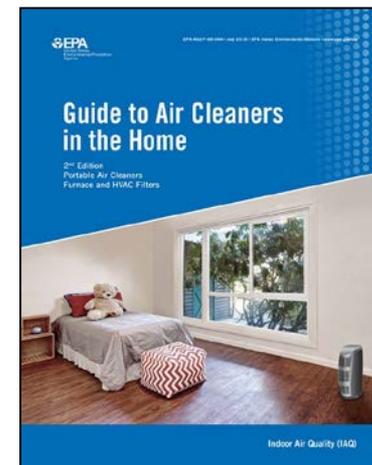
Filter Performance – Stakeholder Feedback

- The Version 1.2 Specification does not reference specific filter types. However, in EPA Indoor Environments Division’s “Guide to Air Cleaners in the Home”, it is noted that filter type does influence the performance of a room air cleaner.
- In the Discussion Guide, EPA requested feedback on setting requirements specific to filter type and filter efficiency.

Five stakeholders commented that EPA should not add filter efficiency criteria and did not believe EPA should exclude any filter types because:

- The same CADR could be achieved using different combinations of filters and product designs-the whole system should be considered not a single component, the filter.
- There isn’t an industry standard test procedure.

Two stakeholders suggested adding a filter efficiency requirement.





Filter Performance

- Ensuring that product performance is not compromised even as efficiency improves is a key tenet of ENERGY STAR and is the reason EPA considered a filter type requirement.
- However, EPA understands that product design and filter type both contribute to a product's air cleaning effectiveness.

As a result, EPA will not set efficiency criteria for filter types or require a specific filter type be used but EPA proposes to require that a product be shipped with the filter that was used when tested.



Room Air Cleaner Fan Noise

- In EPA Indoor Environments Division's recently released "Guide to Air Cleaners in the Home", it is noted that noise generated by room air cleaners can be a concern for consumers, who have cited noise as a reason for decreasing the speed of their air cleaner or turning it off.
- In the Discussion Guide, EPA requested feedback on setting requirements specific noise of room air cleaners.



Noise Criteria – Stakeholder Feedback

Five stakeholders disagreed with the proposal to set requirements on fan noise because:

- Studies that note noise as a concern for consumers may be outdated.
- It is not known what noise levels would be acceptable to consumers, some consumers may prefer it as a source of white noise.
- Manufacturers have interest in ensuring that consumers are satisfied.

While EPA maintains concerns that some consumers will turn off their room air cleaners because of noise, EPA understands that consumers may have different preferences when it comes to fan noise.



Sensors – Stakeholder Feedback

- Stakeholders have noted that there are room air cleaners that incorporate sensors that adapt to room conditions to reduce air flow once acceptable contamination levels are reached.
- In the Discussion Guide, EPA requested stakeholder feedback on the prevalence and efficacy of sensors.

- Two commenters noted that a wide variety of sensors are used - with varying sensitivities and accuracies.
- Another stakeholder noted that sensors can be an expensive add-on feature and quality will be dependent on a manufacturer's implementation/algorithm.
- Two stakeholders stated that EPA should find a way to credit products with sensors.



Sensors

- EPA recognizes there does seem to be an increasing amount of room air cleaner models featuring an air quality sensor.

However, due to a lack of confidence in the effectiveness of today's sensors and the algorithms the room air cleaners use in response to sensor input to control the devices, EPA has not proposed incentives for sensors in Draft 1.

- EPA continues to be interested in this potential energy saving feature and encourages stakeholders to share information and data with EPA to better support the ability to recognize models with air quality sensors in the future.



Testing - Contaminant Level

- In the Discussion Guide, DOE and EPA asked stakeholders the following regarding contaminate level during testing:

21. DOE and EPA welcome feedback on an adjustment in contaminate level to potentially be more representative of typical consumer conditions.
22. DOE and EPA are interested in feedback on the feasibility of varying contaminate levels depending on test unit features (e.g., size, power draw, other) that may indicate the expected contaminate level for that particular unit in the field.
23. DOE and EPA are interested in the potential of testing at different contaminate levels to further differentiate the room air cleaner market.



Testing - Contaminant Level

- Three stakeholders recommended that the AHAM test method, AC-1-2015, remain referenced as the approach to introduce contaminant in the test chamber.
- One stakeholder noted that decreasing the initial number of contaminant particles in the test chamber at the start of testing will impact repeatability and reproducibility of the test.
- Another noted that decreasing the initial particle concentration would impact the test method's ability to measure high-CADR devices, as there may be insufficient particle counts towards the end of the test to provide reliable data.

Based on stakeholder feedback, DOE and EPA expect that reducing the initial contaminant concentration may introduce test variability and may also limit the ability to reliably measure the performance of air cleaners that remove contaminant at a higher rate than smaller units. Therefore, DOE and EPA plan to retain the current initial room contaminant concentration level.



Testing - Control Speed

- In the Discussion Guide, DOE and EPA asked stakeholders the following regarding control speed during testing:

27. DOE and EPA welcome feedback on an appropriate control speed setting for testing room air cleaners.

Four stakeholders recommended that EPA follow the AHAM AC-1-2015 standard and require that the maximum fan control speed be used throughout testing.

- One commenter encouraged DOE and EPA to participate in the AC-1 task force to raise the issue of testing at multiple speeds.
- Another stakeholder noted that the approach to use maximum fan speed is consistent with other countries' methodologies.

- In light of the concerns raised by stakeholders, DOE and EPA agree that using the maximum control speed is most appropriate at this time.
- DOE and EPA also appreciate the invitation to participate in the AC-1 task force and look forward to participating.



Testing - Test Duration

- In the Discussion Guide, DOE and EPA asked stakeholders the following regarding test duration:

28. DOE and EPA welcome feedback on the applicability of a longer rating test period for air cleaners to incentivize advanced technologies.

- Two stakeholders supported maintaining the current ANSI/AHAM test method duration time - noting that air cleaners that require a test period longer than 20 minutes typically have a very low CADR.
- Another stakeholder stated that a longer test would require a higher particle concentration and it would not provide more accurate CADR information than the current testing approach.
- One stakeholder suggested reducing the test period.

DOE and EPA agree that maintaining the current 20-minute test is appropriate given the state of the market and relationship between test duration and initial room concentration during testing.



Testing - Filter Condition

- In the Discussion Guide, DOE and EPA asked stakeholders the following regarding filter condition during testing:

29. DOE and EPA welcome feedback on the applicability of a used filter test and how performance may vary as filter usage time increases.

Four stakeholders stated that a used filter test will make it difficult to define specific testing criteria and also note that such a test will be overly burdensome, subjective, and expensive for manufacturers.

DOE and EPA agree that testing with a new filter is appropriate, given the variability and burden associated with performing a used filter test.



Testing - Test Method

- Stakeholders offered the following general comments on test method considerations:

- Several stakeholders recommended maintaining the AHAM test procedure, without deviation. These stakeholders also noted that AHAM's specification is most consistent across industry standards and changing from this practice will cause undue burden.
- Stakeholders welcomed EPA and DOE participation in AHAM's task force to review the industry test procedure, rather than to make changes that are specific to ENERGY STAR.

DOE and EPA appreciate the invitation to participate in the AHAM AC-1 task force and look forward to participating.

Savings & Payback

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Per Unit and National Lifetime Savings

- Annual per unit savings and national lifetime savings are significant.

CADR Range	Per Unit Annual Savings			National Lifetime Savings		
	Electrical Savings (kWh)	Operational Savings (\$)	Emissions Reduction (pounds of CO ₂)	Energy Savings (GWh)	CO ₂ Savings (million metric tons)	Cost Savings (million \$)
30 ≤ Smoke CADR < 100	61	\$ 8	95	23,280	36.3	\$ 1,504
100 ≤ Smoke CADR < 150	95	\$ 12	147			
150 ≤ Smoke CADR < 200	173	\$ 21	267			
200 ≤ Smoke CADR	328	\$ 40	505			

Assumptions: The baseline used to calculate savings was a Smoke CADR/W equivalent to a Dust CADR/W level of 1.9, which is just under the ENERGY STAR V1.2 level. Calculations assume (1) Smoke CADR/W is equal to the Dust CADR/W divided by Dust CADR and multiplied by Smoke CADR, (2) Emissions Factor = 1.54 lbs CO₂E/kWh, and (3) the cost of residential electricity is \$0.1220/kWh. National lifetime savings assumes all room air cleaners in the U.S. are ENERGY STAR at the proposed Version 2.0 criteria over the lifetime. Projected shipments of room air cleaners were estimated per analysis of ENERGY STAR shipments.



Average Cost and Payback

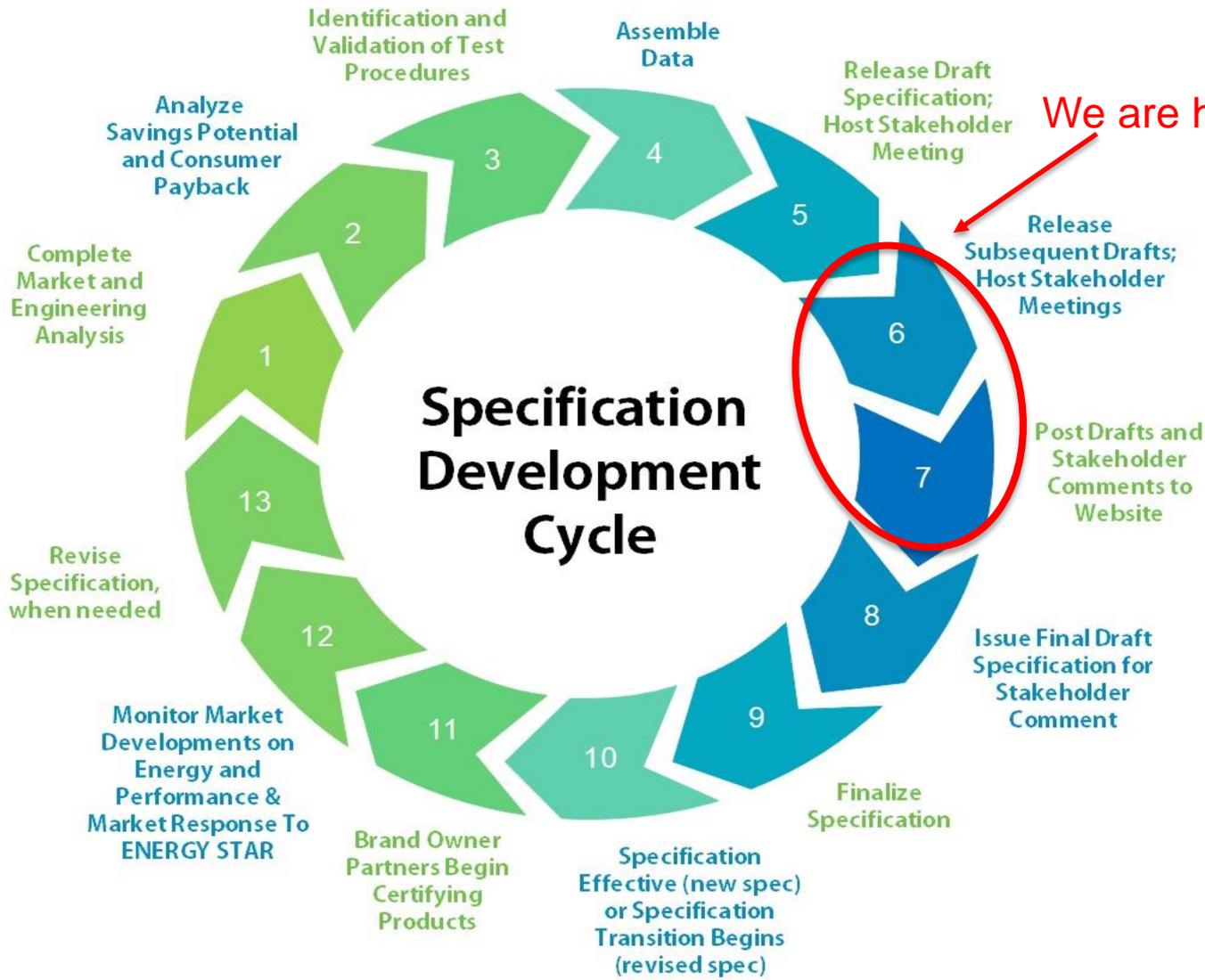
- Payback is less than one year for all categories except the largest, which is less than two years.

Product Size	Efficiency Level	Smoke CADR/W	Average Annual Energy Cost (\$)	Average Purchase Cost (\$)	Payback (yrs)
30 ≤ Smoke CADR < 100	ENERGY STAR V1.2	1.72	\$ 33.32	\$ 74.05	-
	V2.0 Draft 1 Proposal	2.10	\$ 27.05	\$ 79.99	0.9
100 ≤ Smoke CADR < 150	ENERGY STAR V1.2	1.91	\$ 48.46	\$ 163.32	-
	V2.0 Draft 1 Proposal	2.40	\$ 38.34	\$ 169.99	0.7
150 ≤ Smoke CADR < 200	ENERGY STAR V1.2	2.02	\$ 63.98	\$ 146.59	-
	V2.0 Draft 1 Proposal	2.90	\$ 44.42	\$ 159.99	0.7
200 ≤ Smoke CADR	ENERGY STAR V1.2	1.97	\$ 115.25	\$ 240.71	-
	V2.0 Draft 1 Proposal	2.90	\$ 78.16	\$ 299.99	1.6



Timeline and Open Discussion

Time	Topic
1:00–1:10	Introductions and Background
1:10–2:00	Version 2.0 Draft 1 Specification <ul style="list-style-type: none">- Contaminant Selection- Data Analysis- Product Size Bins- Efficiency Metric- Partial On Power- Test Methods
2:10–2:30	Other Comments Received on Discussion Guide and EPA/DOE Responses
2:30–2:45	Savings & Payback
2:45–3:00	Timeline and Open Discussion



We are headed here





Next Steps

Event	Date
<i>Version 2.0 Discussion Guide Published</i>	<i>October 18, 2018</i>
<i>Version 2.0 Discussion Guide Webinar</i>	<i>November 13, 2018</i>
<i>Discussion Guide Comments Due</i>	<i>November 27, 2018</i>
<i>Version 2.0 Draft 1 Specification</i>	<i>March 18, 2019</i>
Version 2.0 Draft 1 Webinar	April 4, 2019
Draft 1 Comments Due	April 17, 2019
Release Subsequent Drafts of Specification	Spring 2019
Publish Final Version 2.0 Specification	Summer 2019
Version 2.0 Specification Effective Date	Spring 2020



Webinar Wrap-up and Comment Deadline

- EPA and DOE appreciate today's opportunity to discuss the Draft 1.
- Again, comments are due on **April 17, 2019**.
- Please send all comments to:

roomaircleaners@energystar.gov

- Unless marked as confidential, all comments will be posted to the Room Air Cleaner product development page at [https://www.energystar.gov/products/spec/room air cleaners version 2 0 pd](https://www.energystar.gov/products/spec/room_air_cleaners_version_2_0_pd)



Open Discussion



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