ASSOCIATION OF HOME APPLIANCE MANUFACTURERS

1111 19th Street NW ➢ Suite 402 ➢ Washington, DC 20036
t 202.872.5955 f 202.872.9354 www.aham.org

Written Statement
Association of Home Appliance Manufacturers

House Oversight and Accountability Committee
Subcommittee on Economic Growth, Energy Policy, and Regulatory Affairs

Hearing on "Consumer Choice on the Backburner: Examining the Biden Administration's Regulatory Assault on Americans' Gas Stoves"

May 24, 2023

The Association of Home Appliance Manufacturers is a strong supporter of both the Department of Energy (DOE) Appliance Standards Program and of consumer choice and safety. We offer this statement to inform the House Oversight and Accountability Committee on its Hearing related to DOE's proposed energy conservation standards for cooking products.

AHAM represents more than 150 member companies that manufacture 90% of the major, portable and floor care appliances shipped for sale in the U.S. Home appliances are the heart of the home, and AHAM members provide safe, innovative, sustainable and efficient products that enhance consumers' lives. The home appliance industry is a significant segment of the economy, measured by the contributions of home appliance manufacturers, wholesalers, and retailers to the U.S. economy. In all, the industry drives nearly $200 billion in economic output throughout the U.S. and manufactures products with a factory shipment value of more than $50 billion.

Home appliances also are a success story in terms of energy efficiency and environmental protection. New appliances often represent the most effective choice a consumer can make to reduce home energy use and costs.

AHAM is a major stakeholder in the Appliance Standards program. Our member companies make this program work through their investments and innovations. We have been involved in virtually all legislative efforts that have culminated into what is today's Appliance Standards program, including the National Appliance Energy Conservation Act of 1987. We strongly support a system of Federal standards and state preemption. And we support amended energy conservation standards that maintain product performance and consumer choice and features and do not unreasonably raise costs for consumers or disproportionately impact low-income consumers. A single, uniform standard throughout the U.S. is vastly preferable to a patchwork of 50 disconnected state-by-state standards.

One set of nation-wide standards is critical to a thriving domestic industry, its employees, and to ensure that consumers have fully featured, moderately priced products. Federal appliance

standards based on industry input and stakeholder agreement is a path towards more reasonable regulation and protection of consumer interest in a full diversity of products by manufacturer, brand, features and price points. Rational, definite standards with sufficient lead-time, especially when coupled with incentive programs, can also minimize the damage to U.S. employment.

AHAM and its members are committed to providing energy efficient home appliances that have a direct, positive impact on the lives of consumers. The energy efficiency gains across all of the core major appliance categories are dramatic and undeniable. Today's average refrigerator has much greater capacity yet uses less energy than a 60-watt light bulb. Clothes washer capacity is 50 percent larger than in 2000, while energy consumption has dropped by 70 percent. Dishwashers use just between three to five gallons of water to was a full load as compared to those without a dishwasher who run a faucet using two gallons of water per minute.

Specific to the subject of this hearing, AHAM supports reasonable energy conservation standards for residential conventional cooking surfaces that do not eliminate consumer features. Unfortunately, as demonstrated through our detailed comments to DOE, which are attached to this statement, DOE's proposed standards, especially for gas cooktops and all ranges will eliminate consumer features. Consumers should have a range of features and fuel types to choose from as they do today. The Appliance Standards Program should not, and indeed under the Energy Policy and Conservation Act of 1975, as amended (EPCA), must not require eliminating or adding consumer features and should not favor a particular fuel source as DOE's current proposal does. We, therefore, urge action that will ensure DOE's final rule promulgates reasonable energy conservation standards for gas and electric cooktops that do not favor one fuel source over another.

DOE's proposed rule is bad for consumers.

DOE's proposed standards will save consumers only $1.51 per year in energy costs and almost 20 percent of people purchasing a product that meets the proposed standards will experience a net cost of owning a new gas range under DOE's proposal.

DOE's proposed rule favors electric cooktops over gas cooktops. Significantly more electric products meet DOE's proposed standards—DOE's test sample shows that 80 percent of electric cooktops meet its proposed level as opposed to four percent of gas products, despite the fact that gas cooktops are used in about 40 percent of homes across the U.S..[1] And, incredibly, DOE, under its own analysis, proposes to eliminate 100 percent of gas ranges with features that many consumers desire.

[1] Seventeen percent of gas products meet the proposed standard if the additional units that DOE reported on in its subsequent notice of data availability (NODA) are included. *See* Energy Conservation Standards for Consumer Conventional Cooking Products; Notification of Data Availability (NODA); Docket No. EERE-2014-BT-STD-0005; RIN-1904-AD15; 88 Fed. Reg. 12603 (Feb. 28, 2023). But, as discussed further below, the three additional units DOE added through its NODA (and the units DOE counted on retailer websites) demonstrate that **the majority of gas products that DOE indicates are capable of meeting its proposed standard do not provide features and functionality otherwise available on the market today**—they lack features and functionality and replace those features with less desirable ones such as burners with input rates less than 14,000 Btu/h, wire grates, and/or non-continuous grates.

The overly stringent standards DOE proposed for gas cooktops will eliminate gas products with performance characteristics, features, and sizes that are similar to those available today. Consumers value safety, performance, and cost as purchase drivers more than energy efficiency and cost to use a product over time and DOE must ensure that these factors are not negatively impacted by its proposed standards.

Unfortunately, DOE's proposed very stringent energy conservation standards for gas products will likely have that effect because it will drive manufacturers to homogenize designs to include predominately or only burners with mid-range input rates. Specifically, as described in our attached written comments to DOE, the following will be lost if DOE finalizes its proposed standards for gas products:

- **Ranges**, which are by far the most popular product category for consumers representing 87 percent of gas cooking product shipments in 2022. No ranges tested to date meet DOE's proposed standards for gas cooktops. Ranges offer the consumer utility of providing a cooktop and an oven in a single product, taking up less space than a separate cooktop and oven. Ranges are also less expensive to install because they do not require customization in the kitchen, which is necessary for a standalone cooktop (and oven(s))—*i.e.,* a cutout in the countertop for the cooktop and an oven cutout in the cabinets.

- **High input rate burners**, which are typically used by consumers to boil water quickly and sear proteins. Based on testing AHAM members conducted, *consumers will spend about 23 additional hours per year waiting for water to boil*.

- **Low input rate burners**, which are typically designed to gently heat small quantities of liquid and are used by consumers for melting chocolate, cooking sauces, cooking eggs, and keeping food warm.

- **A spectrum of heat inputs**. Consumers want a variety of burners, but the proposed levels for gas are likely to homogenize the types of burners available on cooktops. These burners will be essentially useless when cooking foods that require a spectrum of heat inputs because they will not be able to adequately reduce heat input.

- **Continuous cast-iron grates**. Manufacturers would likely need to turn to thinner, wire grates meaning that consumers will lose the option to purchase products with sturdier grates that allow pots and pans to be safely moved from one place to another without lifting the pot/pan.

Action must be taken to ensure these negative impacts are not realized. The Save our Gas Stoves Act (HR 1640) will prohibit regulators from finalizing these specifically proposed standards and ensure consumer choice and a fair, balanced approach to developing energy conservation standards for cooking products. AHAM supports this legislation.

DOE's proposed rule demonstrates poor analysis and does not meet EPCA's requirements.

Although AHAM does not always agree with DOE's outcomes, we have historically acknowledged that DOE is a data-driven agency. But DOE's proposed rule for energy conservation standards lacks data and support and relies on poor analysis. Moreover, DOE—in an effort to defend its proposal—has attempted to twist the data. One thing is clear, DOE's data just does not add up.

The data and analysis underlying DOE's proposed standards is flawed in several respects, as described in more detail in AHAM's written comments, which are attached:

- **DOE's test sample is not representative of the market.** It does not accurately represent shipment ratios between product types and classes—certain categories are significantly over- or under-represented in the sample. It also consists of numerous products that are currently not commercially available, and DOE has not demonstrated that the reasons for that unavailability are inconsequential to its analysis.

- **DOE's analysis fails to adequately consider the impact of test procedure variation on its results.** Specifically, when accounting for test variation, the single gas standalone cooktop in DOE's SNOPR test sample that meets DOE's proposed standards, could just as easily fail to meet DOE's proposed standard as it could meet it. And given that test procedure variation, a product with a measured efficiency similar to that test unit would not be certified at that value. Even with less variation, manufacturers, as a general rule, do not certify products at tested values. They conservatively rate—a practice supported and acknowledged by DOE that ensures consumers get the claimed efficiency or better. Thus, DOE's test sample—when accounting for test variation and the realities of product certification—does not include any products that pass its screening criteria and meet the proposed standards for gas cooktops.

- **DOE only tested one unit of each model one time.** DOE's certification rules require testing of more than one unit in order to obtain a statistically representative value for each basic model. The data used to develop the proposed standard level and EL should also be developed in this manner or should at least account for it by evaluating normal unit and test variation. DOE does neither.

- **DOE's analysis is contradictory with the introduction of the NODA.** DOE uses different analyses and introduces units in the NODA that it screened out in the proposed rule. In the NODA, DOE also conducted an analysis—counting models on retailer websites and assuming they meet the proposed standards because they appear similar to products DOE tested that do not meet the screening criteria, but do meet DOE's proposed standards—that does not pass the laugh test. DOE did not present its full data or findings, which makes it difficult for commenters to evaluate.

- **DOE relies upon a withdrawn test procedure to quantify the savings for its proposed oven standards.**

These inadequacies result in proposed standards for both gas and electric cooktops that are too stringent. And, especially for gas products, these data gaps must be resolved before DOE can continue to a final rule, otherwise DOE's final rule will certainly not be based on adequate data under the Administrative Procedure Act or the Data Quality Act and will be arbitrary, capricious, and an abuse of discretion.

DOE's proposed rule is bad for manufacturers, without a corresponding benefit.

DOE estimates that this proposed rule will result in a **decrease in the industry net present value (INPV) of manufacturers of as high as $154.8 million dollars, which is a decrease of 9.6 percent**. Additionally, DOE estimates industry conversion costs to be over $183.4 million made up of $109.9 million in product conversion costs and $73.5 million in capital conversion costs. DOE estimated similar manufacturer impacts in other recent rulemakings, but this level of manufacturer impact is a sharp departure from what the Department once found acceptable and, is not balanced by a consumer benefit where savings are only 0.46 quads over 30 years and less than $1.50 per month across all product categories.

The nature of EPCA's requirement that energy conservation standards be reviewed every six years is that, when standards are finalized all in close time, they are then reviewed and amended again in close time. This creates a never-ending cycle in which manufacturers are faced with updating or redesigning products to meet amended (and sometimes new) standards all at once. This is the case with home appliances.

For example, in July 2010, AHAM, efficiency advocates, utilities, states, and consumer advocates reached a multi-product agreement on energy conservation standards and test procedures for five products. We then jointly proposed those standards and test procedure revisions to the Department and they were implemented all in close-time. At the time, this multi-product agreement was expected to be beneficial for manufacturers because it would provide certainty across several product lines on energy conservation standards. While it did do that and AHAM members were pleased to provide the agreement to the Department and be part of achieving energy savings across several product categories, it also meant that manufacturers had to spend large amounts of capital—both monetary and human—on regulatory compliance across several product categories. As a result, companies diverted resources away from other efforts, primarily research and development. The longer-term effect is that this situation is about to repeat itself.

AHAM and its members have long been supporters of the Appliance Standards Program and we support reasonable energy conservation standards. We are concerned about DOE's recently proposed standards that are unprecedented in their stringency and are expected to have compliance dates in 2027.

DOE's proposed levels for residential clothes dryers, refrigerator/freezers, conventional cooking products, consumer refrigerator/freezers, miscellaneous refrigeration products, and its final rule for room air conditioners and microwave ovens will require significant redesign of products. In some cases, entire product lines for certain product classes (e.g., gas cooktops, top-load clothes washers) will require complete redesign. This means engineers will spend all of their time re-

designing (not innovating), test technicians will spend their time conducting testing to support re-design and to certify products, and others will spend significant time on business planning, marketing, labeling, etc. Factories will need to be re-tooled for several product categories. The combination of the stringency of the levels, the short lead-in under EPCA for compliance with these standards, and the fact that compliance with all of them is likely to be required in close time to one-another represents significant cumulative regulatory burden for the home appliance industry. It also means that resources are expected to be pulled from other efforts, such as research and development, and that innovation on anything other than efficiency will be stalled by at least three years.

The potential impact of DOE's proposed rules is significant for consumers and manufacturers. To achieve 13.71 quads of energy savings—a number that, while not insignificant, includes some rules that will have negligible savings—according to DOE, manufacturers will spend an expected $2.66 billion in conversion costs to comply with DOE's proposed and final standards for clothes washers, clothes dryers, cooking products, dishwashers, external power supplies, battery chargers, refrigerator/freezers, room air conditioners, microwave ovens, and miscellaneous refrigeration products. And, in many cases, 25-50 percent of consumers will experience a net cost, meaning that they will lose money by purchasing a more efficient product. Even where consumers will save money, the savings are minimal and, in some cases, including the proposed standards for cooking products, are so miniscule as to not even be noticed by consumers on a monthly basis.

AHAM urges Congress to take action to reduce these burdens on manufacturers both specific to this proposed rule as well as by addressing the underlying provisions in EPCA that create these results.

Ventilation Is Key To Improving Indoor Air Quality

We note that DOE is not the only agency considering the future of gas cooking products. During the comment period on DOE's proposed rule, CPSC issued a Request for Information to evaluate potential chronic hazards related to gas cooking products. Because this topic was of interest during the hearing, AHAM submits its response to that RFI attached to this statement and summarizes it below.

American consumers have been protected for many decades by ANSI Z21.1 from carbon monoxide hazards in consumer products. Outside of the acute carbon monoxide (CO) hazard covered by this standard, existing evidence does not support that gas cooking creates a substantial health hazard for American consumers. Cooking, whether on gas or electric products, produces emissions, most notably from the foodstuffs being cooked and not from the cooking heat source. Indeed, the Environmental Protection Agency (EPA) has stated that fine particulates ($PM_{2.5}$) pose the greatest health risk.[2] A review of the studies indicates there are substantial weaknesses in the quality of the studies and inconclusive correlations of gas cooking with acute or chronic health hazards. More specifically, there is weak or inconclusive support that carbon monoxide or nitrogen dioxide emissions from gas cooking products constitute health risks to individuals. Science is always evolving and the best science is based on the totality of evidence and not one study or parts of studies that further an advocacy agenda.

Our conclusion is based on a review of the literature and the studies conducted thus far. This does not end the story. We continue to support unbiased health and safety science and actions to enhance the protection of our members' customers:

- Indisputably and by far the most important improvement in indoor air quality related to cooking of any type is improved ventilation, primarily, but not exclusively, to deal with particulate matter, especially $PM_{2.5}$, emitted during both gas and electric cooking and originating in the foodstuffs cooked.

- We support public educational campaigns aimed at building owners, consumers, public housing authorities, and other entities to install and use improved ventilation in residences, including, but not limited to, the proper use and installation of ventilation devices such as exhaust hoods and fans. **The evidence is overwhelming that these measures will significantly improve indoor air quality in the kitchen environment.**

- We work closely with California with respect to its Title 24 Building Code, and we are integrally involved in the consensus standard effort to improve ventilation devices' effectiveness and reduce sound levels through proper use of those devices. We have developed a certification program to support improved ventilation systems.

- Another way to improve indoor air quality in the kitchen, and throughout the home, is through the use of room air cleaners which can augment ventilation.

- We are moving rapidly in several groups to support continuous improvement to ANSI Z21.1 and international standards to include nitrogen dioxide and any other revisions that are justified to enhance public health.

- We support further research and study on indoor air quality, especially with respect to the emissions and any health effects related to cooking (regardless of fuel source) and effective methods of mitigating any such effects.

We view CPSC's RFI as only one step in the public, CPSC, and stakeholder engagement on understanding more fully this complex issue and acting on good data, as it is developed. In our comments, we discuss our view of CPSC's role in this arena, the types of gas cooking products AHAM covers, kitchen ventilation and vent hoods, studies on cooking related emissions, studies on cooking products and health effects, and our efforts to improve ventilation products and strengthen consensus standards.

* * *

We thank the Committee for holding a hearing related to DOE's proposed energy conservation standards for cooking products. AHAM looks forward to working with DOE and Congress to ensure any final energy conservation standards are reasonable, do not reduce consumer choice related to fuel or features, and do not eliminate functionality consumers desire.

PUBLIC VERSION

ASSOCIATION OF HOME APPLIANCE MANUFACTURERS

1111 19th Street NW ➢ Suite 402 ➢ Washington, DC 20036
t 202.872.5955 f 202.872.9354 www.aham.org

April 17, 2023

By E-mail

Ms. Ashley Armstrong
Department of Energy
Building Technologies Program
Mailstop EE-5B
1000 Independence Avenue, SW
Washington, DC 20585-0121

ConventionalCookingProducts2014STD0005@ee.doe.gov

Re: AHAM Comments on DOE's SNOPR on Energy Conservation Standards for Residential Conventional Cooking Products; Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD15

Dear Ms. Armstrong:

The Association of Home Appliance Manufacturers (AHAM) respectfully submits the following comments to the Department of Energy (DOE or Department) on its second Supplemental Notice of Proposed Rulemaking (SNOPR or 2023 SNOPR) for Energy Conservation Standards for Residential Conventional Cooking Products; Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD15; 88 Fed. Reg., 6818 (Feb. 1, 2023).

AHAM supports DOE in its efforts to save energy and ensure a national marketplace through the Appliance Standards Program. We support energy conservation standards for residential conventional cooktops that do not eliminate consumer features. Unfortunately, as demonstrated through these comments, DOE's proposed standards, especially for gas cooktops and all ranges will eliminate consumer features. Consumers should have a range of features and fuel types to choose from as they do today. The Appliance Standards Program should not, and indeed under the Energy Policy and Conservation Act of 1975, as amended (EPCA), must not require eliminating or adding consumer features and should not favor a particular fuel source as this proposal does. We, therefore, support reasonable energy conservation standards for cooktops, but we oppose the overly-stringent levels DOE has proposed for both gas and electric cooktops in this SNOPR. We do not, however, object to DOE's proposed design standards for ovens.

I. DOE's Proposed Standards Inappropriately Favor Electric Over Gas Cooktops.

DOE's proposed energy conservation standards for cooktops demonstrates a clear preference for electric cooktops over gas cooktops. In fact, the proposed rule is so lopsided that the only conclusion is that DOE is contravening EPCA and inappropriately using this rule as a backdoor

means to achieve the Administration's electrification goals. Regardless of the Department's intentions, the proposed rule, because it proposes levels that are at the maximum technologically feasible level (max tech) for gas products, will likely force consumers who seek to maintain certain features and functionality—for example, the ability to have a range instead of a stand-alone cooktop, quick cooking times, precise control at lower temperatures, and the ability to safely move pots/pans seamlessly across the cooking surface—to switch from a gas to an electric cooktop.

DOE's own data bear this out. Significantly more electric products meet DOE's proposed standards. DOE's test sample shows that 80 percent of electric cooktops meet its proposed level as opposed to four percent of gas products.[1] And, incredibly, DOE, under its own analysis, proposes to eliminate 100 percent of gas ranges.

DOE Original Test Sample: Number of Models Meeting the Proposed Standards Levels

Test Sample	Percentage of Gas Cooking Top Models Meeting the Proposed Standard Level	Percentage of Smooth-Electric Cooking Tops Meeting the Proposed Standard Level
SNOPR Original Test Sample (Tables 5.5.5 & 5.5.6 in the TSD document)	4.7%	80%
NODA Additional Test Sample	16.6%	80%

AHAM's data also demonstrate this point. In AHAM's test sample, which is described below, none of the gas products could meet DOE's proposed standards. But 92 percent of the electric products could meet DOE's proposed levels.

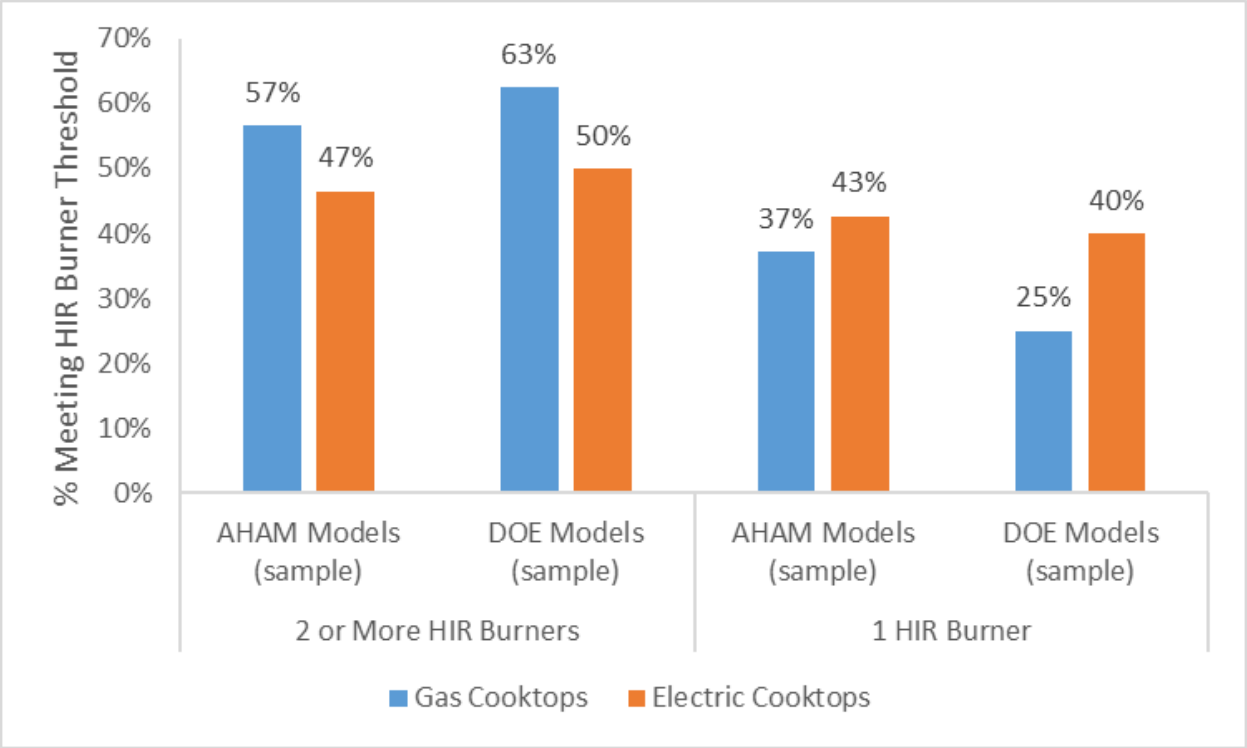
Because DOE indicates in the SNOPR, and AHAM agrees, that one key consumer feature that must be retained is the ability of a product to include high input rate burner(s), AHAM investigated the impact of DOE's proposed rule on gas products with one or more high input rate burners as compared to electric products with higher wattage elements that provide the same functionality to consumers as high input rate burners on gas cooktops. (We note that we used DOE's definition of high input rate burner—14,000 Btu/h—but we question whether that is the appropriate threshold for this definition. DOE has not provided justification for that selection in

[1] Seventeen percent of gas products meet the proposed standard if the additional units that DOE reported on in its subsequent notice of data availability (NODA) are included. *See* Energy Conservation Standards for Consumer Conventional Cooking Products; Notification of Data Availability (NODA); Docket No. EERE-2014-BT-STD-0005; RIN-1904-AD15; 88 Fed. Reg. 12603 (Feb. 28, 2023). But, as discussed further below, the three additional units DOE added through its NODA (and the units DOE counted on retailer websites) demonstrate that **the majority of gas products that DOE indicates are capable of meeting its proposed standard do not provide features and functionality otherwise available on the market today**—they lack features and functionality and replace those features with less desirable ones such as burners with input rates less than 14,000 Btu/h, wire grates, and/or non-continuous grates.

the form of consumer data, or other evidence. DOE needs to present the data supporting this otherwise its analysis is arbitrary. We note that AHAM presents data on consumer preference in these comments which points toward a higher threshold).

AHAM determined by surveying its members that a 2,600 watt (W) element is approximately equivalent in function and, perhaps, in heat transfer (considering the burner's and heating element's efficiency) to a 14,000 Btu/h burner. AHAM then used that translation and evaluated DOE's and AHAM's data (including the three additional NODA units in DOE's sample) to determine how many gas and electric products include burners/elements with high inputs. The table below shows the percentages of products in each test sample that have burners/elements with high input rates/wattages.

Percentages of Gas and Electric Products With High Input Rate/Wattage



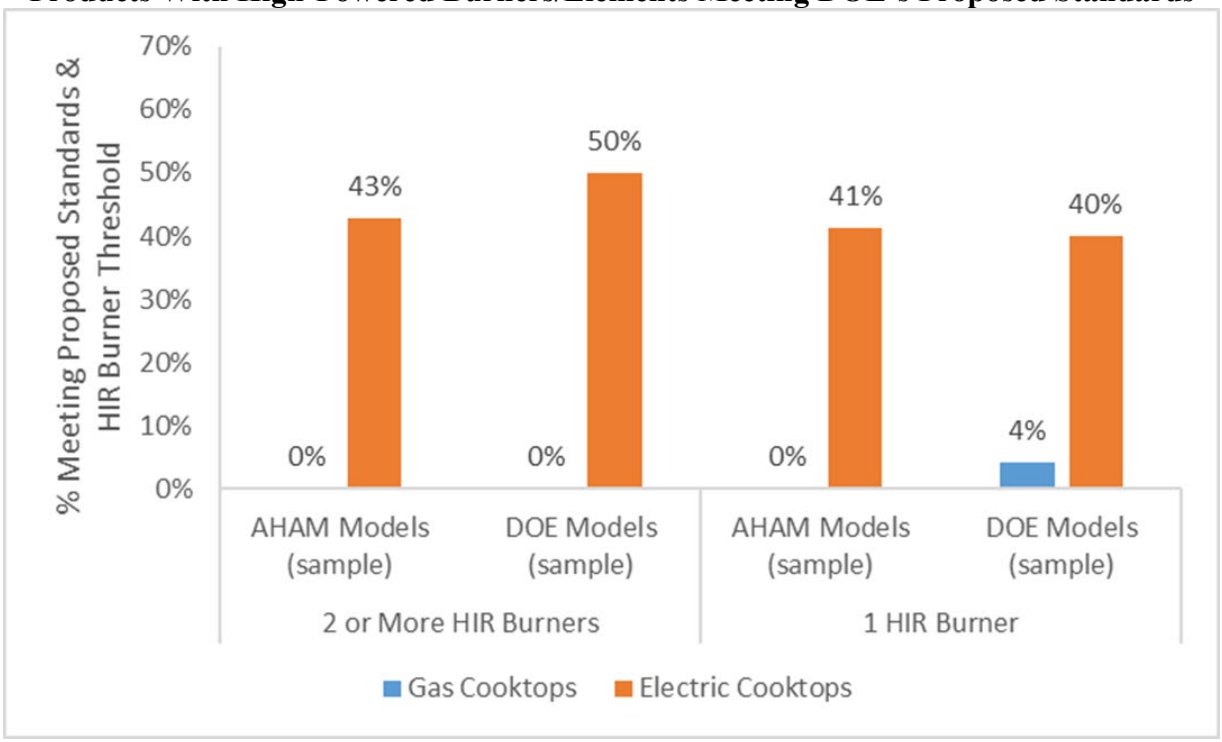
"HIR" electric is defined as 2,600 W | HIR gas is defined, per DOE, as 14,000 Btu

These data show that both test samples include a significant number of units with high input rates/wattages. This demonstrates that gas and electric products are comparable in their provision of one or more elements/burners with high input wattages/rates as a consumer feature/functionality in the market today. It also demonstrates that a significant percentage of products today provide these features, which indicates that having one—and even more than one—high-powered/input rate burner is a feature consumers desire.

Next, AHAM looked at the impact of the proposed standard on these products—in other words, we examined whether the high-powered/input rate burners and elements in DOE's and AHAM's respective test samples meet DOE's proposed standards. The table below shows the ability (or

inability) to meet DOE's proposed standards for gas and electric products with high-powered burners/elements.

Products With High-Powered Burners/Elements Meeting DOE's Proposed Standards



HIR = High Input Rate (burner), "HIR" electric defined as 2,600 W | HIR gas defined as 14,000 Btu

These data show that, with the exception of a single unit in DOE's test sample (unit 2), no gas cooktops with high input rate burners can meet DOE's proposed standards. (However, even unit 2 would likely fail to meet DOE's standard due to test variation). Meanwhile, 40-50 percent of the electric models in DOE's and AHAM's test samples that include high wattage burners (including those with two or more high wattage burners) can meet DOE's proposed standards. This further proves this difference in DOE's treatment of gas and electric products that offer consumers the features and functionality DOE itself indicates in the SNOPR are critical to maintain per EPCA's requirements.

Disparate treatment of products based on fuel source is not an appropriate result—energy conservation standards should be fuel neutral. The proposed standards for both gas and electric need to be revised, but in particular, the gas standards are far too stringent and should be brought in line with the electric standards in order to achieve parity between standards for gas and electric products. Electric standards should not be made more stringent to accomplish this goal because, as discussed in more detail in these comments, the costs to manufacturers would be too great and consumer features will be lost as a result of overregulation of cooking products.

II. DOE's Data And Analysis Are Flawed And Need To Be Revised.

The data and analysis underlying DOE's proposed standards is flawed in several respects. As described more fully below:

- **DOE's test sample is not representative of the market.** It does not accurately represent shipment ratios between product types and classes—certain categories are significantly over- or under-represented in the sample. It also consists of numerous products that are currently not commercially available, and DOE has not demonstrated that the reasons for that unavailability are inconsequential to its analysis.

- **DOE's analysis fails to adequately consider the impact of test procedure variation on its results.** Specifically, when accounting for test variation, the single gas standalone cooktop in DOE's SNOPR test sample that meets DOE's proposed standards (unit 2), could just as easily fail to meet DOE's proposed standard as it could meet it. And given that test procedure variation, a product with a measured efficiency similar to that test unit would not be certified at that value. Even with less variation, manufacturers, as a general rule, do not certify products at tested values. They conservatively rate—a practice supported and acknowledged by DOE. Thus, DOE's test sample—when accounting for test variation and the realities of product certification—does not include any products that pass its screening criteria and meet the proposed standards for gas cooktops.

- **DOE only tested one unit of each model one time.** DOE's certification rules require testing of more than one unit in order to obtain a statistically representative value for each basic model. The data used to develop the proposed standard level and EL should also be developed in this manner or should at least account for it by evaluating normal unit and test variation. DOE does neither.

- **DOE's analysis is contradictory with the introduction of the NODA.** DOE uses different analyses and introduces units in the NODA that it screened out in the SNOPR. In the NODA, DOE also conducted an analysis—counting models on retailer websites and assuming they meet the proposed standards because they appear similar to products DOE tested that do not meet the screening criteria, but do meet DOE's proposed standards—that does not pass the laugh test. DOE did not present its full data or findings, which makes it difficult for commenters to evaluate.

- **DOE relies upon a withdrawn test procedure to quantify the savings for its proposed oven standards.**

These inadequacies result in proposed standards for both gas and electric cooktops that are too stringent. And, especially for gas products, these data gaps must be resolved before DOE can continue to a final rule, otherwise DOE's final rule will certainly not be based on adequate data under the Administrative Procedure Act or the Data Quality Act and will be arbitrary, capricious, and an abuse of discretion.

A. DOE's Test Sample Is Not Representative Of The Market.

DOE's test sample does not sufficiently represent the market for cooktops. Specifically, the test sample: 1) does not accurately represent the shipments ratios between product classes and product types—certain categories of products are over- or under-sampled; and 2) does not consist of products that are currently commercially available.

DOE's test sample does not represent the ratios between product types in terms of shipments and is, therefore, not representative of the market. In other rulemakings where a full database of available products is available to DOE through its certification data, this may not be as significant a problem depending on the analysis. In this case, however, where there is no available data, this inaccuracy flows through DOE's entire analysis potentially resulting in a rule that is arbitrary, capricious, and unsupported by data.

The below tables show the difference between DOE's test sample and shipments for each product type.

Product Type	DOE Test Sample	2022 AHAM Shipments
Gas Standalone Cooking Tops	61.9%	13.3%
Gas Ranges	38.1%	86.7%

Product Type	DOE Test Sample	2022 AHAM Shipments
Open (coil) Element	9.1%	25.6%
Smooth-electric Resistance	50%	69.8%
Induction	40.9%	4.6%

From this data, it is evident that DOE significantly under-sampled gas ranges, which represent a majority of gas cooktop shipments. Conversely, DOE's test units over-sample gas stand-alone cooktops. Thus, DOE's reliance on its test sample as representative of the market is significant error. Moreover, for electric products, DOE significantly over-sampled induction cooktops. Although those products represent under five percent of shipments, they represent nearly half of DOE's test sample.

DOE's test sample for smooth-electric cooktops is not as far off in terms of representation. Yet, the Department's coil element sample is extremely low and in fact is so low that, as described below, it is difficult to assess whether DOE is even setting standards at the appropriate level. Indeed, AHAM proposes DOE should not be setting standards for electric open (coil) element cooktops at all.

These data also demonstrate that DOE's reliance on its test sample as representative of market penetration is misplaced. DOE's reliance on its test sample to determine viable technology pathways to compliance for gas and electric products is also misplaced, given that it has not focused attention on the correct product categories.

Note that AHAM also conducted testing in support of these comments, but our test sample does not solve for the representativeness issue at this time due to time constraints imposed by DOE.[2] Our test sample's composition is summarized in the below table. It is comprised of products that were tested in support of AHAM's work to develop a cooktop test procedure as well as products that AHAM members tested after DOE released the 2023 SNOPR.

AHAM Cooktop Testing: Test Sample Composition

	Gas*	Electric**
Total number of samples	32	67
Total number of ranges	16	27
Total number of cooking tops	16	40

*Half of the gas samples were identified by the manufacturer as commercial style.
**The electric sample set consisted of 6 coil, 37 radiant, and 24 induction.

AHAM has already provided test data to DOE through Guidehouse for the portions of this sample that were tested in support of test procedure development. A summary of the full AHAM data set is provided in Exhibit B and AHAM will provide the full data to Guidehouse through our nondisclosure agreement (NDA) with Guidehouse. DOE should combine AHAM's data in with its own test data as it conducts further analysis, but even doing this will not resolve the serious data gaps in DOE's analysis.

Putting both AHAM's and DOE's test sample together, the below table shows the lack of representativeness of each test sample and the combined test sample as compared to shipments.

Fuel Type	Product Type	DOE Test Sample	AHAM Test Sample	AHAM Shipments 2022
Gas	Gas Standalone Cooking Tops	61.9%	50%	13.3%
	Gas Ranges	38.1%	50%	86.7%
Electric	Open (coil) Element	9.1%	9%	25.6%
	Smooth-electric Resistance	50%	55%	69.8%
	Induction	40.9%	36%	4.6%

AHAM plans to continue to test products in an effort to produce a more representative test sample to further assess DOE's proposed standards for gas and electric cooktops. If we are able to do so before DOE finalizes a rule, we will provide the data to DOE. Nevertheless, DOE should not proceed to a final rule without ensuring that its test sample is representative of the market in terms of the ratio of shipments. It is not AHAM's responsibility to provide this data—

[2] Although DOE did extend the comment period on this SNOPR by 14 days, which we appreciate, AHAM sought more time which was not granted. AHAM needed that time to assess DOE's analysis, including through testing of additional products.

it is DOE that must demonstrate that its proposed rule is based on adequate data and is not arbitrary and capricious.

Comparing DOE's test sample to shipments by product class is not the only marker of whether the sample is representative. Whether the test sample represents *current* products must also be assessed. DOE acknowledged that it "considers technologies incorporated in commercially-available products or in working prototypes to be technologically feasible"[3] per sections 6(b)(3)(i) and 7(b)(1) of the Process Rule.[4] Yet, DOE's test sample is comprised of several old models, some of which are no longer commercially available and would certainly not constitute working prototypes. The table below shows the percentage of DOE test samples that were still commercially available in February 2023 according to DOE's notice of data availability (NODA).[5] We expect manufacturers will provide additional feedback to DOE on the availability of their models.

Commercially Available Units as of February 2023 in DOE's Test Sample

Gas	Electric
37.5%	54.5%

DOE's continued use of this old test sample conflicts with DOE's statement that it considers commercially available products or working prototypes in its evaluation. AHAM disagrees with DOE's statements in the NODA that if a product *was* on the market it can be included in the analysis—that could be the case if it can be shown that the model was replaced with a similar model that retains similar efficiency performance and similar technology options. But it could also mean that a product is removed from the market, and is no longer commercially available, for reasons that should eliminate it from the sample, such as reliability or quality issues or consumer dissatisfaction. In this case, DOE does not have data to demonstrate that the models that are no longer commercially available were replaced with like models or were not removed from the market for reasons related to the very technologies DOE is considering.

AHAM is unable to comment on the similarity of current models to the old models in DOE's sample because DOE has not publicly released the model numbers for the products in its test sample (for reasons we understand and appreciate). DOE has, however, released this information to manufacturers who requested DOE's test data related to their individual models in the test sample and we thank DOE for doing so. Thus, AHAM expects that individual manufacturers will provide more information to DOE on their models that are no longer available. Absent data to indicate that a particular model that is no longer commercially available should remain in the test sample, DOE should remove the old models from its test sample and ensure that the test sample informing this analysis consists only of commercially available products (or working

[3] 2023 SNOPR, at 6832.

[4] See 10 CFR 430, subpart C, appendix A (Process Rule).

[5] Energy Conservation Standards for Consumer Conventional Cooking Products; Notification of Data Availability (NODA); Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD-15; 88 Fed. Reg. 12603 (Feb. 28, 2023).

prototypes). Without that data, DOE cannot support its conclusions that the technologies in these older products are viable design options.

Before proceeding to a final rule, DOE needs to correct the insufficiency of its test sample by ensuring that it contains commercially available products (i.e., those currently on the market) and by ensuring that it is representative of the mix of products on the market (i.e., shipments) and does not over- or under-sample particular product types within product classes. This is critical because in downstream analyses in this rulemaking, DOE assumes that the percentages of product types in its test sample (e.g., gas, electric, induction) are the same as the percentages of those same product types in the market. DOE uses this assumption to calculate the percentages of products that could comply with its proposed standards, energy savings, and consumer and manufacturer economics. In essence, the assumption that DOE's test sample is representative of the market underlies nearly every downstream conclusion. Thus, the failure to fix it will lead to a final rule that is unsupported by the facts, is arbitrary and capricious, and is an abuse of discretion.

B. DOE's Analysis Does Not Account For Test Procedure Variation.

DOE indicated in the NODA that each data point presented in the SNOPR technical support document (TSD) represents one test of a conventional cooktop conducted at one test laboratory. DOE also indicated during the January 31, 2023 public meeting that it did not account for test procedure variation in its analysis of which energy conservation standards to propose.[6]

First, AHAM questions whether DOE has additional data for the units in its test sample. Especially given that DOE indicated it tested some of the same models in development of its test procedure, it seems unlikely that DOE tested each unit only once. AHAM requests that DOE provide any additional test results on the units in its test sample that may exist from other test runs. This data is relevant because it could illuminate the relevance of test variation to DOE's standards selection. As discussed further below, this could be especially important for the single model in DOE's SNOPR test sample that may just barely meet DOE's proposed standard (unit 2).

Second, DOE's analysis fails to analyze the potential impacts of known test procedure variation on its test results. Doing so is important because DOE only provided results from a single test for each unit in its test sample and it is possible that test variation could shift the results for any given model to be more or less efficient. This should be significant to DOE given that it is relying wholly on this test sample to propose an energy conservation standard.[7]

[6] Energy Conservation Standards for Conventional Cooking Products; Supplemental Notice of Proposed Rulemaking; Docket No. EERE-2014-BT-STD-0005; Public Meeting Transcript, at 40-43 (Jan. 23, 20230).

[7] We also note that DOE has not addressed how to treat connected products.

DOE itself has acknowledged the variation in the test procedure. Specifically, DOE released repeatability and reproducibility analysis in the test procedure NODA.[8] This data shows high reproducibility variation: According to DOE's analysis, there could be as much as an 8.4 percent difference for gas products when comparing Lab A to Lab B and a 5.6 percent difference for electric products when comparing Lab A to Lab C.[9]

Additionally, DOE's failure to account for test procedure variation means that DOE is proposing to set a standard based on *measured* values of products. This is not consistent with its approach elsewhere. DOE typically uses its certification database to evaluate the efficiency of the current market. That database contains *certified* values, which as DOE knows and supports, are typically conservative ratings in order to take into account several sources of known variation such as test procedure variation and manufacturing variation. DOE has expressly permitted and encouraged conservative rating, yet it fails to account for it in its analysis.[10]

Given this acknowledged variation and the realities of product certification (DOE's regulations require manufacturers to test more than one unit in an effort to account for variation),[11] AHAM conducted a sensitivity analysis, shown in the below graph, on DOE's data and AHAM's test data to evaluate the potential impact of test variation on DOE's analysis. Note that AHAM's data presented below, also represent a single test of a test unit at a single laboratory. (AHAM members were not able to do repeat testing and AHAM was not able to conduct a new round robin due to time constraints DOE imposed).

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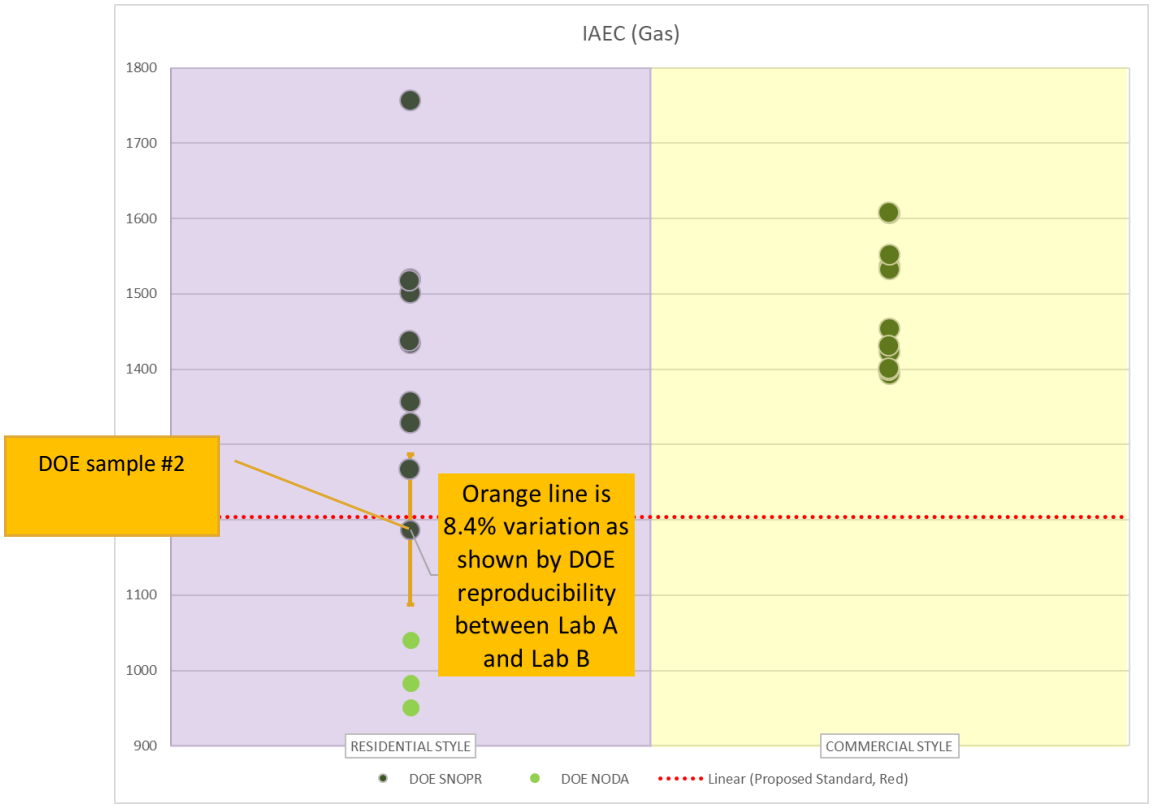
[8] Test Procedure for Cooking Products: Notification of Data Availability (NODA); Docket No. EERE-2021-BT-TP-0023; RIN 1904-AF18; 86 Fed. Reg. 71406 (Dec. 8, 2021).

[9] We note that AHAM's round robin had better repeatability and reproducibility. But DOE's data shows that there is an outlier laboratory (Lab A) and DOE has indicated that Lab A conducted the test procedure accurately. If Lab A has a larger difference, and it tested correctly, then DOE needs to consider that variation for gas products, particularly because it is possible or even likely that Lab A could conduct enforcement testing for DOE in the future or, if it is a third party lab, could certify products for manufacturers.

[10] Energy Conservation Program: Certification, Compliance, and Enforcement for Consumer Products and Commercial and Industrial Equipment, Final Rule, 76 Fed. Reg. 12422, 12429 (Mar. 7, 2011) ("[M]anufacturers may rate models conservatively, meaning the tested performance of the model(s) must be at least as good as the certified rating, after applying the appropriate sampling plan. The sampling plans are designed to create conservative ratings, which ensures that consumers get—at a minimum—the efficiency indicated by the certified rating. In this final rule, DOE allows manufacturers to use conservative ratings beyond those provided by the sampling plans.").

[11] *See* 10 C.F.R. 429.11. Notably, DOE sought comment and data to potentially re-evaluate the sampling plan for cooktops in 10 C.F.R. 429.23 in the context of any potential performance standards for these products. The data in these comments and DOE's findings related to variation should be considered in the context of certification and enforcement. DOE should ensure that its rules recognize the variation in this particular case, which exceeds that of other test procedures, and should account for that fact—which its own data and analysis demonstrates—rather than ignore it.

Sensitivity Analysis of DOE's and AHAM's Test Data



Critically, the gas standalone cooktop unit maintaining consumer features and functionality that DOE indicated could meet its proposed standard (unit 2) could potentially no longer meet the proposed level taking into account test variation/conservative rating and DOE's sampling plan requirements for certification.[12] Taking variation into account, that unit could have test results anywhere along the orange line in the above graph, meaning that it could test more efficient or less efficient, with test results on either side of DOE's proposed standard. This is a major point because, even without the high known variation in this test procedure, manufacturers will not rate at the tested value, as discussed above. To do so would be reckless because it could result in an enforcement action upon a subsequent test that could result in lower energy efficiency. The "buffer" that manufacturers build in for conservative rating varies by manufacturer and by product, but is generally at least five percent. This ensures that claims are accurate and not misleading and it insulates manufacturers from enforcement actions.

To set a standard based upon a single test result at a single lab ignores these facts, and in doing so, from a practical perspective, sets a more stringent standard because manufacturers will need to design products significantly more efficient than the proposed level in order to achieve consistent compliance. This means that only the products in DOE's NODA sample, which lack

[12] *Id.*

the features and functionality DOE itself recognized must be maintained, would be capable of meeting DOE's proposed standards when variation is taken into account.

Accordingly, like its unrepresentative test sample, DOE's failure to account for known, significant test procedure variation and certified ratings in its analysis is a fatal flaw. Whether or not variation (i.e., conservative rating) is considered is the difference between whether or not any units in DOE's test sample meet its proposed standards while also maintaining the product utilities available today.

C. DOE Confused Its Methodology With Its Supplemental Data.

During the January 31, 2023 public meeting and afterwards, AHAM sought additional data from DOE regarding the characteristics and testing of the units in DOE's test sample. AHAM also sought clarity from DOE on its statements in media that conflicted with the data in the SNOPR TSD.[13] In response, DOE published a notice of data availability on February 28, 2023 (NODA).[14] Throughout this process, DOE has presented contradictory and confusing information and data.

First, in the SNOPR, DOE stated that it estimated the current efficiency distribution for each product class from the sample of cooktops it used to develop the engineering analysis. Based on this analysis, DOE indicated that four percent of the current market could meet the proposed standards for gas cooktops. This analysis was based on DOE's methodology of only including gas products in its test sample that met its screening criteria-i.e., that had continuous cast iron grates and at least one high input burner (as defined by DOE to be 14,000 Btu/hour input rate or above).

Second, during the January 31, 2023 public meeting, AHAM asked about the implications of a test sample that is selected based only on products that meet DOE's screening criteria. AHAM asked, "Does that mean that there could be proportionately even more models in the market today that would not be able to meet the proposed standards than proportionately those in the test

[13] *See* AHAM Request for Additional Data on DOE's SNOPR for Energy Conservation Standards for Residential Conventional Cooking Products; Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD15 (Feb. 3, 2023) (stating, "Additionally, DOE has recently made statements in the media that 'every major manufacturer has products that meet or exceed the requirements proposed [on February 1]—including nearly 50% of the current gas cooktop market that will not be impacted by this proposal.' There does not appear to be data to support this point in the SNOPR or TSD. Thus, AHAM asks that DOE provide the data or methodology it used to draw that conclusion.").

[14] Energy Conservation Standards for Consumer Conventional Cooking Products; Notification of Data Availability (NODA); Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD-15; 88 Fed. Reg. 12603 (Feb. 28, 2023).

sample?" DOE's consultant responded, "I don't believe there is information to suggest that versus even the opposite. There's no information available."[15]

Third, with the NODA, DOE explained that it based its updated analysis on model counts of the burner/grate configurations of gas cooktop models currently available on retailer websites and estimated—without having tested products it simply viewed on websites—that nearly half of the total cooktop market for gas would achieve the proposed level and not be impacted by proposed standards. This methodology was based on model counts on websites—it was not based on the DOE test sample and it did not attempt to be representative of the market in terms of shipments like DOE's SNOPR analysis.

Finally, on February 24, 2023, in a statement to media, DOE indicated that "Suggestions that only 1 out of 21 (4%) of stoves would meet the proposed standards without significant modification are misleading and misinterpreting data," Ortiz [DOE spokesperson] said. "DOE presented a set of data of units that we physically tested – this should not be confused with percentage of products that would meet the standard. The test sample is just a small subset of models that better help DOE understand the annual energy consumption of these units."[16]

These conflicting statements and methodologies leave stakeholders wondering what DOE's actual methodology is. DOE appears to be trying to have its cake and eat it too. On the one hand, in the SNOPR analysis, DOE tested only gas products that satisfied the screening analysis in order to, consistent with EPCA and the Process Rule, ensure that the selected design options did not adversely impact the utility of gas products or result in the unavailability of any covered product type with performance characteristics, features, sizes, capacities, and volumes that are substantially the same as products generally available in the U.S. today. But then, with the NODA, DOE uses a back of the napkin approach, counting products on a website that look like products it tested that, though they eliminate performance characteristics and features, could meet its proposed standards. DOE, of course, has no actual basis for knowing if the products it found on websites meet its proposed standard because it did not test them.

Moreover, DOE used a different methodology in the NODA than in the SNOPR for determining the percentage of products that would meet its proposed standards. In the SNOPR, DOE determined the predicted market share of products that could meet its proposed standards by A) assuming that its test sample is representative of the market; B) determining the percentage of models in its test sample that could meet the proposed level (one unit, representing four percent of the sample); and C) assuming that the market share that could meet the proposed standard was equivalent to the percentage of models in the test sample that could meet the proposed level (four percent).

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[15] U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy: Energy Conservation Standards Supplemental Notice of Proposed Rulemaking for Conventional Cooking Products, Docket No. EERE-2014-BT-STD-0005; Public Meeting, at 66-67 (Jan. 23, 2023).

[16] Dabs, Brian, "DOE Rule May Block 50% Of Current Gas Stove Models," E&E News (Feb. 24, 3023), *available at* www.eenews.net/articiles/doe-rule-may-block-50-of-new-gas-stoves/.

In the SNOPR, DOE states that units with both continuous cast-iron grates and at least one high input rate burner must be continue to be available on the market. Continuous cast-iron grates provide a safety benefit and high input rate burners provide utility expected by consumers. Due to the importance of these features, DOE screens "…out any optimized burner and grate design that would result in the lack of continuous cast-iron grates or the lack of at least one HIR burner."

In the NODA, DOE cites testing on units which do not have the combination of features DOE indicated in the SNOPR must be maintained. Specifically, DOE "tentatively determined that gas cooking tops without these features, such as gas cooking tops with steel grates, non-continuous grates, and/or burners with input rates less than 14,000 Btu/h—many of which are entry-level models—would also be able to meet the efficiency levels" in the SNOPR.[17] The SNOPR and NODA contradict one another. DOE cannot maintain that certain features must be available on the market and propose a standard based on data which includes products that do not have those features.

Then, DOE, using its "analysis" of retailer websites, used model counts of products it did not even test and determined a percentage of those products on websites that would meet its proposed standard (based, presumably, on the fact that these other products also lack the features and functionality DOE decided were necessary in its SNOPR screening analysis). DOE indicates in the NODA that based "on its testing results and model counts of the burner/grate configurations of gas cooking top models currently available on the websites of major U.S. retailers, DOE estimates that the products that were screened out of the engineering analysis represent over 40 percent of the market. Together with the models included in the engineering analysis, DOE estimates that nearly half of the total gas cooking top market" would meet its proposed standards. DOE here seems to be doing a model count analysis rather than a market share analysis.

Were DOE to use the same methodology it used in the SNOPR, 17 percent of estimated shipments would meet its proposed standards including the additional three models it tested. DOE provides no data or substantiation for how it determined the models on retailer websites would meet its proposed standards. (And we note that "looks like" is not the same as "works like."). DOE does not identify the websites it reviewed. It does not identify which models, or even how many models, it determined would meet its proposed standards or the criteria it applied to make that determination other than the presence or absence of certain features. DOE's "analysis" in the NODA is not transparent and commenters cannot fully comment on it.

Putting the confusion the NODA causes aside, DOE's NODA data confirms AHAM's arguments, detailed below, that finalizing standards at DOE's proposed levels for gas products will force a race to the middle where all products are essentially the same and, contrary to EPCA's requirements and the Process Rule, lack features and functionality currently available in

[17] Energy Conservation Standards for Consumer Conventional Cooking Products; Notification of Data Availability (NODA); Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD-15; 88 Fed. Reg. 12603 (Feb. 28, 2023).

the U.S. market. DOE's analysis demonstrates that the products potentially capable of meeting DOE's proposed standards (other than, possibly, unit 2, which also would not likely be certified to meet DOE's proposed standard) are those that do not include the very features and consumer utility DOE deemed must be maintained. Instead, the units that comply lack continuous cast iron grates, low-input burners, and/or one or more than one high input rate burners. Thus, the NODA shows that DOE's proposed standards for gas cooktops do not meet EPCA's requirements.

D. DOE Inappropriately Relies On A Withdrawn Test Procedure To Calculate Savings Attributable To Design Standards For Ovens.

On December 16, 2016, DOE published a final rule repealing the test procedures for conventional ovens based on its determination that it may not accurately represent consumer use because it favors conventional ovens with low thermal mass and does not capture cooking performance-related benefits due to increased thermal mass of the oven cavity.[18] Because of the uncertainties in analyzing a performance-based standard using the now-withdrawn oven test procedure, DOE did not propose performance-based energy conservation standards in the September 2016 SNOPR and again in the 2023 SNOPR proposes prescriptive design requirements for the control system of conventional ovens.[19]

Nevertheless, DOE used the repealed oven test procedure to test ovens and determine the savings related to its proposed design requirements. Although AHAM does not object to the proposed design standards for ovens, DOE should not calculate savings based on a test it has determined does not produce representative results. Any analysis produced using a defunct, unrepresentative test procedure is likely to be inaccurate.

III. The Proposed Standards Will Eliminate Consumer Utilities For Gas Cooktops.

EPCA prohibits DOE from prescribing an amended or new energy conservation standard that "interested persons have established by a preponderance of the evidence" is "likely to result in the unavailability in the United States in any covered product type (or class) of performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as those generally available in the United States at the time" of the rule.

AHAM's analysis below demonstrates that, contrary to EPCA's requirements, DOE's proposed standards for gas cooktops will eliminate gas products with performance characteristics, features, and sizes that are substantially the same as those generally available in the United States today.

AHAM's consumer research shows that consumers value safety, performance, and cost as purchase drivers more than energy efficiency and cost to use over time. The below table shows the percentage of consumers that rated these features as either extremely or very important in

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[18] Test Procedures for Cooking Products, Notification of Data Availability (NODA); RIN 1904-AD-15; 88 Fed. Reg. 12603 (Feb. 28, 2023).

[19] *Id.*

their purchase drivers.[20] While all ranked in the top five, energy efficiency and cost to use over time were less important to consumers than safety, performance, and cost.

Top Five Cooking Product Features When Purchasing a New Cooking Product

Feature	Overall (Rank & %)	Electric Coil Ranges (Rank & %)	Electric Smooth Cooking Top / Ranges (Rank & %)	Gas Cooking Tops / Ranges (Rank & %)
Safety	1 (88%)	3 (83%)	1 (90%)	1 (91%)
Performance	2 (87%)	1 (84%)	2 (87%)	2 (85%)
Cost	3 (85%)	1 (84%)	2 (87%)	2 (85%)
Energy Efficiency	4 (79%)	4 (79%)	4 (78%)	4 (77%)
Cost of Use Over Time	5 (76%)	5 (73%)	5 (77%)	5 (72%)

*Respondents either selected "very important" or "extremely important" when answering

This demonstrates that, consistent with EPCA's requirements, DOE must ensure that safety, performance, and product price are not negatively impacted by its proposed energy conservation standards.

DOE's proposed very stringent energy conservation standards for gas will likely have the effect of removing several performance characteristics, features, and sizes of gas cooktops that are currently available in the United States. This is because DOE's proposed standard will drive manufacturers to homogenize designs to include predominately or only burners in the 9,500-10,000 Btu/h range. DOE's individual burner data demonstrate that those burners are the most efficient and, given the stringency of the proposed standard, it is most likely that manufacturers will need to provide only burners in that range in order to comply with DOE's proposed standards. Specifically, the following will be lost:

- **High input rate burners**. DOE recognizes in the SNOPR the consumer utility associated with high input rate burners, stating that such burners "provide unique consumer utility and allow consumers to perform high heat cooking activities such as searing and stir-frying."[21] Yet, without any data to support its conclusion, DOE decided that consumer utility will not be impacted by a standard that allows only a single high input rate burner. AHAM challenges that conclusion.

  According to consumer research provided to AHAM by members, high input burners are typically used to boil water quickly (e.g., for starches) and to sear proteins. They are used to heat large pots and pans. Medium input burners are typically used to brown proteins and sauté vegetables. Thus, the two types of burners have different uses.

[20]Bellomy on Behalf of AHAM, Appliance Efficiency Regulatory Impact Consumer Research (July 2022).

[21] 2023 SNOPR at 6845.

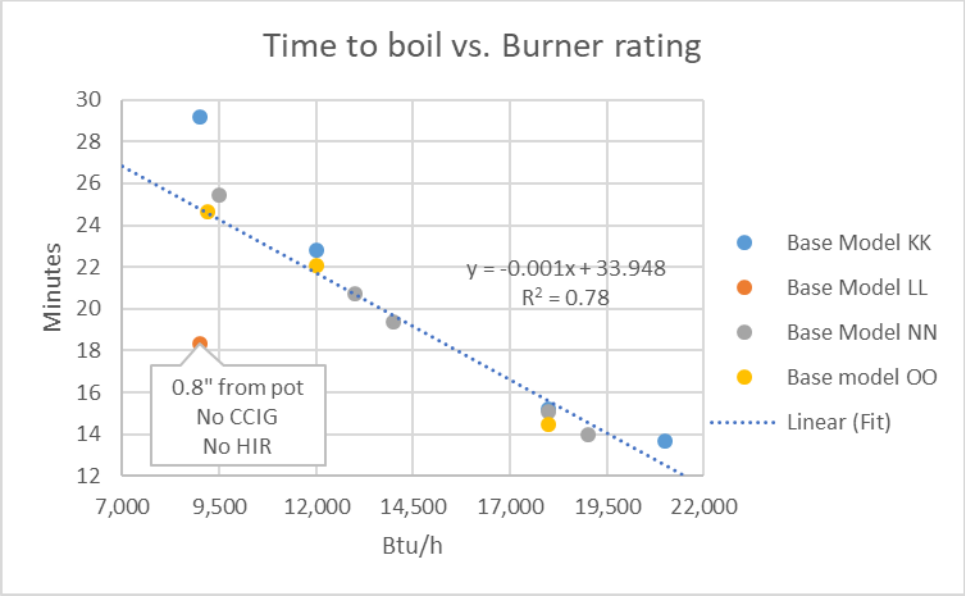
When asked what they would like their cooktop to do better, consumers indicated that they want the cooktop to boil water faster and have another high input burner. Those were in the top five wishes. Additionally, consumers want more than one large burner because they have more than one large pan to put on them and want to use both at the same time, particularly for serving larger groups of people and special occasion meals. This data is proprietary to members and thus, we expect individual companies will provide the supporting data directly to DOE.

No cooktop in DOE's or AHAM's sample with more than one 14,000 Btu/h input rate meets DOE's proposed standards. DOE's own anticipated design pathways to reach its incremental efficiency levels assume that its proposed levels will be achievable by reducing the number of high input rate burners. DOE indicates that EL 1 can be achieved with four or more high input rate burners and continuous cast-iron grates. But EL 2, the proposed standard, is only (potentially) achievable by a single unit that in DOE's test sample that has fewer high input rate burners.

Additionally, with the possible exception of DOE's unit 2, no product in AHAM's or DOE's test sample with even a single high input rate burner meets its proposed standard. As discussed elsewhere in these comments, DOE's gas cooking top unit 2—which contains a high input rate burner and DOE test results show as just meeting its proposed standard—likely would not be certified to meet its proposed standard in the future. (And it is possible that unit is no longer available on the market, though DOE does not provide data to determine that with certainty. DOE provided only the number of models still available on the market in its NODA—it did not identify which ones are available/unavailable). DOE should not consider units that could just as easily not meet DOE's proposed standard as they could meet it to meet the proposed standard—such an assumption is not consistent with DOE's sampling plan in 10 C.F.R. 429.11 and manufacturers would not certify units at such levels based on those test results.

Moreover, no cooktop in DOE's or AHAM's test sample with a burner input rate above 18,000 Btu/h meets DOE's proposed standard. Although DOE sets the "high input rate" threshold at 14,000 Btu/h, consumer data below show that higher burner input rates have consumer utility—specifically, higher input rate burners provide quicker times to boil, an important consumer performance feature. DOE's proposed standard would eliminate that performance feature and lengthen times to boil.

Times to boil are directly related to burner input rate—generally, the higher the burner input rate, the shorter the time to boil. This is shown in the below summary of testing conducted by AHAM members to assess boil times of different burners. According to these data, the correlation between burner input rate and time to boil is strong, with an R^2 value of 78 percent.



The outlier point on the above graph is from a unit that may have decreased utility due to the burners' proximity to the cookware. The unit also lacks a high input rate burner and continuous cast iron grates.

DOE does not seem to acknowledge consumer utility associated with more than one high input burner, while consumers indicate such utility—consumers find utility in having several high input burners so they can mix and match various pan sizes and cooking methods all at the same time. (And consumers trying to boil one pot of water will also experience this same amount of additional wait time). In order to avoid negatively impacting consumer utility and removing products on the market like those that are available today—which is contrary to EPCA—DOE must ensure that its standards do not require limitations on the number of high input rate burners.

For example, there are meals that require boiling more than one pot of water in a single cooking session—e.g., lobster and corn; rice and beans; hot dogs and macaroni and cheese, etc. Based on DOE's unit 2, consumers trying to accomplish this task would spend an additional 37 percent longer (21.2 minutes versus 14.6 minutes) boiling two pots of water than a theoretical sample with two burners at 19,000 Btu/h. **Assuming consumers try to boil two pots of water at the same time 209 times per year, a consumer will spend about 23 additional hours per year waiting for water to boil.**[22] This demonstrates that there is consumer utility associated with the ability to more quickly boil more than one pot of water simultaneously (and accomplish other high heat cooking tasks simultaneously—boiling water is just one example) and that DOE's proposed standard will negatively impact gas products' ability to provide that utility.

[22] The methodology for this analysis is in Exhibit A to these comments.

Accordingly, DOE should consider the consumer utility associated with more than one high input rate burner (and ensure its standard does not result in manufacturers having to limit the number of high input rate burners offered on a single product) as well as the consumer utility associated with high input rate burners at and above 14,000 Btu/h. Under EPCA, DOE must ensure that a final standard does not remove these performance related features.

- **Low input rate burners.** DOE does not consider the consumer utility associated with low input rate burners. These burners offer consumers important performance characteristics. Low input rate burners are typically designed to gently heat small quantities of liquid and are used by consumers for melting chocolate, cooking sauces, cooking eggs, etc. Market research similar to that DOE conducted to support its finding that high input rate burners provide consumer utility demonstrates that low input rate burners also provide consumer utility. Consumer Reports assesses a cooktop's ability to cook with low heat using its "low heat" scoring criteria and provides details on not just "high-power" burners, but also "low-power" burners which it defines as 6,500 Btu/h or less.[23]

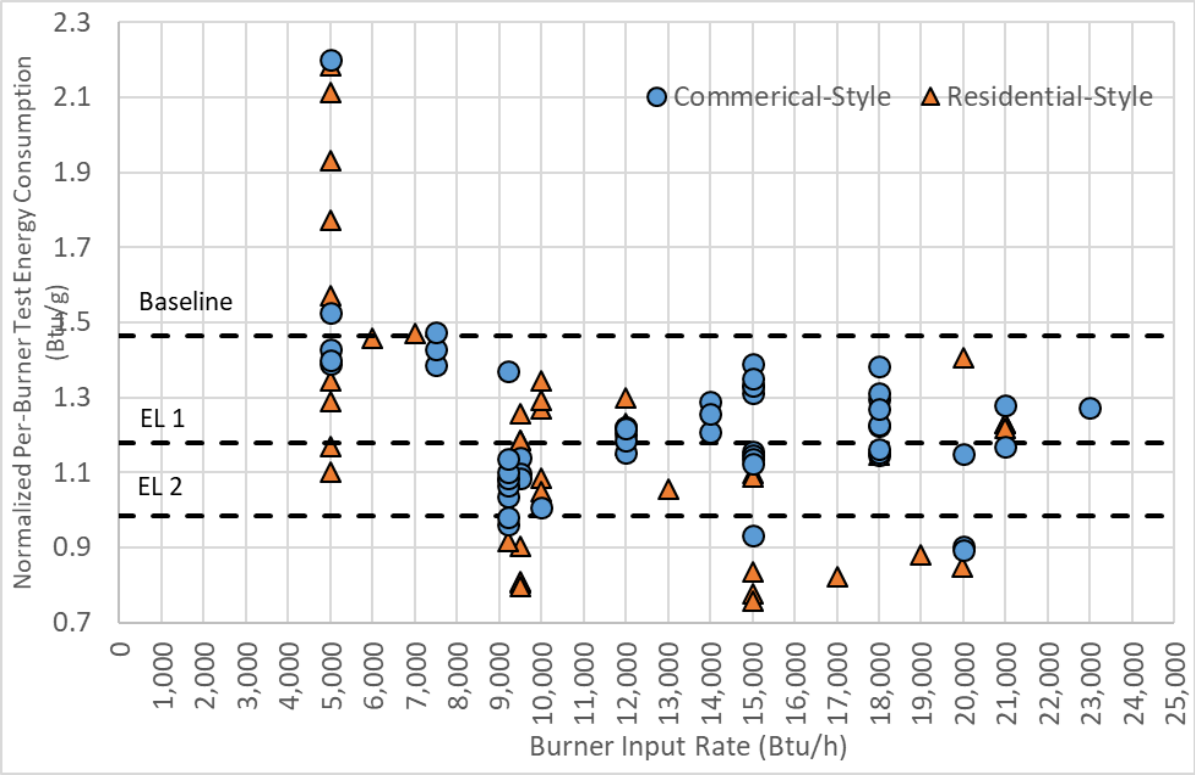
  Consumer research members provided to AHAM indicates that low input rate burners are designed and used for sauces, gravies, simmering soups/stews, cooking scrambled eggs, etc. They are also used to keep food warm, for example on holidays or when entertaining. Low input rate burners are not used for boiling starches or searing proteins, browning proteins or sautéing vegetables. Thus, they have a unique utility as compared to high- and medium-input rate burners. A significant number of consumers use the low input rate burner on their cooktop for much of the cooking cycle. Low input rate burners (and high input burners) ranked amongst the most important cooktop features for consumers. This data is proprietary to members and thus we expect individual companies will provide the supporting data for these points directly to DOE.

  Low input rate burners are smaller in diameter and, therefore, have 30-40 percent lower minimum input rates than traditional (non-multi-ring) burners. This allows for lower heat transfers to the cookware and gives consumers a wider range of cooking temperatures.

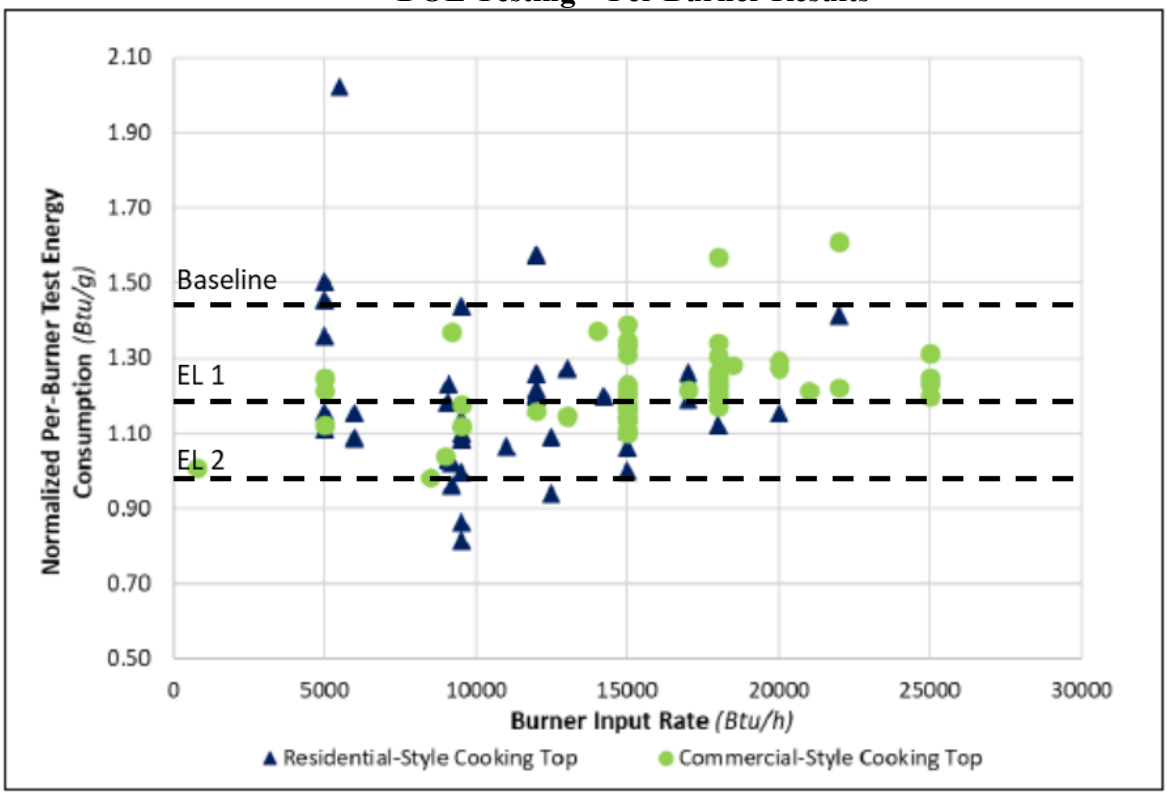
  Because the test procedure measures the efficiency of boiling a pot of water and low input rate burners are not intended for that purpose, these burners appear less efficient when tested using the test procedure and, therefore, are penalized as shown in the charts below. These burners do not meet DOE's proposed level.

[23] *See* https://www.consumerreports.org/products/cooktops-28977/gas-cooktop-28692/view2/.

AHAM – Manufacturer Testing Per Burner Results



DOE Testing – Per Burner Results



Thus, in an effort to comply with DOE's proposed standards, manufacturers are not likely to be able to continue to offer low-input burners that provide simmering, melting, and "keep warm" functionality. (Notably, DOE's test sample unit 2, which is the only test unit that possibly meets DOE's proposed standards, does not include a low input rate burner. It includes, we believe, a stacked burner, and DOE has not evaluated the cost of that technology as an option for reaching the proposed level). Instead, cooktops are likely to be homogenized, offering mostly mid-input rate burners—burners in the 9,500-10,000 Btu/h range—which DOE's data and analysis shows to be the most efficient as shown in the above table. These mid-input rate burners do not accomplish the tasks low-input rate burners are designed to do well.

Exhibit C shows the visual difference between mid-input rate burners and low-input rate burners for cooking sauce, representing the impact consumers will see.

Thus, removal of low-input rate burners will have negative performance impacts on consumers and will eliminate consumer utility. To retain performance, a stacked burner would be an option, but that has a cost impact for which DOE has not accounted. DOE should not limit its screening criteria to high input rate burners. It should also consider low input rate burners in its screening criteria and should ensure that its final standards do not eliminate low input rate burners that can effectively melt, warm, simmer and accomplish other low-heat cooking tasks.

Importantly, DOE needs to revisit and reanalyze the cost impacts of meeting any proposed standard. The costs are not zero, as DOE is projecting between EL 1 and El 2. In order to retain a full range of burner capacities, including a low input rate burner, a cooktop will cost more than one with a homogenized set of mid-input range burners.

- **A spectrum of heat inputs.** Consumers are not interested in just one type of burner, as is evident from the above discussion. They want a variety of burners including high input rate burners and low-input burners. Consumers often use more than one burner for a meal, particularly for dinner and special occasions. A compilation of consumer research from members indicated that consumers used two or more burners to make dinner and could use four or more for special occasions. Additionally, they want the ability to cook with a spectrum of heat inputs. Data supporting these points is proprietary to manufacturers and, thus we expect that individual manufacturers will provide such data directly to DOE.

  Moving the burner closer to the cookware as anticipated by DOE's "optimize burners and grates" technology option, should be screened out based on reduction in consumer utility (and safety, as discussed below). As shown by Unit LL in the boil time graph above, it is possible to boil water more efficiently, with a lower Btu/h, by moving the burner closer to the cookware. But a burner using that design will be essentially useless when cooking foods that require a spectrum of heat inputs because closer burners are unable to adequately reduce heat input.

An AHAM member conducted testing to demonstrate this point which is summarized by the below table and photos and described in more detail in Exhibit D. These data and photos show that food cooked with only mid-range input rate burners takes longer to cook. It also shows that mid-input rate burners, for some foods, provide a lower quality of cooking than high input rate burners. For this testing, the pan was left on the burner in order to not artificially lengthen the cook time. The result is an overcooked exterior in order to meet internal temperatures. The higher the food load, the greater the time increase for cooking to achieve proper doneness. For pork medallions to be cooked properly with only mid-range input burners, for example, the user would need to pull the pan off the burner to reduce pan temperatures intermittently until the internal temperature was met in order to avoid the burning results shown below. This would require new cooking behavior and lost utility for consumers.

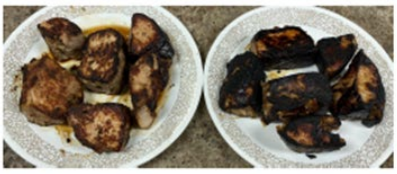
This testing is described in more detail in the second page Exhibit D.

Unit	Product A Family A Burners						Product B Family B Burners					
Meal	Breakfast		Lunch		Dinner		Breakfast		Lunch		Dinner	
Recipe	Sausage Patties	Oats	Chicken Breast	Chicken Noodle Soup	Pork Medallion	White rice	Sausage Patties	Oats	Chicken Breast	Chicken Noodle Soup	Pork Medallion	White rice
BTU/hr	18K	18K	18K	18K	18K	18K	9.5K	11.5K	11.5K	9.5K	11.5K	9.5K
Cooking Time (min)	9	19	27	44	29	33	10	24	30	52	31	37

Chicken breast

Product A Product B

Pork medallion



Product A Product B

Thus, consumers will lose utility associated with quality of cooking and speed of cooking as manufacturers are forced to homogenize their products and provide mid-range burners in an effort to meet the standard.

- **Ranges. <u>No ranges in DOE's or AHAM's sample meet DOE's proposed energy conservation standards for gas cooktops</u>**. Ranges offer the consumer utility of providing a cooktop and an oven in a single product, taking up less space than a separate cooktop and oven. Ranges are also less expensive to install because they do not require customization in the kitchen, which is necessary for a standalone cooktop (and oven(s))—*i.e.,* a cutout in the countertop for the cooktop and an oven cutout in the cabinets. The fact that there is utility associated with ranges is evidenced by the millions of ranges sold each year, regardless of fuel type. This is by far the most popular product category and yet DOE's proposed standard threatens to eliminate them from the market for gas products as no gas ranges meet DOE's proposed standards.

- **Continuous cast iron grates.** DOE acknowledges that "some consumers derive utility from continuous cast-iron grates and at least one [high input rate] burner."[24] Notably, putting together items from the above discussion, according to consumer research members provided to AHAM, consumers rank cast iron grates, high heat, and temperature control as important characteristics of their current cooktops. (We expect individual manufacturers to provide the supporting data for this point directly to DOE).

  In order to achieve the "burner and grate optimization" DOE's proposed standards require, manufacturers are likely to turn to thinner, wire grates meaning that consumers will lose the option to purchase products with sturdier grates that allow pots and pans to be safely moved from one place to another without lifting the pot/pan. (This utility is further evidenced on induction cooktops, some of which feature the option to slide pans from one zone to the next and their user interface follows and keeps the temperature during the move. This is done because manufacturers know that consumers move pans around the cooktop during the cooking process).

  Consumer research provided to AHAM by members indicates that large, heavy, or specialty pots must be able to be slide from burner to burner without getting caught or causing a spill that must be cleaned up or cause a burn. This is a purchase driver for consumers and it can translate to consumer satisfaction. People commonly move pans while cooking, particularly on gas cooktops. This data supporting these points is proprietary to members and, thus, we expect individual members will provide DOE with the data to support these points.

- **Other Features—Confidential.** AHAM surveyed its members regarding features that would be lost should DOE's proposed standards for gas and electric cooktops be finalized. The aggregated list of those features is provided in Exhibit E and this list is provided as confidential business information. It is highly sensitive and was not even provided in aggregate form to AHAM's members.

IV. DOE Should Define Separate Product Classes For Gas And Electric Ranges And High Output Gas Cooktops.

EPCA permits DOE to establish product classes based on the type of energy used or "capacity or other performance related feature" that may justify a higher or lower standard. 42 U.S.C. 6295(q). In making the determination concerning whether a performance-related feature justifies the establishment of a higher or lower standard, DOE considers factors such as the utility to the consumer of the feature and other factors DOE deems appropriate. *Id.*

To date, with regard to cooktops, DOE has established separate product classes only for electric open (coil) element cooktops, electric smooth element cooktops, and gas cooktops. DOE has declined to establish a separate product class for products that combine a conventional cooktop and/or conventional oven. DOE has also declined to establish a separate product class for commercial/professional style gas cooktops reasoning that its testing demonstrated that energy

[24] *Id.*

consumption for gas cooktops is more closely related to burner and grate design than input rate. DOE indicated that the difference in energy consumption between residential-style and commercial-style gas cooktops could not be correlated to any specific utility provided to consumers. DOE did, however, state that, given the utility commercial-style products provide to consumers, it evaluated efficiency levels for gas cooktops that maintain the features available in cooktops marketed as commercial-style, which it indicated were continuous cast-iron grates and at least one high input rate burner of 14,000 Btu/h or more.

AHAM proposes that DOE adopt separate product classes for gas ranges, electric smooth ranges, and high output gas cooktops.[25] These proposals and the support for them are described in detail below.

A. Ranges

DOE's data and AHAM's data demonstrate a need for DOE to adopt separate product classes for gas cooktops and electric cooktops that are part of a range:

- Separate product classes are consistent with EPCA's requirement that product classes be based on a performance-related feature, considering such factors as consumer utility. Ranges allow consumers to have a single product that combines a cooktop and an oven in their home rather than having two separate appliances. This can be especially important for those consumers that need to save space. Given the typically lower cost of ranges and the lower cost to install (because custom countertop and cabinet cutouts are not required, as discussed above), many low-income consumers likely turn to these products.

- The combination of a cooktop and an oven into a single product justifies a less stringent standard for ranges because there are necessary design differences for ranges that impact efficiency. This is borne out in the data, which show that ranges either cannot meet or have a more difficult time meeting DOE's proposed standards for cooktops.

  No gas ranges in DOE's test sample or in AHAM's test sample meet DOE's proposed gas cooktop standards. Fewer ranges meet DOE's proposed electric smooth cooktop standards than cooktops as shown in the below table.

Products Meeting DOE's Proposed Standards (%)		
	Electric Smooth Cooktops	**Electric Smooth Ranges**
DOE Test Sample	12 of 13 models or 92%	4 of 7 models or 57%
AHAM Test Sample		

[25] We urge DOE not adopt standards for electric open (coil) cooktops because doing so is counter to EPCA's requirements. But should DOE do so despite our objection and EPCA's requirements, it should also consider a separate product class for electric open (coil) ranges based on the same reasoning presented in this section describing the design differences between ranges and standalone cooktops that necessitate a less stringent standard.

	43 of 43 models or 100%	19 of 24 models or 79%

Contributing to this difference are:

1. **Standby energy**. DOE's test procedure assumes a split of standby energy that assigns 60 percent of measured standby to the cooktop and 40 percent of the standby to the oven. This additional energy being (somewhat arbitrarily) apportioned to the cooktop penalizes ranges because some cooktops do not have standby energy (e.g., infinite switch control electric open (coil) products and gas products) and the standby energy consumption measured may be mostly related to the oven function.

2. **Design differences**. Ranges are typically less efficient because of how they must be designed. For example, a range is a larger heat sink than a cooktop. Heat is passed and absorbed by the oven, back guard, and other parts of the range, which do not exist in a cooktop.

   The size of the unit plays an important role in the design of the cooktop due to its impact on the availability of secondary air. There are various sizes in both the cooktops and ranges. We believe that only gas cooktop to meet DOE's proposed standard (unit 2, based on a single test and without accounting for test variation) is 36 inches wide, making it easier to pass this test. DOE must consider all widths in order to ensure it does not eliminate consumer utility.

   DOE should understand the battery of tests ranges must pass before energy efficiency considerations can be made. For example, the below safety requirements—which must not be ignored or compromised—impact the ability of ranges to achieve higher levels of efficiency.

   A. *Combustion.* In order to meet CO standards, grate heights need to be higher, which is in direct conflict with efficiency—this design element, which is necessary for safety will make a burner less efficient. (This is also true for cooktops).

   B. *Component temperatures.* For gas and electric ranges, all thermal and emissions tests are run with both the cooktop and oven on. This results in additional heat that must be managed and combustion emissions that must be designed for. In ranges, there must be design features to cool the components and keep them at temperatures below allowable limits. This also makes burners less efficient. For example, these requirements drive design elements such as the addition of cooling fans, holes in strategic places to bring cool air and cool components and other areas, but also creating additional heat sinks for the burners and making them less efficient by necessity.

   C. *Surface temperatures.* The location and proximity to elements/burners to touchpad and knobs are different between ranges and cooktops for both electric and gas ranges. Ranges must be designed to ensure a range's touchable surfaces

remain cool to the user's touch and do not burn them, and this is another source of burner heat sinks.

D. *Enclosure temperatures.* Units are tested (for electric and gas) per their installation instructions. Ranges tend to have much closer wall spacing than cooktops. This impacts grate design, input rates, and burner spacing. Test requirements to avoid fire hazards also add additional burner heat sinks because of design features to ensure the range's surrounding installation walls are cool enough to prevent combustible materials from catching fire or to maintain wall temperatures below the material's ignition temperatures. This can result in built-in and slide-in ranges being less efficient than stand-alone ranges.

E. *Venting.* Because the oven is on during the testing of freestanding ranges, the oven vent location for gas ranges, and its impact of secondary air for the cooktop burners must be considered.

It is important that DOE not eliminate ranges from the market because, as shown in the below table, they represent over 90 percent of cooktop shipments for both electric and gas products. **No ranges tested to date meet DOE's proposed standard, meaning that 91 percent of gas products sold in the U.S. in 2022 would not meet DOE's proposed standard.**

AHAM 2022 Cooking Product Shipments		
Cooking Type	**Cooking Tops**	**Ranges**
Electric	353,254	4,990,016
Gas	470,586	3,082,547
Total	823,840	8,072,563
% of Total Cooking	**9%**	**91%**

For all of these reasons, AHAM strongly urges DOE to adopt separate product classes for gas cooktops that are part of a range and electric cooktops that are part of a range. These products have performance-related features that justify a less stringent standard than cooktops.

B. High Output Gas Cooktops And Ranges.

DOE has acknowledged that there is consumer utility associated with gas cooktops that have continuous cast-iron grates and at least one high input rate burner of at least 14,000 Btu/h. There is also utility for consumers in having several high input rate burners as described in the consumer survey data above. Given the analysis above which also demonstrates that high input rate burners offer consumer utility and that DOE's proposed standards cannot be met with products that offer several high input rate burners, a separate product class is justified in order to maintain the utility of products with one or more high input rate burners and continuous cast iron grates—there is consumer utility that justifies a less stringent standard. Thus, AHAM proposes that DOE define a product class for gas cooktops that meet the following criteria[26]:

- Continuous cast iron grates; and
- ≥ 4 burners; and
- at least one burner ≥ 14k Btu/h; and
- meets at least one of the following conditions:
    a. Total burner output ≥ 56,000 Btu **and** average burner input rate of ≥ 14k Btu; OR
    b. at least one multi-ring burner (i.e., more than one flame ring) (reference, section 3.4.1.7 of EN-30-1-1:2021).

In order to implement these criteria, a definition for continuous cast iron grates would be necessary. Such a definition should satisfy several key principles:

- the grates should be made from cast-iron; and
- there should be a planar area accomplished through a single or several grate pieces; and
- the grates should bridge the gap between burners—i.e., the grates cover the space between burners.

These definitions are intended to focus on the consumer utility associated with continuous cast iron grates and higher input burners without focusing on how a product is marketed. DOE's analysis thus far has focused on per-burner data, but this definition is designed to focus on the combination of features that higher output products offer to consumers as a package that impact efficiency.

V. DOE Should Not Include Portable Products In The Standard's Scope.

DOE proposes that standards for conventional cooktops would apply to portable models according to their means of heating (gas, electric coil element, or electric smooth element). DOE proposes to define a portable conventional cooktop as a conventional cooktop designed to be moved from place to place. DOE seeks comment on its proposed definition and its proposal to include portable products within the existing product classes and not differentiate cooktops on the basis of portability when considering product classes.

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[26] For lack of a better name, AHAM refers to this class in these comments as "high output," but we do not necessarily propose that as the title for the product class. A number could just as easily be used, as in refrigeration, with a definition as we propose above.

AHAM strongly opposes inclusion of portable cooktops in the scope of energy conservation standards for cooktops. DOE has done no analysis on this product type—in fact, there is so little discussion of them in the proposed rule that it would have been easy to miss DOE's proposal. DOE presents **no data** on consumer usage of portable products—DOE has not evaluated that the use case for portable products is likely different than for major appliances in terms of the frequency and duration of use. DOE presents **no data** on efficiency of portable products. DOE presents **no test data** for portable products and, therefore, **no data** on their relative efficiency. DOE presents **no data** evaluating the similarities and/or differences between portable products and major appliances to show that it has evaluated whether it is justified to apply the same standard to both types of products or to allow commenters to make such an evaluation. Continuing on the theme, DOE presents **no data or information** on the types of products that it believes would fall under the scope of its definition. DOE's proposed definition is so vague that AHAM believes it could include a wide array of products such as cooktops in recreational vehicles and tea kettles.

DOE does not address how the test procedure would apply to portable products. Importantly, the existing test procedure does not account for portable cooktops. As one example, the pressure of butane and propane canisters are different and DOE has not evaluated the impact associated with that difference.

If DOE includes portable cooking products over our strong objection, they should be in a separate product class given that their portability provides a distinct consumer utility that likely justifies a different standard. We note that electric portable cooktops are generally 120 volt products. A clear definition for portable products would be needed. And DOE would need to conduct analysis to support a proposal that fills in the numerous data gaps identified above. Because this analysis would be new, DOE would need to ensure it provides the public with notice and an opportunity to comment on its analysis and proposal.

VI. The Proposed Standards Correctly Exclude Energy Consumption Of Downdraft Venting Systems.

DOE sought comment on its proposal not to include the energy consumption of any downdraft venting system in the energy conservation standards for conventional cooktops. DOE also indicated that it could, as an alternative, consider specifying an adder to the maximum allowable IAEC value in the standard for cooktops with a downdraft venting system to account for the energy consumption of the fan and any motor operation during active mode and any standby mode or off mode power consumption specifically associated with the downdraft venting system.

DOE should finalize its proposal to exclude the energy consumption of any downdraft venting system in the energy conservation standards for conventional cooktops. DOE should not adopt the alternative method of specifying an adder to the maximum allowable IAEC value in the energy conservation standards for cooktops with a downdraft venting system. As DOE states, this is a developing technology without significant data on consumer use. And indoor air quality issues are critical and rapidly evolving due to market demands. DOE including an adder could impede innovation in this area.

VII. DOE's Standby Power Analysis Needs Revision And Disadvantages Some Products.

DOE's calculation of the EL 2 standard level for gas has an error. To calculate highest measured efficiency, DOE adds the lowest measured active energy consumption (1,175 kBtu) plus highest standby energy consumption of all units (30 kWh). DOE seems to be adding different units (kBtu + kWh). A correct calculation would be 1,175kBtu + 102kBtu = 1,277kBtu. DOE's baseline calculation contains the same error. Additionally, AHAM points out below that it does not make sense for DOE to add together active mode energy from one unit and standby energy from another unit. DOE should modify the highest measured efficiency accordingly.

Also, DOE may be "double-dipping" on standby energy consumption of ranges, as discussed above in the product class discussion. Energy apportioned to the cooktop may actually be standby-energy used by the oven portion of the range. This may be unfairly disadvantaging ranges, which represent most cooktop shipments.

VIII. The Baseline Approach Is Flawed.

DOE sought comment on its methodology and results for the proposed baseline efficiency levels for conventional cooktops.

DOE's method for determining the baseline is flawed because it adds active and standby from different units, which is not a representative approach. Product design is holistic and it does not make sense to assume theoretical energy use based on tests from different units as DOE has done. Typically, a baseline model is one that just meets current energy conservation standards, or, if no standards are in place such as is the case here, the baseline is typically the most common or least efficient unit on the market. *See* 2023 SNOPR at 6844. DOE should follow its usual, more representative, methodology of selecting the least efficient single unit. We note that this method will always be, necessarily, flawed because it will be based on a test sample. But DOE can minimize that inherent flaw by ensuring that its test sample is as broad and representative of the market as possible. To that end, DOE should include AHAM's data. And DOE should rectify lack of representativeness of its current sample, even with AHAM's test data included, before proceeding to a final rule.

AHAM analyzed both DOE's and AHAM's data and the below table presents AHAM's proposed baseline levels based on available data and including each product class AHAM proposes. These proposed baseline levels are based on the least efficient unit from both data sets for each proposed and already-existing product class. Note that as AHAM and DOE update their respective test samples, these could change.

AHAM's Proposed Baseline: The Least Efficient Unit In The Combined Test Sample

Product Class	AHAM Proposed Baseline
Coil standalone cooking top	211 kWh/year
Smooth-electric cooktop	223 kWh/year
Smooth-electric range	236 kWh/year
Gas cooktop	1,694 kBtu/year
Gas cooktop – high output *	1,756 kBtu/year
Gas range	1,706 kBtu/year
Gas range – high output*	1,762 kBtu/year

*AHAM defines high output as a gas cooking unit that has:
(1) Continuous cast-iron grates
(2) 4 or more burners
(3) At least one high input rate (HIR) burner greater than or equal to 14,000 Btu, and
(4) Either
(a) The unit total burner input rate greater than 56,000 Btu and average burner input burner greater than or equal to 14,000 Btu, OR
(b) At least one multi-ring burner (more than one flame ring (section 3.4.1.7 of EN-30-1-1:2021). Note, AHAM is uncertain if DOE's or AHAM's test sample included units with this type of burner and thus, it is possible that additional units could fall under this definition. AHAM may update our position at a later date to reflect this additional data point. Note that the baseline for gas cooktops – high output assumes that one of the test units in DOE's sample includes a multi-ring burner.

IX. DOE's Analysis Of Certain Technology Options Is Inaccurate And Needs Revision.

A. Coil Cooktops

DOE determined that there are no available technology options for improving efficiency of electric open (coil) element cooktops. AHAM agrees with that conclusion and with DOE not including improved contact conductance as a technology option based on data and information AHAM provided on this docket related to pan warpage.[27] We note that the unavailability of a viable technology option to improve efficiency is enough on its own to support a DOE determination that a standard for this product class is not technologically feasible.

B. Smooth Electric Cooktops

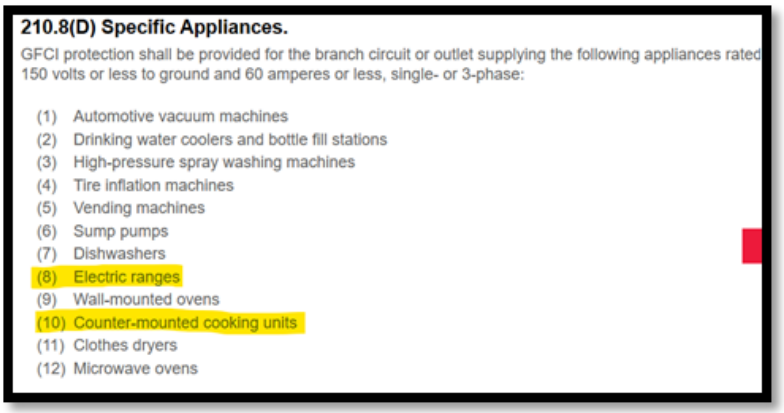
For electric smooth element cooktops, DOE considered the following technology options for improving efficiency: halogen elements, induction elements, low-standby loss electronic controls, and reduced air-gaps.

In the screening analysis, DOE screened out halogen elements based on its determination that it would not be practicable to manufacture, install, and service halogen heating elements on the scale necessary to serve the relevant market. AHAM agrees with that determination. DOE also screened out a subset of low-standby-loss electronic controls that use "automatic power-down" because they may result in the loss in the utility of the continuous clock display for combined cooking products, such as ranges. AHAM also agrees with that determination.

[27] AHAM Comments on DOE's SNOPR for Energy Conservation Standards for Residential Conventional Cooking Products; Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD15 (Nov. 2, 2016).

DOE continued to include low-standby loss electronic controls such as switch-mode-power supplies (SMPS). AHAM disagrees with that determination and urges DOE to screen out low-standby-loss electronic controls as a technology option.

Such controls, ". . . switch the current at high frequencies . . ." according to DOE. Ranges and cooktops must be connected to a Ground-Fault Circuit-Interrupter (GFCI) according to 2023 National Electric Code section 210.8(D).



210.8(D) Specific Appliances.

GFCI protection shall be provided for the branch circuit or outlet supplying the following appliances rated 150 volts or less to ground and 60 amperes or less, single- or 3-phase:

(1) Automotive vacuum machines
(2) Drinking water coolers and bottle fill stations
(3) High-pressure spray washing machines
(4) Tire inflation machines
(5) Vending machines
(6) Sump pumps
(7) Dishwashers
(8) Electric ranges
(9) Wall-mounted ovens
(10) Counter-mounted cooking units
(11) Clothes dryers
(12) Microwave ovens

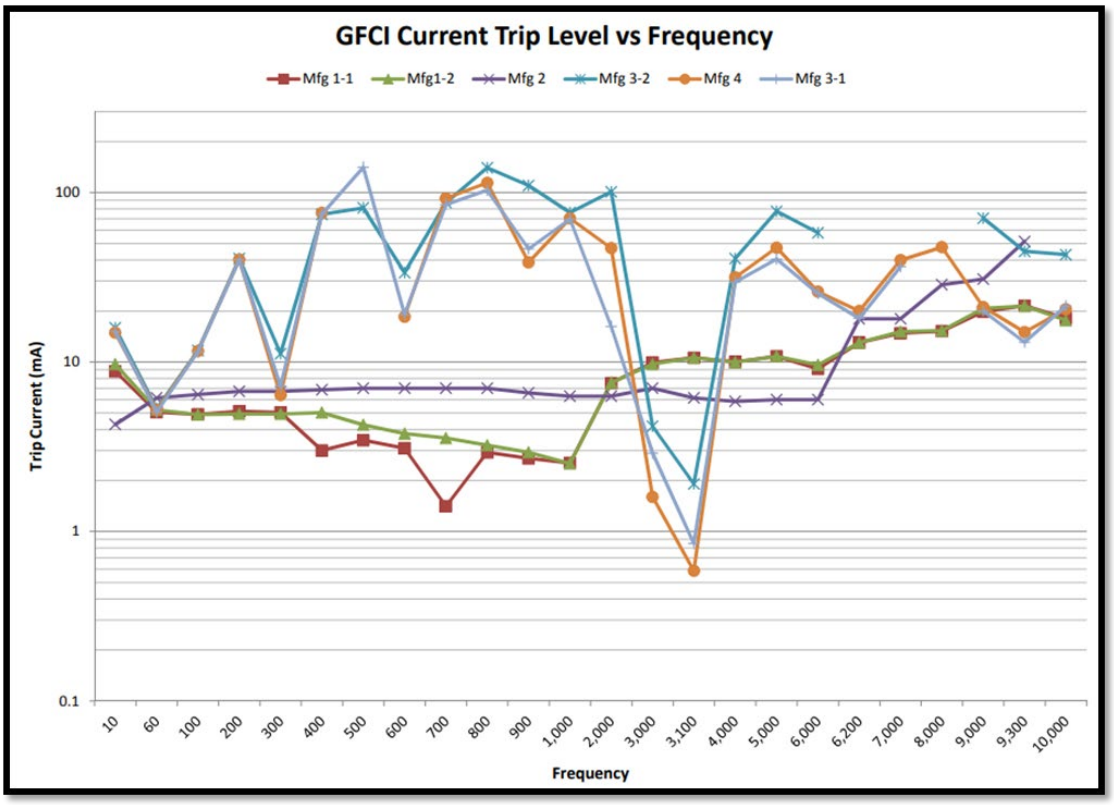
In some instances, cooking appliances must be connected to a GFCI based on their installation location, as seen in the 2020 National Electrical Codes section 210.8(A).

Components operating at high frequencies contribute to nuisance tripping, where power is removed from the appliance, even when no electrical hazard exists. UL has conducted an independent study that verifies this. At the time of writing these comments, this study has not yet been published. UL is inviting interested parties to contact the relevant engineer, Darrin Conlon, for more information: Darrin.Conlon@ul.com. **AHAM requests that DOE reach out to UL to obtain the specifics of this study.**

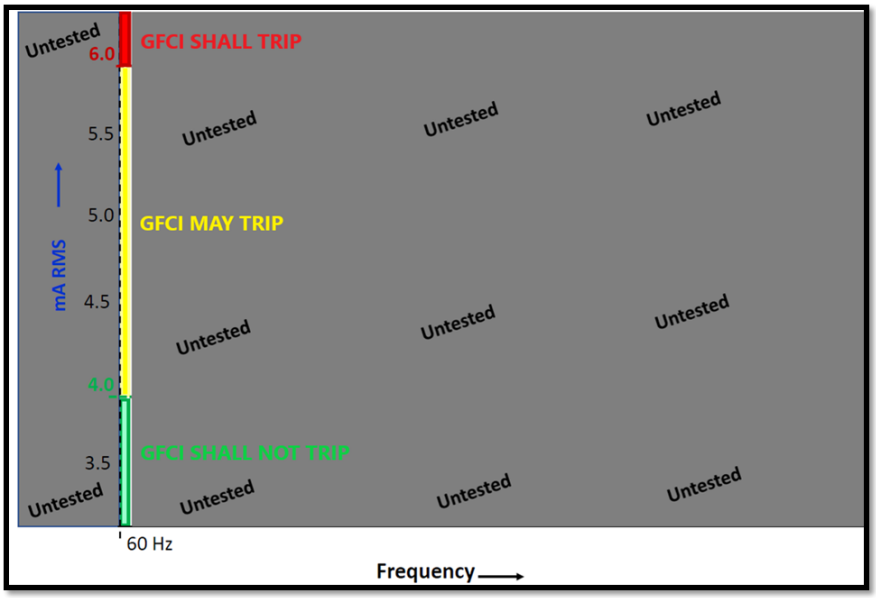
Importantly, the Consumer Product Safety Commission (CPSC) staff has connected nuisance tripping to DOE energy conservation standards: "Expanding Department of Energy requirements for higher energy efficiency of products have resulted in broader use of energy-saving technologies."[28] CPSC goes on to provide an example of variable-speed drives as high frequency technology that can cause nuisance tripping.

There are some things that appliance manufacturers can do to help in avoiding nuisance tripping, such as adding filters, however this increases energy consumption and does not solve the root cause: highly variable GFCI trip thresholds at high frequencies:

[28] Letter from Douglas Lee, Electrical Program Area Risk Manager, Office of Hazard Identification and Reduction, CPSC to Marina Currie, Project Manager for STP 101, UL Standards & Engagement (Feb. 7, 2023), attached as Exhibit F.



This variation exists today because the UL standard for GFCIs allows this (see the significant amount of gray area in the diagram below):



If DOE disagrees with AHAM's suggestion to screen out low-standby-loss electronic controls, we ask that DOE answer the following questions in comment responses:

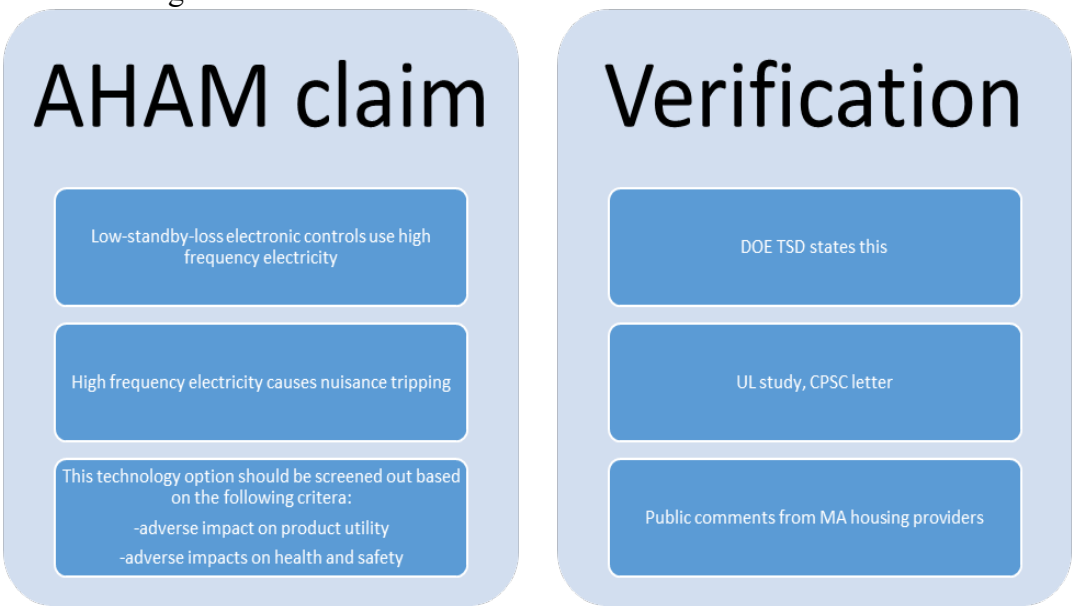
1. Does DOE agree that high-frequency components contribute to the appliance losing power due to GFCI nuisance tripping?
    a. If no, why?
    b. If yes, what does DOE plan to do to prevent nuisance tripping?
2. How did DOE consider GFCI nuisance tripping in setting standards for smooth electric?
    a. How was GFCI nuisance tripping considered in manufacturer cost?
    b. How was GFCI nuisance tripping considered in consumer cost?
    c. How was GFCI nuisance tripping considered in DOE's technology option screening analysis?

Home appliance manufacturers are not experts in testing or manufacturing GFCIs, nor do we have time to collect additional GFCI data by the comment deadline. We ask that DOE use its expertise and resources to properly investigate this technological incompatibility. Simply pointing the finger at CPSC or UL, or any other standards organization or regulatory body, is unacceptable. Home appliance manufacturers want to make their products more efficient, however there is a real world barrier to doing so and DOE cannot just ignore it.

As connection of cooking equipment to GFCIs has become more common, nuisance tripping has become more common. An example is laid out in the document attached at Exhibit G where more than 1700 cases of GFCI nuisance tripping have been reported in Massachusetts. It should be noted that many of these nuisance tripping cases involved ranges which contained high frequency components other than variable-speed drives. If DOE further investigates cases like these, DOE must also consider the variety of reasons that nuisance tripping can occur. Nuisance tripping can be due to multiple, simultaneous causes, where any of the causes would result in nuisance tripping on their own. If DOE investigates a nuisance tripping case and finds another cause besides high frequency components, this does not mean that high frequency emissions from low-standby-loss electronic controls is not an issue.

If DOE continues to consider low low-standby-loss electronic controls as a feasible technology option, the existing nuisance tripping problems will get worse. High frequency emissions from components are cumulative. The more components operating on high frequencies contained in an appliance, the more likely nuisance tripping is to occur.

The following substantiation chart summarizes this section:



GFCIs have been in the home a long time, but their use is being quickly expanded to cover cooktops.[29] Over the next ten years, more and more cooking equipment will be connected to GFCIs as new electrical codes are adopted by states.

AHAM raised this point in comments related to energy conservation standards for room air conditioners,[30] and received no direct response from DOE in the final rule.[31] DOE cannot simply ignore AHAM's comments. We request that DOE address this point in the next step of this rulemaking.

C. Gas Cooktops

In the 2016 SNOPR and the 2020 Notice of Proposed Determination (NOPD), DOE screened out radiant gas burners, catalytic burners, reduced excess air at the burner, and reflective surfaces as technology options for improving efficiency of gas cooktops. In 2016, DOE proposed efficiency levels associated with the remaining technology option, optimized burner and grate design. But in 2020, DOE screened out that option. Now, in 2023, DOE again proposes to maintain "optimized burner and grate design" as a technology option. DOE noted however that it is screening out any optimized burner and grate designs that would reduce consumer utility by only including in its analysis gas cooktops that include at least one high input burner and continuous

[29] *See, e.g.,* 2023 National Electrical Code; Minnesota Board of Electricity, Meeting Minutes (2023-01-31), page 14.

[30] *See* AHAM Comments on DOE's Notice of Proposed Rulemaking on Energy Conservation Standards for Room Air Conditioners; Docket No. EERE-2014-BT-STD-0059; RIN 1904-AD97 (Apr. 7, 2022).

[31] Energy Conservation Standards for Room Air Conditioners; Pre-Publication Final Rule; Docket No. EERE-2014-BT-STD-0059; RIN 1904-AD97 (Room Air Conditioners Pre-Publication Final Rule).

cast iron grates. (Yet, as discussed above, DOE then adds in test units that do not include those features as part of its data set in the NODA).

Burner and grate design is a complex process—each part of the design is intricately linked to the other parts of the design. And the overall design is driven by what a brand's consumers desire. The final design is a nexus of compliance with safety standards, performance, energy efficiency, and appearance. And sometimes these factors are at odds with each other. For example, consumers that desire fast performance times need to have products that deliver that fast speed, but the product must still meet surface temperatures and combustion requirements.

As cooking can be culturally dependent, design preferences for a cooking product are regional and not global in nature. To highlight this, AHAM members have indicated that European consumers and US/Canadian consumers seek different things. Products that do well in one region do not do well in another.

AHAM members work to design appliances that are as safe as they are useful. Safety is not a design element that can be compromised in the pursuit of energy efficiency and, indeed, EPCA requires DOE to screen out technology options that would negatively impact product safety. Safety standards are always evolving, and DOE did not take this future evolution into account, despite all of the ongoing work on indoor air quality (IAQ) by other Federal agencies including the Consumer Product Safety Commission (CPSC).

Specifically, CPSC is currently investigating whether there are indoor air quality risks associated with gas cooking. There is a very active CPSC effort including a request for information on IAQ and gas cooking products underway (and, in fact, open for comment simultaneously with DOE's proposed rule).[32] DOE should wait until CPSC has more fully investigated IAQ risks before establishing any new DOE gas cooking energy standards. It is possible that revised or additional consensus or mandatory standards could result and that those requirements will be at odds with DOE's proposed rule. In other words, manufacturers may not have a workable design for gas cooktops if the agencies and standards development organizations proceed independently—to improve efficiency for gas products based on DOE's proposed design pathway, emissions would need to increase. But safety standards could limit the ability to "optimize" burners and grates in the way DOE anticipates as its basis for this proposed rule.

Related, currently there is work underway to develop an NO_2 standard (under CPSC Working Group 3). This standard would likely require product redesign and the timeline is likely to be quite close to DOE's compliance date. Most importantly, the NO_2 standard could impact manufacturers' ability to "optimize" burners and grates. To effectively address NO_2 emissions, more energy may be required. If DOE does not review the impact of necessary safety changes for NO_2, it is not evaluating the technologies likely to be in the market during the compliance period for this standard.

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[32] Request for Information on Chronic Hazards Associated With Gas Ranges and Proposed Solutions; Docket No. CPSC-2023-0009; 88 Fed. Reg. 14150 (March 7, 2023) (requesting detailed technical information and studies related to gas cooking and indoor air quality by May 8, 2023).

Federal agencies—in this case, DOE and CPSC—should coordinate to avoid unnecessarily imposing cumulative regulatory burden on manufacturers such as two redesigns in close time to each other. And DOE should also ensure that its timeline does not result in multiple redesigns in close time—*e.g.,* DOE should carefully time its standard with that of potential new consensus standards such that a cooktop need not be redesigned for energy and then nearly immediately be redesigned to meet safety standards requirements. Accordingly, DOE should wait to conduct the next phase of this rulemaking until it knows what the imminent NO_2 standard will require so that it can consider whether the design options it relies upon continue to be feasible under the new safety standard.

We note that DOE should not rely on European designs as it evaluates whether "burner and grate optimization" is possible while also complying with safety standards such as combustion limits. The European safety standard, EN 30-1-1, generally has higher CO limits than allowed in North America per ANSI Z21.1. As DOE recognizes, ANSI Z21.1 results in limits on grate weight, flame angle, and distance from the burner to the cookware. As DOE states in the TSD, "Reducing the spacing between the gas flame and the cooking vessel can increase efficiency, but flame quenching due to flame impingement and contact with the grate/cooking vessel can lead to increased carbon monoxide emissions and combustion by-products."

In selecting its efficiency levels, DOE determined that there is not likely to be a cost difference between EL 1 and EL2. But, in order to retain product performance—e.g., the ability to cook at lower temperatures—a stacked burner would be an option. As mentioned above, DOE has not considered the cost associated with that design option. If DOE continues to consider EL 2, it must take into account the cost associated with stacked burners at EL 2. To obtain that information, DOE should seek related data from manufacturers and suppliers.

Importantly, DOE seeks comment on any impacts of its proposals in this SNOPR on indoor air pollutants released by gas cooking products, as well as any other design approaches, control strategies, or other measures to mitigate these emissions.

We note that DOE's question is biased and overly-narrow: it focuses only on the potential indoor air pollutants released by gas products. But pollutants are released by indoor cooking no matter the fuel. The biggest concern in indoor air quality is related to $PM_{2.5}$.[33] PM $_{2.5}$ is from cooking and is at the same or similar levels where the cooking product is gas or electric.[34] ASHRAE

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[33] *See, e.g.,* Logue JM, Price PN, Sherman MH, Singer BC, A Method to Eliminate the Chronic Health Imact of Air Pollutants in U.S. Residences, *Environ. Health Perspect.* 2012; California Air Resources Board, Indoor Air Pollution from Cooking, *at* https://ww2.arb.ca.gov/resources/documents/indoor-air-pollution-cooking (discussing the importance of proper ventilation and providing numerous resources);Zhang, *et al*., Measurement of Ultrafine Particles and Other Air Pollutants Emitted by Cooking Activities, *Int. J. Environ. Res. Public Health*, *at* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2872333/.

[34] Johnson F, PhD, Residential Cooking IAQ Special Report: Cooking Emissions for Natural Gas, Propane and Electric Range Tops, *at* https://www.gti.energy/wp-content/uploads/2022/09/Residential-Cooking-Indoor-Air-Quality-Cooking-Emissions-for-NaturalGas-Propane-Electric-Range-Tops-whitepaper.pdf.

62.2, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, has for decades been working to establish the proper requirements for dealing with contaminants of concern and requires a minimum air flow and requires external venting (or equivalent continuous venting) ***regardless of the fuel***. The most appropriate design approach and control strategy to mitigate emissions from the cooking process is to use the range hood as noted by the standard that is most responsible for Indoor Air Quality.

D. Ovens

DOE is continuing to screen out added insulation, bi-radiant oven, halogen lamp oven, no oven door window, reflective surfaces, and optimized burner and cavity design, though it retains SMPSs, forced convection, improved door seals, oven separators (electric only), and reduced vent rates (electric standard only). DOE sought comment on its screening analysis.

AHAM reiterates the comments we made in response to the 2016 SNOPR and incorporates those by reference here. In summary:

- Forced convection should be screened out. Depending on the total energy consumption of the unit, the motor wattage could negate any potential energy savings. Convection is also not appropriate for cooking all food types and so this technology option should be screened out. For example, any covered food loads will not benefit. Furthermore, DOE repealed the oven test procedure, and therefore there is no way to determine whether there are efficiency gains from this technology option.
- Improved door seals should be screened out. Further improving door seals could lead to a loss of performance due to a loss of sufficient airflow. Door seals today are already optimized to provide a consumer utility and retain heat while offering enough airflow for cooking performance. If the door is sealed further, increased airflow would be required by some means of implementing an additional motor which most likely will consume more energy. The one percent energy gain DOE estimated in 2016 (based on the test procedure DOE has since repealed) would be undercut.
- Oven separators should be screened out. This is not a widely available feature. DOE notes in the SNOPR TSD that, "…any standards requiring oven separators for the electric oven product classes would be very difficult to meet since that would require completely redesigning the oven cavity of almost every electric oven model currently on the market." Also, this design option essentially relies on consumer use of the feature and without knowing whether consumers do or will use the oven separator, it is impossible to know whether the energy savings DOE attributes to this design option would be realized in the field.
- Reduced vent rates should be screened out. DOE is relying on testing performed a long time ago on product designs that are incredibly old. Energy gains are negligible and are based on a test procedure DOE has repealed. Future gains might not be captured if a future test procedure is different than the prior procedure. Oven vents are a complex equation—vent rate is also connected to air flow that impacts preheat times, cooking performance, and fire and explosion performance from the safety standard. Skewing this to reduce energy by a negligible amount will drive significant effort and could lead to the elimination of self-clean ovens or cause poor cooking performance because it will result in low air flow and the development of hot spots.

- AHAM agrees with DOE's screening out of the other technology options.

X. AHAM Supports The Proposed Design Standards For Ovens.

For conventional ovens, DOE proposed to require that electric ovens not be equipped with a control system that uses a linear power supply and that gas ovens not be equipped with a constant burning pilot light and not be equipped with a linear power supply. AHAM supports DOE's proposed design standards for ovens.

It should be noted that additional high frequency power use, beyond switched-mode power supplies in an oven, such as low-standby loss electronic controls will exacerbate GFCI nuisance tripping issues.

XI. AHAM Urges DOE To Evaluate Additional Efficiency Levels For Cooktops.

After DOE fixes its data set such that it is representative, includes the product classes AHAM proposes, and improves its recognition of consumer utility associated with a variety of features AHAM discusses above, DOE should evaluate gap fill levels and select as a final standard gap fill levels significantly less stringent than DOE's proposed levels. In establishing and evaluating these gap fill levels and, ideally, ultimately selecting these as the final standard, DOE should have as key principles achieving parity between product types and maintaining features and functionality. Specifically, 80 percent of the market (based on a *representative* test sample) should meet the standards for each product type. And the final standards should account for test variation based on DOE's test procedure analysis—5.6 percent for electric and 8.4 percent for gas according to DOE's own analysis. AHAM proposes that DOE consider 5 percent across all product categories. Accounting for this variation recognizes that products will not be certified at their tested values and approximates possible certified values that are conservative ratings.

For gas, AHAM also propose that DOE exclude 5,600 Btu/h and below low-input rate burners from the IAEC calculation for gas products.

Taking all of these principles into account, AHAM proposes that DOE evaluate the following gap fill levels and select one as the final standard that is less stringent than the proposed levels. AHAM may follow these comments with specific proposed levels. But at this time, we do not have sufficient data to determine the full set of products that would be considered high output cooktops or ranges and we do not have sufficient data for gas products to accurately exclude the 5,600 Btu/h burners from the IAEC calculation. If we are able to obtain that information, we may propose specific gap fill levels to DOE.

Proposed Product Class	AHAM Proposed Gap Fill For DOE Analysis
Electric Open (Coil) Element	No standard
Smooth-electric cooktop	Analyze gap fill between EL 1 and the (revised) baseline Account for test variation /conservative rating (add 5%)
Smooth-electric range	Analyze gap fill between EL 1 and the (revised) baseline. Account for test variation /conservative rating (add 5%)
Gas cooktop	Analyze gap fills between EL 1 and the (revised) baseline and between EL 2 and EL 1 Account for test variation/ conservative rating (add 5%) Exclude 5,600 Btu/h burner and below from the IAEC calculation
Gas cooktop – high output *	Analyze gap fill between EL 1 and the (revised) baseline Account for test variation /conservative rating (add 5%) Exclude 5,600 Btu/h burner and below from the IAEC calculation
Gas range	Analyze gap fill between EL 1 and the (revised) baseline Account for test variation/ conservative rating (add 5%) Exclude 5,600 Btu/h burner and below from the IAEC calculation
Gas range – high output*	Analyze gap fill between EL 1 and the (revised) baseline Account for test variation/ conservative rating (add 5%) Exclude 5,600 Btu/h burner and below from the IAEC calculation

*AHAM defines high output as a gas cooking unit that has:
(1) Continuous cast-iron grates
(2) 4 or more burners
(3) At least one high input rate (HIR) burner greater than or equal to 14,000 Btu, and
(4) Either
(a) The unit total burner input rate greater than 56,000 Btu and average burner input burner greater than or equal to 14,000 Btu, OR
(b) At least one multi-ring burner (more than one flame ring (section 3.4.1.7 of EN-30-1-1:2021). Note, AHAM is uncertain if DOE's or AHAM's test sample included units with this type of burner and thus, it is possible that additional units could fall under this definition. AHAM may update our position at a later date to reflect this additional data point. Note that the baseline for gas cooktops – high output assumes that one of the test units in DOE's sample includes a multi-ring burner.

A. Coil Cooktops

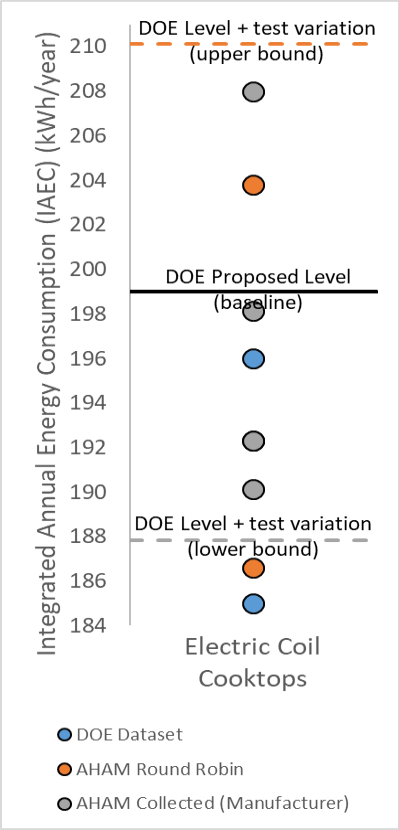
AHAM continues to oppose an energy conservation standard for coil cooktops. DOE determined that there are no available technology options to improve efficiency of open (coil) electric cooktops and, therefore, under EPCA, DOE must make a determination that a standard is not technologically feasible.

DOE proposes to set a standard at the baseline for electric coil cooktops because there are not available technology options. But that is the wrong approach, especially given that DOE is relying on a test sample and not a full set of data on the efficiency of this class of products. It is possible—in fact, likely—that there are other models that are less efficient than the models in DOE's test sample. In fact, AHAM's data show that there are two models below DOE's proposed baseline and standard, as shown in the graph below. Even including AHAM's data, there are far too few models in the combined sample upon which to base an energy conservation standard.

And, as discussed above, DOE's analysis does not account for the impact of test variation on manufacturer certification. The below graph shows the potential impact of lab-to-lab variation—models that, in one test, appear to meet DOE's proposed standard might, in another test, fail to meet it. In fact, from the models in DOE's test sample, a model might be just as likely to meet the standard as it would be to fail it.

Regardless of the test variation, as described in detail above, manufacturers do not rate at tested values. They will need to rate conservatively in order to ensure consistent compliance. This

means that DOE setting the standard as-proposed or even at AHAM's proposed baseline could require product redesign. This is shown in the below graph.



For these reasons—an energy conservation standard based on efficiency performance is not technologically feasible given the lack of design options, the test sample is inadequate, and DOE's analysis does not take into account the impact of test variation and conservative rating—DOE must not establish an energy conservation standard for electric open (coil) cooktops. Doing so would be contrary to EPCA and arbitrary and capricious given the lack of data and supporting evidence. The better approach, and the one supported by EPCA, is for DOE to make a determination that standards are not justified for electric open (coil) cooktops because there are no available technologies to improve efficiency.

B. Smooth Electric Cooktops

AHAM opposes DOE's proposed standards for smooth electric cooktops and would oppose any proposed standard more stringent than DOE's proposed level. But we do not oppose standards for these products so long as the standard takes into account test procedure variation and the reality that manufacturers will not certify products at the tested values upon which DOE bases its analysis. Additionally, cooktops and cooktops that are part of ranges should be in separate product classes as discussed above partly because ranges are impacted by the oven standby whereas other cooktops are not.

AHAM, therefore, proposes that DOE evaluate a gap fill level for electric smooth cooktops and electric smooth cooktops that are part of a range that is between EL 1 and the baseline (as adjusted). DOE should also account for test variation and conservative rating by applying an additional five percent to the standard.

C. Gas Cooktops

AHAM strongly opposes the overly-stringent proposed standards for gas cooktops. As discussed more fully above, DOE's proposed levels:

- Favor electric cooktops over gas cooktops;
- Will likely result in homogenized cooktop designs that eliminate more than a single high input rate burner and the consumer utility associated with multiple high input rate burners (cooking on more than one burner with high heat), eliminate burners above 14,000 Btu/h without adding costs that DOE has not accounted for in its analysis (lengthening boil times), eliminate low-input burners and the consumer utility associated with them (cooking sauces, melting chocolate, holding food warm), and offer burner input rates ranging from 9,5000-10,000 Btu/h in order to meet the stringent standard;
- Rely on a single test of a single unit as justification;
- Do not account for significant test procedure variation DOE itself has acknowledged and, therefore, rely on a test of a single unit that may or may not meet DOE's proposed level depending on the test lab;
- Ignore the reality that manufacturers, even with acceptable test procedure variation (repeatability and reproducibility) conservatively rate in order to ensure compliance with standards and, therefore, would not rate the single passing unit at the tested value. Thus, there may not be any units that could certify compliance with DOE's proposed standard; and
- Ignore the fact that no ranges in the test sample can comply with DOE's proposed standard, despite the fact that ranges are the most common cooktop type—almost ten to one!

Accordingly, DOE should evaluate less stringent standards for gas cooktops that bring parity between product types and maintain consumer features and functionality. Specifically, 80 percent of cooktops based on a *representative* test sample should meet DOE's proposed standards and DOE should account for conservative rating and test procedure variation. DOE should also divide gas cooktops up into four product classes as AHAM proposed above. Finally, DOE should exclude burners with 5,600 Btu/h input rate and below from the IAEC calculation in order to ensure consumer utility, as discussed above, associated with these low-input burners is not lost and in recognition of the fact that the test procedure measures the efficiency of these burners boiling water, which is a function they are not designed to do and, therefore, is not representative of an average consumer use cycle. Moreover, this would be consistent with DOE's exclusion of warming zones which serve a similar function and, in practice, will only apply to electric cooktops. Accordingly, excluding these low-input rate burners would help achieve parity between DOE's treatment of gas and electric cooktops.

AHAM proposes that DOE evaluate gap fill levels for gas cooktops that are part of ranges and for gas cooktops with high output between EL 1 and the baseline. For gas cooktops that are not part of ranges and are not high output, AHAM proposes that DOE evaluate gap fill levels between EL 2 and the baseline and between EL 2 and EL 1. For all of these gap fill levels, DOE should also add five percent to the level to account for test variation and conservative rating.

XII. The Average Use Cycles Should Be Updated.

DOE has computed an average number of cooking cycles per year at 418 based on the 2015 RECS. The 2020 RECS data yields essentially the same value. This points to stability in cooking behavior over the past several years and DOE should continue to use this estimate. While there may have been some change in cooking at home during the COVID pandemic, it is too soon to determine whether there is a long-term trend for more home-cooked meals and DOE should wait to assess this until the next round of standards when more data will be available. Absent long-term data to the contrary, DOE should retain its current estimate of cooking cycles.

XIII. DOE Needs To Meaningfully Consider Cumulative Regulatory Burden.

The nature of EPCA's requirement that energy conservation standards be reviewed every six years is that, when standards are finalized all in close time, they are then reviewed and amended again in close time. This creates a never-ending cycle in which manufacturers are faced with updating or redesigning products to meet amended (and sometimes new) standards all at once. This is the case with home appliances.

For example, in July 2010, AHAM, efficiency advocates, utilities, states, and consumer advocates reached a multi-product agreement on energy conservation standards and test procedures for five products. We then jointly proposed those standards and test procedure revisions to the Department and they were implemented all in close-time. At the time, this multi-product agreement was expected to be beneficial for manufacturers because it would provide certainty across several product lines on energy conservation standards. While it did do that and AHAM members were pleased to provide the agreement to the Department and be part of achieving energy savings across several product categories, it also meant that manufacturers had to spend large amounts of capital—both monetary and human—on regulatory compliance across several product categories. As a result, companies diverted resources away from other efforts, primarily research and development. And the longer-term effect is that this situation is about to repeat itself.

AHAM and its members have long been supporters of the Appliance Standards Program and we support reasonable energy conservation standards. But we are concerned about DOE's recently proposed standards that are unprecedented in their stringency and are expected to have compliance dates in 2027.

DOE's proposed levels for residential clothes dryers, residential clothes washers, conventional cooking products, consumer refrigerator/freezers, and its final rule for room air conditioners will require significant redesign of products. In some cases, entire product lines for certain product classes (e.g., gas cooktops, top-load clothes washers) will require complete redesign. This means

engineers will spend all of their time re-designing (not innovating), test technicians will spend their time conducting testing to support re-design and to certify products, and others will spend significant time on business planning, marketing, labeling, etc. Factories will need to be re-tooled for several product categories. The combination of the stringency of the levels, the short lead-in under EPCA for compliance with these standards, and the fact that compliance with all of them is likely to be required in close time to one-another represents significant cumulative regulatory burden for the home appliance industry. It also means that resources are expected to be pulled from other efforts, such as research and development, and that innovation on anything other than efficiency will be stalled by at least three years.

The potential impact of DOE's proposed rules is significant for consumers and manufacturers. To achieve 13.4 quads of energy savings—a number that, while not insignificant, includes some rules that will have negligible savings—according to DOE, manufacturers will spend an expected $2.604 billion in conversion costs to comply with DOE's proposed and final standards for clothes washers, clothes dryers, cooking products, external power supplies, battery chargers, refrigerator/freezers, room air conditioners, microwave ovens, and miscellaneous refrigeration products. And, in many cases, a quarter of consumers (or more) will experience a net cost, meaning that they will lose money by purchasing a more efficient product.

DOE's analysis does not adequately account for this cumulative regulatory burden. DOE says that it analyzes it, but DOE's analysis appears to be nothing more than a hand wave. It is unclear what DOE does if it finds that there is significant cumulative regulatory burden and DOE has not been able to clarify it despite AHAM asking this question during several public meetings. Moreover, DOE has largely ignored AHAM's comments on this issue to date. While, up until now, manufacturers have had to accept this reality and move on, the stringency of DOE's many proposals make that much more difficult now. Accordingly, DOE needs to acknowledge the cumulative regulatory burden its proposals place on industry **and** it needs to do something about it such as space out its final rules, allow more lead-time by issuing final rules well before publishing them in the Federal Register, and reduce the stringency of standards such that fewer percentages of products would require complete re-design. DOE should be careful not to go so far with its final standards that it jeopardizes the credibility and longevity of the Appliance Standards Program.

With regard to cooking products in particular, we also note, as discussed above, that CPSC is currently seeking input on IAQ and cooking. It is possible that redesign for gas products to meet the proposed efficiency standards will impact the same parts (burners, grates, cooktop sumps) that will require potential redesign to meet any new NO_2 requirements. To minimize cumulative regulatory burden, the two efforts need to line up with a single compliance date. DOE needs to be aware of the standards activities and coordinate with the relevant standards development organizations and with CPSC to make this happen. AHAM requested similar coordination and care when DOE amended energy conservation standards for refrigerator/freezers and the Environmental Protection Agency sought to regulate refrigerants on a similar, but not identical, timeline. The agencies failed to coordinate and the result was two transitions on the same products in short order. That cannot be repeated.

Interestingly, when asked what DOE does with its analysis of cumulative regulatory burden, DOE did not provide any specific action other than to indicate that it is part of its holistic analysis under EPCA. But the Process Rule provides specific actions DOE should take should there be cumulative impacts from other Federal regulatory action. Section 13(g) states that the Department will not just recognize cumulative burden, but will also "seek to mitigate the overlapping effects on manufacturers of new or revised DOE standards and other regulatory actions affecting the same products or equipment. DOE will analyze and consider impact on manufacturers of multiple product/equipment-specific regulatory actions. These factors will be considered in setting rulemaking priorities, conducting the early assessment as to whether DOE should proceed with a standards rulemaking, assessing manufacturer impacts of a particular standard, and establishing compliance dates for a new or revised standard that, consistent with any statutory requirements, are appropriately coordinated with other regulatory actions to mitigate any cumulative burden."

Despite AHAM asking in several DOE standards rulemakings, DOE has yet to attempt to prioritize rulemakings or spread compliance dates in an effort to mitigate the impact of its rules cross-product category. In fact, it appears that DOE has almost been going out of its way to propose rules that impact the home appliance industry in a clump, which is likely to result in compliance dates that will also be clumped together. For example, during the comment period for this SNOPR, there were also rulemakings open for battery chargers, clothes washers, dishwashers, external power supplies, miscellaneous refrigeration products, refrigerator/freezers, and small electric motors, all of which impact AHAM's members.

The Process Rule goes on to indicate that if the "Department determines that a proposed standard would impose a significant impact on product or equipment manufacturers within approximately three years of the compliance date of another DOE standard that imposes significant impacts on the same manufacturers (or divisions thereof, as appropriate), the Department will, in addition to evaluating the impact on manufacturers of the proposed standard, assess the joint impacts of both standards on manufacturers." It is unclear exactly what this analysis would entail, but AHAM has suggested, and continues to suggest, adding the combined costs of complying with multiple regulations into the Product Conversion Costs in the Government Regulatory Impact Analysis (GRIM) model as one potential solution. An appropriate approach is to include the costs of manufacturers needing to comply with multiple regulations across product categories as well as on the same product.[35] The manufacturer impact analysis, as currently structured, does not adequately analyze the effects on an industry of multiple regulations within a short period.

[35] AHAM has also suggested that DOE not discount the time and resources needed to evaluate and respond to all proposed test procedures and energy conservation standards for several products proposed over a short period, as is currently the case. DOE has responded that this is outside the scope of analysis for individual product rulemakings because these activities would exist regardless of the regulatory option DOE adopts through a rulemaking and would be independent from the conversion costs required to adapt product designs and manufacturing facilities to meet an amended standard (Energy Conservation Program: Energy Conservation Standards for Room Air Conditioners, Pre-Publication Final Rule; Docket No. EERE-2014-BT-STD-0059; RIN 1904-AD97). DOE welcomed data and costs associated with monitoring and responding to regulatory proposals. *Id.* AHAM may consider providing more detail on these points in the future.

AHAM urges DOE to abide by the Process Rule's requirements and take action to fully review the cumulative impacts its rules will have on manufacturers (as well as consumers). This review should include examining the potential impact on the economy and inflation as a result of reducing industry net present value so significantly.

XIV. DOE's Lifecycle Cost Analysis Needs Revision.

First, as described in III, above, DOE's analysis of gas cooktops is deficient because it effectively eliminates key consumer features including a range of burner capacities. DOE needs to revise its engineering pathway to compare products using a full range of capacities in a cooktop. In particular, manufacturers report that providing the desired consumer features will require a stacked burner and, therefore, DOE needs to include the incremental cost of such a burner in its Lifecycle Cost (LCC) LCC analysis. Since the mean LCC savings estimated by DOE at EL 2 are $22 and the median savings are $9, virtually any additional costs will make the proposed standards economically unjustified for consumers. The inherent statistical variation from sampling error and from potential data collection errors in the RECS mean that DOE has no confidence that the average household will actually achieve improvements in LCCs.

Second, AHAM, the Air Conditioning, Heating and Refrigeration Institute (AHRI), and others have commented frequently on a number of issues in the DOE Lifecycle Cost (LCC) analysis. These comments have covered:

- The DOE process and data used to assess effects on low-income consumers;
- DOE's use of incremental, rather than average markups through retail channels;
- DOE's reliance on and computation of learning curve effects; and
- Weaknesses in the RECS database as a proxy for estimating energy consumption and the resulting introduction of likely spurious "outlier" data points.

DOE has yet to respond directly to these criticisms and many accompanying suggestions for improvement to DOE's models. Importantly, the National Academies of Sciences, Engineering and Medicine conducted, at DOE's request, a review of DOE's analyses and issued a report. [36] AHAM has continually commented that DOE should review that report and provide notice and an opportunity to comment on whether and how DOE will incorporate the recommendations in that report in its analysis. To date, DOE has failed to do so and has responded only that it will conduct a separate rulemaking to consider the analysis. It has now been several years and no such rulemaking has been initiated. Unfortunately, DOE seems to be ignoring the recommendations in the NAS Peer Review Report and even, in many cases, conducting analysis that is opposite of those recommendations. DOE cannot continue to perpetuate the errors in its analytical approach that have been pointed out by stakeholders and the NAS report.

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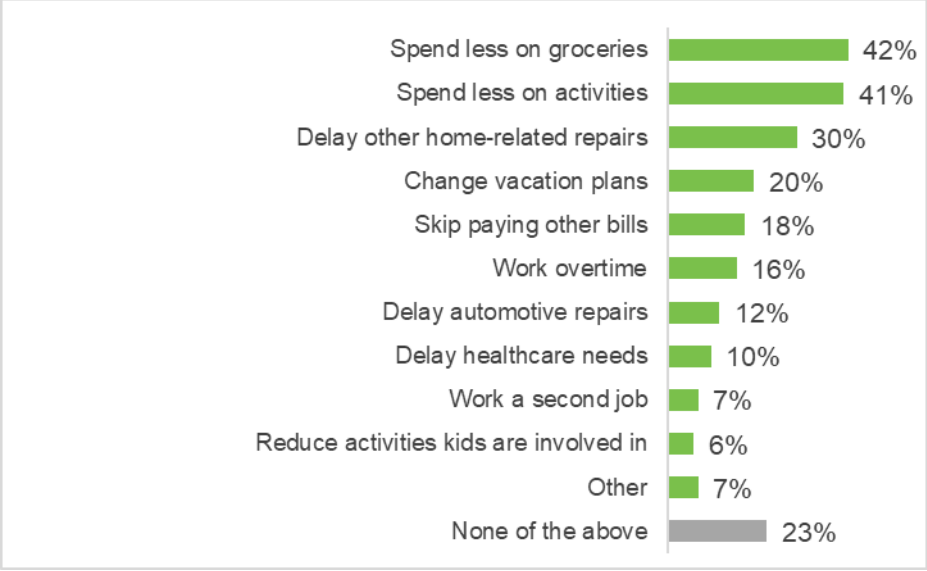
[36] National Academies of Sciences, Engineering, and Medicine 2021. *Review of Methods Used by the U.S. Department of Energy in Setting Appliance and Equipment Standards*. Washington, DC: The National Academies Press. https://doi.org/10.17226/25992 (NAS Peer Review Report).

A. Low-Income Consumers

DOE addresses the issue of low-income consumers in two ways. First DOE contends that there is a significant split-incentive problem for low-income renters where the landlord purchases a product while the low-income household pays the utility bills. DOE, therefore, contends that low-income consumers will benefit from tighter standards because those households will have lower utility bills. Further, DOE claims that the landlord will have no incentive to purchase more efficient products because the landlord sees none of the energy savings. While this split-incentive situation and the resulting under-purchase of efficient appliances does, likely, occur in some instances, DOE has done nothing to determine to what degree it occurs. Further, DOE has not analyzed fully the effects of tighter standards on other potential landlord behavior, such as continuing to repair old appliances or resorting to used appliances. DOE has also not considered the relative degree to which standards might affect low-income homeowners. Understanding these issues would require they type of thoughtful marketplace analysis recommended by the NAS Peer Review Report that DOE seems unwilling to recognize and incorporate in its process.

AHAM, in conjunction with Bellomy Research, has conducted consumer research with a special focus on low-income households.[37] While this does not constitute a full marketplace analysis, it does provide additional information on the effects of higher appliance prices on low-income households and is helpful in understanding the real-world impact DOE's proposed standards may have. Principal findings of this study include:

- Substantially more households with incomes below $25,000 would purchase a used cooking appliance rather than a new one (24%, approximately double the percentage for other income groups).
- 78% of households with incomes below $25,000 would have a negative impact from being forced to purchase a new cooking appliance. The negative effects would include:



[37] Appliance Efficiency Regulatory Impact Consumer Research. (July 2022). Bellomy Market Intelligence on behalf of the Association of Home Appliance Manufacturers (AHAM).

- When asked how higher appliance prices would disrupt her life and finances in a scenario in which she needed to replace her cooking appliance, one consumer responded, "If my gas range broke, it would disrupt my life because I would not be able to cook and prepare meals. I'm a homemaker so cooking is everything for me and it would definitely be hard on the finances because it's very expensive to get this kind of appliance."

Secondly, DOE uses an inappropriate discount rate in its analysis of the effects of standards on low-income households. AHAM has commented on this in numerous rulemakings.[38] Fundamentally, DOE contends that a static balance sheet is the appropriate measure of the cost of funds to a household. DOE does not take into account any issues of capital availability or the non-financial costs (such as missed food or housing payments) from a purchase. These may be short-term effects in a long-term situation, but they are very real to the households affected. Further, in order to rebalance a balance sheet following a purchase, however paid for, requires savings. As AHAM has shown, the lowest 30 percent of income groups have no discretionary income to save.[39]

In its recent final room air-conditioner standards rule, DOE responded to some of AHAM's comments. [40] DOE's responses, unfortunately, show an astounding lack of understanding of basic finance and financial terminology. Further, these responses show a fundamental disconnect between DOE's comments and the real-life conditions of low-income households. These households are real people living real, complicated lives, not abstract RECS data points. The continuing lack of adequate response by DOE and the limitations of its work show an arbitrary and capricious desire to buttress a pre-conceived approach rather than a fair openness to reconsider mistaken approaches.

First, DOE misunderstands the nature of Balance Sheets and the role of cash and cash flow. Available cash is, as DOE alludes to when it states: "that a majority of these "unbanked" households primarily rely on cash to complete transactions and as a form of savings."[41] This statement totally misses the point of the meaning of "unbanked" and, more importantly, misunderstands the cash situation facing low-income households: they do not have any.

Second, as AHAM has pointed out previously, low-income households rarely have positive discretionary income (*i.e.,* income after paying necessary bills). They, therefore, do not have cash to purchase appliances. The Federal Reserve Board does an annual survey of households

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[38] AHAM Comments on DOE's NOPR for Energy Conservation Standards for Room Air Conditioners; Docket No. EERE-2014-STD-0059; RIN 1904-AD97, at 5-8 (Jun. 6, 2022); AHAM Comments on DOE's Energy Conservation Standards for Refrigerators, Refrigerator-Freezers, and Freezers; Docket No. EERE-2017-BT-STD-0003; RIN 1904-AD80, 17-19 (Dec. 23, 2021).

[39] AHAM Comments on DOE's Energy Conservation Standards for Refrigerators, Refrigerator-Freezers, and Freezers; Docket No. EERE-2017-BT-STD-0003; RIN 1904-AD80 (Dec. 23, 2021).

[40] Room Air Conditioners Pre-Publication Final Rule.

[41] Room Air Conditioners Pre-Publication Final Rule, 103.

including the ability to make a $400 emergency purchase. Thirty two percent of all adults could not make a $400 emergency purchase with cash on hand and would need to use some form of financing. DOE cannot simply ignore this. "Lower-income adults were especially likely to face difficulty paying bills. Half of adults with a family income less than $25,000 had one or more bills that they were unable to pay in full that month or were one $400 financial setback away from being unable to pay them, compared with 5 percent for adults with a family income of $100,000 or more."[42]

"Unbanked" households, by definition of the term, do not have relationships with FDIC insured institutions, such as conventional banks, savings and loans, and credit unions or the like. That does not mean that these households do not access financing. Instead, they rely on other means such as rent-to-own, payday loans, friends and family, or other means. In addition to the "unbanked" are the "underbanked"—those with bank accounts that still rely on other forms of high-cost financing. They do not pay cash. They take on some form of debt and reduce that debt by not paying other bills or by foregoing food, medicine, or other requirements of living. DOE's lack of understanding of—or refusal to acknowledge—both of the terms and the reality of low-income households' life situations—even in the face of data to contradict its analysis—casts serious doubt on its whole financial analysis process and the representativeness of this analysis. It is thus likely to lead to an arbitrary and capricious rule that is not based on the facts.

This absence of positive discretionary cash flow also means that they cannot rebalance their personal balance sheets. A balance sheet is only a consequence measure of historic cash flow and how it is used. It is not a causal measure of anything. A household can only reduce its debt level to the extent that it has positive discretionary income and uses that income to repay debt. This is common sense. In the absence of such discretionary income, there is no debt reduction. DOE does not even make the most cursory effort to develop a theory of how low-income households will do the long-term rebalancing that DOE predicts.

DOE needs to undertake a full study of the effects of standards on low-income households beyond simply restating its belief that the balance sheet approach is appropriate in the face of comments and data demonstrating the inaccuracy of this belief.

B. Incremental Versus Average Channel Markups

DOE uses different markups from manufacturers to end customers for the base case and for any costs added to meet proposed standards, average, and incremental markups respectively. AHAM, AHRI and others have vigorously disputed this distinction over many years and rulemakings.[43]

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[42] https://www.federalreserve.gov/publications/2022-economic-well-being-of-us-households-in-2021-dealing-with-unexpected-expenses.htm, last accessed April 7, 2023.

[43] *See, e.g.,* AHRI Comments on DOE's NOPR for Energy Conservation Standards for Consumer Furnaces; Docket No. EERE-2014-BT-STD-0031; RIN 1904-AD20, 36-39 (Jul. 10, 2015); AHRI Comments on DOE's NOPR for Energy Conservation Standards for Small, Large, and Very Large Air-Cooled Commercial Package Air Conditioning and Heating Equipment; Attachment 4: Incremental Markups – A Critical Review of Theory and Practice; Docket, No. EERE-2013-BT-STD-0007; RIN

In particular, AHAM's comments on DOE's 2015 NOPR for Energy Conservation Standards for Residential Dishwashers[44] contain quotes from **actual retailers about their actual practices, quotes which directly contradict the DOE process**, which is based on no empirical evidence and on theory discredited.[45] DOE cannot simply ignore data that contradicts its analysis. It must take these comments into account or its analysis cannot reasonably considered to be supported by the facts and a resulting standard could be arbitrary and capricious.

C. Learning Curve Effects

DOE reduces the expected extra manufacturing costs required to meet proposed standard levels by applying a factor based on increased production, or a "learning or experience curve". As AHAM and several other stakeholders showed in previous rulemakings, there is little to no theoretical underpinning for why an experience or learning curve should exist, what functional form it should take and, even, whether it should be a continuous function. It is merely an empirical relationship.[46] As such, there needs to be a clear connection between the actual products in question and the data used to develop the relationship. Analogs are of highly questionable applicability. Further, when the data takes a new shape, DOE must adjust its equations to reflect that change. Continuing to use old data and equations simply to create a longer time series is not acceptable.

D. RECS Database

DOE relies on the Residential Energy Consumption Survey (RECS) for many aspects of its analysis, particularly in computing expected energy consumption and the variation of consumption across and between households. RECS is a comprehensive and extremely valuable

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1904-AC95 (Dec. 22, 2014); AHAM Comments on DOE's Pre-TSD for Residential Refrigerators, Freezers and Refrigerator-Freezers; Docket No. EERE-2008-STD-0012; RIN 1904-AB79 (Jan. 15, 2010); AHAM Comments on DOE's NOPR for Energy Conservation Standards for Residential Dishwashers; Docket No. EERE-2014-BT-STD-0021; RIN 1904-AD24 (Mar. 25, 2015).

[44] AHAM Comments on DOE's NOPR for Energy Conservation Standards for Residential Dishwashers; Docket No. EERE-2014-BT-STD-0021; RIN 1904-AD24, 10-11, Attachment A (Mar. 25, 2015).

[45] AHRI Comments on DOE's NOPR for Energy Conservation Standards for Small, Large, and Very Large Air-Cooled Commercial Package Air Conditioning and Heating Equipment; Docket No. EERE-2013-BT-STD-0007; RIN 1904-AC95 (Dec. 22, 2014).

[46] *See, e.g.,* AGA Comments on DOE's NODA on Equipment Price Forecasting in Energy Conservation Standards Analysis; Docket No. EERE-2008-BT-STD-0012, Attachment B (Mar. 24, 2011); AHAM Comments on DOE's NODA on Equipment Price Forecasting in Energy Conservation Standards Analysis; Docket No. EERE-2008-BT-STD-0012, Attachment B (Mar. 24, 2011); AHRI Comments on DOE's NOPR for Energy Conservation Standards for Consumer Furnaces; Docket No. EERE-2014-BT-STD-0031; RIN 1904-AD20, 36-39 (Jul. 10, 2015); AHRI Comments on DOE's NOPR for Energy Conservation Standards for Residential Furnaces; Docket No. EERE-2014-BT-STD-0031; RIN 1904-AD20, 29 (Jan. 6, 2017).

survey program providing many important insights. DOE, however, is pushing the survey data further than it supports. In doing so, DOE is introducing "outlier" values into its LCC analysis and then assuming that those outlier households with very high energy consumption are just as likely as any other household to select an energy efficient appliance absent standards (*i.e.,* in the Base Case).

The effect of this process is that the Mean (or average) LCC savings at any standard level are significantly higher than the Median (or 50th percentile). Ordinarily in a statistical distribution, the Mean and the Median should be relatively close together. AHAM and AHRI have commented on this and some of the reasons to treat the RECS data with caution in numerous rulemakings.[47] AHAM, AHRI and others have proposed that DOE use medians rather than means to avoid many of the random assignment and data issues. AHAM continues to urge DOE to use medians, including in this rulemaking.

XV. National Savings Analysis

A. Insignificance Of Savings

Despite supporting reasonable standards that do not eliminate consumer utilities or favor a particular fuel, AHAM still questions whether DOE's projected savings are significant under EPCA, especially given that they may be inaccurate for the reasons discussed above.

We note that the Inflation Reduction Act incentivizes consumers to purchase electric cooking products. The intent of the Act will only be realized if a full range of products remain on the market for consumers.

B. Monetization Of Emissions Reductions And Consideration Of Health Benefits

DOE stated that "because consumer operating cost savings and health benefits alone greatly exceed costs under all . . . assumptions and scenarios, DOE noted that this conclusion does not depend on climate benefits (though climate benefits remain important and robust).

AHAM objects to DOE using the social cost of carbon and other monetization of emissions reductions benefits in its analysis of the factors EPCA requires DOE to balance to determine the appropriate standard. As DOE has acknowledged, the scientific and economic knowledge

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[47] AHAM Confidential Comments on DOE's NODA on Equipment Price Forecasting in Energy Conservation Standards Analysis; Docket No. EERE-2008-BT-STD-0012, Exhibit A (Mar. 24, 2011); AHAM Comments on DOE's Energy Conservation Standards for Refrigerators, Refrigerator-Freezers, and Freezers; Docket No. EERE-2017-BT-STD-0003; RIN 1904-AD80, Exhibit A, 12-13 (Dec. 23, 2021; AHRI Comments on DOE's NOPR for Energy Conservation Standards for Consumer Furnaces; Docket No. EERE-2014-BT-STD-0031; RIN 1904-AD20, 53-57 (Jul. 10, 2015); AHRI Comments on DOE's NOPR for Commercial Packaged Boilers; Docket No. EERE-2013-BT-STD-0030; RIN 1904-AD01, Attachment A (June 22, 2016); AHRI Comments on DOE's NOPR for Energy Conservation Standards for Consumer Furnaces; Docket No. EERE-2014-BT-STD-0031; RIN 1904-AD20, 3-4 and Appendix A (Oct. 6, 2022).

continues to evolve rapidly as to the contribution of CO_2 and other GHGs to change in the future global climate. Thus, the values are constantly subject to change. Accordingly, while it may be acceptable for DOE to examine the social cost of carbon and monetization of other emissions reductions benefits as informational, so long as the underlying interagency analysis is transparent and vigorous, the monetization analysis should not impact the TSLs DOE selects as a new or amended standard. It is inappropriate, for the reasons stated above, for DOE to rely upon the highly subjective and ever-changing monetization estimates in justifying an energy conservation standard.

DOE has responded to AHAM's objection by indicating that environmental and public health benefits associated with the more efficient use of energy, including those connected to global climate change, are important to take into account when considering the need for national energy conservation, which is one of the factors EPCA requires DOE to evaluate in determining whether a potential energy conservation standard is economically justified.[48] As indicated above, AHAM does not necessarily object to DOE considering the benefits. What AHAM objects to is DOE relying upon those benefits to justify a rule given the uncertain and ever-evolving nature of those estimates. Although DOE can consider "other factors" under EPCA, that does not override the key criteria EPCA requires DOE to balance. "Balance" is the key term—DOE must consider EPCA's factors together and achieve a balance of impacts and benefits—a balance DOE has failed to strike in this rule.

XVI. DOE's Process Undercuts A Full Opportunity For Commenters To Provide Meaningful Feedback On DOE's Proposed Rule.

In the SNOPR, DOE indicates that it decided to deviate from the Process Rule and provide 60 instead of 75 days to respond to this SNOPR. DOE reasons that since 2014, it has provided several comment periods on various proposals. DOE stated that it has relied on many of the same analytical assumptions and approaches for each of these proposals and, thus, a 60-day comment period on the current proposal is sufficient. But the very nature of this statement is contradictory. Since 2014, DOE proposed 1) to amend standards, 2) not to amend standards, and now, 3) again, to amend standards, but at different levels. Unless DOE is reaching different conclusions based on the same data and analysis, there must be something different in DOE's data and/or analysis supporting this SNOPR. And in fact, DOE released new data and information during the comment period on this SNOPR. Accordingly, the initial comment period should not have been shortened and we appreciate that DOE extended the deadline upon our request to align with the Process Rule's requirements.

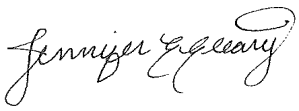
DOE's publication of the 2023 NODA was very helpful for the most part—AHAM appreciates that DOE published data responsive to our requests. But the addition of three new units to DOE's test sample that did not follow the same criteria as its 2023 SNOPR analysis and the conflicting statements and methodology DOE employed in the NODA (and in the media) were confusing at best. That approach was distracting and misleading. DOE needs to ensure that its analyses are consistent. And, if they are not, then DOE needs to explain why and give commenters more time

[48] *See* Energy Conservation Program: Energy Conservation Standards for Room Air Conditioners, Pre-Publication Final Rule; Docket No. EERE-2014-BT-STD-0059; RIN 1904-AD97.

to evaluate a new approach and comment on it. In this case, DOE should have explained whether the NODA data on three additional units changed its SNOPR analysis or was meant only to respond to AHAM's request that DOE support its statements to the media that differed from its SNOPR analysis.

AHAM appreciates the opportunity to submit this request on DOE'S SNOPR for Energy Conservation Standards for Residential Conventional Cooking Products and would be glad to discuss these matters in more detail should you so request.

Respectfully Submitted,



Jennifer Cleary
Vice President, Regulatory Affairs

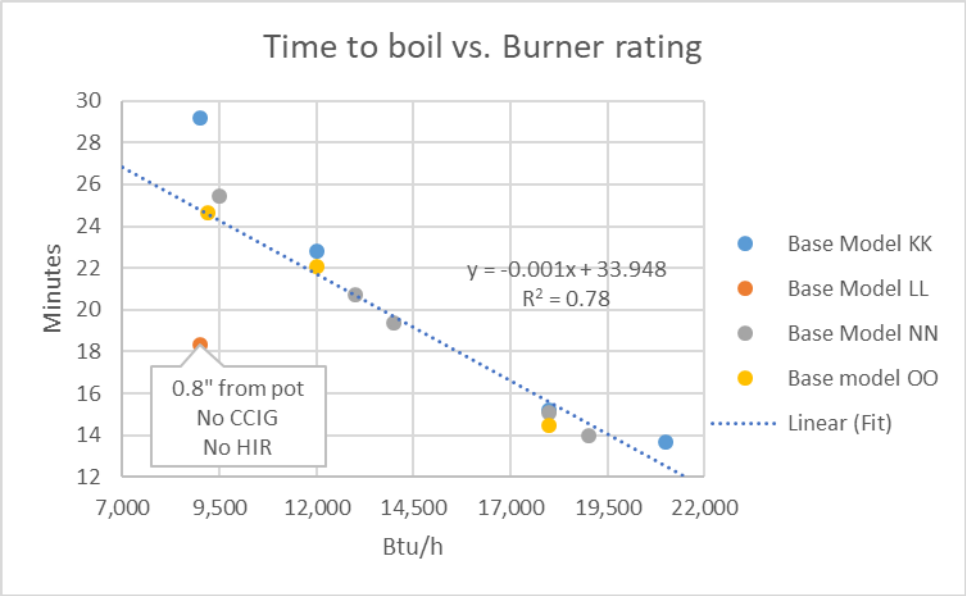
About AHAM: AHAM represents more than 150 member companies that manufacture 90% of the major, portable and floor care appliances shipped for sale in the U.S. Home appliances are the heart of the home, and AHAM members provide safe, innovative, sustainable and efficient products that enhance consumers' lives. The home appliance industry is a significant segment of the economy, measured by the contributions of home appliance manufacturers, wholesalers, and retailers to the U.S. economy. In all, the industry drives nearly $200 billion in economic output throughout the U.S. and manufactures products with a factory shipment value of more than $50 billion.

Exhibit A

PUBLIC VERSION

AHAM Analysis: Consumer Utility Associated With High Input Rate Burners

AHAM members conducted testing to prove that two high input rate burners provide additional utility that DOE must consider. First, four models of gas cooking tops were tested by boiling water, using the largest test vessel, and associated water load, on each burner tested. Besides cookware size, setup was consistent with the DOE test procedure. Boiling is defined is bringing the water load from 25° to 98°C using the highest power setting. From this testing, AHAM created a linear fit to correlate boil time and burner rating.



This linear fit can then be used to compare boil times of burners two different cooking tops:

Unit	Burner rating (Btu/hour)	Time to boil (minutes)
DOE gas unit 2	18,000	15.6
(passes proposed standard)	12,500	21.2
Theoretical unit	19,000	14.6
(fails proposed standard)	19,000	14.6

DOE's test sample unit 2 will take 37 percent longer to finish boiling two pots of water, an additional 7 minutes of cooking time.

According to DOE's testing, DOE test sample unit 2 would meet DOE's proposed standards. Similarly, according to DOE's testing, no samples with more than one high input rate burner or even one burner above 18,000 Btu/h will pass the proposed standard. If DOE proceeds with the standards as proposed, DOE's gas test sample unit 2 will still be available on the market (if it is even on the market today, which is questionable), while the theoretical unit, and any unit like it, will no longer be available on the market.

The test procedure assumes that consumers are boiling 418 pots of water a year. This equates to 209 instances of boiling two pots of water at the same time. Taking the seven minutes of additional boil time and multiplying by 209, consumers could spend an additional 23 hours per year waiting for water to boil if DOE finalizes its proposed standard.

PUBLIC VERSION

Exhibit B

PUBLIC VERSION

AHAM DATA – SMOOTH ELECTRIC COOKING TOPS

	Model#	Product Type	IAEC (kWh/year)	ETLP (kWh/year)	Marketed As
1	AHAM Smooth-Electric Resistance	Cooktop	196	7	Residential
2	AHAM Smooth-Electric Resistance	Cooktop	189	0	Residential
3	AHAM Smooth-Electric Resistance	Cooktop	198	4	Residential
4	AHAM Smooth-Electric Resistance	Cooktop	189	4	Residential
5	AHAM Smooth-Electric Resistance	Cooktop	190		Residential
6	AHAM Smooth-Electric Resistance	Cooktop	188	4	Residential
7	AHAM Smooth-Electric Resistance	Cooktop	186	4	Residential
8	AHAM Smooth-Electric Resistance	Cooktop	180	4	Residential
9	AHAM Smooth-Electric Resistance	Cooktop	185	17	Residential
10	AHAM Smooth-Electric Resistance	Cooktop	185	17	Residential
11	AHAM Smooth-Electric Resistance	Cooktop	185	17	Residential
12	AHAM Smooth-Electric Resistance	Cooktop	185	4	Residential
13	AHAM Smooth-Electric Resistance	Cooktop	185	4	Residential
14	AHAM Smooth-Electric Resistance	Cooktop	185	4	Residential
15	AHAM Smooth-Induction	Cooktop	205	4	Residential
16	AHAM Smooth-Induction	Cooktop	205	17	Residential
17	AHAM Smooth-Induction	Cooktop	205	17	Residential
18	AHAM Smooth-Induction	Cooktop	205	17	Residential
19	AHAM Smooth-Induction	Cooktop	205	17	Residential
20	AHAM Smooth-Electric Resistance	Cooktop	205	17	Residential
21	AHAM Smooth-Electric Resistance	Cooktop	205	17	Residential
22	AHAM Smooth-Electric Resistance	Cooktop	205	17	Residential
23	AHAM Smooth-Induction	Cooktop	185	17	Residential
24	AHAM Smooth-Induction	Cooktop	185	2	Residential
25	AHAM Smooth-Induction	Cooktop	185	17	Residential
26	AHAM Smooth-Induction	Cooktop	185	17	Residential
27	AHAM Smooth-Induction	Cooktop	198	0	Residential
28	AHAM Smooth-Induction	Cooktop	198	1	Residential
29	AHAM Smooth-Induction	Cooktop	198		Residential
30	AHAM Smooth-Induction	Cooktop	198		Residential
31	AHAM Smooth-Induction	Cooktop	198		Residential
32	AHAM Smooth-Induction	Cooktop	198		Residential
33	AHAM Smooth-Induction	Cooktop	198		Residential
34	AHAM Smooth-Induction	Cooktop	198		Residential
35	AHAM Smooth-Induction	Cooktop	181		Residential
36	AHAM Smooth-Induction	Cooktop	202		Residential
37	AHAM Smooth-Induction	Cooktop	202		Residential
38	AHAM Smooth-Electric Resistance	Cooktop	193		Residential

PUBLIC VERSION

	Model#	Product Type	IAEC (kWh/year)	ETLP (kWh/year)	Marketed As
39	AHAM Smooth-Electric Resistance	Cooktop	196		Residential
40	AHAM Smooth-Electric Resistance	Cooktop	189		
41	AHAM Smooth-Electric Resistance	Cooktop	198		
42	AHAM Smooth-Electric Resistance	Cooktop	193		
43	AHAM Smooth-Induction	Cooktop	181		
44	AHAM Smooth-Electric Resistance	Range	202	17	Residential
45	AHAM Smooth-Electric Resistance	Range	202	17	Residential
46	AHAM Smooth-Electric Resistance	Range	200	13	Residential
47	AHAM Smooth-Electric Resistance	Range	189	6	Residential
48	AHAM Smooth-Electric Resistance	Range	191	10	Residential
49	AHAM Smooth-Electric Resistance	Range	195	3	Residential
50	AHAM Smooth-Electric Resistance	Range	218	26	Residential
51	AHAM Smooth-Electric Resistance	Range	203		Residential
52	AHAM Smooth-Electric Resistance	Range	206	0	Residential
53	AHAM Smooth-Electric Resistance	Range	217	17	Residential
54	AHAM Smooth-Electric Resistance	Range	152	4	Residential
55	AHAM Smooth-Electric Resistance	Range	223	4	Residential
56	AHAM Smooth-Electric Resistance	Range	208		Residential
57	AHAM Smooth-Electric Resistance	Range	192		Residential
58	AHAM Smooth-Electric Resistance	Range	181		Residential
59	AHAM Smooth-Electric Resistance	Range	193		Residential
60	AHAM Smooth-Electric Resistance	Range	198		Residential
61	AHAM Smooth-Electric Resistance	Range	197		Residential
62	AHAM Smooth-Electric Resistance	Range	182		Residential
63	AHAM Smooth-Electric Resistance	Range	193		
64	AHAM Smooth-Electric Resistance	Range	192		
65	AHAM Smooth-Induction	Range	182		
66	AHAM Smooth-Induction	Range	236		
67	AHAM Smooth-Induction	Range	205		

PUBLIC VERSION

AHAM DATA – GAS COOKING TOPS

	Model#	Product Type	IAEC kBtu / year	ETLP (kBtu / year)	Marketed As	Total BTU	Avg. BTU	Input Burner Rate 1	Input Burner Rate 2	Input Burner Rate 3	Input Burner Rate 4	Input Burner Rate 5	Input Burner Rate 6
1	AHAM Gas	Cooktop	1,330	10	Commercial	57,600	14,400	18,000	9,200	9,200		9,200	12,000
2	AHAM Gas	Cooktop	1,607	12	Commercial	84,200	14,033	15,000	9,200	15,000	15,000	15,000	15,000
3	AHAM Gas	Cooktop	1,430	10	Commercial	70,000	14,000	20,000	15,000		20,000	15,000	
4	AHAM Gas	Cooktop	1,405	0	Commercial	91,000	45,500	21,000	18,000	18,000	10,000	12,000	12,000
5	AHAM Gas	Cooktop	1,437	0	Residential	63,000	15,750	18,000	15,000		9,000	6,000	15,000
6	AHAM Gas	Cooktop	1,604	4	Residential	62,600	15,650	19,500	10,000	13,600	19,500		
7	AHAM Gas	Cooktop	1,694	25	Residential	55,000	13,750	12,000	6,000	20,000	10,000	7,000	
8	AHAM Gas	Cooktop	1,387	0	Commercial	50,000	10,000	10,000	5,500	10,000	5,500	19,000	
9	AHAM Gas	Cooktop	1,328	6	Commercial	62,400	12,480	12,000	9,200	12,000	9,200	20,000	
10	AHAM Gas	Cooktop	1,577	0	Residential	62,000	12,400	10,000	10,000	10,000	12,000	20,000	
11	AHAM Gas	Cooktop	1,408	0	Residential	50,000	10,000	10,000	5,500	19,000	10,000	5,500	
12	AHAM Gas	Cooktop	1,220	0	Residential	42,700	8,540	3,400	6,000	17,000	10,300	6,000	
13	AHAM Gas	Cooktop	1,220	0	Residential	42,700	7,117	3,400	6,000	17,000	10,300	6,000	
14	AHAM Gas	Cooktop	1,223	0	Residential	52,000	8,667	8,000	10,000	16,000	8,000	10,000	
15	AHAM Gas	Cooktop	1,223	0	Residential	52,000	8,667	8,000	10,000	16,000	8,000	10,000	
16	AHAM Gas	Cooktop	1,345	0	Residential	57,600	11,520	18,000	9,200	9,200	9,200	12,000	
17	AHAM Gas	Range	1,762	17	Commercial	85,000	85,000	20,000	15,000		20,000	15,000	15,000
18	AHAM Gas	Range	1,409	0	Commercial	74,000	14,800	23,000	15,000	15,000	21,000		
19	AHAM Gas	Range	1,356	0	Residential	44,500	11,125	15,000	9,500		15,000	5,000	
20	AHAM Gas	Range	1,471	0	Residential	44,500	11,125	15,000	9,500		15,000	5,000	
21	AHAM Gas	Range	1,474	34	Residential	47,500	11,875	18,000	5,000	9,500	15,000		
22	AHAM Gas	Range	1,252	31	Residential	33,500	6,700	9,500	9,500		9,500	5,000	
23	AHAM Gas	Range	1,522	19	Residential	44,500	8,900	15,000	9,500		15,000	5,000	
24	AHAM Gas	Range	1,683	0	Residential	56,200	11,240	19,000	5,000	8,000	15,000	9,200	
25	AHAM Gas	Range	1,706	3	Residential	44,350	8,870	17,000	5,000	7,350	10,000	5,000	
26	AHAM Gas	Range	1,374	0	Residential	37,000	7,400	9,500	9,500	5,000	13,000		
27	AHAM Gas	Range	1,482	0	Residential	56,000	11,200	21,000	5,000	12,000	18,000		
28	AHAM Gas	Range	1,471	56	Residential	44,500	11,125	15,000	5,000	9,500	15,000		
29	AHAM Gas	Range	1,417	0	Residential	60,000	10,000	21,000	5,000	9,500	15,000	9,500	
30	AHAM Gas	Range	1,523	28	Residential	46,500	11,625	14,000	9,500	5,000	18,000		
31	AHAM Gas	Range	1,536	29	Residential	46,500	11,625	14,000	9,500	18,000	5,000		
32	AHAM Gas	Range	1,703	0	Residential	63,500	10,583	18,000	7,500	18,000	5,000	7,500	7,500

PUBLIC VERSION

Exhibit C

PUBLIC VERSION

Tomato Sauce Simmer Test Details:

Burner was run on the lowest output rate for 2 hours with a 2.5-quart Calphalon 87822 with 1270 grams of Ragu chunky Tomato, Garlic, and Onion Sauce. It was stirred every 30 mins, noting any sticking or burning in the pot. Pictures were taken at 30 min intervals to show splatter and sauce consistency.

PUBLIC VERSION

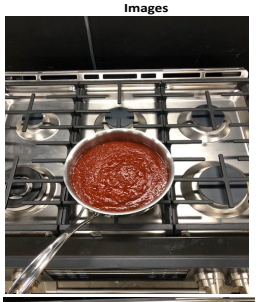
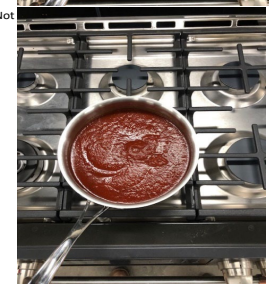
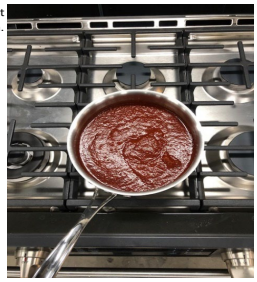
Time	Base Model LL (9000 Btu/hr) Images	Notes	Base Model KK (5000 Btu/hr) Images	Notes	Base Model KK (9000 Btu/hr) Images	Notes
Start of Test						
30 mins		Boiling, starting to get splatter on cooktop. No signs of sticking.		No Visiible Change from start. Not boiling.		No Visible Changes. Not boiling.
60 Mins		Boiling rapidly, increased splatter. Beginning to stick to bottom of pot.		No visiible change. Not boiling.		No Visible Changes. Not boiling. No signs of sticking.
90 Mins		Boiling. Sauce thickening and sticking to pot. Significant splatter.		No visiible change. Not boiling. Sauce is warm.		No Visible Changes. Not boiling. No signs of sticking.
120 Mins		Sauce burnt to pan bottom. Very thick. Significant splatter.		No visiible change. Not boiling. Sauce is warm.		No Visible Changes. Not boiling. No signs of sticking.
Cleanup	  	Cooktop covered in sauce. Sauce inside the adjacaent burner. Sauce burnt to center bottom of pan.	 	No Splatter on cooktop. No sauce stuck to the pot bottom.	 	No Splatter on cooktop. No sauce stuck to the pot bottom.

Exhibit D

PUBLIC VERSION

Chocolate melting

Methodology:

-Minimum power setting
-Cast Iron Pot, diameter = 10 inches, Measured in 5 points for 30 minutes (see picture)
-All testing was done with current residential appliances
-Should be noted that proper temperature for melting chocolate is 100°F

Results:

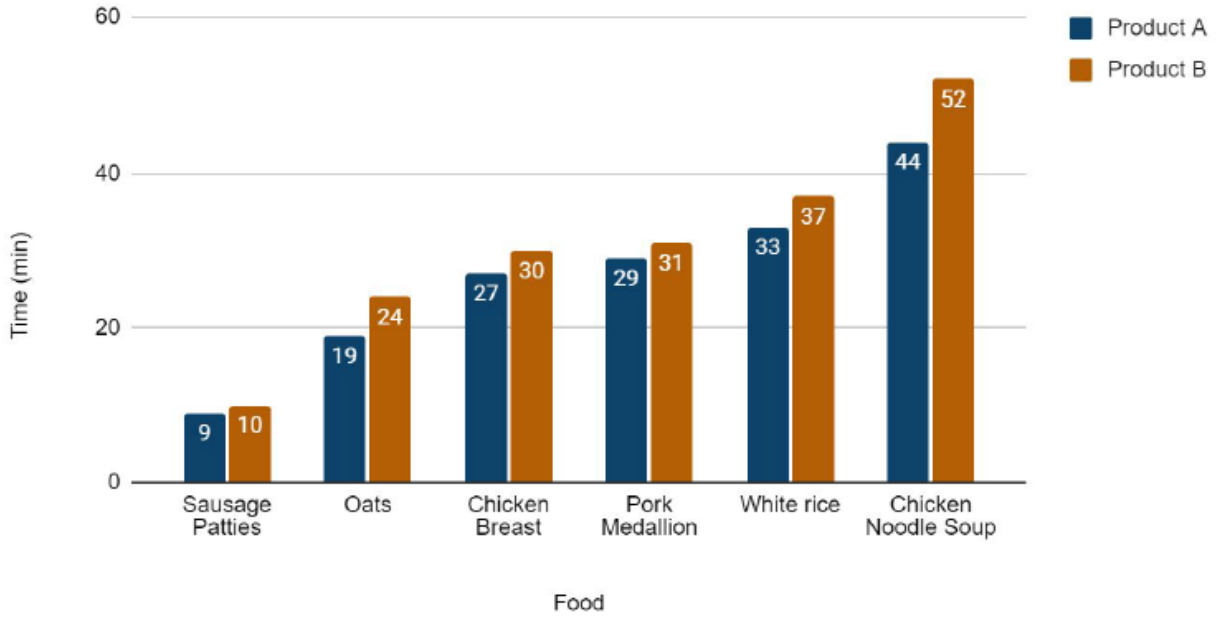
Burner Power Rate	Burner Family	Burner Size	Average temperature in pot °F	Delta Between Baseline to other cases
5K (Baseline)	Family A	Auxiliary	107	Average 100 °F
5K (Baseline)	Family C	Auxiliary	92	
9.5k	Family A	Semi Rapid	249	+149 °F
9.5k	Family B	Semi Rapid	181	+81 °F

Conclusion:

Regardless the burner family, the elimination of auxiliary burners will directly impact customer ability use the cooktop for melting chocolate, effectively losing the low temperature function.

PUBLIC VERSION

Consumer Usage Impacts



		Energy Consumption kBtu/yr	Cooking Time Breakfast + Lunch + Dinner	Cooking Quality
Product A Conventional Burners	UR 18 kBtu/h		Breakfast 19 min Lunch 44 min Dinner 33 min	Well Cooked
Product B High Efficiency Burners	SR 11.5 kBtu/h 9.5 KBtu/h		Breakfast 24 min Lunch 52 min Dinner 37 min + 17 min per day	Overcooked

Conclusion

Product B: The higher the food load, the greater the time increase for cooking to achieve proper doneness. Overcooked Pork medallions would require consumer to pull pan off of burner to reduce pan temperatures intermittently until internal temperature is met. We the left the pan on the burner to not artificially lengthen cook time resulting in an overcooked exterior to meet internal temperatures.

Both of these changes would require consumers to learn new cooking behaviors to enable similar cooking results as they can achieve with their current products, but at longer cook times.

PUBLIC VERSION

Exhibit E

CONFIDENTIAL BUSINESS INFORMATION OMITTED

PUBLIC VERSION

Features Removed If Proposed Standards Are Finalized
Confidential Business Information Omitted

Gas Cooking Products

Product Feature	Impact to Meet Proposed Standard Level

Electric Cooking Products

Product Feature	Impact to Meet Proposed Standard Level

PUBLIC VERSION

Exhibit F

PUBLIC VERSION

United States
Consumer Product Safety Commission

February 7, 2023

Marina Currie
Project Manager for STP 101
UL Standards & Engagement
12 Laboratory Drive
Durham, NC 27709-3995

Dear Ms. Currie:

Re: Proposals for *UL 101, Standard for Leakage Current for Utilization Equipment Dated* December 23, 2022

U.S. Consumer Product Safety Commission (CPSC or Commission) staff[1] supports the proposals to revise UL 101, dated December 23, 2022, as proposed. Standards improvements, such as double insulation and the expanded use of ground-fault circuit interrupter technology, have improved electrical shock safety since the early 1970s. In the interest of continuing and further improving electrical shock safety and keeping consumers safe, CPSC staff believes it is imperative that the installation codes, such as the *National Electrical Code*, *NFPA 70*, and the many electrical end-product standards, work together. Expanding Department of Energy requirements for higher energy efficiency of products have resulted in broader use of energy-saving technologies. Motor-driven equipment that uses variable-speed drives to achieve these efficiency improvements has resulted in high-frequency electrical noise or leakage currents, causing nuisance tripping of ground-fault circuit interrupters.

The proposed revisions for testing requirements and GFCI interoperability are needed in UL 101 to complement proposed revisions to UL 943, *Standard for Ground-Fault Circuit Interrupters,* to test for compatibility of a product's high-frequency noise and leakage currents at safe levels, based on available research test data. Staff also supports the adoption of UL 101 requirements for all other electrical end-product standards.

CPSC staff appreciates the opportunity to comment on this matter and encourages industry to adopt these changes without delay.

Sincerely,
Douglas Lee
Douglas Lee
Electrical Program Area Risk Manager
Office of Hazard Identification and Reduction

[1] These views are those of CPSC staff, and have not been reviewed or approved by, and may not necessarily reflect the views of the Commission.

U.S. Consumer Product Safety Commission
4330 East-West Highway
Bethesda, MD 20814
cpsc.gov

National Product Testing & Evaluation Center
5 Research Place
Rockville, MD 20850

PUBLIC VERSION

United States
Consumer Product Safety Commission

Cc: Jacqueline Campbell, CPSC Voluntary Standards Coordinator

U.S. Consumer Product Safety Commission
4330 East-West Highway
Bethesda, MD 20814
cpsc.gov

National Product Testing & Evaluation Center
5 Research Place
Rockville, MD 20850

PUBLIC VERSION

Exhibit G

PUBLIC VERSION

December 12, 2022

Massachusetts Electrical Advisory Committee (MEAC) c/o
Paul Vigneau, Director
Division of Fire Safety
Department of Fire Services
P.O. Box 1025
Stow, MA 01775

Dear Mr. Vigneau:

Thank you for the opportunity to provide public comment on the very serious human impact of the 2020 NEC and the 2023 NEC code as drafted. In a word, it is **dreadful**. Of course, we deeply appreciate MEAC's focus on safety and remain strongly committed to a resolution that both protects safety and allows affordable housing residents to have the dignity of cooking in their own homes.

As you know, through our earlier advocacy including the enclosed petition from October, affordable housing providers have found that the GFCI circuit breakers required by the code are not compatible with current stove manufacturers' ability to deliver appliances that work with the breakers. EVERY time a resident attempts to cook, they trip the breakers. This nuisance tripping, happening in all the apartments built or renovated now, effectively means that entire low-income communities are without usable kitchens.

To date, **more than 1,700 units with low-income tenants have been suffering from this problem statewide from Boston to Springfield.** For example, at 2Life Communities, a nonprofit organization doing a comprehensive modernization of the existing Coleman House property in Newton, their low-income senior residents (average age 81) are moving into brand new apartments but due to nuisance tripping they are completely unable to cook. **These are residents who rely upon a median annual income of $11,595 and for whom the loss of access to use of their kitchen appliances represents a literal threat to their ability to afford to eat.** None could host or even contribute to Thanksgiving dinners—something they found humiliating. This issue is not unique to residents at 2Life, as you will note that over 35 organizations signed the enclosed petition in October asking for a solution.

Since signing the enclosed petition in October, affordable housing providers have met with members of MEAC, representatives from the electrical breaker manufacturers, and the appliance manufacturers to find a solution to the immediate impacts of electric nuisance tripping. The two proposed interim solutions—enlarging the kitchen or hardwiring the stoves—are infeasible. All affordable housing built in MA is funded by the state in a cost-constrained environment which will not allow larger kitchens. Hardwiring the stoves is now allowed by only some local electrical inspectors—for those that do permit it, it is a cost burden of $250-

$300/apartment outside of approved budgets. **Importantly, neither of these solutions are possible under the draft 2023 code—so all new construction or modernization projects which are planned to begin shortly will be faced with building unusable kitchens for very low-income people who have no other options.**

We have learned from the cooking manufacturers that they don't expect to have their manufacturing systems ready to be compatible with the GFCI breakers required in the code until Spring 2025. This 3+ year gap in the supply of cooking appliances that are compatible with GFCI breakers would mean affordable housing developers building thousands of units (at the state's urging) will face the unviable choice of delaying occupancy -- delays in receiving Certificates of Occupancy trigger severe penalties under the IRS code, since affordable housing relies on Low Income Housing Tax Credits -- or moving in families who cannot cook or afford to purchase prepared meals. Supply chain issues are also a serious consideration since there are limited quantities of the less expensive electric stoves and they are only available from a few manufacturers.

As you can see, we feel a sense of both urgency and desperation. **The codes as written pose very real hardship for the most vulnerable members of our communities.** PLEASE reexamine the existing 2020 state electrical code and the forthcoming 2023 NEC electrical code so that the hardship does not fall on low-income households and the federal, state and local resources that are supporting these affordable housing developments.

Sincerely,

2Life Communities

Allston Brighton Community Development Corporation

Beacon Communities

Boston Housing Authority (BHA)

Boston Center for Independent Living

Boston Neighborhood Community Land Trust (BNCLT)

Brookline Housing Authority

B'nai B'rith Housing (BBH)

Cambridge Continuum of Care (CoC)

Cambridge Housing Authority (CHA)

Capstone Communities LLC

Chelmsford Housing Authority

CHOICE Housing Opportunities

Citizens' Housing and Planning Association (CHAPA)

Coalition for a Better Acre (CBA)

Commonwealth Community Developers, LLC

Community Development Partnership (CDP)

Community Teamwork, Inc. (CTI)

David Koven Consulting

Dellbrook | JKS

Domus Incorporated

Dorchester Bay Economic Development Corporation (DBEDC)

Essex County Community Organization

Fenway Community Development Corporation

Harborlight Homes

Hebrew SeniorLife

Henry Joseph & Associates

Hilltown Community Development

Home City Development, Inc.

Homeowner's Rehab, Inc. (HRI)

Housing Corporation of Arlington (HCA)

Jamaica Plain Neighborhood Development Corporation (JPNDC)

John M. Corcoran & Company

Local Initiatives Support Corporation (LISC) Boston

Maloney Properties

Massachusetts Association of Community Development Corporations (MACDC)

Massachusetts Housing Investment Corporation (MHIC)

Massachusetts Housing Partnership (MHP)

Metro Housing Boston

Metro West Collaborative Development

Mission Hill Neighborhood Housing Services (MHNHS)

Munkenbeck Consulting

National Housing Law Project

Neighborhood of Affordable Housing, Inc. (NOAH)

NeighborWorks Housing Solutions

New Atlantic Development

New Ecology

North Shore CDC

Oxbow Urban LLC

PCA

Perkins Eastman

Petersen Engineering

Planning Office for Urban Affairs (POUA)

Preservation of Affordable Housing (POAH)

Resonant Energy

SCG Development Partners, LLC

Somerville Community Corporation (SCC)

South Boston NDC

Southwest Boston CDC

PUBLIC VERSION

Stravros Center for Independent Living

The Community Builders (TCB)

The Neighborhood Developers (TND)

Traggorth Companies LLC

Utile Architecture & Planning

Valley Community Development

VietAID

CC: Secretary Card, Executive Office of Energy and Environmental Affairs

Secretary Kennealy, Executive Office of Housing and Economic Development

Secretary Reidy, Executive Office of Public Safety and Security

Undersecretary Chang, Energy and Climate Solutions

Undersecretary Maddox, Department of Housing and Community Development (DHCD)

Commissioner Woodcock, Department of Energy Resources (DOER)

Maggie McCarey, Director, Energy Efficiency Division at DOER

Alana Murphy, Director of Policy at DHCD

Catherine Racer, Associate Director at DHCD

JoAnn Bodemer, Assistant Attorney General

Amber Villa, Chief, Neighborhood Renewal Division at Massachusetts Attorney General's Office

Beverly Craig, Senior Program Manager at MassCEC

ASSOCIATION OF HOME APPLIANCE MANUFACTURERS

1111 19th Street NW ▸ Suite 402 ▸ Washington, DC 20036
t 202.872.5955 f 202.872.9354 www.aham.org

May 8, 2023

Via Regulations.gov

Alberta E. Mills
Office of the Secretary
U.S. Consumer Product Safety Commission
4330 East-West Highway
Bethesda, MD 20814

RE: AHAM Comments on the Consumer Product Safety Commission's Request for Information on Chronic Hazards Associated with Gas Ranges and Proposed Solutions; Docket No. CPSC-2023-0009

Dear Ms. Mills:

The Association of Home Appliance Manufacturers (AHAM) respectfully submits these comments in response to the Consumer Product Safety Commission's (CPSC or Commission) Request for Information on Chronic Hazards Associated With Gas Ranges and Proposed Solutions (RFI); Docket No. CPSC-2023-0009; 88 Fed. Reg. 14150 (Mar. 7, 2023).

I. Introduction and Summary

AHAM represents more than 150 member companies which manufacture virtually all major appliances shipped for sale in the U.S. and Canada, including "gas ranges" as referenced in the RFI[1] and hereinafter referred to more broadly as "gas cooking products." Importantly, AHAM's members produce gas *and* electric cooking products. We are neutral as to fuel source and support the American consumer's right to choose those products they find most desirable.

The home appliance industry is a significant segment of the economy measured by the contributions of home appliance manufacturers, wholesalers, and retailers to the U.S. economy. In all, the industry drives nearly $200 billion in economic output throughout the U.S., supports 1 million jobs, and manufactures products with a factory shipment value of more than $50 billion.

Product safety is a fundamental obligation of consumer product manufacturers, and the appliance industry, through its individual manufacturers and AHAM, have been leaders in the product safety field. CPSC and Health Canada are critical regulatory relationships. Industry has invested on a continuing basis enormous resources into improving the safety of our products and

[1] 88 FR at 14150.

revising consensus standards, as needed, to reduce safety or health risks associated with our products.

In the area of major appliances alone, since 2012, AHAM has submitted more than 120 different proposals to the Safety Standards Development Organizations (SDO's) like UL, CSA, and NFPA. Notably, for electric and gas cooking products, AHAM, in cooperation with CPSC, developed and supported substantial revisions to UL (electric) and CSA (gas) standards, UL 858 (Household Electric Ranges Standard For Safety), and ANSI Z21.1-CSA 1.1 (Household Cooking Gas Appliances, hereinafter ANSI Z21.1), to reduce the incidence of cooktop fires and other potentially hazardous conditions.

American consumers have been protected for many decades by ANSI Z21.1 from carbon monoxide hazards in consumer products. Outside of the acute carbon monoxide (CO) hazard covered by this standard, existing evidence does not support that gas cooking creates a substantial health hazard for American consumers. Cooking, whether on gas or electric products, produces emissions, most notably from the foodstuffs being cooked and not from the cooking heat source. Indeed, EPA has stated that fine particulates ($PM_{2.5}$) pose the greatest health risk.[2] A review of the studies indicates there are substantial weaknesses in the quality of the studies and inconclusive correlations of gas cooking with acute or chronic health hazards. More specifically, there is weak or inconclusive support that carbon monoxide or nitrogen dioxide emissions from gas cooking products constitute health risks to individuals. Science is always evolving and the best science is based on the totality of evidence and not one study or parts of studies that further an advocacy agenda.

Our conclusion is based on a review of the literature and the studies conducted thus far. This does not end the story. We continue to support unbiased health and safety science and actions to enhance the protection of our members' customers:

- Indisputably and by far the most important improvement in indoor air quality related to cooking of any type is improved ventilation, primarily, but not exclusively, to deal with particulate matter, especially $PM_{2.5,}$ emitted during both gas and electric cooking and originating in the foodstuffs cooked.

- We support public educational campaigns aimed at building owners, consumers, public housing authorities, and other entities to install and use improved ventilation in residences, including, but not limited to, the proper use and installation of ventilation devices such as exhaust hoods and fans. **The evidence is overwhelming that these measures will significantly improve indoor air quality in the kitchen environment.**

- We work closely with California with respect to its Title 24 Building Code, and we are integrally involved in the consensus standard effort to improve ventilation devices' effectiveness and reduce sound levels through proper use of those devices, as described below. We have developed a certification program to support improved ventilation systems.

[2] EPA Region 1, How Does PM Affect Human Health, https://www3.epa.gov/region1/airquality/pm-human-health.html (2023).

- Another way to improve indoor air quality in the kitchen, and throughout the home, is through the use of room air cleaners which can augment ventilation.

- We are moving rapidly in several groups to support continuous improvement to ANSI Z21.1 and international standards to include nitrogen dioxide and any other revisions that are justified to enhance public health.

- We support further research and study on indoor air quality, especially with respect to the emissions and any health effects related to cooking (regardless of fuel source) and effective methods of mitigating any such effects.

We view this RFI as only one step in the public, CPSC, and stakeholder engagement on understanding more fully this complex issue and acting on good data, as it is developed.

In these comments, we discuss our view of CPSC's role in this arena, the types of gas cooking products AHAM covers, kitchen ventilation and vent hoods, studies on cooking related emissions, studies on cooking products and health effects, and our efforts to improve ventilation products and strengthen consensus standards.

II. Perspective on CPSC Authority and Policy of Reliance on Sound Consensus Standards

We greatly appreciate the Commission statement that "[t]his RFI does not constitute or propose regulatory action but rather is intended to inform the commission and the public."[3] This is an appropriate statement and reflects properly the Commission's statutory mission.[4]

This statement should be understood in recognition of the Commission's strong statutory mandate to support and rely on "voluntary" or, more accurately in our case, consensus-based standards, and for these types of products its limited regulatory authority.[5] These provisions not only constitute a mission and regulatory framework for the Commission, but also, and more importantly, adopt critical public policies with respect to analyzing risks and reliance on good science and good consensus standards.

As discussed below, there is no basis for finding that gas cooking products create a substantial product hazard. Notwithstanding the absence of any such evidence, consensus standards relevant to our products have and will continue to eliminate or reduce even perceived risks. We are therefore moving rapidly in several groups to support continuous improvement to ANSI Z21.1 and international standards to include nitrogen dioxide and any other revisions that enhance public health or perceptions. We support further research and study on indoor air quality, especially with respect to the emissions and any health effects related to cooking and effective methods of mitigating any such effects.

[3] 88 FR at 14150.
[4] *See e.g.*, 15 USC § 2051(b) (4); CPSA Section 2 (b)(4).
[5] *See, e.g.*, CPSA Sections 7 and 9, 15 §§ USC 2056 and 2058.

Upon development of an amended ANSI Z21.1 standard, there will be substantial, indeed almost universal, compliance with the standards because such compliance is required in many building codes as well as in the market. For gas cooking products, as with most major appliances, the language in the CPSA describing the standards as "voluntary" does not accurately reflect the regulatory landscape. These consensus standards, such as ANSI Z21.1-CSA 1.1, are not voluntary. They are incorporated in building codes, the national electric code (NEC-NFPA70), and national fuel gas code (NFGC – NFPA54) and enforced by building and electrical inspectors throughout the United States. Both the NEC and NFGC require products to be listed.[6]

Nor would any legitimate retailer or marketer sell a gas cooking product for which there is not certification by independent laboratories as to compliance with ANSI Z21.1 and listing in the certifying bodies' directory. When gas cooking products or other gas consumer products, such as water heaters, furnaces, or clothes dryers, are found due to manufacturing or other problems not to be in compliance with the standard, they are subject to programs of repair or even recall, the latter of which are rare. Therefore, anticipated revisions to ANSI Z21.1 can confidently be expected to obtain virtually 100 percent compliance.

The second part of determining the merits of a consensus standard is that it adequately addresses the risk. As will be described below, AHAM is engaged in multiple, accelerated standards activities, in which CPSC staff are full partners—and indeed leaders—to ensure that any needed standard revisions are made as quickly as reasonably possible.

III. Description and Use of Gas Cooking Products and Related Products

a. Gas Cooking Products

According to the 2020 Residential Energy Consumption Survey (RECS), administered by the U.S. Energy Information Administration (EIA), gas cooking appliances are used in approximately forty percent of homes across the United States. Gas cooking appliances include mainly gas ranges, but also gas cooktops and gas wall ovens. Though the word "stove" has been used in recent public discussions and media, the home appliance industry refers to the gas cooking products as gas ranges, cooktops, or ovens. In 2022, 3.55 million gas cooking appliances were shipped for sale in the United States.

A gas cooktop is an installed flat cooking surface with anywhere from one to the predominant five or more burners, with outputs ranging from 500 to over 20,000 BTUs. A gas range is the combination of a gas cooking surface and an oven cavity configured below the cooktop in the same chassis. A small portion (about five percent) of gas ranges are dual fuel products, meaning that the cooking surface is gas and the oven is electric.

[6] *See* NFPA70 clause 4.22.6, defining listed product as "[e]quipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose." (CMP-1)

Gas Cooktop	Gas Range	Built-in Gas Oven
		

Gas cooking is known for its precise temperature control and range of cooking techniques. For example, the simmer function is used for precise cooking and low flames, with common uses being for simmering soups, sauces, gravies; melting chocolate; or cooking eggs. Consumers also use lower input-rate burners to keep food warm, for example on holidays or when entertaining. Thus, these simmer type burners have a unique utility as compared to high- and medium-input-rate burners. A significant number of consumers use the low input rate burner on their cooktop for much of the cooking cycle. Large burners, on the other hand, are used for searing proteins, stir-frying, and boiling large pots of water. Medium input burners are typically used to brown proteins and sauté vegetables. A combination of lower, medium, and high input-rate burners ranked among the most important cooktop features for consumers. However, consumers do want more than one large burner when they have more than one large pan to put on them and want to use both at the same time, particularly for serving larger groups of people and special occasion meals.

Gas cooking products are also largely equipped with continuous cast iron grates that enhance cooking performance and provide a safety benefit. Consumers identify cast iron grates as a utility that allows them to be able to slide large, heavy, or specialty pots from burner to burner without getting caught or causing a spill that must be cleaned up or cause a burn.

Gas ranges and cooktops typically have four to five or more burners, which are configured with smaller specialized burners, mid-range burners, specialized / multi-ring, and large high-powered burners and in some cases a center griddle or grill. AHAM shipment data shows 86 percent of gas cooktops had five or more burners. A typical configuration for a gas cooktop will include at least one high input rate burner (with outputs ranging from 12,000 to over 20,000 Btu/hour), one or more lower (ranging from (500 – 5,600 Btu/h), and two or more mid- input burners (ranging from 5,600 – 12,000 Btu/h). AHAM factory shipment data shows 99 percent of gas cooking products have sealed burners. A sealed burner is one where the burner is integrated with the maintop and contains spillovers (on the maintop surface). An open burner typically has a pull-out tray (from the front of the range) that a consumer can access to clean food pieces or fluids that spill down into the opening. Open burners are typically seen in restaurants because they allow more oxygen to the flame which can result in higher temperatures.

Gas cooktops can vary from 12 inches to 36 inches wide to accommodate a range of spaces. Larger, professional-style cooktops and ranges can exceed 48 inches wide. The majority of the gas cooking market is in the standard size range, between 24 to 33 inches wide.

In terms of minutes of operation, we offer the assumptions and data used by the Department of Energy (DOE) in its rulemakings. There are 8,760 hours in a year, and DOE has determined that a cooking top is not in active use for 8,544 hours in a year. Therefore, the cooktop is in active use for 216 hours in a year (8,760 – 8,544 = 216). DOE has determined that the average number of cooking cycles in a year is 418 cycles. As a result, the average time a cooktop is in active use each cycle is 31 minutes (216 hours/418 cycles * 60 minutes = 31 minutes). This is a very short duration of operation for cooking emissions compared to the 1-hour, 8-hour, or 24-hour time-weighted average exposure limits.

b. Related products

i. Carbon Monoxide Detectors

As of March 2023, every state, except Hawaii and Missouri, has enacted statutes requiring the presence of CO detectors.[7] All states require smoke detectors. A CO detector should not be placed within fifteen feet of heating or cooking appliances or in or near very humid areas such as bathrooms. The reference to the primary code for smoke alarms and CO detectors[8] has in turn been referenced in the International Residential Code (IRC) since it was first published in 2000.

ii. Kitchen Ventilation

Kitchen ventilation is a critical part of the cooking process to remove heat, moisture, odor, and pollutants that are emitted, primarily from foodstuffs, during cooking (regardless of fuel source). External ventilation has been required in the California and International Code Council (ICC) building codes since 2012. Due to changes in building code requirements in North American and ICC, increases in use and penetration of kitchen ventilation products have occurred in recent years. Options for kitchen ventilation include vent hoods (either externally vented or recirculated), over-the-range-microwave ovens with exhaust fans, downdrafts, or continuous operation exhaust fans, all of which must vent to the outdoors for the best effectiveness in improving indoor air quality.

In 2019, AHAM surveyed more than 8,000 households on saturation of home appliances. The survey was compared to a prior study conducted in 2010 to examine changes in saturation of common household appliances. Of note, in 2019, vent hood saturation grew to 33 percent from 22 percent in 2010. Downdraft saturation doubled from two percent in 2010 to four percent in 2019.

[7] The requirements for CO detectors can be found at: https://ipropertymanagement.com/laws/carbon-monoxide-smoke-detectors.
[8] NFPA 72, National Fire Alarm and Signaling Code.

iii. Air Cleaners

Air cleaners are effective filtration devices that should be considered for kitchen filtration while cooking. Traditionally, this category of appliances is known for reduction of particulate pollutants like tobacco smoke, dust, and pollen. However, as awareness and concern for indoor air quality has grown over the past three years, prompted in large part by COVID, ownership and usage of air cleaners has also increased. In April 2021, AHAM published the results of a consumer survey fielded in December 2020 that showed 46 percent of survey respondents were using their air treatment appliance more during the COVID-19 pandemic than prior to the pandemic. This is on top of an Evergreen Economics research from 2021 that showed 36 percent of US households own or have access to a room air cleaner and the sales continue to grow at a 6.6 percent annual rate.[9]

Of those that have air cleaners, consumer research shows 69 percent run their air cleaner 16 hours a day or less.[10] The Environmental Protection Agency (EPA) and Centers for Disease Control and Prevention (CDC) identify air purifiers as a product to fight the spread of COVID-19 in homes, schools, and businesses. EPA's Indoor Air and Coronavirus (COVID-19) webpage indicates air cleaners with HEPA or better filtration, when used properly and as a complement to HVAC filtered systems, can help reduce airborne contaminants including viruses in a building or small space.[11]

Even beyond the pandemic, awareness has grown about how certain chemicals affect indoor air. AHAM's survey found that, in addition to viruses, smoke, dust and pollen, consumers were concerned about the effects of mold, chemicals and PM (particulate matter). EPA has also stated that fine particles ($PM_{2.5}$) pose the greatest health risk.[12] People who live in areas affected by wildfires also rely on air cleaners to mitigate the effects of wildfire smoke on indoor air quality, as recommended by EPA.[13] Additional AHAM consumer research found improving indoor air quality is the primary reason consumers purchase air cleaners. [14] The top six reasons include:

Improve indoor air quality overall	Reduce allergy symptoms
Help with general health	Reduce odors
Reduce sinus problems	Reduce asthma symptoms

The Clean Air Delivery Rate (CADR)—the rating given to air cleaners that have been tested under AHAM's Air Cleaner test methods—helps rate the effectiveness of an air cleaner's

[9] *See* Fact.MR, U.S. Air Purifier Market, https://www.factmr.com/report/us-air-purifier-market.
[10] Evergreen Economics (2022). Air Purifier NPD Analysis, Final Draft. Conducted for Energy Solutions and Pacific Gas and Electric Company (PG&E) Evergreen Economics (2022).
[11] https://www.epa.gov/coronavirus/air-cleaners-hvac-filters-and-coronavirus-covid-19
[12] EPA region 1, How Does PM Affect Human Health, https://www3.epa.gov/region1/airquality/pm-human-health.html.
[13] Environmental Protection Agency et al. (2020). Wildfire Smoke Factsheet: Reduce Your Smoke Exposure. AirNow Publication, EPA-452/F-18-003, https://www.airnow.gov/sites/default/files/2021-07/reduce-your-smoke-exposure.pdf
[14] *See* Portable Home Appliances Saturation and Usage Study, conducted by for AHAM by the Stevenson Company (Feb. 2018) (AHAM Portable Appliances Study).

performance. The AHAM Verifide® Program is the only program testing air cleaners in an independent laboratory and providing confidence to consumers that an air cleaner meets its performance claims.[15]

Chemicals are present in every home. They are often undetectable, but many are odorous. Common sources include cooking, personal care products, cleaning products, furniture, flooring, and building materials. In addition, thousands of chemicals generated either indoors or outdoors can make their way into the home through the ventilation system or when people enter or exit.

Air cleaners are designed to mitigate many of these chemicals from indoor air. Consumers have a way to compare effectiveness of chemical and particulate reduction now that AHAM has published AHAM AC-4-2022, which serves as an industry-wide standard to test air cleaners for chemical removal. Soon, air cleaners that complete chemical testing through AHAM's Air Cleaner Certification Program will be assigned a numerical rating, c-CADR, for their ability to reduce chemicals in a given room size.

From visible pollutants, like pollen and dust, to those invisible to the naked eye, portable room air cleaners can provide an effective filtration method for those that do not have an installed kitchen filtration device such as a vent hood or downdraft ventilation system, and can augment ventilation even for those that do.

IV. The Key to Improving Indoor Air Quality Is Effective Ventilation

As noted in Section III.b.ii, ventilation or exhaust hoods include recirculation and filtration devices, as well externally vented vent hoods and down draft ventilation. A kitchen hood, exhaust hood, extractor hood, or vent hood is a device containing a mechanical fan that hangs above, or is integrated into or behind the cooking surface in the case of a downdraft, the range or cooktop in the kitchen. It removes airborne grease, combustion products, fumes, smoke, heat, and steam from the air by evacuation of the air and filtration. The efficacy of ranges hoods is not uniformly communicated to consumers and there is not a minimum efficacy requirement in all building codes.

Evidence shows that good ventilation equipment and practices can have a major impact on indoor air quality, including the emissions that are referenced in the RFI. Ventilation can reduce pollutant concentrations by more than 80 percent. Many of the ventilation studies, including studies performed in controlled laboratory conditions and studies performed in homes, measure Capture Efficiency. Capture Efficiency is the measure of the effectiveness of exhaust hoods, and is commonly measured as the percentage of CO_2 captured by the exhaust hood. CO_2 serves as a surrogate gas and is used to represent all cooking emissions.

The main variables affecting the Capture Efficiency of ventilation hoods are the type of hoods used, their size and location relative to the burners, the flow rate of the hoods, and which

[15] *See* https://AHAMverifide.org.

burners (or oven) are being used. Airflow rate and device design have more impact on Capture Efficiency than installation height for exhaust hoods.[16]

Some hoods can achieve high Capture Efficiencies of >80 percent and, in some instances, >90 percent for the highest fan settings when the backburners of the cooktops were used.[17] The Capture Efficiencies of those same hoods can decrease to 46 percent – 78 percent when the front burners were used.[18] Flow rate also impacts the effectiveness of exhaust hoods with every 100 Liters per second (Lps) increase in airflow resulting in an increase of ~33 percent for the Capture Efficiency.[19] One study also showed that if the exhaust device does not extend over the burners, there is a decrease in Capture Efficiency of ~20-25 percent.[20] AHAM notes that there is a balance for manufacturers: for example, hoods should extend far enough to capture the front burners, but must also not inhibit a tall person from standing next to the cooktop without bumping their head on the hood.

Even though the causal connection to health effects is unproven, ventilation can significantly reduce the concentrations of indoor pollutants related to cooking (regardless of the fuel source of the cooking product). There are, however, obstacles to the potential effectiveness of ventilation:

- The use of ventilation during cooking is not uniform or as extensive as it should be.

- Although building codes have required externally vented exhausts for cooking for many years, some homes have fans that do not vent outdoors. Instead the fan mixes the interior air which is less effective although better than no vent hood. Outdoor venting may not be a realistic option for all consumers, and other air cleaning and ventilation devices may need to be used.

- The effectiveness of fans increases as the flow rate increases. The sound of the fan also increases with increasing flow rate, which could discourage people from using the fan. To address this, appliance manufacturers and other vent hood manufacturers are developing products with improved sound levels.

- Vent hoods are more effective when they extend over burners. Some homes have vent hoods that do not extend over the front burners, reducing their effectiveness by 20-25 percent, but note the caveat above.[21]

The advantage of ventilation is that it addresses reductions in indoor air quality associated with all cooking emissions, whereas comparing use of electric range versus a gas range only addresses reductions in indoor air quality associated with emissions specific to gas

[16] Singer, B.C., Sherman, A.D., Hotchi, T., and Sullivan, D. P. 2011. Pollutant Removal Efficiency of Residential Cooking Exhaust Hoods. https://www.osti.gov/servlets/purl/1048291.
[17] *Id.*
[18] *Id.*
[19] Singer, B.C., Delp, W.W., Price, P.N., and Apte, M.G. 2012. Performance of installed cooking exhaust devices. Indoor air, 22, 3, 224–234. https://doi.org/10.1111/j.1600-0668.2011.00756.x
[20] *Id.*
[21] *Id.*

cooking and not the far more significant $PM_{2.5}$ (see below). Ensuring consumers understand the importance of ventilation, install improved ventilation, and use it should be an area of emphasis for CPSC and all stakeholders. AHAM has sought to partner with CPSC and EPA to improve consumer understanding of the benefits and importance of proper ventilation during cooking.

V. Upgrading Ventilation Requirements

ASHRAE 62.2, Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings, has for decades been working to establish the proper requirements for dealing with contaminants of concern. It notes that the most appropriate design approach and control strategy to mitigate emissions from the cooking process is to use a vent hood. It requires a minimum air flow and external venting (or equivalent continuous venting) regardless of the fuel. ASHRAE 62.2, which was most recently updated and published in 2022, has been incorporated or is in the process of being incorporated into various building codes.

- The International Codes (I-Codes), developed by the International Code Council, are a family of fifteen coordinated, modern building safety codes that help ensure the engineering of safe, sustainable, affordable and resilient structures.[22] Section M1503.3 Exhaust discharge in the International Residential Code, says that Domestic Cooking exhaust shall discharge to the outdoor through a duct.

- The Uniform Mechanical Code (UMC) in clause 405.4 requires a kitchen exhaust system, applicable equally for all kitchens regardless of the fuel/energy source which is consistent with ASHRAE 62.2.

States can create their own building codes based on their climates and own individual state goals. For ventilation requirements, the state building codes are typically based directly on the IRC, IMC or the UMC or even ASHRAE 62.2. However, there are exceptions that exist in the IRC, IMC or the UMC that may be used as authorization not to vent cooking effluents externally. The most progressive state building code is California's CEC Title 24, which is eliminating these exceptions.

CEC Title 24 requires single-family and multifamily dwelling units to comply with ASHRAE 62.2 (Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings), with modifications. Notably, recent amendments to this Building Code (2022) set airflow requirements for kitchen vent hoods (gas and electric) based on the project report noted below.[23]

CEC defined a minimum "Capture Efficiency" or minimum CFM in CEC Title 24-2022 but this is only a starting point requirement and does not relate to true efficacy. As noted previously, Capture Efficiency is the measure of the effectiveness of exhaust hoods. It is commonly measured as the percentage of CO_2 captured by the exhaust hood.

[22] *See* Section 1505 of the IRC (International Residential Code) and Section 403.3.2 of the IMC (International Mechanical Code) for the main requirements that are modeled after ASHRAE 62.2.
[23] CEC-500-2021-005, Effective Kitchen Ventilation for Healthy Zero Net Energy Homes with Natural Gas.

Additionally, AHAM has created a certification program to ensure compliance with the California standards and is working with others to improve ventilation efficiency.[24]

The kitchen ventilation equipment requirements for CEC title 24 are:

- The rated airflow value or rated Capture Efficiency value listed in the HVI, AHAM, or other CEC-approved directory.

- The sound rating value listed in the HVI, AHAM, or other CEC-approved directory.

The California Energy Commission (CEC) undertook a project, CEC-500-2021-005, Effective Kitchen Ventilation for Healthy Zero Net Energy Homes with Natural Gas, to create the CEC 2022 requirements. It concluded that to protect indoor air quality in airtight homes, California's Building Energy Efficiency Standards, Part 6 of the Title 24 Building Code, should require new homes to have mechanical ventilation.

Further, a recent CEC funded field study of 70 single-detached homes built to comply with the state's mechanical ventilation requirements found that almost all of the homes had general mechanical ventilation equipment that met the requirements of California's Building Energy Efficiency Standards. Measurements during a one-week period in each home, with the general mechanical ventilation systems operating, found that concentrations of several measured air pollutants were generally low and few homes had pollutant concentrations that exceeded thresholds for ambient air quality standards. All homes in that study had gas cooking products.

The project determined it is possible to provide kitchen exhaust ventilation that, when used routinely, will improve indoor air quality in homes of all sizes with either electric or gas burners. The project report also notes that because cooking, regardless of the energy source, generates pollutants, excluding gas cooking appliances does not eliminate the need for effective kitchen ventilation.[25]

The values in Table 150.0-G indicate that through modeling the noted flows (or Capture Efficiency) provide levels for NO_2 and $PM_{2.5}$ regardless of the size of the residence. These values are being studied further and the appropriate levels will be added to ASHRAE 62.2 -2025.

Table 150.0-G Kitchen Range Hood Airflow Rates (cfm) and ASTM E3087 Capture Efficiency (CE) Ratings According to Dwelling Unit Floor Area and Kitchen Range Fuel Type

Dwelling Unit Floor Area (ft^2)	Hood over Electric Range	Hood Over Natural Gas Range
>1500	50% CE or 110 cfm	70% CE or 180 cfm
>1000 - 1500	50% CE or 110 cfm	80% CE or 250 cfm
750 - 1000	55% CE or 130 cfm	85% CE or 280 cfm

[24] https://www.aham.org/AHAM/What_We_Do/Kitchen_Range_Hood_Certification.
[25] *See* CEC-500-2021-005, Effective Kitchen Ventilation for Healthy Zero Net Energy Homes with Natural Gas, p 7, https://www.energy.ca.gov/sites/default/files/2021-05/CEC-500-2021-005.pdf.

<750	65% CE or 160 cfm	85% CE or 280 cfm

The last step before updating the ventilation requirements is determining the appropriate Capture Efficiency levels. There is a standard that was developed to look at vent hood Capture Efficiency—ASTM E3087, Standard Test Method for Measuring Capture Efficiency of Domestic Range Hoods. However, repeatability and reproducibility are not yet acceptable with this test method. There is an ASTM working group to improve this test procedure made up of test labs, manufacturers, certification bodies, and other IAQ experts. The task at hand is significant. Currently, there is a 20 percent difference in measured Capture Efficiency between different labs with the same unit. AHAM and its members have been very active in the new Capture Efficiency test revisions (for example, mounting height, air inlet location, air inlet area, and statistical data smoothing techniques) to assure that they are effective (*i.e.*, repeatable and reproducible) in measuring the removal of pollutants. This ASTM working group is projecting to get these testing issues resolved by 2024. Once these updates are in place, manufacturers can more effectively communicate their vent hood's performance using the Capture Efficiency metric through updated product directories and can move these CE rating expectations into ASHRAE 62.2 and the building codes.

VI. Emissions and Exposures from Gas Cooking Products

AHAM reviewed over 40 articles purporting to study or in many cases analyze other studies (meta-studies or literature reviews) of emissions and exposure from gas cooking products. Literature on emissions and/or exposure generally report the values either in mass per unit time or unit energy (an emissions value, *e.g.*, g/hr or g/J) or as a concentration value (an exposure value, *e.g.*, ppb or g/m^3). The emissions data (g/hr or g/J) are less biased by influencing factors such as the size of the kitchen, the ventilation conditions, and the frequency and length of cooking. However, the exposure data provides values that are more directly related to exposure guidelines or health effects.

It is critical to distinguish between emissions and exposure. **Emissions** represents the amount of a pollutant released from the range and are mostly dependent on the range itself and the method and types of foods being cooked. An **exposure** is the concentration that occupants are exposed to as a result of the emissions from cooking. For a given emission, the exposure could vary greatly depending on many variables including the size of the kitchen, the air infiltration rate of the home, exposure time, the proximity of the person relative to the emission source, and whether ventilation was used while cooking. When assessing potential health effects, the exposure values are the values of greatest interest. Our below comments consider the literature on health effects after reviewing the literature on emissions/exposures.

Based on the review of the literature, the key pollutants studied within the literature were nitrogen dioxide and nitrogen oxides (NO_2 and NO_x), carbon monoxide (CO), particulate matter ($PM_{2.5}$ and PM_{10}), and methane (CH_4) There are a several key observations from review of gas cooking emissions/exposure literature.

a. Carbon Monoxide

For carbon monoxide, the maximum 8-hr average indoor CO concentrations measured during a 48-h monitoring period in 300 California homes were typically 5 ppm or lower[26] and the highest 1-hr average CO concentrations measured across 316 California homes were also approximately 5 ppm on average (arithmetic mean of 6.4 ppm and geometric mean of 3.8 ppm in Mullen et al. 2015). These values are below the 8-hr average California and National Ambient Air Quality Standards (9 ppm) and also below the 1-hr average California (20 ppm) and federal (35 ppm) ambient air quality standards.[27]

Modeling of residential natural gas combustion cooking estimates that CO concentrations may exceed the 1-hr CAAQS standard in less than 5 percent of California homes (20 ppm).[28] Where elevated CO concentrations were observed, indoor CO concentrations tended to be associated with smaller multiple family homes; homes that cook with gas ranges that have standing gas pilots; that have gas fired wall units or no heating units; and homes that have occupants that smoke and keep their homes warmer than average.[29]

We note that industry moved away from standing pilot lights in many gas cooking products since 1990[30] and all products by 2012 based on a combination of state laws and federal DOE energy conservation standard requirements which industry supported.[31] Fundamentally, it is not surprising that carbon monoxide emissions from gas cooking are well-controlled since the ANSI Z21.1 standard in some form has been in effect since 1925 and, as noted above, is effectively mandatory.

In August 2000, senior CPSC staff responsible for gas products concluded that "[w]hen used as intended, unvented gas ranges do not generally produce CO levels of consequence to healthy consumers, even if oven vents are up to 50% occluded."[32]

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[26] Colome, S. D., Wilson, A. L., Tian, Y. 1994. California residential indoor air quality study. Volume 2. Carbon monoxide and air exchange rate: A univariate and multivariate analysis. Topical report. Gas Research Institute. GRI-93/0224.3.

[27] California Air Resources Board, Carbon Monoxide & Health 2023. https://ww2.arb.ca.gov/resources/carbon-monoxide-and-health; Mullen, N. A., Li, J., Russell, M. L., Spears, M., Less, B. D., & Singer, B. C. 2015. Results of the California Healthy Homes Indoor Air Quality Study of 2011–2013: impact of natural gas appliances on air pollutant concentrations. LBNL-185629. https://doi.org/10.1111/ina.12190.

[28] Logue, J.M., Klepeis, N.E., Lobscheid, A.B., Singer, B.C. 2014. Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California. Environ. Health Perspect. 122, 43–50.

[29] Colome et al. 1994, p. 4-2.

[30] *See* 42 U.S.C. § 6295(h)(1).

[31] *See* Energy Conservation Program: Energy Conservation Standards for Certain Consumer Products (Dishwashers, Dehumidifiers, Microwave Ovens, and Electric and Gas Kitchen Ranges and Ovens) and for Certain Commercial and Industrial Equipment (Commercial Clothes Washers), 74 Fed. Reg. 16,039 (April 8, 2009).

[32] *See* CPSC Memorandum to Jordan, et al., Carbon monoxide (CO) emissions from residential gas ranges: projected consumer exposure and related health concerns (August 24, 2000).

b. Methane

Methane emissions occur from normal use of the appliance and from leaks from the appliance and nearby associated piping. The emissions from normal use occur from unburned methane released during on/off cycling of the burners and while the burners are in operation. The estimate of total U.S. methane emissions in 2016 from the U.S. EPA was 657.4 Tg CO_2e_{100},[33] and the estimated emissions of CH_4 from leaks and normal use from ranges was estimated at ~28 Gg CH_4 per year (~0.78 Tg CO_2e_{100} assuming 28 g CO_2 equivalent to 1 g of methane on a 100-year time scale).[34] Therefore, gas ranges account for ~0.1 percent of total methane emissions estimated by the U.S. EPA. Additionally, even when looking at the methane emissions from a 20-year time scale, the CO_2 equivalent of the estimated total methane emissions from gas ranges are a fraction of the estimated total emissions of CO_2 from the use of gas ranges.[35]

The potential health effects of methane emissions were also considered within the literature[36] due to the fact that natural gas can contain low concentrations of hazardous air pollutants, such as benzene. Modeling was performed to assess the potential exposures to benzene that could occur due to methane leaks. The study determined that "most model simulations – including all median value simulations – did not result in ambient benzene concentrations attributable to emissions of [natural gas] from gas stoves" that exceeds the California 8-hr REL of 0.94 ppbv.[37] Exceedance of the 8-hr benzene REL only occurred for certain geographic locations under the modeled conditions of low air exchange rates (0.05-0.35 ACH) and high methane leak rates (95 percent values from Lebel et al. 2022). In situations where there is an accumulation of methane or high methane leak rate, it is highly likely, due to purposeful odorant put in the gas, that the leak will be detected.

c. Particulate Matter

With respect to Particulate Matter ($PM_{2.5}$ and PM_{10}) exposures, the literature related to cooking clearly shows that this is the most significant kitchen pollutant. Concentrations of $PM_{2.5}$ can often exceed 100 $\mu g/m^3$ during cooking, which is above the California and EPA guidelines.[38] Because these emissions derive primarily from foodstuffs, the concentrations of $PM_{2.5}$ and PM_{10} are similar for gas and electric cooking.[39] Depending on the method and type of food, controlled

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[33] Merrin, Z. and Francisco, P.W. 2019. Unburned Methane Emissions from Residential Natural Gas Appliances. Environmental Science & Technology, 53 (9), 5473-5482. https://pubs.acs.org/doi/pdf/10.1021/acs.est.8b05323.
[34] Lebel, E.D., Finnegan, C.J., Ouyang, Z., Jackson, R.B. 2022. Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes. Environ. Sci. Technol., 56, 4, 2529–2539. https://pubs.acs.org/doi/10.1021/acs.est.1c04707.
[35] *Id.*
[36] Lebel, E.D., Michanowicz, D.R., Bilsback, K.R., Hill, L.L.Goldman, J.S.W, Domen, J.K., Jaeger, J.M., Ruiz, A., Shonkoff, S.B.C. 2022. Composition, Emissions, and Air Quality Impacts of Hazardous Air Pollutants in Unburned Natural Gas from Residential Stoves in California. Environ. Sci. Technol., 56, 22, 15828-15838. https://pubs.acs.org/doi/10.1021/acs.est.2c02581.
[37] *Id.* at p. 15835.
[38] Fortmann R., Kariher P., and Clayton R., Indoor Air Quality: Residential Cooking Exposures. Final Report. 2001. Sacramento, CA: California Air Resources Board.
[39] Hu, T., Singer, B. C., & Logue, J. M. 2012. Compilation of Published PM2.5 Emission Rates for Cooking, Candles and Incense for Use in Modeling of Exposures in Residences. United States. https://doi.org/10.2172/1172959; Fortmann et al. 2001.

tests have resulted in higher $PM_{2.5}$ and PM_{10} values for electric cooking than gas cooking (and vice-versa).[40]

There is significant variability in $PM_{2.5}$ and PM_{10} emissions depending on the type of food cooked (some oils and higher fat foods tend to produce more), as well as whether the burner, whether gas or electric, has residual food on it, and that variability is larger than observed differences between electric and gas cooking.[41] $PM_{2.5}$ concentrations in rooms other than the kitchen can reach levels equal to or above the 24-hr NAAQS guideline (35 $\mu g/m^3$) and typical 98th percentile $PM_{2.5}$ levels in high pollution cities (e.g. Los Angeles, CA).[42] The concentrations in the kitchen can reach even higher levels, and in some cases, reach values above 500 $\mu g/m^3$ for both gas and electric ranges.[43]

d. Nitrogen Dioxide

With respect to NO_2 exposures from the literature related to cooking, the attributable increase in average measured NO_2 associated with gas cooking product usage compared to electric cooking product usage range from ~3 ppb increase[44] to ~15 ppb increase.[45] Factors affecting the amount of increase include: type of structure, the season when measurements taken, and location of measurement (kitchen, bedroom, living room, etc.). These studies do not draw a causal connection or account for other possible sources of NO_2. In homes with electric cooking, indoor average NO_2 concentrations are typically around 5-15 ppb, while average NO_2 concentrations in homes with gas cooking typically range from 10-40 ppb.[46] The significance of these emissions from a health effects point of view is discussed below.

VII. Review of Health Effects Literature

AHAM reviewed over 30 relevant articles classified under the category of health effects. The majority of articles focused on respiratory health effects. In regards to gas cooking, NO_2 was the main pollutant examined for potential health effects likely because NO_2 is a criteria air pollutant and a specific byproduct of natural gas combustion, whereas Particulate Matter is not unique to gas or electric cooking. This creates a bias in scrutiny of NO_2 even though, as discussed below, PM generated during the cooking process is far more important. Many studies did not investigate a specific pollutant but instead investigated an association between gas cooking and health effects.

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[40] Fortmann et al. 2001.
[41] Hu et al. 2012.
[42] Fortmann et al. 2001.
[43] *Id.*
[44] Kornartit, C., Sokhi, R. S., Burton, M. A., & Ravindra, Khaiwal. 2010. Activity pattern and personal exposure to nitrogen dioxide in indoor and outdoor microenvironments. Environment International. 36(1): 36-45.
[45] Lee, K., Levy, J. I., Yanagisawa, Y., Spengler, J. D., & Billick, I. H. 1998. The Boston Residential Nitrogen Dioxide Characterization Study: Classification and Prediction of Indoor NO_2 Exposure. Journal of the Air & Waste Management Association. 48(8): 736-742; Mullen et al. 2015.
[46] Kornartit et al. 2010; Lee et al. 1998; and Mullen et al. 2015.

The meta-analysis by Lin et al. indicated an association between gas cooking and current asthma, lifetime asthma, and all asthma, but its findings are of limited utility.[47] The analysis included only a limited number of studies from North America (only 3 for current asthma, 3 for lifetime asthma, and 6 for all asthma), and the 95 percent confidence interval from some individual studies were large (for example, the Behrens 2005 study from the meta-analysis reported an odds ratio of 0.77 with a 95 percent confidence interval of (0.17, 3.46)), indicating uncertainty in the calculation of risk estimates of asthma associated with gas cooking. [48] Furthermore, when looking at the meta-analysis stratified by study region, the association between gas cooking and asthma (current, lifetime and all) was not significant for studies from North America, suggesting that the association between childhood current asthma and gas cooking in North America may differ from the association found when all geographic regions were included within the meta-analysis.

The meta-analysis also investigated the relationship between indoor NO_2 and asthma. One of the potential hypotheses was that the reason for the association between gas cooking and asthma found in the meta-analysis is due to indoor NO_2. However, the meta-analysis failed to show an association for the subset of studies that examined indoor NO_2 and current asthma in children. The authors of the meta-analysis concluded that the "finding of an association between gas cooking and asthma in the absence of an association between measured NO_2 and asthma suggests that gas cooking may act as a surrogate for causal variables other than air pollutants produced by gas combustion."[49]

A large international study with more than 500,000 children surveyed in total (~300,000 who lived in residences with gas cooking) did not find greater rates of asthma compared to children with electric ranges.[50] This study included a very large sample size compared to many of the studies included in the meta-analysis by Lin et al. 2013. However, the finding of this study is inconsistent with the finding of the Lin et al. meta-analysis, because it found there was not an association between gas cooking and asthma.[51]

[47] Lin, W., Brunekreef, B., Gehring, U. 2013. Meta-analysis of the effects of indoor nitrogen dioxide and gas cooking on asthma and wheeze in children. Int. J. Epidemiol. 42(6): 1724-37.
[48] Behrens, T., Maziak, W., Weiland, S. K., Rzehak, P., Siebert, E., Keil, U. 2005. Symptoms of asthma and the home environment. The ISAAC I and III cross-sectional surveys in Munster, Germany. Int Arch Allergy Immunol. 137: 53–61.
[49] Lin et al. 2013, at p. 1734.
[50] Wong, G., Brunekreef, B., Ellwood, P., Anderson, H., Asher, M., Crane, J., Lai, C. 2013. Cooking fuels and prevalence of asthma: a global analysis of phase three of the International Study of Asthma and Allergies in Childhood (ISAAC). Lancet Respir. Med. 1(5): 386-394.
[51] *Id.*

	Adjusted model		Multivariate analysis	
	6–7 years	13–14 years	6–7 years	13–14 years
Current wheeze	0·98 (0·92–1·04)	0·99 (0·94–1·04)	0·96 (0·89–1·03)	0·99 (0·92–1·07)
Current symptoms of severe asthma	1·01 (0·92–1·10)	0·97 (0·91–1·03)	0·97 (0·87–1·09)	0·97 (0·89–1·07)
Asthma ever	0·95 (0·89–1·01)	0·98 (0·93–1·02)	0·94 (0·88–1·02)	0·99 (0·93–1·05)
Current symptoms of rhinoconjunctivitis	1·04 (0·97–1·01)	0·96 (0·91–1·01)	1·00 (0·92–1·09)	0·99 (0·92–1·06)
Hay fever ever	1·02 (0·95–1·09)	0·96 (0·91–1·01)	1·00 (0·92–1·09)	0·99 (0·92–1·07)
Current symptoms of eczema	0·97 (0·91–1·03)	1·00 (0·94–1·06)	0·94 (0·87–1·02)	1·00 (0·92–1·09)
Eczema ever	0·91 (0·86–0·96)	0·99 (0·93–1·04)	0·93 (0·88–0·99)	1·01 (0·93–1·09)

Data are odds ratio (95% CI), unless otherwise stated. The reference category for these estimates is electricity only used for cooking.

Table 7: Association between use of gas only for cooking and current symptoms of asthma, rhinoconjunctivitis, and eczema, by age group [52]

Although some epidemiological studies have associated gas cooking with asthma in children, other larger studies have found no association. **Therefore, the literature is inconsistent in finding an association and also inconclusive in identifying the source of the association, if one exists**. It should be noted that the observation of an association between gas cooking and asthma does not prove that fuel emissions from gas cooking causes asthma. The association could be due to other confounding factors not accounted for in the analysis, for example, housing characteristics, cooking habits, ventilation use habits, and factors related to socio-economic status.

The reviewed literature also examined the relative risk of NO_2 and $PM_{2.5}$ for indoor air pollution. Using representative indoor air concentrations from the literature, a methodology was developed to assess the impact of the various health effects for various pollutants. The analysis was first performed in 2012[53] and updated in 2022.[54] The updated analysis estimated that the health impact from $PM_{2.5}$ was ~10 times greater than the health impact from NO_2.[55] Additionally, the representative concentrations used in the analysis represent average indoor concentrations, however the peak $PM_{2.5}$ concentrations in the literature can be 1-2 orders of magnitude larger than the representative concentration used in the study. The findings from this literature stress the importance of addressing particulate matter ($PM_{2.5}$ and also PM_{10}) and indicate that particulate matter is an indoor pollutant of greater concern than NO_2.

The emission of particulate matter is primarily an issue of the foodstuffs themselves versus the burners, gas or electric. Studies from the literature indicate that $PM_{2.5}$ emissions/exposures can increase by orders of magnitude when performing certain methods of

[52] *Id.*
[53] Logue, J. M., Price, P. N., Sherman, M. H., Singer, B. C. 2012. A method to estimate the chronic health impact of air pollutants in U.S. residences. Environ Health Perspect. 120(2):216-22.
[54] Morantes, G., Jones, B., Sherman, M., Molina, C. 2022. Health impacts of indoor air contaminants determined using the DALY metric. AIVC Proceedings. https://www.aivc.org/sites/default/files/AIVCProceedings_095.pdf.
[55] *Id.*

cooking (e.g. frying) or cooking with certain foods (e.g. oils) compared with average emissions from cooking with gas or electric burners.[56]

A paper from the National Propane Gas Association noted that there are 22 states that have an asthma rate equal to or greater than the national average of 9.8 percent. Of those 22 states only four have higher gas range usage than the national average. In fact, across the 22 states with equal to or higher than average asthma rates, gas cooking products usage was an average of 7.8 percent less than the national average.[57]

This issue clearly requires greater study, but we note that medical experts are confounded by the causes of asthma. Below is a survey of potential causes from medical experts. None of these list gas cooking products.

Source	Causation Statement	Asthma Triggers
Mayo Clinic[58]	"It isn't clear why some people get asthma and others don't, but it's probably due to a combination of environmental and inherited (genetic) factors."	Airborne allergens; Respiratory infections; Physical activity; Cold air; Air pollutants; Certain medications; Stress; Certain food additives; Gastroesophageal reflux
American Lung Association[59]	"Scientists continue to explore what causes asthma…"	Family history; Allergies; Respiratory infections; Occupational exposures; Smoking; Air pollution; Obesity
UK National Health Service[60]	"The exact cause of asthma is unknown."	Infections; Allergies; Smoke, fumes and pollution; Certain medications; Stress; Weather; mold or damp air; Exercise; Occupational exposures

[56] Hu et al. 2012 and Fortmann et al. 2001.
[57] National Propane Gas Association, Gas/Electric Stove Usage vs. Asthma Rates (2023), https://www.npga.org/wp-content/uploads/2023/01/Gas-and-Electric-Stoves-vs.-Asthma-Rates-v2-2.pdf
[58] Mayo Clinic, Asthma (2023), https://www.mayoclinic.org/diseases-conditions/asthma/symptoms-causes/syc-20369653
[59] American Lung Association, Asthma Causes & Risk Factors (2023), https://www.lung.org/lung-health-diseases/lung-disease-lookup/asthma/learn-about-asthma/what-causes-asthma
[60] NHS, Causes: Asthma n8 (2023), https://www.nhs.uk/conditions/asthma/causes/

Source	Causation Statement	Asthma Triggers
Cleveland Clinic[61]	"Researchers don't know why some people have asthma while others don't."	Allergies; Toxins, fumes, secondhand smoke; Genetics; Respiratory infections; Air pollution; Dust mites; Exercise; Mold; Pests; Pets; Tobacco smoke; Strong chemicals; Occupational exposures
American College of Allergy, Asthma & Immunology[62]	"Asthma can be hard to predict."	Allergens; Smoke, chemical fumes, strong odors; Exercise; Weather conditions; Certain drugs; Stress; Cold, flu; Food additives
US Centers for Disease Control and Prevention[63]	"If you have asthma, an asthma attack can happen when you are exposed to 'asthma triggers.' Your triggers can be very different from those of someone else with asthma."	Tobacco smoke; Dust mites; Outdoor air pollution; Pests; Pets; Mold; Cleaning and disinfection; Cold, flu, RSV; Physical exercise; Some medications; Food additives; Fragrances; Bad weather; Stress
National Institutes of Health[64]	"The exact cause of asthma is unknown, and the causes may be different from person to person. However, asthma often happens when the immune system strongly reacts to a substance in the lungs."	Allergens; Viral infections; Stress; Physical activity; Certain medicines; Poor air quality; Cold air

VIII. Ventilation Solutions for Emissions and Exposures Relating to Gas or Electric Cooking

As discussed, the most effective mitigation for emissions created by both electric and gas cooking is increased use of vent hoods. Other mitigation measures include recirculating fans

[61] Cleveland Clinic (2023), Asthma, https://my.clevelandclinic.org/health/diseases/6424-asthma
[62] American College of Allergy, Asthma & Immunology (2023), What Causes Asthma?, https://acaai.org/asthma/asthma-101/what-causes-asthma/
[63] US Centers for Disease Control and Prevention (2023), Common Asthma Triggers, https://www.cdc.gov/asthma/triggers.html
[64] National Institutes of Health (2023), Asthma: Causes and Triggers, https://www.nhlbi.nih.gov/health/asthma/causes

(over-the-range microwave ovens when recirculating mode is selected), air cleaners, vacuums, utility fans). There are now filtration vent hoods on the market that are essentially an air cleaner above the range.

AHAM encourages ventilation and filtration while cooking. Our communications note that proper ventilation is an important component to ensuring better quality indoor air, reducing cooking odors and removing moisture, heat, and pollutants that accumulate while cooking with gas or electric ranges. For example, AHAM communications offer the following tips:

- Before you begin cooking, ensure that the entire cooking area, including the range top and surrounding counters are clean and free of grease and food residue.

- If your kitchen is equipped with a downdraft or ventilation hood, turn it on prior to cooking to allow for increased airflow. Leave it on for at least 10 minutes afterward. And, when possible, open windows to increase airflow.

    - If you do not have a ventilation hood or downdraft, open windows or turn on a ceiling fan, if possible, to create better airflow.

- There are many types and styles of ventilation equipment available, including downdrafts and kitchen ventilation hoods in a variety of CFM ratings.

    - More information about CFM ratings and a directory of models by CFM can be found at https://www.aham.org/AHAM/What_We_Do/Kitchen_Range_Hood_Certification.

- Consider the type of cooking that you will be doing. The setting of the ventilation hood should match the type of cooking. For example, for high heat cooking, or using multiple burners, use the most powerful setting to ventilate.

- Match the burner size to the size of the cookware. For your safety and for cooking efficiency, do not allow the flame to extend beyond the bottom surface of the pan.

- Cook on the back burners, if possible, because the vent hood exhausts this area more effectively.

IX. AHAM Supports and is Proactively Involved in the Review and, as Justified, Revision of Consensus Standards

There are number of consensus standards that impact indoor air quality and emissions from cooking, electric, or gas. Some relevant standards are:

- Building Codes (UMC, IMC,CEC)

- Indoor Air Guidelines (WHO and Health Canada have set these. There are none in the US at this time. EPA outdoor air limits or adoption of the Health Canada limits in the US have been used for consensus standards discussions.)

- Source Reduction (Range Standards (Gas – ANSI Z21.1, Electric – UL 858)

- Whole Home Ventilation (ASHRAE 62.2)

- Local/Range Ventilation (ASHRAE 62.2 Range Hood Safety (Range Hood – UL507; MWO – UL923)

- Vent Hood Performance

    - Capture Efficiency(ASTM E3087)
    - Sound (AMCA 300/HVI 915)
    - Air Flow ((AMCA 210/HVI 916)

- Air Cleaning Filtration (ANSI/AHAM AC-4)

- Interactions and Installation (NEC – NFPA70 & Fuel Gas Code – NFPA 54)

- Sensors (UL2034/2075)

- Interconnectivity (UL Jtg on Connected Product (UL858/ANSI Z21.1 + UL5500)

More specifically, we note that:

- IEC has established an ad-hoc group (AHG) reviewing venting and gas ranges (AHG57), which in addition to other areas of the IEC range hood standard will be reviewing a possible interlock between the gas hob and the range hood. (IEC TC61 61/6757/AC). AHAM has not taken a position on this design option but we accept that all possible options should be thoroughly reviewed and we will be part of the AHG.

- It is fundamental that a standard cannot be considered for revision unless the base case and future possible revisions can be measured in a uniform and repeatable manner which is not unduly burdensome to conduct. In that regard, on April 26, 2023, AHAM submitted a test method proposal to CSA for ANSI Z21.1. The proposal is a framework for how NO_2 testing of gas ranges can be accomplished. It combines a test procedure used for gas ranges in Australia[65] (with some variations) and one that is used for gas heaters.[66] AHAM asked that a working group of the ANSI Z21.1 Technical Standards Committee (TSC) be established to address open issues and make sure there is a repeatable and reproducible procedure. The next meeting of this group is on May 8, 2023

[65] *See* AS/NZ 5263.1.1.
[66] *See* ANSI Z21.11.2.

and the TSC will review the proposal and take the appropriate next steps towards creating the working group.

- CPSC established a joint task group to potentially make recommendations to various affected consensus standards and code bodies. The CPSC task force was created in July 2021. It is led by CPSC and is co-chaired by AHAM and RMI.

    - There is a Working Group 2 under this Joint Task group to establish limits, as may be required and justified, for CO, NO_2, and $PM_{2.5}$ that would be measured in the room. Currently, the proposal by this group is to adopt the Canadian IAQ Guidelines. This is currently being studied further to assess the impact of the guidelines in Canada. Any adoption of these guidelines should be supported by EPA. Among numerous other actions, revisions to the gas cooking product standard would help support the IAQ guidelines.

    - There is also a Working Group 3 under the joint task group to develop a test method for gas cooking products in parallel with AHAM's activity noted above. There will need to be correlation testing between the WG2 recommendations and the measurements that would be taken at the cooking product with the WG3 or AHAM submitted test method, leading to, as justified, a revision to ANSI Z21.1 to establish the emission limits.

We recently were informed that CPSC is withdrawing from its co-chairmanship of the joint-task group. We are disappointed in this decision because CPSC leadership is key, but we are fully committed to the consensus standards process and urge CPSC full involvement wherever possible.

The standards development discussed above is complex and should be done thoroughly, but AHAM is committed to an accelerated and intensive effort to move these projects forward. We welcome CPSC and public scrutiny of progress and results.

X. Labeling

AHAM does not support labeling relating to emissions nor are test procedures or revised consensus standards in place that would make such labeling accurate or useful to consumers. Once the standard is revised than the same marks of certification and compliance used today will suffice.

XI. Agency Coordination

Importantly, AHAM notes that DOE is currently engaged in regulatory activity that would establish energy conservation standards based on efficiency performance on gas and electric cooktops.[67] The proposed standards are significantly more stringent for gas products than

[67] Supplemental Notice of Proposed Rulemaking (SNOPR or 2023 SNOPR) for Energy Conservation Standards for Residential Conventional Cooking Products; Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD15; 88 Fed. Reg., 6818 (Feb. 1, 2023).

for electric products, such that a significant number of gas products would require redesign to meet the proposed standards and many important features would be lost. The technology option DOE identifies as being available to improve the efficiency of gas products is "burner and grate optimization" which essentially means changing the flame angle, grate design, and distance from the burner to the cookware. The expected compliance timeline is 2027.

Regardless of opinions on whether these proposed standards are justified or achievable, it is important to note that this design option is in conflict with the goal of improving indoor air quality associated with cooking, especially gas cooking. The ongoing work on CPSC Working Group 3's NO_2 standard may require product redesign and the timeline is likely to be quite close to DOE's expected compliance date. Most importantly, however, the NO_2 standard could impact manufacturers' ability to "optimize" burners and grates because, to effectively address NO_2 emissions, more energy may be required. AHAM has urged DOE to review the impact of necessary safety changes for NO_2.[68]

AHAM encourages DOE, EPA, and CPSC to coordinate to avoid imposing cumulative or conflicting burdens on manufacturers in terms of the substantive requirements and the timing. It is important to ensure that DOE's requirements do not hinder a manufacturer's ability to comply with improved consensus standards. CPSC should communicate the importance of these efforts to DOE and work with DOE to ensure that it does not impose changes that make it more difficult to design products that are intended to improve safety, a far more important goal than the modest energy gains new DOE standards would achieve.

AHAM urged DOE to ensure that its timeline does not result in multiple redesigns in close time—*e.g.*, to time its standard with that of potential new consensus standards such that a cooktop need not be redesigned for energy and then nearly immediately be redesigned to meet safety standards requirements.[69] We urge CPSC to make the same request.

XII. Conclusion

Issues surrounding indoor air quality in residences, in the kitchen and related to all cooking, including gas cooking, are complex and involve numerous variables. There is no established causal connection between potential compromised indoor air quality caused by cooking and adverse health effects. Notwithstanding the lack of a causal connection, some cities began debating whether to ban gas cooking products. As that debate evolved, NO_2 was singled out as an indoor health concern, not because it is the primary indoor health concern for cooking, but because it is an emission found from a gas flame and not an electric burner. The justification to single out gas cooking, as part of a public policy debate over electrification, is based on a weak empirical foundation considering the testing and studies.

Nonetheless, the appliance industry welcomes opportunities to follow evolving science to continually improve the safety of products. All stakeholders should be working toward improvements focused on improving ventilation in existing and new residences, improving the

[68] AHAM Comments on DOE's SNOPR on Energy Conservation Standards for Residential Conventional Cooking Products; Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD15 (April 17, 2023).
[69] *Id.*

effectiveness of ventilation devices of various types and revising the consensus standard relevant to gas emissions to take into account the most current information.

These activities can be done in parallel. Some require continuing campaigns and efforts of communication, education and upgrading of building codes and the consensus standard. Nonetheless, health and safety issues should not be politicized and significant strides protective of the well-being and health of US consumers can be achieved in relatively short order. AHAM will continue to be a leader in this area.

Respectfully Submitted,

Jennifer Cleary
Vice President, Regulatory Affairs

About AHAM: AHAM represents more than 150 member companies that manufacture 90 percent of the major, portable and floor care appliances shipped for sale in the U.S. Home appliances are the heart of the home, and AHAM members provide safe, innovative, sustainable and efficient products that enhance consumers' lives. The home appliance industry is a significant segment of the economy, measured by the contributions of home appliance manufacturers, wholesalers, and retailers to the U.S. economy. In all, the industry drives nearly $200 billion in economic output throughout the U.S. and manufactures products with a factory shipment value of more than $50 billion.