



ENERGY STAR® Central Air Conditioners & Air-Source Heat Pumps

Version 6.0
ESPPM Stakeholder Meeting
September 12, 2019





Meeting Agenda

1. Introductions and Background
2. CAC/ASHP Revision Drivers and Goals
3. Draft 1 Proposals, comments, and discussion
- Break at 2:45 -----
4. EPA's Long-term Specification Goals
5. Metric Crosswalk and Transition
6. Closeout: Next Steps, Q&A



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Introductions

Abigail Daken

U.S. Environmental Protection Agency

Antonio M. Bouza

U.S. Department of Energy



ENERGY STAR is the simple choice for energy efficiency.

EPA's ENERGY STAR identifies the most energy-efficient **products**, **buildings**, **plants**, and **new homes** – all based on the latest government-backed standards.

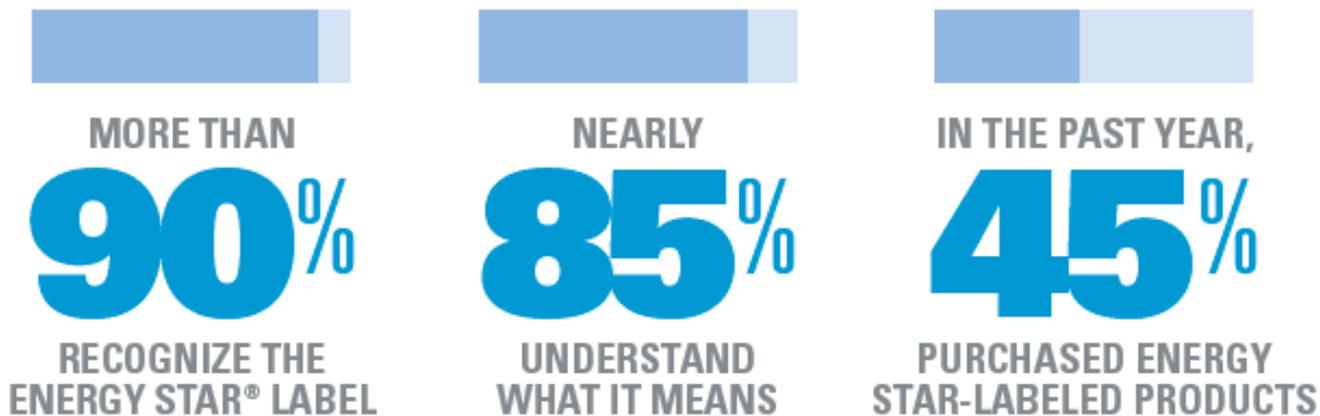
Today, every ENERGY STAR label is verified by a rigorous third-party certification process.





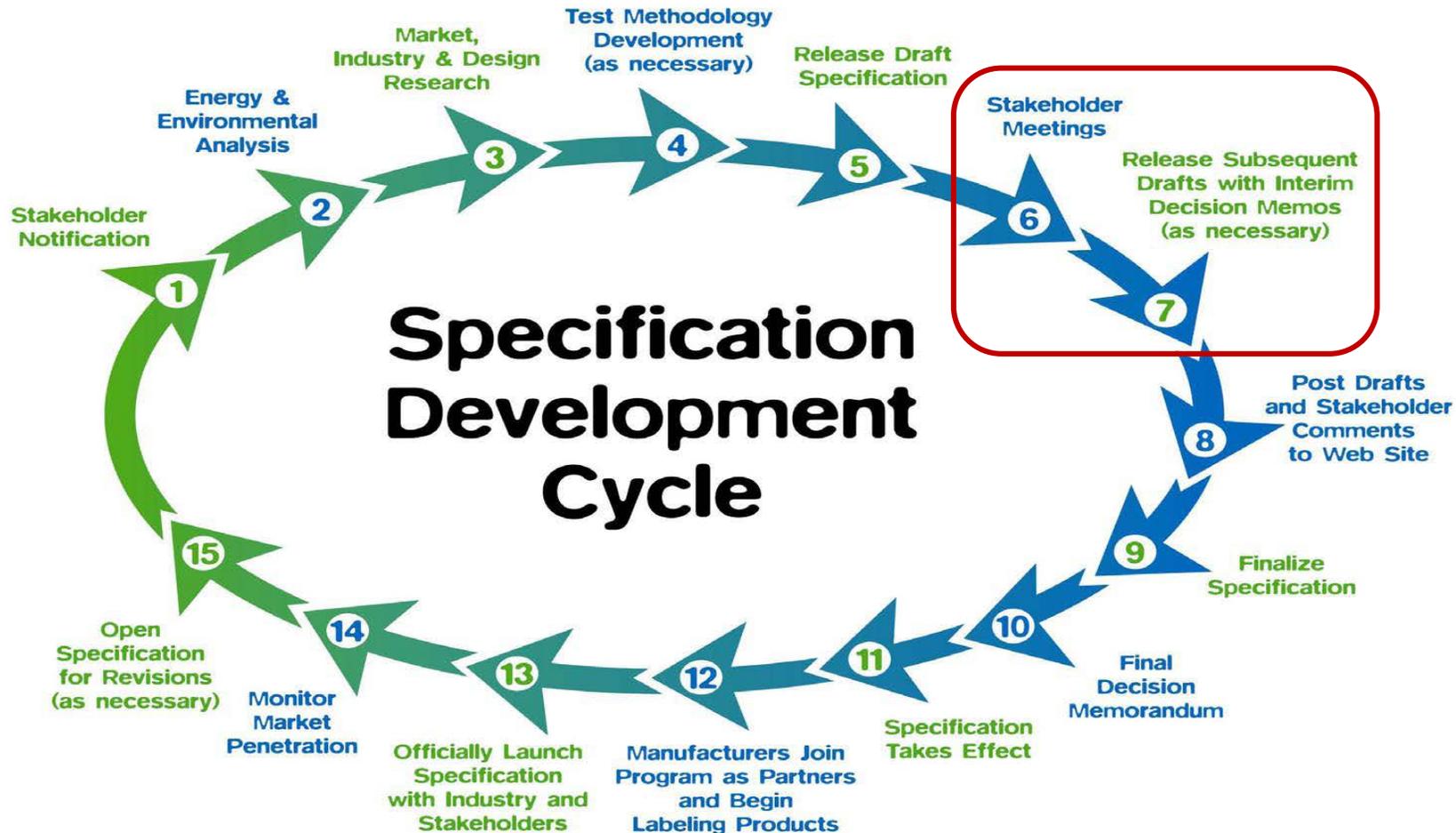
Brand Preference and Loyalty

In American Households:





Specification Revision Process





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Revision Drivers

- Time to take another look – Version 5.0 effective 2015
- Can we alleviate design, installation, and maintenance problems?
- Market changes:
 - Increased interest in electrification → interest in and availability of cold climate optimized heat pumps
 - Prevalence of dual capacity units for increased comfort
- Developing consensus around grid services for CAC/ASHPs



Revision Drivers

Estimated Market Share of ENERGY STAR Certified CACs and ASHPs

2018	Overall	33%
	CACs	28%
	ASHPs	43%

[2018 ENERGY STAR Unit Shipment and Market Penetration Report](#)



Goals of Proposed 2019 Revision

1. Address oversizing, as an effort to increase consumer comfort and contractor excitement about the label
2. Help utility programs and consumers easily identify heat pumps appropriate for their climate
3. Introduce connected criteria for Demand Response



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Draft 1 Summary

- Introduced a Climate differentiated label for ASHPs
- Staged or variable capacity requirement, including SEER levels to reflect this
- Connected criteria for demand response and user amenity (published in LTP)



Draft 1 – Central Air Conditioners

- Increased SEER to align with Staged/variable capacity requirement

Product Type	SEER	EER
CAC Split Systems	16.0	12.5
CAC Single Package Equipment	16.0	12.0



Draft 1 – Air Source Heat Pumps

Product Type	Moderate & Hot Climate		
	SEER	EER	HSPF
ASHP Split Systems	16.0	12.5	8.5
ASHP Single Package	16.0	12.0	8.2



Draft 1 – Air Source Heat Pumps

Product Type	Cold Climate				
	SEER	EER	HSPF	COP @ 5°F	Percentage of Heating Capacity @ 5°F
ASHP Split Systems	16.0	11.5	9.0	1.75	80%
ASHP Single Package	16.0	11.0	9.0	1.75	80%



Draft 1 Comments: Timing

- Most manufacturers: upcoming test method and refrigerant changes are stressing design and test capacity, not able to adjust to new requirements before 2023, though pleased to have criteria finalized soon
- EPA considering 1/1/23 effective date, but V6.0 would need to be more stringent
 - For our own long term goals, and
 - In response to DOE 2023 minimum standards



Draft 1 Proposal: Climate Differentiated ASHP Labels

- Climate differentiated labels: product performance optimized for different climates
 - Moderate and Hot Climates – High EER for peak cooling
 - Cold Climate – High HSPF and heating performance at low temps
- Advantages:
 - Refers to performance of the equipment, not the location of install
 - Very flexible: programs, contractors, and consumers decide which climate is most appropriate
- Is there additional value that could be created with the moderate & hot climate label or a hot dry climate label?



Draft 1 Comments: Climate Differentiated ASHP Labels

- Mixed feedback: some enthusiasm, some confusion; support for alignment with NEEP ccASHP spec
- Manufacturers not able to provide 5°F test data until 2023
- 5°F relative heating capacity problematic as proposed
 - 80% too high for typical designs in short term (though close to technologically feasible), BUT
 - Proposed criteria (5°F capacity/47°F capacity) may not work as M1 requires capacities to be tested



Climate Differentiated ASHP Labels Discussion

- We are looking to reengage with a new marketing push, but it will be hard to do without climate specific criteria soon
 - High level of utility and consumers interest in cold climate heat pumps, and available products that are optimized for this
- We would consider allowing self-reported 5°F performance criteria until 2023
- If our proposed metric for 5°F capacity is unworkable, what would work?



Draft 1 Proposal and Comments: At least 2 capacity stages

“Units shall have at least 2 capacity stages”

- Widespread (not universal) discomfort with prescriptive requirement; most would accept higher SEER to avoid it
- Claim that there are cases where fixed capacity uses no more energy, for less cost
 - Have gotten some specific situations, could use more
- How high would SEER need to be to have essentially all certified products be staged or variable capacity?



Draft 1 Proposal and Comments: Connected

Optional Connected Criteria were published in the LTP released in July

- Connected criteria = user amenity + grid services
 - Grid Services: Based on AHRI 1380
 - User amenity: Includes supporting integration into a home energy management system, open standards, energy reporting
- DR responses are tested and certified
 - Criteria will be developed ahead of the test method.
- Few comments, general support for AHRI 1380 alignment



Recent Activity, CAC / ASHP (Connected Criteria)

CAC / ASHP [Limited Topic Proposal](#) on Draft 1 on July 29, 2019

- [Webinar slides](#) from August 19, 2019

Large Loads Discussion Guide [Document](#), on February 14, 2019

- Comment Response [Letter](#) on June 30, 2019;
- [Example Architectures](#) on June 30, 2019



CAC / ASHP Limited Topic Proposal Recap

- Demand Response (DR): Open ADR 2.0 and/or CTA 2045
 - Protocol choice aligns with AHRI 1380
 - Required: 3 Levels Curtailment, Price Response, Consumer Override in all cases
 - No load up command; Max Temp Rise field for ensuring consumer comfort
- Connected (Non-DR): Proprietary communications allowed
 - Alerts: 2 types, on controller and/or communication link
 - Energy Reporting: Capable of sending measured/estimated power to user authorized third party
 - DR protocol could be used to comply with requirement



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EPA's Long-term Specification Goals

- Climate differentiation, including tested low ambient performance
- Connected capability with DR verified by a test method (thermostat for fixed capacity systems, as per 1380 for variable capacity units)
- Address design, installation, and maintenance issues
- Higher SEER and HSPF levels
 - Maintain differentiation from federal minimums
 - Drive further savings as higher volumes bring costs down
- Recognize a wider variety of efficient solutions
- Recognize system efficiency



Addressing Design, Installation, and Maintenance

- 2 or more capacity stages helps address oversizing
- Also interested in system status and messaging capabilities as in the ENERGY STAR Most Efficient criteria
 - Semi-automated commissioning
 - Automated verification of quality installation
 - Fault reporting and messaging – help consumers achieve quality maintenance
 - Ultimately help mitigate the emergency replacement barrier



System Status & Messaging

- Unit setup information: Units shall be able to send to and receive information from at least one system controller to automatically configure settings appropriate to the controlled equipment, such as airflow for heating and cooling.
- Fault History: Service personnel shall be able to access a log displaying fault history
- Resident Alerts in Plain Text: Units shall facilitate display, in plain text, of messages to residents, without assuming that the resident knows much about their system.



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Metric Crosswalk

- If we are looking at setting the criteria at this time, for after the 2023 metric transition, we'd need to determine a crosswalk
- We have proposed criteria across a range of levels in the following slides – we appreciate all industry feedback if these translations need amendment



Metric Crosswalk Proposal

	SEER	SEER2
2023 Federal Minimum	14.0	13.4
	15.0	14.3
CEE Tier 2	16.0	15.2
	17.0	16.0
CEE Tier 3	18.0	16.9



Metric Crosswalk Proposal

	EER	EER2
2023 Federal Minimum	11.0	10.6
	11.7	11.2
CEE Tier 1	12.0	11.5
CEE Tier 1	12.5	12.0
CEE Tier 2/3	13.0	12.4



Metric Crosswalk Proposal

	HSPF	HSPF2
2023 Federal Minimum	8.0	6.7
	8.8	7.5
CEE Tier 2	9.0	7.7
	9.5	8.1
CEE Tier 3	10.0	8.5



Metric Crosswalk Proposal

- May adjust low temperature capacity metric, but ALSO
- How will the higher static pressure in M1 affect the COP metric?

Product Type	Current Test Method		2023 Test Method	
	COP @5°F	Percentage of Heating Capacity @ 5°F	COP @5°F	Percentage of Heating Capacity @ 5°F
ASHP Split Systems	1.75	70%	?	80%
ASHP Single Package	1.75	70%	?	80%

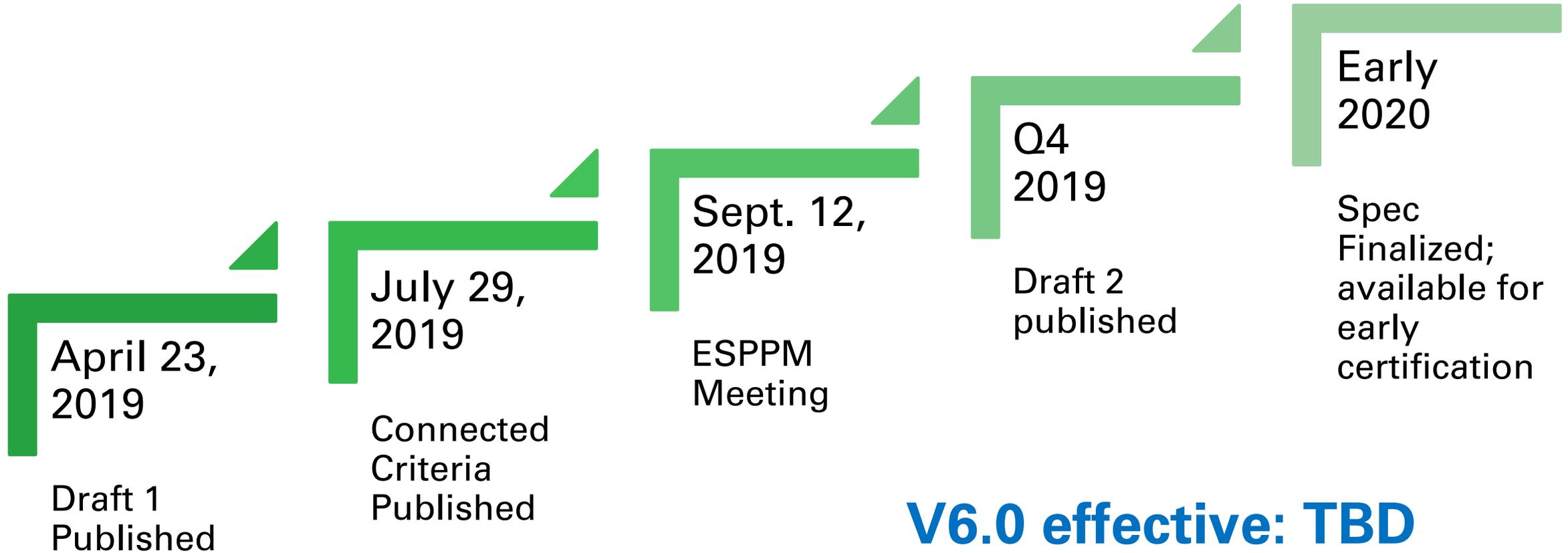


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Anticipated timeline for revision





Questions

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