Submitted via regulations.gov

August 22, 2024

Ms. Julia Hegarty
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Building Technologies Office, EE-5B
1000 Independence Avenue SW
Washington, DC 20585-0121

Re: Notification of Data Availability and Request for Comment: *Energy Conservation Program: Energy Conservation Standards for Consumer Water Heaters*, EERE-2017-BT-STD-0019, RIN 1904-AF65, 89 Fed. Reg. 59692 (July 23, 2024)

Dear Ms. Hegarty:

The American Gas Association ("AGA"), American Public Gas Association ("APGA"), and National Propane Gas Association ("NPGA") (collectively, "Joint Commenters") respectfully submit these comments in response to the above-referenced proceeding regarding the notification of data availability and request for comment ("NODA") pertaining to energy conservation standards for consumer water heaters issued by the U.S. Department of Energy ("DOE").[1] Joint Commenters raise various material issues with the NODA, particularly the fact that DOE currently relies on data used in rules designed for other natural gas appliances and not gas-fired instantaneous water heaters ("GIWHs"). Due to these critical issues, DOE should restart the rulemaking process for GIWHs, or at minimum issue a supplemental notice, that contains analysis with the appropriate data and addresses the concerns discussed herein.

I. Identity and Interest

AGA, founded in 1918, represents more than 200 local energy companies that deliver clean natural gas throughout the United States. There are more than 78 million residential, commercial, and industrial natural gas customers in the U.S., of which 95 percent — more than 74 million customers — receive their gas from AGA members. AGA is an advocate for natural gas utility companies and their customers and provides a broad range of programs and services for member natural gas

[1] *Energy Conservation Program: Energy Conservation Standards for Consumer Water Heaters*, EERE-2017-BT-STD-0019, RIN 1904-AF65, 89 Fed. Reg. 59692 (July 23, 2024).

pipelines, marketers, gatherers, international natural gas companies, and industry associates. Today, natural gas meets more than one-third of the United States' energy needs.[2]

APGA is the trade association for more than 730 communities across the U.S. that own and operate their retail natural gas distribution entities. They include not-for-profit gas distribution systems owned by municipalities and other local government entities, all locally accountable to the citizens they serve. Public gas systems focus on providing safe, reliable, and affordable energy to their customers and support their communities by delivering fuel to be used for cooking, clothes drying, and space and water heating, as well as for various commercial and industrial applications.[3]

NPGA is the national trade association of the propane industry with a membership of about 2,400 companies, and 36 state and regional associations that represent members in all 50 states. Membership in NPGA includes retail marketers of propane gas who deliver the fuel to the end user, propane producers, transporters and wholesalers, and manufacturers and distributors of equipment, containers, and appliances. Propane gas fuels millions of installations nationwide for home and commercial heating and cooking, in agriculture, industrial processing, and as a clean air alternative engine fuel for both over-the-road vehicles and industrial lift trucks. Roughly 75% of NPGA's members have fewer than 100 employees and are considered small businesses. The proposal directly addresses products which currently, and in the future, may rely on propane for fuel, and as such, the proposal has the potential to have a direct and significant impact on NPGA's members.

Joint Commenters provide the energy needed to fuel consumer water heaters, thus making them critical stakeholders. Joint Commenters support and actively invest in energy efficiency.[4]

II. Overview of the NODA

The Energy Policy and Conservation Act, as amended ("EPCA"), prescribes energy conservation standards for various consumer products and certain commercial and industrial equipment, including consumer water heaters. EPCA also requires DOE to periodically determine whether more-stringent standards would be technologically feasible and economically justified and would result in significant energy savings. In this NODA, DOE is providing a full set of analytical results specific to GIWHs that includes updates to the analysis conducted for the July 2023 notice of proposed rulemaking ("NOPR").[5]

[2] For more information, please visit www.aga.org.
[3] For more information, please visit www.apga.org.
[4] Joint Commenters incorporate by reference the comments filed on September 26, 2023 in *Energy Conservation Program: Energy Conservation Standards for Consumer Water Heaters*, EERE-2017-BT-STD-0019 by AGA, APGA, NPGA, and Spire Inc., Spire Missouri Inc., and Spire Alabama Inc., ("2023 Comments") available at https://www.regulations.gov/comment/EERE-2017-BT-STD-0019-1181.
[5] *Energy Conservation Program: Energy Conservation Standards for Consumer Water Heaters*, EERE-2017-BT-STD-0019, RIN 1904-AD91, 88 Fed. Reg. 49058 (July 28, 2023) ("July 2023 NOPR").

III. Procedural History

According to the NODA, DOE initiated the current data availability request by publishing the NOPR on July 28, 2023. On May 6, 2024, DOE published a final rule that amended the energy conservation standards for certain consumer waters heaters, except for GIWHs.[6] DOE indicated that it was not finalizing standards in the May 2024 final rule, as DOE continues to consider comments before finalizing a decision on amended standards. In the NODA, DOE is providing a full set of analytic results specific to GIWHs that include updates from the July 2023 NOPR. In the NODA, DOE is not summarizing or responding to any specific GIWHs comments. DOE states it is continuing to consider all comments submitted on GIWHs. In response to comments received, DOE may propose to adopt energy efficiency levels ("ELs") that are either higher or lower than the proposed standards.[7]

IV. Comments

A. DOE's Use of Venting and Installation Models from Other Rules is Inappropriate for GIWHs

DOE's Consumer Water Heater NODA model inappropriately relies on the installation cost method used in rules designed for other gas appliances, specifically assuming the use of Category I vented gas systems that have negative pressure in the vent and do not produce condensate that needs to be disposed from the venting system. Instead, GIWHs are mainly power vented, have positive pressure in the vent, and may (condensing types – Category IV) or may not (Category III) require condensate disposal. While DOE's approach in this analysis might be suitable for non-condensing gas furnaces and minimum-efficiency storage water heaters, it does not accurately reflect the unique requirements of GIWHs which are normally vented horizontally, use different types and styles of venting materials, and must be gas tight since they operate with positive pressure. This is not the case for Category I furnaces that operate under negative pressure, use different venting materials and are mainly vented vertically with substantially longer venting systems that do not reflect the typical venting of a GIWH. This is a material and critical flaw that DOE has introduced into the GIWH technical and economic analysis that must be corrected before a final rule is issued.

Typically, non-condensing gas furnaces and storage water heaters necessitate up to 30+ feet of vertical venting to safely expel exhaust gases beyond the building envelope. These installations often require the use of steel piping and the complexity of the installation—spanning multiple floors with numerous elbows, connectors, and potential obstacles—resulting in higher labor hours. A typical system might involve 10 to 20 feet of venting and require significant creativity and expertise from a general contractor to ensure a safe and effective installation.

However, DOE's decision to apply the same installation cost and venting assumptions from gas furnaces to GIWHs has led to a significant overestimation of both labor hours and material costs. In the model, 100% of installations are assumed to use stainless steel parts, with associated high

[6] *Energy Conservation Program: Energy Conservation Standards for Consumer Water Heaters*, EERE-2017-BT-STD-0019, RIN 1904-AD91, 89 Fed. Reg. 37778 (May 6, 2024).
[7] NODA at 59693.

labor costs due to the complexity of vertical installations. This assumption fails to account for the fact that GIWHs do not universally require such extensive venting solutions.

Moreover, while DOE's model includes cost data for alternative, more cost-effective materials like double-walled aluminum flex pipe—which is approximately half the cost of stainless steel—it does not apply these alternatives in any of the 10,000 trial scenarios. This oversight skews the cost-effectiveness analysis, leading to an inflated estimate of installation costs that does not accurately represent the variety of real-world installation scenarios for GIWHs.

Venting Design as Described in DOE's TSD: Misalignment with Horizontal Installations (Figure 8D.3.3)

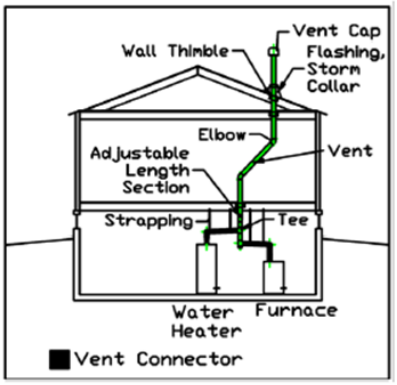


Figure 8D.3.2 Metal Venting Installation (Non-Condensing Gas-fired Water Heater and/or Non-Condensing Gas-fired Furnace)

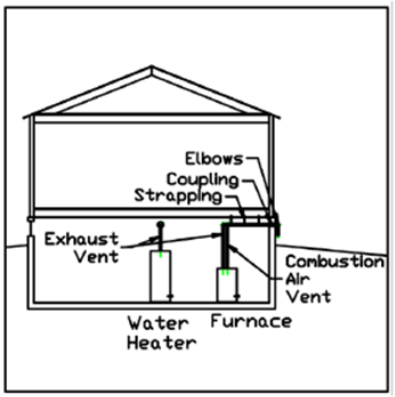


Figure 8D.3.3 Plastic PVC Installation (Condensing Example)

The DOE model identifies 86% of all GIWH installations in the 10,000 trials as horizontal, with the remaining 14% utilizing vertical vent designs like those used by non-condensing furnaces, typically spanning 10 to 20+ feet. However, the model likely overestimates the percentage of vertical installations for both new and replacement GIWH installations. The economic advantages of new non-condensing GIWH systems typically favor horizontal venting over the more complex and costly vertical Category I venting systems used by other water heaters. Fixing the overestimation of new GIWHs installed with vertical venting, especially long 20+ foot length installs, would reduce average Life Cycle Cost ("LCC") savings further.

Despite recognizing that 86% of installations are horizontal, the DOE model inaccurately applies the same labor and material costs to these installations as it does to vertical installations. This results in an overestimation of costs for horizontal installations, which are generally much simpler than vertical installations. The average horizontal system requires less than 7 feet of venting and follows a straightforward work plan, like that of a condensing unit. Such installations typically involve connecting just 3 or 4 individual parts through a wall, drastically simplifying the process compared to the more complex Category I vented storage water heaters or non-condensing furnaces.

The model assigns Efficiency Level 0 ("EL0") to 30% of trials—of which about 10% involve vertical venting in the base case. For the horizontal EL0 GIWH installations, the model assumes the same labor and part requirements for vertical installations, failing to reflect the simplicity and lower cost of horizontal venting designs in general.

B. Concerns About Material Costs in the NODA Due to DOE's Use of the Same Venting Model from Other Rules

DOE's reliance on a venting model derived from other gas appliance rules raises serious concerns about the accuracy of material costs in the NODA for non-condensing EL0 GIWH installations. The model overlooks the fact that the majority of these installations use a different, more cost-effective pipe system that is both cheaper and faster to install. Specifically, GIWH installations utilize a double-layered pipe with an aluminum core and plastic shell, rather than the stainless-steel parts assumed by DOE and used in the model.

Venting kits that include all necessary components for installations up to 2 feet can be easily purchased from retailers like Home Depot or online at a significantly lower cost than the stainless-steel parts priced by DOE's model. For example, Home Depot venting kits retail for approximately $85.80,[8] and even less when on sale. In DOE's model, individual parts cost $131.13—a 52% increase. Additional linear pipe segments, which are adjustable and available in 1 to 3-foot increments, cost around $43.68 for 3 feet,[9] while DOE's model prices a similar 3-foot segment at $72.75, a 66% markup, and $48.50 for 2 feet.

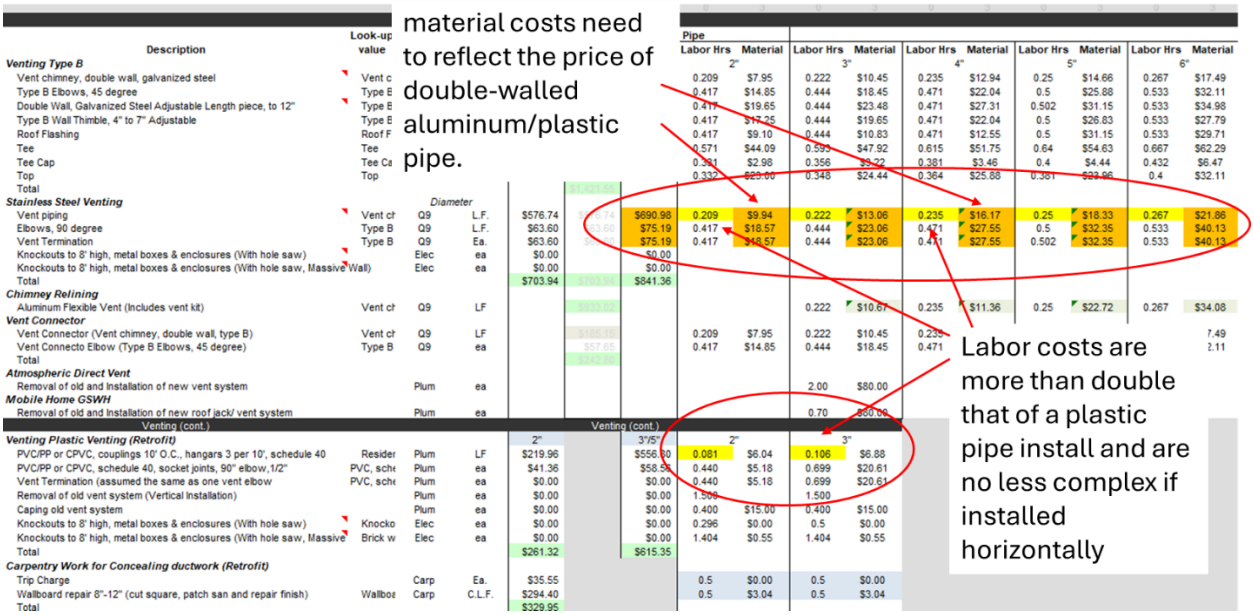
Moreover, DOE's model includes additional markups, but it is unclear whether these are applied to the final retail price or if they represent added costs passed on to consumers by installers. If these markups reflect installer fees, DOE appears to assume significant markups on metal materials, which are already included in the installation and labor costs. The model applies a 1.39 multiplier for metal parts, with no equivalent multiplier for plastic components. The average markup value assigned for both metal and plastic is 1.08, which may account for taxes, but does not explain the additional 1.39 value applied exclusively to metal parts (along with a 1.25 multiplier for converting the cost from galvanized steel to stainless steel).

When adjusting for the combined cost of a venting kit, the 1.08 markup, and the linear pipe cost to reflect the actual cost of a double-walled aluminum pipe installation, the LCC savings drop from $109 at Efficiency level 2 ("EL2") to $65. This adjustment involves recalculating the cost of the elbow and termination parts to be half the price of the kit and removing 1 foot from the total length of linear pipe used in horizontal metal venting systems. The kit includes 21 inches of linear pipe, a factor not accounted for in DOE's model, necessitating the removal of 1 foot from the cost equation. These variables can be found on the "installation cost" tab within the NODA model,

[8] *See* https://www.homedepot.com/p/Rinnai-21-in-Plastic-Universal-Non-Condensing-Horizontal-Vent-Termination-Kit-for-HE-and-HE-Tankless-Water-Heaters-223182/307634804 (last visited August 22, 2024).
[9] *See* https://www.supplyhouse.com/Rinnai-224053-39-Vent-Pipe-Extension-Non-Condensing?msclkid=ea93a93b4d5818dd63fbcf80df38cc0e (last visited August 22, 2024).

under the table labeled "venting." The linear pipe cost was adjusted so that a 4-foot 3"/5" installation would align with the $43.68 cost of a 3-foot extension pipe before labor, acknowledging that the first 1 to 2 feet is part of the kit, with the model already assuming every horizontal installation is at least 1 foot long.

Location of Material and Labor Hours Used in DOE's Model (Installation Cost Tab)



C. DOE's Use of the Same Venting Model Impacts Labor Hours and Costs

Labor is a significant factor in the DOE model, constituting about half the total cost of the venting system. For instance, in the model, the $131.13 set of parts results in a total installation cost of $314.98 when labor is included. According to DOE's model, the job primarily involves three parts and takes 87 minutes to complete. Specifically, attaching a 2-foot segment of metal linear venting pipe is estimated to take 28 minutes. However, this time does not account for any work on the exterior wall or the appliance's installation itself, as these are covered in different sections of the installation cost model.

The discrepancy becomes evident when comparing this to the installation of a similar 2-foot pipe for a condensing GIWH, which the model estimates would only take 13 minutes to install—even though the process and complexity are nearly identical, as both involve short horizontal installations. This inconsistency in labor time estimates leads to an overestimation of labor costs for non-condensing GIWHs.

By adjusting this single variable and aligning the model's labor cost for the metal linear pipe with the labor time used for polyvinyl chloride pipe installations, the LCC savings drop from $109 at EL2 to $48. This adjustment highlights the model's overestimation of labor hours and the subsequent impact on cost-effectiveness assessments.

D. Impact of Other Assumptions in DOE's Model on the Outcome

DOE's model makes several assumptions that significantly impact its outcomes. One such assumption is the use of a national market share for each product level, without accounting for regional variations that could influence consumer choices. The model also posits that consumers are more likely to install a more efficient option based on square footage, rather than considering more relevant household attributes such as the number of bathrooms, bedrooms, or inhabitants.

Historical data from DOE's final furnace and pending boiler rule models show that market shares for condensing and non-condensing units vary significantly across different climates. Similarly, this regional variation is likely true for GIWHs, suggesting that different climates and household characteristics could heavily influence not only the type of products installed but also the required venting parts to ensure safe and effective operation—especially in unconditioned spaces like basements, attics, or outdoor areas.

No freeze protection present in the model indicates that the model fails to account for different electricity consumption in the winter versus summer months. Electricity consumption should be slightly higher for all units installed in unconditioned spaces that are exposed to freezing temperatures.

E. Impact of Adjusted Assumptions on Condensing Model Costs

The cost variability associated with condensing models could be significantly affected if the assumptions in the DOE model are adjusted. For instance, the model currently assumes that a condensate neutralizer is installed in approximately 12.5% of installations. If this percentage were increased to 25%, the LCC savings at EL2 would decrease from $109 to just $97.

The maintenance cost used in the model for condensate neutralizers is only $20 every 2-3 years, while online sources for the part range from $35 to on sale for $55 ($75 full price) from major retailers (these values don't include a possible sales tax). [10] Changing the average cost of the refill kit from $20 to $40 results in the LCC savings dropping from $109 to $97. DOE does not adequately reference the source of the $20 cost and is likely underreporting the cost to the professional installing it. It is possible that the $20 cost is for another maintenance expense. If this is the case, then DOE's model completely ignores the need to replace and refill the condensate

[10] *See* https://www.supplyhouse.com/Rinnai-809000114-Condensate-Neutralizer-Refill-All-Models?gad_source=1 and https://www.lowes.com/pd/Rinnai-Plastic-Enhancement-Kit-Tankless-Gas-Water-Heater/5014837763?user=shopping&feed=yes&srsltid=AfmBOopSWgTkodxlCvAyNo_dprGYXHm5aw2firqMA53iopr-Kzx-HWsLh-c (last visited August 22, 2024).

neutralizer and the model needs an added maintenance cost every 2-3 years that costs around $40 for the parts and an additional 0.5 hours of labor.

F. DOE's "Random Assignment" Methodology is Unreasonable

DOE's use of random assignment in the NODA suffers from the same infirmities that existed in the July 2023 NOPR. The previously submitted 2023 Comments include a detailed discussion of the problems with DOE's use of random assignment and the issues raised in those comments also apply to the NODA.[11] In short, DOE's model in the NODA works the same as the previously issued model concerning consumer water heaters, as well as other DOE rulemaking proceedings.

As discussed in the 2023 Comments:

- **DOE's random assignment methodology is unreasonable**. The base case investment in Standards-Compliant products would disproportionately include investments with *attractive* economic outcomes. The rule outcome investments in Standards-Compliant products would disproportionately include investments with *unattractive* economic outcomes. The average economic outcome for base case investments in Standards-Compliant products would be better – and that for rule outcome investments would be worse – than the average economic outcome for all potential investments in Standards-Compliant products.[12]

- **Random assignment simulates extreme and unreasonable purchasing behavior.** Economic considerations play a significant role in consumer purchasing decisions. The fact that random assignment produces some apparently reasonable assignments by chance does not provide a basis to assert that it simulates a market in which *any* purchasing decisions are influenced by economic considerations.[13]

- **Economic considerations do influence purchasing behavior.** DOE indicated that it was employing data demonstrating that economic considerations have a significant impact on purchasing behavior and – specifically – *on decisions to make or decline investments in more efficient products*.[14]

- **Random assignment assumes that economic considerations never matter.** Random assignment simulates a market in which some base case purchasers make economically advantageous efficiency investments purely by chance, not a market

[11] 2023 Comments at pp. 10 – 23. As noted above, the 2023 Comments are incorporated by reference into these comments; therefore, the Joint Commenters will only summarize the main issues previously presented in the proceeding on random assignment.
[12] *Id.* at pp 10-11.
[13] *Id.* at p 12.
[14] *Id.* at p 12.

in which some purchasing decisions are made *on the basis of economic considerations*.[15]

- **Random assignment unreasonably skews the results of DOE's analysis.** Because it simulates a world in which decisions to make (or decline) efficiency investments are *never* influenced by the economic consequences of such investments, random assignment treats too many good investments in Standards-Compliant products as rule outcomes and too many bad investments in such products as the self-inflicted injuries of consumers acting on their own. As a result, DOE's analysis significantly understates the percentage of consumers that would experience net costs as a result of the standard and overstates the economic benefits the standard would provide.[16]

As previously discussed in the 2023 comments and herein, DOE's failure to address the errors created by random assignment is unreasonable and creates material flaws in the rulemaking process.

G. Full LCC Impact of More Likely Venting Material Costs and Labor in EL0 GIWH

When more realistic adjustments are made to the labor hours for installing horizontal metal pipes and the material costs associated with using double-walled aluminum and plastic pipes in horizontal systems, the total LCC savings drop significantly. Specifically, the LCC savings decrease from $109 to just $10, with the simple LCC falling to $0.

This adjustment also shifts the cost-benefit analysis for consumers. A greater proportion of consumers would experience negative benefits from the rule, with 19.7% facing negative outcomes, compared to 18.1% seeing positive impacts, and 62.3% experiencing no impact at all—largely because they already operate a higher efficiency level unit.

Lastly, adding the increased maintenance cost for the refill kit for the condensate neutralizer results in a complete loss of LCC savings and $-2 in overall savings (negative $16 simple LCC savings). These three specific changes alone have dramatic impacts on the model. The changes made to material costs, maintenance, and labor hours all reflect the average experiences that consumers will face installing and operating a GIWH. This does not include any changes to the occurrence that the condensate neutralizer is installed or the possibility that more of the vertical installs are constructed much more often like horizontal installs than a non-condensing furnace or Category I vented water heater would.

[15] *Id.* at p. 13.
[16] *Id.* at p. 15.

H. Residential Energy Consumption Survey Data

In the July 2023 NOPR, DOE established a sample of households using GIWHs based on the Energy Information Administration's ("EIA") 2015 Residential Energy Consumption Survey ("RECS"). In the NODA, DOE incorporated EIA's 2020 RECS data as the basis of the building sample development and updated the analyses accordingly.[17] Joint Commenters appreciate DOE using the recent survey data as part of the NODA. As explained in prior comments, Joint Commenters support the use of the most recent and reliable data available.[18]

V. Conclusion

As discussed in these comments, Joint Commenters provide a detailed description of the material problems and flaws in DOE's analysis and model. These errors should be corrected, and the rulemaking process and related analysis should be restarted. The concerns raised and the flaws identified warrant a revision and reinitiation of the analysis contained in the July 2023 NOPR for consumer water heater products to characterize shipments and market effects of consumer choice and downstream impacts at the national level. DOE's efficiency standards must be fact-based and supported by evidence, particularly when DOE is proposing to eliminate non-condensing GIWHs from the market. Therefore, Joint Commenters request that DOE restart the rulemaking process or at minimum issue a supplemental notice and revised analysis that address the concerns raised in these comments.

Joint Commenters thank the DOE for its review and consideration of these comments. If you have any questions regarding this submission, please do not hesitate to contact the undersigned.

Respectfully submitted,

[17] NODA at 59695. *See* EIA, 2020 Residential Energy Consumption Survey, available at *www.eia.gov/consumption/residential/* (last visited August 22, 2024).
[18] *See* 2023 Comments at p. 32.

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