



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.<sup>1</sup> 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**

<b>Test Sample</b>	<b>Percentage of Gas Cooking Top Models Meeting the Proposed Standard Level</b>	<b>Percentage of Smooth-Electric Cooking Tops Meeting the Proposed Standard Level</b>
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

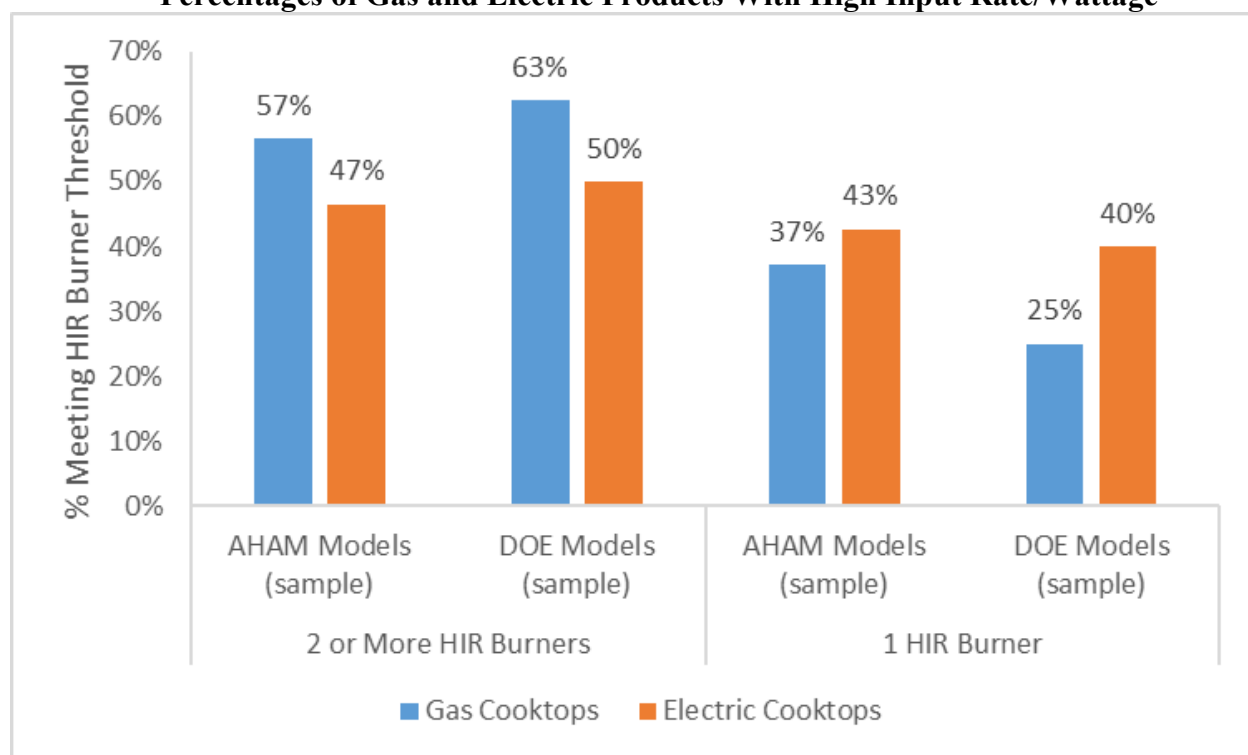
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<sup>1</sup> Seventeen percent of gas products meet the proposed standard if the additional units that DOE reported on in its subsequent notice of data availability (NODA) are included. *See* Energy Conservation Standards for Consumer Conventional 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**



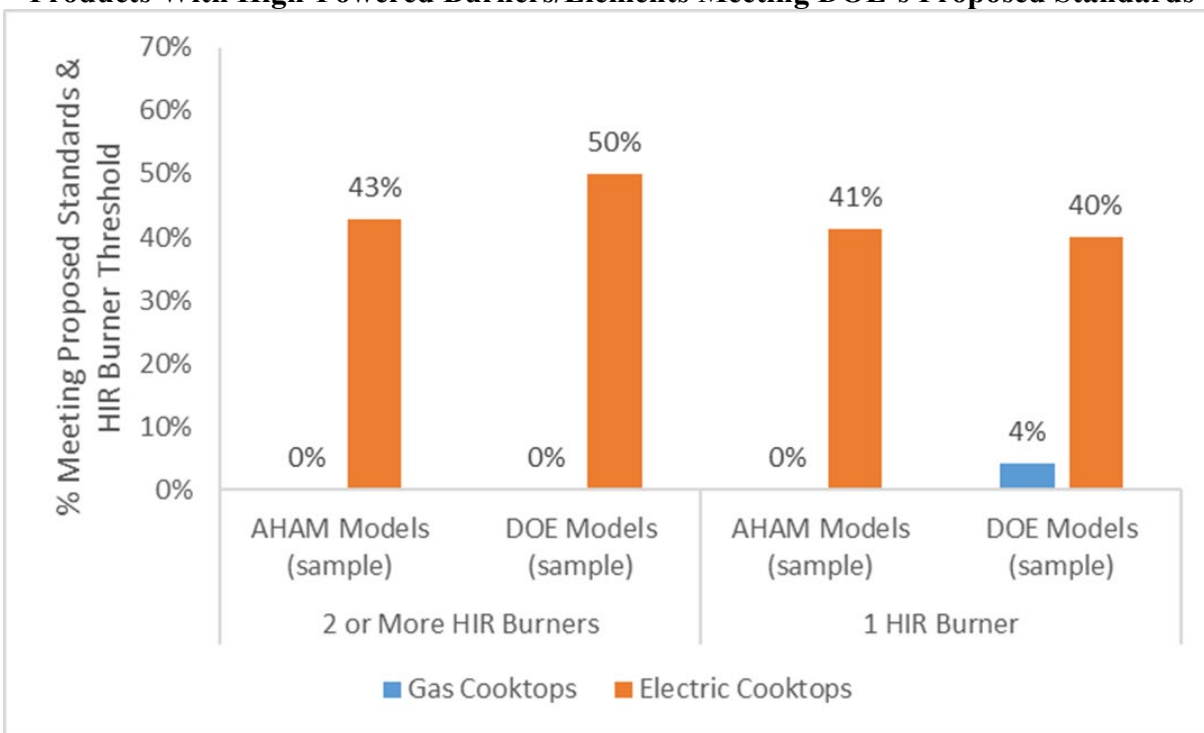
“HIR” electric is defined as 2,600 W | HIR gas is defined, per DOE, as 14,000 Btu

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.

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

<b>Product Type</b>	<b>DOE Test Sample</b>	<b>2022 AHAM Shipments</b>
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.

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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.<sup>2</sup> 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 SNO PR.

**AHAM Cooktop Testing: Test Sample Composition**

	<b>Gas*</b>	<b>Electric**</b>
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.

<b>Fuel Type</b>	<b>Product Type</b>	<b>DOE Test Sample</b>	<b>AHAM Test Sample</b>	<b>AHAM Shipments 2022</b>
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—

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<sup>2</sup> Although DOE did extend the comment period on this SNO PR 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”<sup>3</sup> per sections 6(b)(3)(i) and 7(b)(1) of the Process Rule.<sup>4</sup> 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).<sup>5</sup> 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**

<b>Gas</b>	<b>Electric</b>
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

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<sup>3</sup> 2023 SNOPR, at 6832.

<sup>4</sup> See 10 CFR 430, subpart C, appendix A (Process Rule).

<sup>5</sup> 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 SNO PR 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.<sup>6</sup>

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 SNO PR 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.<sup>7</sup>

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<sup>6</sup> 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, 2023).

<sup>7</sup> We also note that DOE has not addressed how to treat connected products.

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DOE itself has acknowledged the variation in the test procedure. Specifically, DOE released repeatability and reproducibility analysis in the test procedure NODA.<sup>8</sup> 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.<sup>9</sup>

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.<sup>10</sup>

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),<sup>11</sup> 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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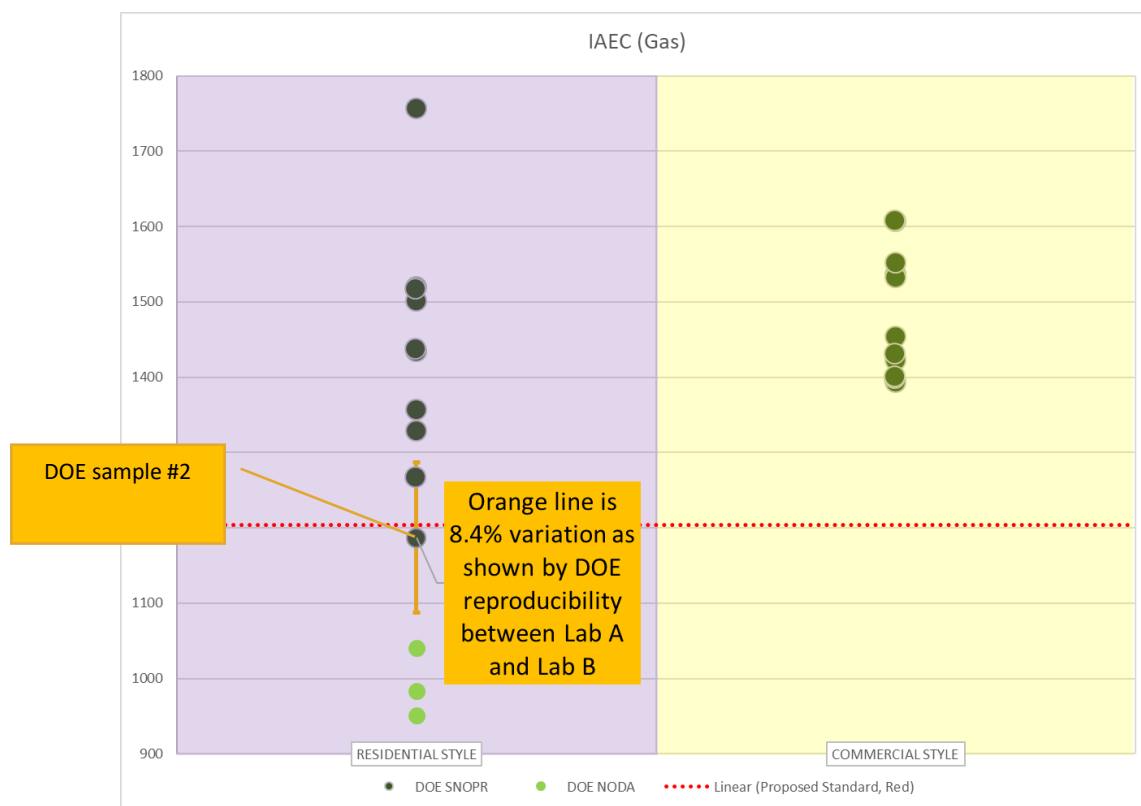
<sup>8</sup> Test Procedure for Cooking Products: Notification of Data Availability (NODA); Docket No. EERE-2021-BT-TP-0023; RIN 1904-AF18; 86 Fed. Reg. 71406 (Dec. 8, 2021).

<sup>9</sup> 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.

<sup>10</sup> 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.”).

<sup>11</sup> 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.**<sup>12</sup>

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

<sup>12</sup> *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.<sup>13</sup> In response, DOE published a notice of data availability on February 28, 2023 (NODA).<sup>14</sup> 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

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<sup>13</sup> 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.").

<sup>14</sup> 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).

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sample?” DOE’s consultant responded, “I don’t believe there is information to suggest that versus even the opposite. There’s no information available.”<sup>15</sup>

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 SNO PR 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.”<sup>16</sup>

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 SNO PR 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 SNO PR for determining the percentage of products that would meet its proposed standards. In the SNO PR, 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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<sup>15</sup> 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).

<sup>16</sup> Dabs, Brian, “DOE Rule May Block 50% Of Current Gas Stove Models,” E&E News (Feb. 24, 2023), *available at* [www.eenews.net/articles/doe-rule-may-block-50-of-new-gas-stoves/](http://www.eenews.net/articles/doe-rule-may-block-50-of-new-gas-stoves/).

## PUBLIC VERSION

In the SNO PR, 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 SNO PR 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 SNO PR.<sup>17</sup> The SNO PR 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 SNO PR 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 SNO PR, 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

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<sup>17</sup> 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.<sup>18</sup> 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 SNO PR and again in the 2023 SNO PR proposes prescriptive design requirements for the control system of conventional ovens.<sup>19</sup>

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

<sup>19</sup> *Id.*



their purchase drivers.<sup>20</sup> 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.”<sup>21</sup> 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.

<sup>20</sup>Bellomy on Behalf of AHAM, Appliance Efficiency Regulatory Impact Consumer Research (July 2022).

<sup>21</sup> 2023 SNOPR at 6845.

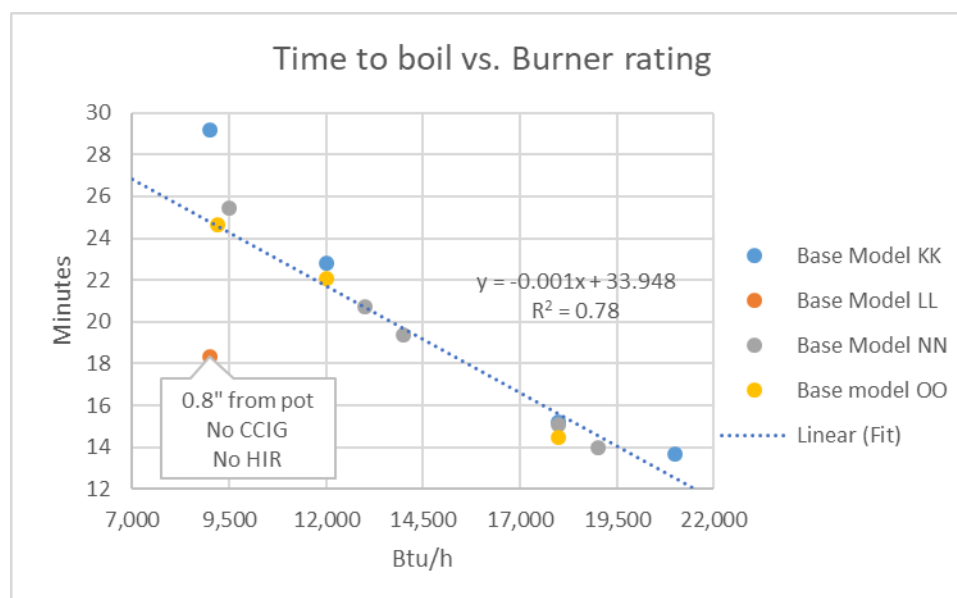
When asked what they would like their cooktop to do better, consumers indicated that they want the cooktop to boil water faster and have another high input burner. Those were in the top five wishes. Additionally, consumers want more than one large burner because they have more than one large pan to put 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.**<sup>22</sup> 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.

<sup>22</sup> 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.<sup>23</sup>

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.

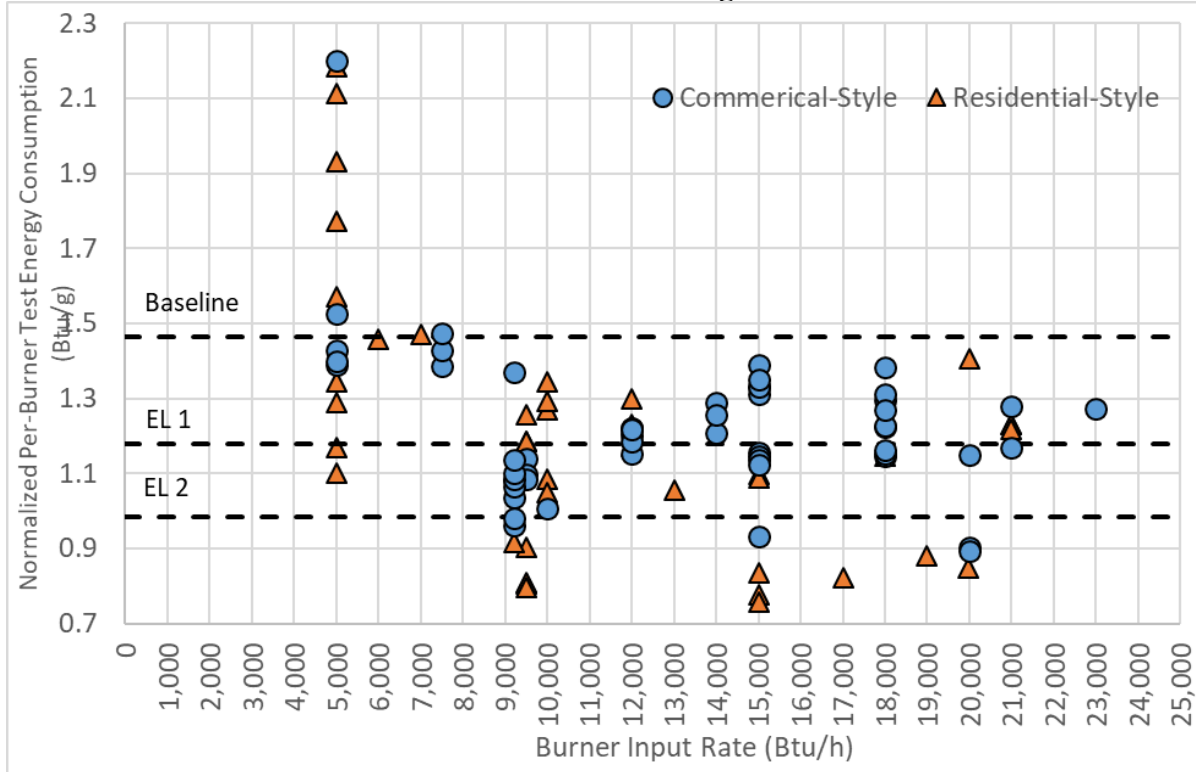
Low input rate burners are smaller in diameter and, therefore, have 30-40 percent lower minimum input rates than traditional (non-multi-ring) burners. This allows for lower heat transfers to the cookware and gives consumers a wider range of cooking temperatures.

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.

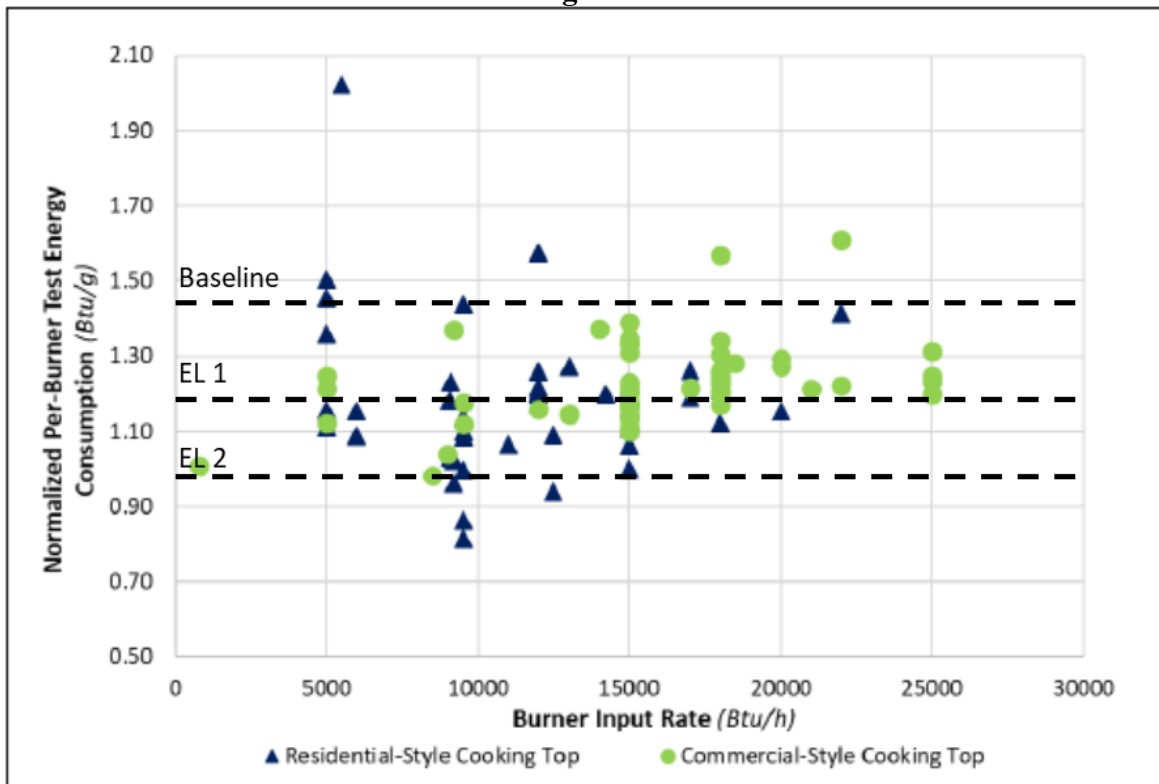
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<sup>23</sup> See <https://www.consumerreports.org/products/cooktops-28977/gas-cooktop-28692/view2/>.

**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					
	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. No ranges in DOE’s or AHAM’s sample meet DOE’s proposed energy conservation 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. 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.”<sup>24</sup> 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

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<sup>24</sup> *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.<sup>25</sup> 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.

<b>Products Meeting DOE’s Proposed Standards (%)</b>		
	<b>Electric Smooth Cooktops</b>	<b>Electric Smooth Ranges</b>
DOE Test Sample	12 of 13 models or 92%	4 of 7 models or 57%
AHAM Test Sample		

<sup>25</sup> 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%
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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.**

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

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<sup>26</sup>:

- Continuous cast iron grates; and
- $\geq 4$  burners; and
- at least one burner  $\geq 14k$  Btu/h; and
- meets at least one of the following conditions:
  - a. Total burner output  $\geq 56,000$  Btu **and** average burner input rate of  $\geq 14k$  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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<sup>26</sup> 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  $1,175\text{kBtu} + 102\text{kBtu} = 1,277\text{kBtu}$ . 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**

<b>Product Class</b>	<b>AHAM Proposed Baseline</b>
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.<sup>27</sup> 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.

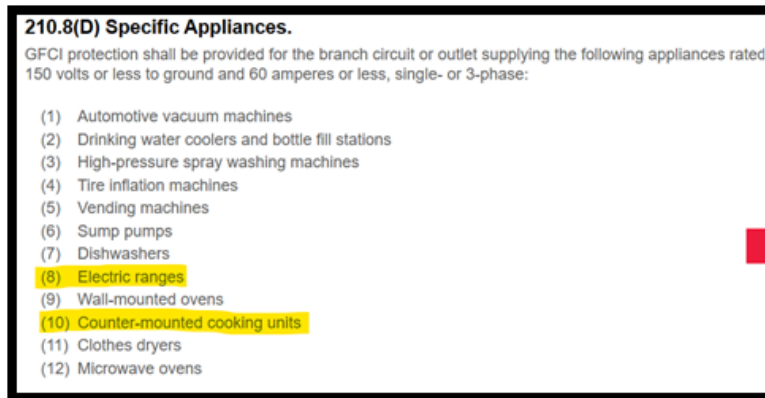
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<sup>27</sup> AHAM Comments on DOE’s SNOPR for Energy Conservation Standards for Residential Conventional Cooking Products; Docket No. EERE-2014-BT-STD-0005; RIN 1904-AD15 (Nov. 2, 2016).

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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).



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).

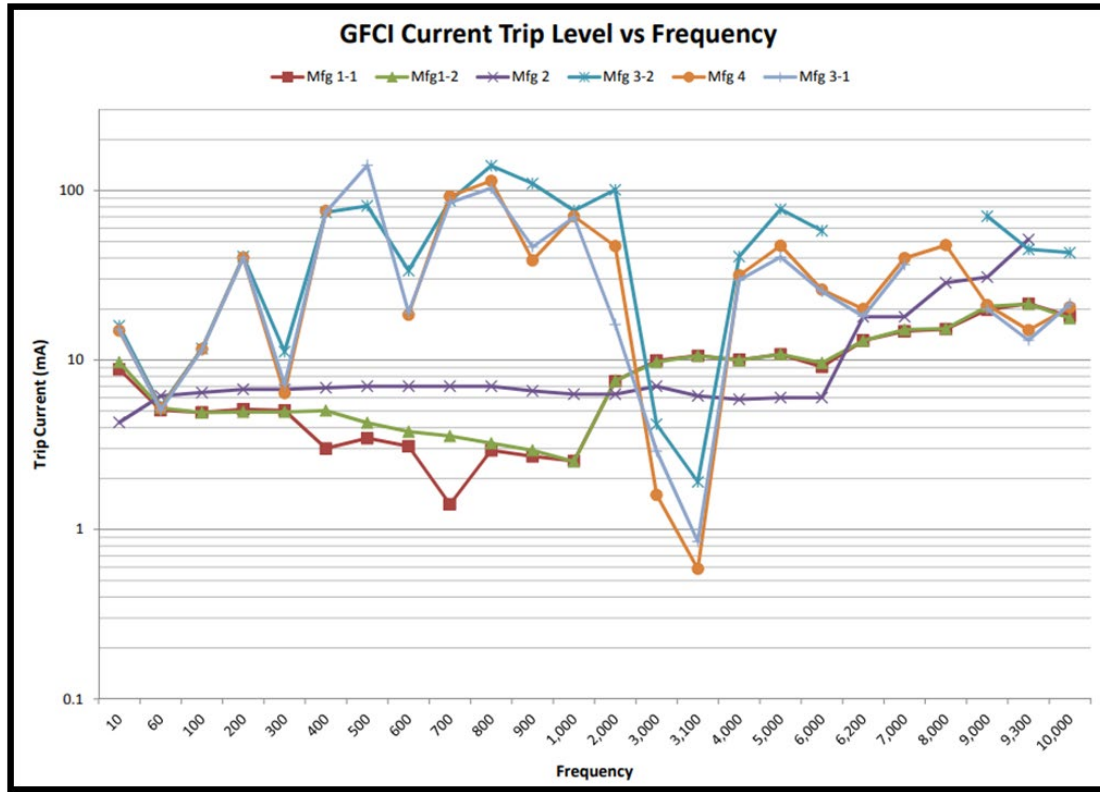
Components operating at high frequencies contribute to nuisance tripping, where power is removed from the appliance, even when no electrical hazard exists. UL has conducted an independent study that verifies this. At the time of writing these comments, this study has not yet been published. UL is inviting interested parties to contact the relevant engineer, Darrin Conlon, for more information: [Darrin.Conlon@ul.com](mailto: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.”<sup>28</sup> CPSC goes on to provide an example of variable-speed drives as high frequency technology that can cause nuisance tripping.

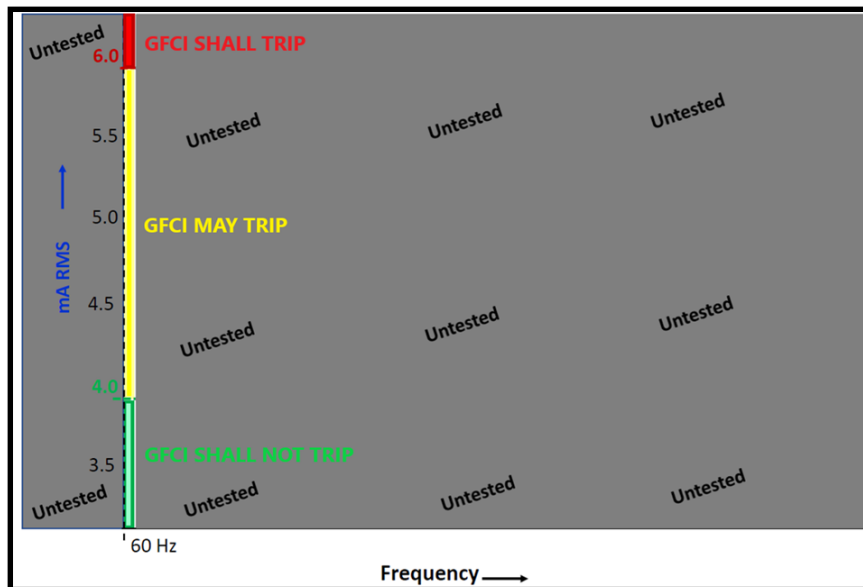
There are some things that appliance manufacturers can do to help in avoiding nuisance tripping, such as adding filters, however this increases energy consumption and does not solve the root cause: highly variable GFCI trip thresholds at high frequencies:

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<sup>28</sup> 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:**

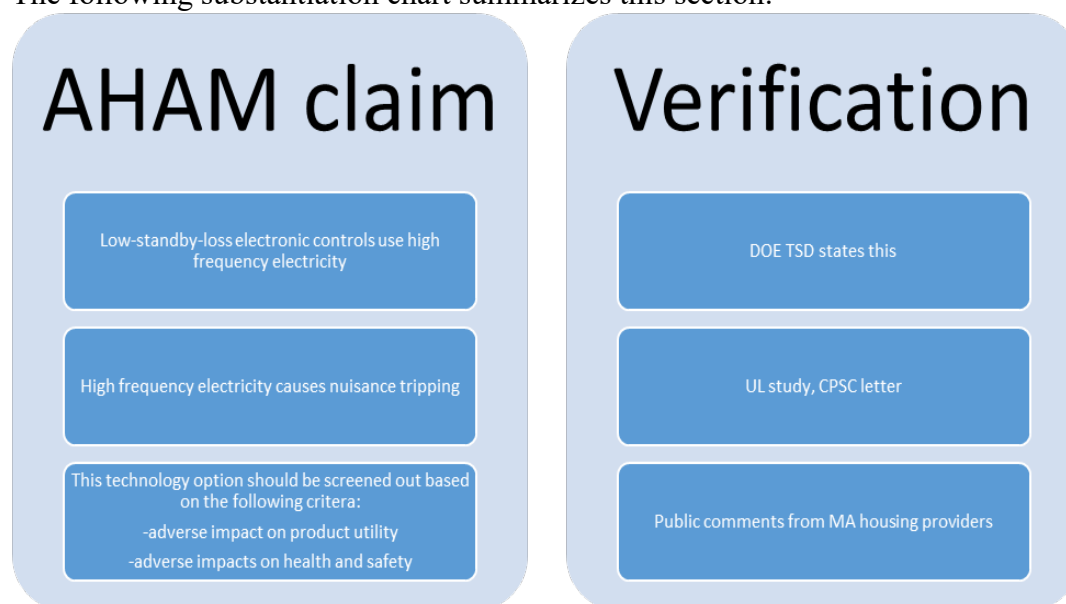
1. Does DOE agree that high-frequency components contribute to the appliance losing power due to GFCI nuisance tripping?
  - a. If no, why?
  - b. If yes, what does DOE plan to do to prevent nuisance tripping?
2. How did DOE consider GFCI nuisance tripping in setting standards for smooth electric?
  - 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.<sup>29</sup> 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,<sup>30</sup> and received no direct response from DOE in the final rule.<sup>31</sup> 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

<sup>29</sup> See, e.g., [2023 National Electrical Code](#); [Minnesota Board of Electricity, Meeting Minutes \(2023-01-31\)](#), page 14.

<sup>30</sup> 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).

<sup>31</sup> 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).<sup>32</sup> 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<sub>2</sub> 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<sub>2</sub> standard could impact manufacturers’ ability to “optimize” burners and grates. To effectively address NO<sub>2</sub> emissions, more energy may be required. If DOE does not review the impact of necessary safety changes for NO<sub>2</sub>, it is not evaluating the technologies likely to be in the market during the compliance period for this standard.

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<sup>32</sup> 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).

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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<sub>2</sub> 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<sub>2.5</sub>.<sup>33</sup> PM<sub>2.5</sub> is from cooking and is at the same or similar levels where the cooking product is gas or electric.<sup>34</sup> ASHRAE

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<sup>33</sup> See, e.g., Logue JM, Price PN, Sherman MH, Singer BC, A Method to Eliminate the Chronic Health Impact 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/>.

<sup>34</sup> 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 SNO PR 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 SNO PR 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.

<b>Proposed Product Class</b>	<b>AHAM Proposed Gap Fill For DOE Analysis</b>
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:

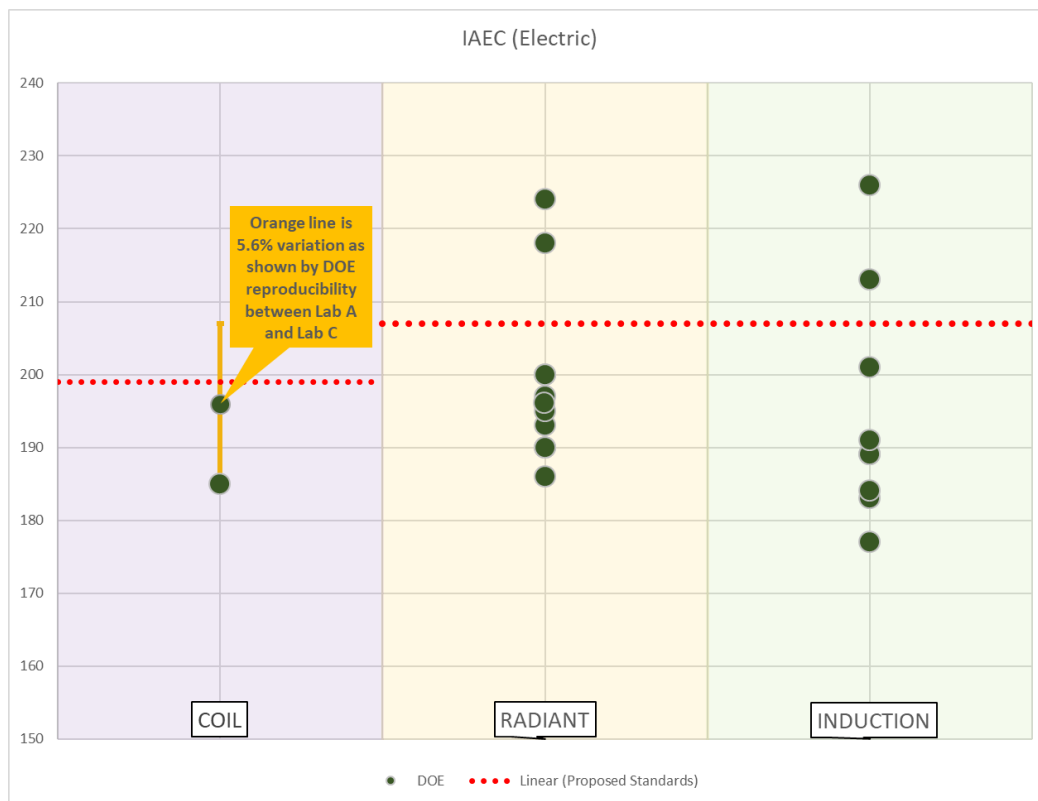
- (1) Continuous cast-iron grates
- (2) 4 or more burners
- (3) At least one high input rate (HIR) burner greater than or equal to 14,000 Btu, and
- (4) Either
  - (a) The unit total burner input rate greater than 56,000 Btu and average burner input burner greater than or equal to 14,000 Btu, OR
  - (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.

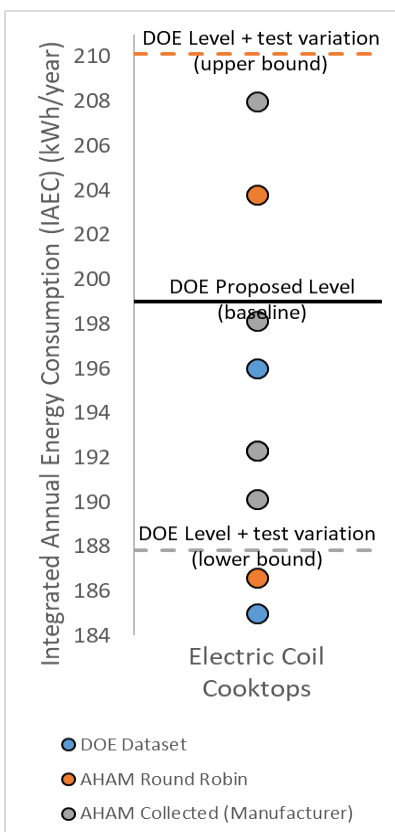
DOE proposes to set a standard at the baseline for electric coil cooktops because there are not available technology options. But that is the wrong approach, especially given that DOE is relying on a test sample and not a full set of data on the efficiency of this class of products. It is possible—in 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 9,500-10,000 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



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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<sub>2</sub> 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.<sup>35</sup> The manufacturer impact analysis, as currently structured, does not adequately analyze the effects on an industry of multiple regulations within a short period.

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<sup>35</sup> 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.<sup>36</sup> 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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<sup>36</sup> 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 the 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.<sup>37</sup> 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:



<sup>37</sup> Appliance Efficiency Regulatory Impact Consumer Research. (July 2022). Bellomy Market Intelligence on behalf of the Association of Home Appliance Manufacturers (AHAM).

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- 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.<sup>38</sup>

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.<sup>39</sup>

In its recent final room air-conditioner standards rule, DOE responded to some of AHAM’s comments.<sup>40</sup> 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.”<sup>41</sup> 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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<sup>38</sup> 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).

<sup>39</sup> 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).

<sup>40</sup> Room Air Conditioners Pre-Publication Final Rule.

<sup>41</sup> 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.”<sup>42</sup>

“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.<sup>43</sup>

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

<sup>43</sup> 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<sup>44</sup> 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.<sup>45</sup> DOE cannot simply ignore data that contradicts its analysis. It must take these comments into account or its analysis cannot reasonably 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.<sup>46</sup> 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).

<sup>44</sup> 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).

<sup>45</sup> 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).

<sup>46</sup> 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 50<sup>th</sup> 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.<sup>47</sup> 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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<sup>47</sup> 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<sub>2</sub> 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.<sup>48</sup> 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 SNO PR, DOE indicates that it decided to deviate from the Process Rule and provide 60 instead of 75 days to respond to this SNO PR. 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 SNO PR. And in fact, DOE released new data and information during the comment period on this SNO PR. 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 SNO PR 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

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<sup>48</sup> 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.

**PUBLIC VERSION**

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,



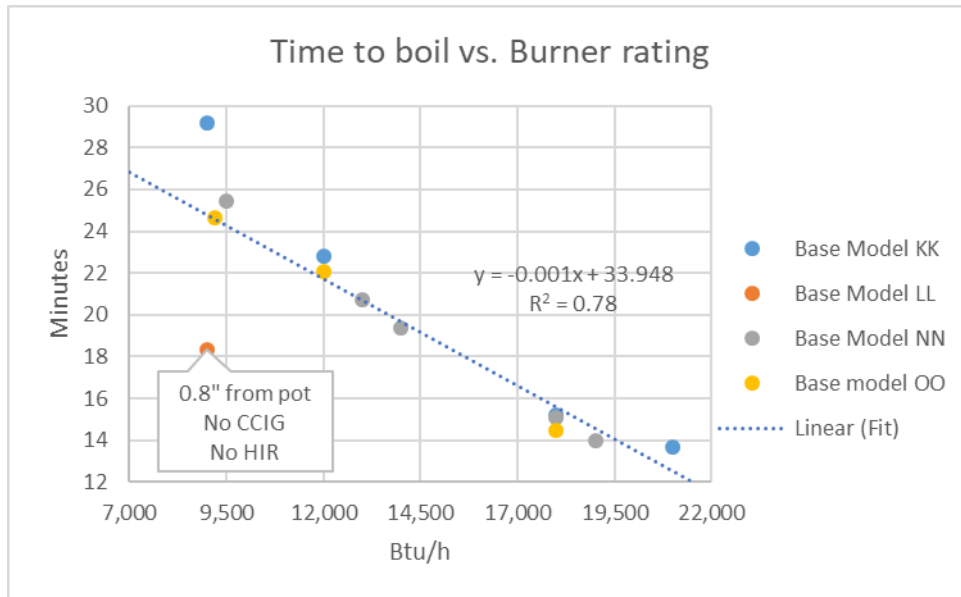
Jennifer Cleary  
Vice President, Regulatory Affairs

**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**

**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 as 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)
<b>DOE gas unit 2</b>	18,000	15.6
<b>(passes proposed standard)</b>	12,500	21.2
<b>Theoretical unit</b>	19,000	14.6
<b>(fails proposed standard)</b>	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.**

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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.

## **Exhibit B**



## 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**

	<b>Model#</b>	<b>Product Type</b>	<b>IAEC (kWh/year)</b>	<b>ETLP (kWh/year)</b>	<b>Marketed As</b>
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

## **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 Visible Change from start. Not boiling.		No Visible Changes. Not boiling.
60 Mins		Boiling rapidly, increased splatter. Beginning to stick to bottom of pot.		No visible change. Not boiling.		No Visible Changes. Not boiling. No signs of sticking.
90 Mins		Boiling. Sauce thickening and sticking to pot. Significant splatter.		No visible 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 visible change. Not boiling. Sauce is warm.		No Visible Changes. Not boiling. No signs of sticking.
Cleanup		Cooktop covered in sauce. Sauce inside the adjacent 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**



## **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



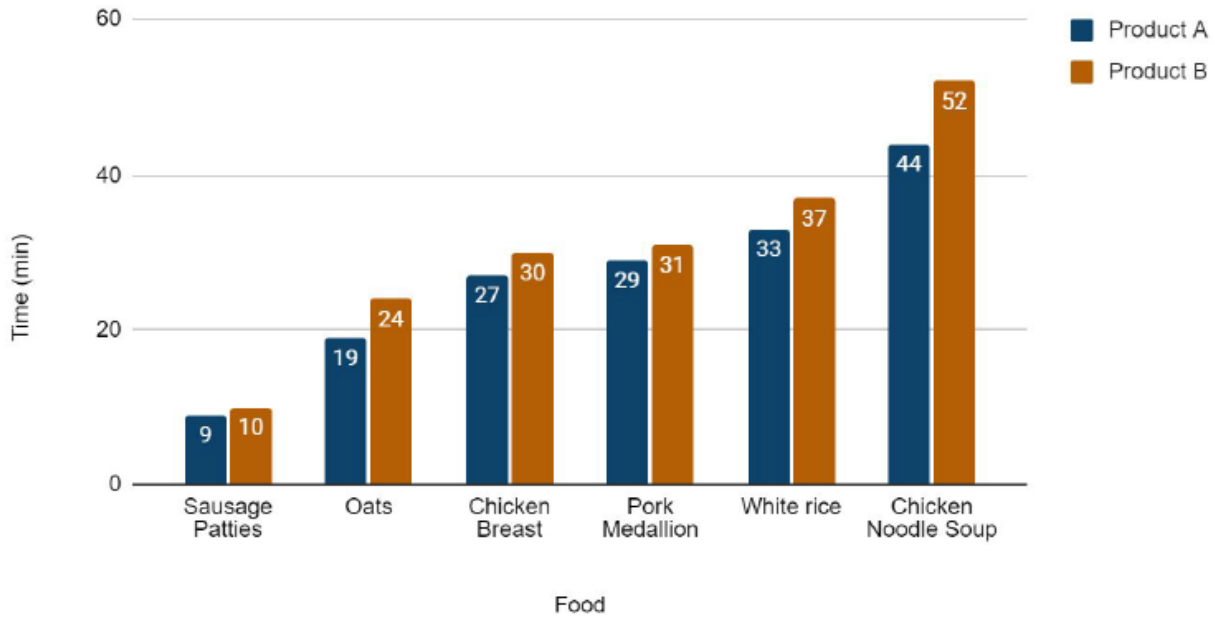
### **Results:**

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.

### Consumer Usage Impacts



		Energy Consumption kBtu/yr	Cooking Time Breakfast + Lunch + Dinner	Cooking Quality
<b>Product A</b> Conventional Burners	UR 18 kBtu/h		Breakfast 19 min Lunch 44 min Dinner 33 min	Well Cooked
<b>Product B</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**



## **Exhibit F**



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<sup>1</sup> 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,

A handwritten signature in cursive script that reads "Douglas Lee".

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

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<sup>1</sup> 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.

**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](http://cpsc.gov)

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



# **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-

## **PUBLIC VERSION**

**\$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

## **PUBLIC VERSION**

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

## **PUBLIC VERSION**

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