

**Summary of Comments, EPA Responses, and Resulting Policy Changes on Draft 1
ENERGY STAR Single-Family New Homes (SFNH), National Program Requirements, Version 3.2, and
ENERGY STAR Multifamily New Construction (MFNC), National Program Requirements, Version 1.2**

EPA has posted a compilation on its website of all comments received during the stakeholder feedback period, which ended November 15, 2021, for its draft ENERGY STAR SFNH, National Program Requirements, Version 3.2 and ENERGY STAR MFNC, National Program Requirements, Version 1.2.

This document contains a summary of these comments, along with EPA's responses and the resulting policy change, if any.

When similar comments were received from multiple respondents, EPA has consolidated these ideas into a single summary bullet. However, EPA has attempted to retain all unique comments received, including those submitted by a single respondent.

ENERGY STAR SFNH National Program Requirements, v3.2, and MFNC National Program Requirements, v1.2

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ID	Comment Summary	EPA's Response
Baseline Configuration		
1	<ul style="list-style-type: none"> One commenter expressed that the Residential Energy Services Network's (RESNET's) statistic that approximately a third of all homes that received an energy rating in 2020 used a high-efficiency water heater should not be used to justify the inclusion of the "reduced energy use in service water-heating option" in the 2021 IECC baseline home. The commenter also stated that this statistic might be more reflective of the use of high-efficiency gas water heaters rather than electric heat pump water heaters. 	<ul style="list-style-type: none"> As stated in the ENERGY STAR Residential New Construction Program Roadmap, EPA believes that the other four options available for complying with the 2021 IECC are less likely to be used throughout the country. Furthermore, the use of the water heating option in the baseline is consistent with the methodology that PNNL used to analyze the cost-effectiveness of the 2021 IECC code. <p>In addition, the commenter's own analysis found that the water heating option had the lowest national-average incremental cost among the five packages available in the 2021 IECC. Knowing that first cost is one key consideration for builders when assessing compliance strategies, EPA believes the inclusion of this option in the baseline is a reasonable assumption.</p>
2	<ul style="list-style-type: none"> One commenter encouraged EPA to expand its analysis for the proposed Version 3.2 program requirements to encompass other house configurations, such as additional square footages, stories, foundation types, and attached vs. detached units. 	<ul style="list-style-type: none"> EPA determines the performance target for each individual home through the ENERGY STAR ERI Target. This is done by configuring each proposed home with a consistent set of efficiency measures, called the ENERGY STAR Reference Design Home, and then calculating its associated ERI value. <p>This largely mitigates the impacts of changing the house configuration. For example, a different ENERGY STAR ERI Target may be determined for two homes that are identical except that one has a slab foundation and the other has a crawlspace foundation, with the difference in targets caused by the varying performance of each foundation type. The net result is that a single set of efficiency measures could be used for both homes to meet the program requirements, despite the varying configurations. In addition, once the target is defined for each home, partners are free to select other measures, provided they still achieve the target.</p> <p>This same approach has been successfully used to define the requirements for Version 3.0 and 3.1 of the SFNH program, and EPA believes sufficient analysis has been completed to define the proposed program requirements.</p>
Reference Design Configuration and Performance Targets		
3	<ul style="list-style-type: none"> Several commenters affirmed that they were not aware of any data or analyses to indicate that EPA's proposed SFNH Version 3.2 and MFNC Version 1.2 program requirements are not warranted or that the proposed efficiency levels are not appropriate, achievable, or cost-effective. <p>In contrast, other commenters expressed concern about the costs associated with meeting the proposed</p>	<ul style="list-style-type: none"> EPA notes that the 2021 IECC has been assessed by PNNL and found to be cost-effective overall. In addition, EPA's own analysis indicates that the proposed program requirements are also cost-effective relative to the 2021 IECC. <p>EPA estimates the incremental costs for the proposed SFNH v3.2 and MFNC v1.2 program requirements relative to the 2021 IECC to be approximately \$1,000 – 2,500 per home and \$800-\$1500 per unit, respectively, which is comparable to the current versions of the program. As a reminder, these new versions are only intended to be implemented in states that adopt the 2021 IECC or an equivalently</p>

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	<p>program requirements, with one commenter stating that the costs would significantly increase, which they believed would be difficult to offset through financing or appraisals. Another commenter expressed specific concern with the cost-effectiveness of the insulation levels included in the ENERGY STAR Reference Design.</p>	<p>stringent code, as well as to serve as the energy efficiency foundation of the proposed new program to provide additional recognition for homes that incorporate efficient electric technologies and EV charging capabilities.</p>
4	<ul style="list-style-type: none"> One commenter requested that EPA provide additional detail about how it arrived at the cost estimates provided for single-family homes. 	<ul style="list-style-type: none"> EPA's Cost & Savings Estimates for ENERGY STAR Certified Homes, Version 3.2 (Rev. 11), will be available on the ENERGY STAR website once completed.
5	<ul style="list-style-type: none"> Several commenters expressed concern about the ability of all-electric townhouses and small homes to include a heat pump water heater, which is incorporated into the SFNH Version 3.2 reference design. <p>Another commenter noted that in-unit heat pump water heaters in apartments might create challenges as well. Though the MFNC Version 1.2 reference design does not include a heat pump water heater, it does specify an electric water heater efficiency that is slightly above what is available in electric resistance models.</p> <p>The commenters also noted that these house types, as well as dwelling units, typically have limited floor area and that having a heat pump water heater next to living space may create comfort, noise, vibration, excess cooling, and dehumidification issues. They noted that other measures would need to be selected if an electric resistance water heater was included instead.</p>	<ul style="list-style-type: none"> EPA believes that many small homes, townhouses, and apartments will be able to include a heat pump water heater while delivering a positive consumer experience. For example, partners can select models with lower sound ratings and use a ducting kit to draw and exhaust air from outside the living space. <p>However, as commenters noted, the use of a heat pump water is not mandatory, and partners will be permitted to select other efficiency measures if a heat pump water heater cannot be installed, such as ENERGY STAR certified clothes washers and dryers, low-flow fixtures, and/or drain water heat recovery systems.</p> <p>EPA also believes that other high-efficiency electric water heating options will become increasingly popular, such as split-system models or, for multifamily buildings, central ground-source heat pump water heaters. These system types move the condenser to the outside of the dwelling or dwelling unit, alleviating space concerns and further improving efficiency, sound, and comfort.</p>
6	<ul style="list-style-type: none"> Two commenters expressed concern that the MFNC v1.2 proposal specified water heater efficiencies using the EF metric and recommended using the UEF metric instead. One commenter also suggested listing the ratings that would be applicable to central (commercial) systems that are not rated using either the EF or UEF metric. 	<ul style="list-style-type: none"> EPA agrees that UEF is a more appropriate metric for specifying water heating efficiency. <p>While not specified in the Reference Design, the Rater Field Checklist does include prescriptive requirements for water heaters of various types, including commercial systems that use metrics other than UEF and EF.</p> <p>Proposed Change: EPA has updated the water heater efficiencies from the EF metric to the UEF metric in Draft 2 of both the SFNH v3.2 and MFNC v1.2 program requirements.</p>

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<p align="center">7</p>	<ul style="list-style-type: none"> Two commenters expressed agreement that 1.2 EF was reasonable for the electric water heater efficiency in the MFNC v1.2 Reference Design. One commenter proposed increasing the 1.2 EF to 2.0 UEF to align with federal standards. In contrast, two commenters expressed concern that having the Reference Design include 1.2 EF might make the performance target too hard to achieve. One commenter suggested that efficient gas water heating should be allowed as an alternative option. 	<ul style="list-style-type: none"> EPA appreciates commenters' confirmation that specifying a water heater efficiency of 1.2 EF in the Reference Design is reasonable. EPA notes that the 1.2 EF value was included in the Reference Design to contribute to EPA's overall performance target of $\geq 10\%$ savings. EPA understands water heaters at this efficiency level are not available but believes that specifying this efficiency level in the Reference Design provides partners with the needed flexibility to meet the program requirements in cases where a project can install a heat pump water heater, as well as where an electric resistance water heater must be used instead. <p>If EPA had specified an electric resistance water heater in the MFNC v1.2 Reference Design instead, more stringent measures would have been required to achieve the 10% savings target. In contrast, if a heat pump water heater with an efficiency of 2.0 UEF had been specified, this would have significantly exceeded EPA's savings goal.</p> <p>By specifying a water heater efficiency of 1.2 EF in the Reference Design, apartments where a heat pump water heater can be installed will be able to reduce other efficiency measures; and apartments where a heat pump water heater cannot be installed can instead specify an electric resistance water heater and upgrade other measures to meet the program requirements.</p> <p>The use of a heat pump water heater is not a mandatory requirement, and even gas water heating can be used in all Paths.</p>
<p align="center">8</p>	<ul style="list-style-type: none"> One commenter encouraged EPA to consider pursuing innovative new efficiency technologies for small buildings and multifamily applications where current heat pump water heaters may be challenging to incorporate. 	<ul style="list-style-type: none"> The use of a heat pump water heater is not mandatory, and partners are permitted to combine any technology approaches to achieve the performance target. This includes the use of innovative technologies, so long as they are recognized within the underlying performance path standards (e.g., ANSI / RESNET / ICC 301 or ASHRAE 90.1).
<p>Mandatory Requirements</p>		
<p align="center">9</p>	<ul style="list-style-type: none"> While some commenters were supportive of the thermal backstop proposed in Draft 1, many others expressed concerns. <p>One area of concern raised by commenters was related to the cost-effectiveness of some of the prescriptive insulation requirements of the 2021 IECC, such as the increased attic insulation in CZ 2-3 and the new requirement for continuous wall insulation in CZ 4-5.</p>	<ul style="list-style-type: none"> EPA appreciates the variety of comments received on this issue. The thermal backstop defines the minimum levels of insulation and window performance that a home or apartment must use and is designed to ensure that insulation and windows are not traded off for other efficiency measures to a degree that EPA believes would negatively impact performance and homebuyer comfort. EPA recognizes that some stakeholders have advocated for keeping the backstop at the 2021 IECC prescriptive levels, or an equivalent UA value, as originally proposed, while others support a less stringent backstop that would allow for more flexibility in tradeoffs of the envelope with other measures. <p>There is precedent for EPA setting the thermal backstop in alignment with the Reference Design, as it did when SFNH v3.0 and MFNC v1.0 were first</p>

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	<p>One commenter suggested that aligning the thermal backstop with the thermal performance of the ENERGY STAR reference designs negated the intent of a backstop. Another noted that the 2021 IECC itself defines a thermal backstop roughly equivalent to the 2018 IECC when using the ERI Compliance Alternative path without on-site renewables.</p> <p>One commenter noted that while the reference design insulation levels have effectively advanced one step (from 2012/15/18 IECC levels to 2021 IECC levels) in the new program requirements, the proposed backstop has advanced two steps (from 2009 IECC levels to 2021 IECC levels).</p> <p>Multiple commenters also expressed concern that states adopting the 2021 IECC, such as Maryland, may relax the thermal enclosure requirements of the code, such that the proposed thermal backstop for the ENERGY STAR program will be more stringent than the amended state code.</p> <p>Multiple commenters indicated that many builders would have difficulty achieving the 2021 IECC thermal enclosure in a short period and/or considered the proposed backstop to be aggressive, which may ultimately limit participation in the program.</p> <p>Some commenters suggested using the 2018 IECC instead. One commenter suggested that EPA could consider increasing the backstop stringency at a later time.</p>	<p>introduced, as well as for setting the backstop at a lower level than the Reference Design, as it did for SFNH v3.1 and MFNC v1.1. In this case, EPA believes it is important to set a high bar for the insulation and window levels to ensure the long-term performance of certified homes and apartments as the program advances.</p> <p>At the same time, EPA recognizes that increasing the thermal backstop from the 2009 IECC (as used in the prior versions) to the 2021 IECC is a significant advancement, and based on the feedback received, EPA believes that providing partners with additional time to prepare for such a change is warranted, particularly in the first states to have the new versions enforced.</p> <p>Proposed Change: EPA has revised the proposed thermal backstop in Draft 2 of the SFNH v3.2 and MFNC v1.2 program requirements. While the original proposal to align the thermal backstop with the 2021 IECC is being retained in Draft 2, a transition period has been added to allow homes and apartments permitted before January 1, 2025, to be certified with a total building thermal envelope UA that is less than or equal to 105% of the total UA resulting from the U-factors in the 2021 IECC. This represents a significant immediate and long-term advance in the Thermal Backstop while providing partners and the market with a reasonable amount of time to develop solutions that achieve the full 2021 IECC enclosure levels.</p> <p>In addition, for SFNH Version 3.2, the thermal backstop requirement in Draft 2 is now presented exclusively in terms of a total UA target to emphasize the tradeoffs that are permitted within the enclosure (e.g., less attic insulation in exchange for better windows).</p>
<p>10</p>	<ul style="list-style-type: none"> In addition to the primary backstop, the Draft 1 proposal for the SFNH v3.2 program requirements also included an alternative thermal backstop for homes with low infiltration, defined as $\leq 115\%$ of the total UA resulting from the U-factors in the 2021 IECC. EPA asked stakeholders whether this was appropriate and achievable, as well as whether it should be restructured to better target the home types most likely to use it. <p>While there seemed to be some confusion among commenters about what was proposed, no significant concerns were expressed. However, one stakeholder</p>	<ul style="list-style-type: none"> EPA’s intent with the original proposal was to maintain a separate, less stringent thermal backstop for homes that achieved a lower infiltration rate. This is analogous to the current requirements for the SFNH program. <p>However, because the transition period for the thermal backstop is being provided in Draft 2, during which a less stringent backstop than the original proposal will be allowed, EPA believes it is appropriate to require that all homes meet the same enclosure requirements, even homes with lower infiltration rates.</p> <p>Proposed Change: As part of the revised proposal for the thermal backstop in Draft 2 of the SFNH v3.2 program requirements, the alternative thermal backstop for homes that achieve a lower infiltration rate has been removed.</p>

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	<p>suggested aligning this alternative backstop with the 2018 IECC, rather than $\leq 115\%$ of the total UA resulting from the U-factors in the 2021 IECC.</p>	
11	<ul style="list-style-type: none"> One commenter noted that EPA's UA analysis for SFNH Version 3.2 only included homes with a window to floor area ratio of 15% and inquired what options would be available for homes with a higher percentage of windows. 	<ul style="list-style-type: none"> The window area of the proposed home is used to calculate both the UA value of the proposed home as well as the code-required UA value. Therefore, as the window area increases, the performance of the windows plays a larger role in determining the overall UA value. Given that windows are commonly available that perform better than the prescriptive code requirements, the UA of the proposed home relative to the code home should improve.
12	<ul style="list-style-type: none"> Two commenters expressed concern that EPA's proposal might result in a de facto requirement to use ANSI / RESNET / ACCA / ICC 310. 	<ul style="list-style-type: none"> EPA notes that the proposed program requirements do not mandate the use of ANSI / RESNET / ACCA / ICC 310. The HVAC Credential track, which does not require the use of this standard, will continue to be allowed to satisfy the HVAC design and installation requirements.
13	<ul style="list-style-type: none"> One commenter requested that compartmentalization air-tightness requirements be added for duplexes and townhouses. 	<ul style="list-style-type: none"> EPA notes that there are already compartmentalization requirements for townhouses certified using the MFNC program. While EPA intends to limit the number of new mandatory requirements introduced with these proposed program requirements, it appreciates the stakeholder feedback and will consider the addition of compartmentalization requirements for duplexes and townhouses certified using the SFNH program when developing future versions of the program.
14	<ul style="list-style-type: none"> One commenter suggested that the proposed program requirements should be revised to require full electrification or, if not, be strengthened by requiring that ENERGY STAR certified heat pump water heaters be used in all homes. 	<ul style="list-style-type: none"> While EPA agrees that strategic electrification will play an increasingly important role in meeting emissions reduction targets, partners need to be given time to incorporate such technologies into their homes on a voluntary basis. It is for this reason that EPA has proposed a differentiated program, launching next year, to provide additional recognition for next-generation homes and apartments that meet this challenge now. <p>EPA will monitor the success and uptake of the new certification to determine when it is appropriate to begin integrating such features into the base program.</p>
15	<ul style="list-style-type: none"> One commenter requested that EPA update the minimum required ventilation rates to align with ASHRAE 62.2-2016, ASHRAE 62.2-2019, or higher; align definitions with the latest edition of the standard; add exceptions to the sone rating requirement for dwelling unit mechanical ventilation systems with heat or energy recovery; and update requirements for ventilation terminations to better align with current codes, standards, and best practices. 	<ul style="list-style-type: none"> The primary intent of the new program requirements is to be responsive to the more stringent efficiency requirements of the 2021 IECC rather than update or advance the non-energy mandatory requirements of the program. <p>EPA agrees in principle, however, that references to more recent editions of ASHRAE 62.2 should be considered when the next major version of the program is developed, which will encompass the non-energy mandatory requirements. Improvements to the ventilation termination requirements will also be considered at that time.</p>

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		<p>In the interim, EPA allows and encourages partners to use the latest edition of ASHRAE 62.2. It also notes that any dwelling-unit mechanical ventilation systems, with or without heat and energy recovery, are already exempted from the sone rating requirement if they are mounted outside the habitable spaces, bathrooms, toilets, and hallways and have ≥ 4 ft. ductwork between the fan and intake grill. Habitable spaces are intended for continual human occupancy; such space generally includes areas used for living, sleeping, dining, and cooking but does not generally include bathrooms, toilets, hallways, storage areas, closets, or utility rooms.</p>
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Implementation Timeline

<p>16</p>	<ul style="list-style-type: none"> Multiple commenters affirmed EPA’s proposed policy that the new versions of the program be used to certify homes and apartments permitted one year after the date of implementation of the state’s new code. In contrast, one commenter requested that PHIUS+ projects be allowed to use the pre-certification date instead of the permit date, given the longer development time typical of such projects. In addition, one commenter suggested that the first states adopting the 2021 IECC, such as Maryland, should be given a longer transition period so that partners have time to evaluate thermal enclosures that result in compliance with the new program requirements. 	<ul style="list-style-type: none"> EPA appreciates commenters’ confirmation that the proposed implementation schedule is reasonable. <p>EPA believes that the requirements of the PHIUS+ program will continue to be considerably more stringent than even EPA’s newly proposed program requirements. Therefore, PHIUS+ projects will likely comply with the proposed program requirements without requiring any changes and, therefore, will not need an extended implementation timeline.</p> <p>As discussed above, in the revised proposal, EPA is providing a transition period during which a less stringent backstop than the original proposal will be allowed. Given the extra flexibility that will be provided to partners during this period, EPA believes that the one-year transition period that has been proposed will be sufficient, even for early adopters.</p>
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