Ann Bailey, Chief
ENERGY STAR® Labeling Branch
US Environmental Protection Agency
1200 Pennsylvania Ave. NW, MC 6202A
Washington, DC 20460

Subject: Response to EPA Proposal to Sunset ENERGY STAR for Roofing

July 9, 2018

Dear Ms. Bailey,

The Cool Roof Rating Council (CRRC) appreciates the opportunity to comment on the proposal to sunset the ENERGY STAR for Roof Products program. The CRRC believes that EPA should reconsider its proposal to sunset the ENERGY STAR for Roof Products program, as its loss would have negative consequences on the roofing industry's ability to promote efficient "cool" products to its consumers and to codes and programs that require or reference ENERGY STAR.

The CRRC was founded in 1998 to develop accurate and credible methods for evaluating and labeling the solar reflectance and thermal emittance (radiative properties) of roofing products and to disseminate the information to all interested parties. In fact, the U.S. Environmental Protection Agency (EPA) played a large role in the early support of the CRRC. This support helped the CRRC to develop, launch, and maintain a technical program that strives to educate the public about the impact of the radiative properties of roof surfaces on building efficiency and the built environment. Unlike what the ENERGY STAR for Roofing Products program provides to consumers, the CRRC Rating Program does not qualify products that meet minimum criteria, but instead provides a technical basis which supports programs like ENERGY STAR. In that way, the ENERGY STAR certification program is both distinct from and complementary to the CRRC Rating Program. Both programs provide a necessary and unique service to the public.

In addition to maintaining the CRRC Product Rating Program, the CRRC is also an EPA-recognized ENERGY STAR Certification Body. We strongly believe that the ENERGY STAR for Roof Products program offers advantages to the market, and so our organization continues to invest resources into the ENERGY STAR certification branch of our organization.

Additional Recommendations

The CRRC wishes to make the following points in response to EPA's proposal to sunset the ENERGY STAR for Roof Products program.

1. **The ENERGY STAR label on roofing products is a valuable indicator to the public that products are energy efficient.**

The ENERGY STAR brand and label are well-known indicators of efficient products, and remain useful to consumers and other end users. Consumers who are interested in saving money and increasing the energy efficiency of their homes and businesses trust and rely on the ENERGY STAR label. Part of the inherent value of the ENERGY STAR label is its uniformity across product types. A consumer who is not knowledgeable about roofing, but recognizes the ENERGY STAR logo from other products, such as light bulbs, refrigerators, or televisions, will immediately understand what the ENERGY STAR label conveys about roofing products. In 2013, a Consortium for Energy Efficiency (CEE) survey revealed that 87% of consumers recognized the ENERGY STAR logo, and a majority understood the message it conveyed. Architects and builders of "green" construction prefer ENERGY STAR-certified products, because the logo easily communicates value to their customers.

Moreover, ENERGY STAR certifications for steep-sloped residential roofing products in particular help homeowners separate the high performance products from traditional ones that may look similar or identical. There are a variety of different "cool" roofing products available in the market today. Many of these are beyond the traditional white cool roofing products. Over the years, the advent of "cool color" paints and reflective granules, which look the same as ordinary roofing products but are more reflective of infrared energy, have emerged in the marketplace. Since homeowners may not be aware of the diversity in cool roofing products, the ENERGY STAR label becomes even more helpful to the product selection process.

2. **There are many programs that offer incentives, rebates, or loans that are based on ENERGY STAR qualified products and/or the ENERGY STAR specification for roofing products, as well as municipal ordinances that reference ENERGY STAR. The elimination of the program will directly affect these codes and programs.**

The CRRC believes that the loss of the ENERGY STAR label will have negative consequences on programs that require ENERGY STAR-certified products. With the loss of the ENERGY STAR label and Qualified Products List, these programs will not be able to determine which products qualify for their program offerings. Table 1 below provides examples of current programs that require ENERGY STAR-certified roof products. The list is not exhaustive but is intended to represent a sample of programs that would be affected by the discontinuance of the ENERGY STAR for Roof Products program and label.

The CRRC believes that the loss will also greatly affect roofing product manufacturers, roofing suppliers, and home builders. The negative consequences would be the loss of investment made by the businesses to associate themselves with the ENERGY STAR program, and the costs associated with changing packaging, labeling, and marketing material to remove ENERGY STAR branding. This investment in the ENERGY STAR program was further reinforced by the 2013 survey conducted by the National Association of Home Builders entitled, "What Do Home Buyers Really Want?" (NAHB). This survey found that "91% of home buyers want an energy-star rating [sic] for the whole home."

Table 1. Examples of Incentive and Loan Programs that require ENERGY STAR-certified Roof Products to Qualify (as of June 13, 2018)

Organization	Location	Site Link
Clay Electric Cooperative	Florida	https://www.clayelectric.com/sites/default/files/doc/Loan-RoofingBrochure.pdf
Duke Energy	Southeast	https://www.progress-energy.com/assets/www/docs/business/cool-roof-sheet.pdf
Georgia Power	Georgia	https://intake-docserve.icfiweb.com/docs/documents/GPC/Equip_Requirements_Reflective_Roofing.pdf

HERO Program (Renovate America)	California	https://9662473e561b2ca15fec-e991096dabe6d2069d3f005000c6b73d.ssl.cf2.rackcdn.com/HEROEligibleProductsList.pdf
Orlando Utilities Commission	Florida	http://www.ouc.com/business/business-rebates-programs/business-rebates-information
Rocky Mountain Power	Wyoming	https://www.rockymountainpower.net/content/dam/rocky_mountain_power/doc/Business/Save_Energy_Money/WY_wattsmart_Business_Building_Envelope_Retrofits_Incentives.pdf
Sacramento Municipal Utility District (SMUD)	California	https://www.smud.org/en/Rebates-and-Savings-Tips

3. **ENERGY STAR-certified roof products also create positive impacts for addressing the Urban Heat Island and mitigating human health risks.**

Beyond direct energy efficiency gains to the building, there is a scientific understanding that cool roofing also has positive impacts on the built environment by reducing the Urban Heat Island Effect (UHIE). Alleviating the UHIE helps to mitigate human health impacts both during heat waves and routine hot weather through the reduction of outdoor and indoor air temperatures. Reducing UHIE also improves air quality and grid reliability through periods of peak demand.

A lot of research has been completed on the topic of UHIE mitigation, which has found that cool surfaces (including cool roofs) play a major role. For example, in a study of the Baltimore-Washington metropolitan area during a heat wave, Li et al. (2014) found that when 50% of conventional roofs with a solar reflectance of 0.30 were converted to cool roofs with a reflectance of 0.70, the near-surface UHIE (air temperature at height of 2 meters) at the time of peak surface temperature was reduced by about 0.41 °F (0.23 °C). If this increase in reflectance is applied to many buildings in a metropolitan area, the cumulative effect is regional cooling.

Reducing urban air temperature with cool surfaces can also improve comfort and human health. The Energy Coordinating Agency in Philadelphia found that upgrading rowhouses to highly reflective roofs reduced the indoor temperature of upstairs apartments by 5 ºF (2.7 ºC). Kalkstein (2013) found that in the Washington, D.C. area, a 10-percentage point increase in urban albedo (solar reflectance) could reduce the number of deaths during heat events by an average of 6%.

4. **The "winter heating penalty" is overstated, and only plays a small role in reducing the energy efficiency gains a cool roof has on a building.**

In its "ENERGY STAR Roof Products Specification Sunset Proposal" dated June 5, 2018, EPA wrote:

> "Discussion with stakeholders ... revealed that reflective roofing is not the best choice for efficiency for many climates and homes. While reflectivity is helpful in hot climates, it is counter-productive in cold climates."

The "winter heating penalty" is the term used to describe the scenario where a cool roof reduces a building's cooling load in the summer, but increases the building's heating load in the winter.. While it is true that cool roofs may not be appropriate in the coldest climate zones in the United States, the range of climates that can benefit from cool roofs is more extensive than only the warm climates. There are a variety of reasons why the winter heating penalty plays a lesser role in buildings in cooler climates. In his 2010 paper, Levinson and Akbari simulates and calculates the energy gains and losses from cool roofs on different building types in different climate zones. Some key reasons regarding the winter heating penalty are described below:

- Angle of incidence — The amount of solar radiation (insolation) hitting the building is less during the winter because the sun is lower in the sky, and the sun's rays travel through more atmosphere before reaching the building.
- Length of day — The amount of daylight is less in the winter than the summer, thereby reducing the amount of possible heat gain in the winter.
- Winter weather — In many climates, the sky is more likely to be overcast or cloudy in the winter. This serves to further reduce the amount of available solar heating in the winter.
- Snow — If snow falls on a building, the color of the roof becomes irrelevant, as it gets a temporary "cool roof" until the snow melts.

5. **Some of the technical justifications made by EPA regarding the cost effectiveness of cool roof installations in various climate zones do not align with the CRRC's evidence.**

In its "ENERGY STAR Roof Products Specification Sunset Proposal" dated June 5, 2018, EPA wrote:

> "EPA also found that the cost premium is high for preferred darker [sic] residential roof materials, approximately $0.55 per square foot. Attic air sealing, increasing attic insulation levels, and insulating ducts are very often more cost effective than an ENERGY STAR residential roof and deliver benefit in both heating and cooling climates."

These statements do not align with the reality that tens of millions of homes in the U.S. would greatly benefit from cool roofs. Appendix A of this letter provides the calculations detailing the cost-effectiveness comparison between insulation and roof choices. In summary the evidence shows that **upgrading attic floor and ductwork insulation in these homes to seek comparable savings would be roughly 2 to 4.5 times more expensive than choosing a cool roof.**

Conclusion

The CRRC wants to express its sincere appreciation to EPA for its leadership in the development of a roofing certification program that has resulted in the promotion of cool roofing. The CRRC believes that the ENERGY STAR for Roof Products program is an important tool for product manufacturers and end users to distinguish efficient "cool" products in the market, and that the loss of the program would have negative consequences for industry, consumers, and codes and programs that rely on the ENERGY STAR program. We strongly request that EPA reconsider its proposal to sunset the program.

Sincerely,

Jeffrey Steuben
Executive Director
Cool Roof Rating Council

cc: CRRC Board of Directors

References

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U.S. Energy Information Administration. 2018. “2015 Residential Energy Consumption Survey (RECS).” Table HC2.3 - Structural and geographic characteristics of U.S. homes by year of construction, 2015. https://www.eia.gov/consumption/residential/data/2015/hc/hc2.3.xlsx .

Appendix A

Details regarding cost-effectiveness calculations for cool roofs and insulation

While residential cool roofs are most beneficial in warm climates, simulations of U.S. Department of Energy building prototypes by Levinson et al. (2018) indicate that residential cool roofs save energy in many U.S. climate zones, with especially large energy cost savings in homes built before 1980. Almost a third of all homes in the U.S. are in warm climates and were built before 1980, so this is not a trivial statement.

For example, the annual heating, ventilation, and air conditioning (HVAC) energy cost savings per unit ceiling area for a cool roof on a pre-1980 single family home ranges from about $0.4 to $0.8/m² in warmer U.S. climates, and from about $0.1 to $0.3/m² in cooler U.S. climates. The scenario studied in the 2018 study compared a baseline roof reflectance to one raised by 0.30, and incorporated cooling savings and heating penalties over the entire year.

Assuming a mid-range annual HVAC energy cost savings of $0.6/m² ceiling for cool roofs on pre-1980 homes in warm climates, and applying a 3% real rate-of-return and a 20-year service life, the present value of lifetime HVAC energy savings is approximately 15 times the annual savings, or $8.9/m² ceiling [$0.83/ft² ceiling]. This substantially exceeds the $0.55/ft² roof (or $0.58/ft² ceiling, assuming roof pitch 4:12) cool roof cost premium cited by EPA.

Additionally, selecting a cool roof product when an existing roof is due for replacement (e.g. at the end of its service life) is much less expensive than adding attic insulation. *Homewyse* estimates the total cost of adding R-19 insulation to a home in Las Vegas, NV is about $1.76 to $3.53/ft² ceiling, or about 3 to 6 times the cool roof cost premium assumed by EPA. Furthermore, adding insulation to the attic floor in a warm climate is far less effective than a cool roof because HVAC ductwork typically runs through the hot attic space above the attic floor insulation (Levinson et al. 2016). Adding even basic contractor-grade insulation to existing ductwork would cost $0.78 to $1.47/ft². This would bring the total cost of insulating the attic floor and ductwork to $2.54 – $5.00/ft², or about 4 to 9 times the cool roof premium. If we assume that attic-floor insulation and ductwork insulation each last 100 years, while roofs are replaced every 20 years, the 100-year life-cycle cost (present value at 3% real discount rate) of improving the attic floor and duct insulation once will be 2 to 4.5 times that of the five cool roof premiums. As such, residential cool roof retrofits are cost effective for tens of millions of U.S. homes, and much less expensive than adding insulation.

Upgrading attic floor and ductwork insulation in these homes to seek comparable savings would be roughly 2 to 4.5 times more expensive than choosing a cool roof.