# ENERGY STAR Certification System Quality Assurance and Quality Control Enhancements

## Companion Document for First Comment Period

## December 11, 2023

# I. Abstract

When the U.S. Environmental Protection Agency (EPA) first developed the *ENERGY STAR Certification System for Homes and Apartments Using an Energy Rating Index or Dwelling Unit Modeling Compliance Path*[1] in 2018, it included requirements for Home Certification Organization (HCO) "Quality Control Protocols".[2] Since that time, compliance matters have brought additional information to light that suggests room for improvement in those requirements. In addition, the 45L tax credit's newfound reliance on the ENERGY STAR program is expected to put the quality and reliability of ENERGY STAR certifications under greater scrutiny than ever before.

Based on this, EPA believes it is necessary and appropriate at this time to strengthen the ENERGY STAR Certification System's quality assurance/quality control (QAQC) requirements. This document lays out a draft proposal designed to improve the effectiveness of current QAQC activities, give HCOs new tools to oversee participants operating in their ENERGY STAR certification programs, and ultimately create more confidence in the quality of ENERGY STAR certifications.

This companion document provides context on the ENERGY STAR Certification System and explains the rationale behind the proposed enhancements. It is accompanied by a redline draft of the specific edits proposed in the ENERGY STAR Certification System document as well as a stakeholder comment form.

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[1] Find the current revision of the ENERGY STAR Certification System at: https://www.energystar.gov/partner_resources/residential_new/working/other_participants/hco/become_hco

[2] For the purposes of this document, "quality control" refers to processes that evaluate the end product, which, in this case, are the homes being certified as ENERGY STAR. File review is an example of a quality control activity. In contrast, "quality assurance" will be used to refer to efforts that are focused on the certification *process*, including things like training, credentialing, and equipment calibration.

# II. Background on the ENERGY STAR Certification System

Since its inception, the U.S. Environmental Protection Agency (EPA)'s ENERGY STAR New Construction Program has required third-party verification of homes and apartments that earn ENERGY STAR certification. In 2007, EPA developed and implemented a structure to formally recognize the independent organizations that provide oversight of the verification process and the raters that performed the inspections and testing necessary to document compliance with ENERGY STAR program requirements. In 2018, EPA updated the oversight recognition structure to better reflect the entire home certification process, rather than just verification oversight.

An organization seeking to become an HCO must submit an 'Application for Recognition' to EPA demonstrating that it meets the program's eligibility criteria and has the capability, competencies, and proper controls to implement an ENERGY STAR certification program in accordance with the ENERGY STAR Certification System. Applicants are responsible for, among other things, developing detailed policies and protocols that meet the Certification System's high-level requirements. While all HCOs are held to the same threshold standard, applicants are welcome to exceed the minimum requirements if desired. In addition, applicants are welcome to propose alternative methods for EPA consideration, provided those methods achieve the underlying intent of the Certification System requirement.

Since 2018, EPA has accepted applications and recognized two HCOs with national scope and two HCOs with California scope. A list of recognized HCOs is available at www.energystar.gove/hco.

# III. Opportunities for Improvement

EPA's analysis indicates that the ENERGY STAR Certification System's current requirements suffer from two shortcomings that result in a diminished level of confidence in ENERGY STAR certifications. First, field evaluations, which serve as the sole Quality Control approach on installed measures, are statistically compromised because the home selection is not required to be unannounced, random, and unbiased. The result is a home selection process that is subject to bias (conscious or unconscious) because it is under the influence of the Rater whose work is being reviewed. Opportunities to address this include performing some quality control of installed features at the file review stage (e.g., by using Rater photos) and requiring software systems to randomly select those homes for review.

The second shortcoming is the limited extent of mandatory data collection and data review processes at the HCO level, especially for ENERGY STAR-specific data points (as opposed to ANSI/RESNET/ICC 301), and most acutely for ENERGY STAR's documentation requirements. The lack of centralized ENERGY STAR data limits HCOs' insight into certifications occurring through their programs, impedes their ability to respond to compliance matters in a timely matter, and fails to create a sufficiently credible threat of discovery for non-compliant practices.

Besides addressing shortcomings, EPA sees opportunities to proactively advance minimum requirements in areas where HCOs, software developers, and Energy Rating Companies have already driven technologies and standards of practice beyond the Certification System's current requirements. Where appropriate, EPA seeks to take better advantage of current technology and formally recognize best practices that are already being applied in the marketplace.

# IV. Proposed Enhancements to Quality Assurance and Quality Control Requirements

EPA proposes the following categories of improvements to overcome the current shortcomings identified above.

### A. Centralized collection of ENERGY STAR checklist data in HCO database

EPA proposes that HCOs centrally collect ENERGY STAR checklist data for 100% of homes at the time of certification, just as the HCO databases have historically collected ANSI 301 minimum-rated features. To enable this function, Approved Rating Software tools would be required to support Rater input and review of this digital checklist data. At a minimum, this input could occur in software's web or desktop interfaces, but it would also be recommended (though not required) for software to enable data exchange with digital field collection applications.

EPA would develop data schemas (XML, XSD), stylesheets (XSL), and "business rules" to allow third-party software and HCO systems to work with digital versions of the ENERGY STAR checklists in a consistent manner, roughly similar to IRS's Modernized e-File program. While EPA would not immediately mandate the use of this schema, to avoid unnecessary disruption with existing systems, it envisions systems naturally standardizing around EPA's schema over time. EPA would release schema updates during its annual end-of-year revisions.

In general, documentation would be required to be attached to each dwelling's rating upload. However, for the ENERGY STAR Multifamily New Construction (MFNC) program, input of batch documentation covering multiple units would be acceptable, provided that a data relationship is established so that every unit is associated with a checklist. [3]

This element would ensure that program documentation is completed and retained for every certified dwelling and enable automatic validations. Having this data readily available to reviewers would also enhance the effectiveness of later quality control steps, particularly those at the HCO level. Finally, creation of a more thorough record for each certified dwelling would bolster accountability mechanisms and deter non-compliant practices.

### B. Centralized Collection of Rater Photos in HCO Database

EPA proposes that HCOs centrally collect on-site photographs captured by Raters, including those photos required by ANSI/RESNET/ICC 301 Normative Appendix B, as well as a new set of approximately 10-15 photos covering key ENERGY STAR dwelling unit and such as range hoods being exhausted to the outdoors. Each photo would be required to include timestamp and geotag metadata. The specific photos to be collected would be determined during next year's program requirement revision and reflected in the program checklists.

For Multifamily New Construction, photos are anticipated to include common space measures. Like above, it would be acceptable for these common space photos to be input on a batch (e.g., building level) basis.

Downsizing photos to a to-be-determined minimum resolution would be acceptable and HCOs would be free to delete photo data in their central database after a minimum retention period of three years.

The ready availability of photos would enable quality control reviewers to assess these installed measures more definitively during the file review steps and, as with the prior element, bolster accountability mechanisms and deter non-compliant practices.

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[3] Note that the ENERGY STAR Multifamily New Construction (MFNC) checklists are completed at the building-level and cover all common spaces and units in that building. For MFNC, the proposed minimum requirement is to centrally collect a single copy of the building checklist, provided it can be associated with each unit contained in that building. Relatedly, note that EPA is planning to add a requirement for explicit building-level tracking in MFNC projects (e.g., via assignment of a unique Building ID, in addition to the current unit-level IDs).

### C. Formalized List of Automated Validations in Approved Rating Software and Databases

Approved rating software has traditionally included several validations for compliance with ENERGY STAR measures, such as meeting the ENERGY STAR ERI target or the mandatory duct tightness level, but implementation is inconsistent across software systems. More recently, EPA defined certain validation conditions in its Homes Online Submission Tool (HOST) API, such as a dwelling unit's home type matching eligibility requirements (e.g., a multifamily dwelling unit should use the Multifamily New Construction Program). As a practical necessity, these HOST validations have filtered down to the HCO database and, to a lesser degree, the approved rating software.

EPA proposes to formalize a list of required validations at each level of the reporting stack (Approved Rating Software, the HCO database, and the HOST API). In addition to improving the consistency of the existing validations, EPA proposes to introduce new validations to cover a more complete set of the program's requirements. Examples include validating program Version eligibility based on a home's location and permit date and verifying builder and Energy Rating Company ENERGY STAR partnership using EPA's Partner List API.

The purpose of this element is to take advantage of software's inherent logicality and scalability to comprehensively check all machine-verifiable program requirements for all certifications.

### D. Printing ENERGY STAR Certificates and Labels Exclusively in Approved Rating Software

EPA proposes to explicitly prohibit printing labels and certificates through any means other than the approved rating software to ensure that documentation of ENERGY STAR certification uses a consistent format and is only available for certified homes. HCOs would have primary responsibility for enforcing this policy with its participants (e.g., its credentialed Raters), and EPA would have responsibility for violations by non-participants via its brand integrity mechanisms.

For background, in the program's early iterations, EPA made available templates and, later, an Excel-based 'label printing tool' that allowed Energy Rating Companies to print ENERGY STAR labels and certificates with no controls on data quality or accuracy. In addition, EPA is aware that some Energy Rating Companies have integrated the ENERGY STAR label/certificate assets into their proprietary IT systems (without EPA permission, but also in the absence of a formal policy forbidding it). All these methods allow labels and certificates to be printed with no assurance that those homes are reported to the HCO database or meet program requirements like the ERI target. This element would formally close these known loopholes.

Related to this element, EPA is also considering additional changes to its label/certificate design to prevent counterfeiting, such as the inclusion of a QR code linked to the HCO's online certification record or even eliminating the printed label altogether and relying solely on an online repository of certification information. At this stage, EPA seeks stakeholder feedback on these general concepts before it develops a specific proposal.

### E. Performing Quality Control of Installed Features During File Review Step

EPA proposes that, in addition to performing quality control of installed measures at the "field evaluation" step, this task would also be accomplished during the existing file review step using the checklist data and rater photos referenced above. Because documentation and photos would be centrally collected for all homes, quality control selection would occur at random (as implemented by Approved Rating Software), in an unannounced fashion, outside the influence of the Rater being evaluated. When a quality control review identifies errors, the ready availability of documentation and photos would allow expanding the review to additional homes as warranted.

No change to the existing file review frequency of 10%/Rater/year is proposed.

EPA would strongly prefer that file review occur prior to certification and encourages HCOs to explore options to make that possible. However, based on partner feedback, EPA understands that some flexibility may be warranted to avoid unnecessary disruption. At a minimum, EPA proposes to require file review occur within 10 business days of certification. In addition, should an HCO decide to allow this review to occur after certification, it

would be required to develop a standardized certification recall mechanism to address cases where the review reveals unresolvable errors.

### F. Adding "Skills and Knowledge" Check as Purpose of Field Evaluations

Despite the shortcomings noted above , field evaluations provide value as a quality control measure and EPA proposes that these evaluations continue to be performed on a roughly representative selection of homes (e.g., covering a broad selection of builders, locations, construction types), as is the existing intent. Now, EPA proposes to formally recognize an additional purpose of these evaluations, which is as a periodic Rater "skills and knowledge" check, and to readjust the required frequencies accordingly.

For Raters performing 100 or fewer certifications per year, EPA would require, at minimum, one field evaluation per year. This evaluation would be required to alternate between the pre-drywall stage and the final stage on alternating years.

For Raters performing 100 or more certifications per year, EPA would require, at minimum, one field evaluation per year, as well as one pre-drywall evaluation per year.

The purpose of this element is, in part, to recognize the full benefits of field evaluation and ensure that it delivers value in proportion to the cost required to implement it. Whereas EPA has previously approved several HCO proposals for alternative methods based on the field evaluation's quality control rationale, these approvals would be reevaluated unless alternative methods could be identified that also speak to the additional "skills and knowledge" check purpose.

Note that, unlike with file review, EPA is not proposing that field evaluation selection be algorithmically randomized because it recognizes that site visits typically require advanced coordination and some flexibility to select from available homes on the day of evaluation. Similarly, EPA is not proposing a strict time limit (unlike the 10-day limit with file reviews) because it would reduce the already small pool of available homes.

### G. Layering On HCO Direct (Non-Delegated) Quality Control Review

The next element is for HCO personnel to directly perform quality control file reviews on at least 0.5% of ENERGY STAR certifications to ensure consistency and objectivity across that HCO's participant base. [4] Note that this is an additional layer to the current 10% file review step, which HCOs could continue to delegate to approved designees, if desired. To allow this HCO file review to occur at the time of certification, HCO systems would automatically flag 0.5% of ENERGY STAR certifications for 'further review' at random, which would be split between files that were already reviewed by a designee and those not yet reviewed.

EPA proposes the direct HCO file review be a human-reviewer standard. To be as effective as possible and generate the intended accountability, it is necessary for the HCO's file reviews to be at least as rigorous as the (potentially) delegated 10% file reviews. While EPA appreciates that this would require significant effort at the scale of hundreds of thousands of homes per year, it proposes that a rate of 0.5% sets an achievable target.

EPA is aware that all current HCOs have some type of automated red-flagging technology and anticipates this technology will continue to advance. EPA will continue to monitor this technology but does not propose setting specific requirements at this time, though it certainly supports red-flag analysis informing the selection of homes for the direct HCO file review with the caveat that approximately half of the home selection still occur randomly to hedge against any unintended biases that a red-flag algorithm may introduce.

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[4] EPA's intent is for the Certification System's required QC rates to be calculated based on the pool of ENERGY STAR certifications, as opposed to the full set of homes submitted to an HCO (many of which may not be ENERGY STAR certified). EPA acknowledges this intent is ambiguous in the current Certification System document and proposes to clarify this requirement.

### H. Requiring Builders to Facilitate HCO Site Visits

EPA proposes to give HCOs an additional investigative tool by updating the ENERGY STAR partnership agreement to require that builders facilitate HCO site visits to certified homes and/or homes pursuing certification directly upon request. At this time, this is envisioned as an as-needed tool to be used in relatively rare cases when compliance matters arise. In those circumstances, this would allow HCOs to investigate matters more quickly and ensure a Rater whose work is potentially being investigated is not able to act as gatekeeper to the physical homes in question.

# V. Future Steps to Put New Requirements into Practice

Before the ENERGY STAR Certification System's high-level requirements are put into practice, additional steps will be necessary to establish the implementation details. Once this proposal is finalized, EPA will ask each HCO to update its policies and procedures in response to the new requirements and submit an updated application for recognition. At that stage, EPA will work with HCOs to set appropriate implementation timelines for each new element, recognizing that some elements require more time and effort to implement than others.

For the elements involving software and HCO databases, EPA will organize a working group of developer stakeholders (e.g., EPA's contractors, HCO's IT teams, and third-party software developers) to work through details like defining a digital checklist data exchange schema, coordinating a standardized list of data validations and business rules, and outlining an enhanced software review form. Based on this input, EPA will develop the referenced support resources and maintain them with each annual revision.

As with any other policy or protocol change, the HCO will notify participants in their certification programs (e.g., Raters and designees) of implementation timelines through normal channels when those changes ready. To summarize, EPA will play a background coordination role in the rollout of new elements, but it is the HCO that will communicate timelines and details to participants as changes start to be required in their day-to-day activities.