Rinnai®

MEMORANDUM

Via email

From: Perry McGuire, VP and General Counsel

To: U.S. Department of Energy, expartecommunications@hq.doe.gov

Re: *Ex parte* Memorandum

Date: October 17, 2023

Representatives of Rinnai America Corporation ("Rinnai") met with Department of Energy officials on October 10, 2023, to discuss the Notice of Proposed Rulemaking (NOPR) for the Energy Conservation Standards for Consumer Water Heaters, EERE-2017-BT-STD-0019/RIN 1904-AD91. The following persons attended the meeting:

Rinnai:
Perry McGuire, Rinnai America Corp.
Eddie Ergican, Rinnai America Corp.
Sarah Jorgensen, Reichman Jorgensen Lehman & Feldberg LLP
Ted Williams, Natural Gas Direct, LLC
Chris Sarley, Cornerstone Government Affairs

DOE:
Jeff Marootian
Ashley Armstrong
Satchel Tsai

The NOPR proposes amending the UEF standard for gas instantaneous water heaters (GIWH) in a way that would eliminate non-condensing GIWHs entirely. The following issues were discussed:

1. Rinnai's residential gas tankless water heater products and water heater market trends over the past decade.

2. Rinnai's concern that the proposed GIWH standard will likely result in a loss of energy savings. Rinnai estimates that 80% of sales that would have been non-condensing gas tankless water heaters will instead switch to gas storage water heaters, resulting in a loss of energy savings. The Department requested data relating to Rinnai's market analysis.

3. Rinnai's concerns that the proposed rule is not economically justified, that the LCC savings are likely to be negative when accurate cost data are considered, and that the

proposed rule will have an adverse impact on Rinnai and on competition in the water heater market.

4. Rinnai's concern that the proposed rule will make performance characteristics and features of non-condensing GIWHs unavailable, and that such features and characteristics, including suitability for many buildings, ease of installation, and affordability, are important to consumers, particularly in common urgent replacement situations. The simple solution is for the Department to issue separate standards for non-condensing and condensing GIWHs.

Rinnai provided a slide deck which is attached to this Memo.

Presentation to Department of Energy: Consumer Water Heater Efficiency Rule

Rinnai America Corporation

10/10/23

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INTRODUCTION

- Proposed rule on GIWH will lead to perverse results
  - Eliminates non-condensing water heaters from the market
  - Likely result is that consumers will switch to the (cheaper) less efficient products still on the market, reducing energy savings
- Proposed rule exceeds Department's authority under EPCA
  - Not economically justified
  - Makes product features unavailable
- Simple solution: issue separate standards for condensing and non-condensing gas tankless water heaters
  - Increases efficiency and complies with EPCA

Background: Market Overview

- **Expanding market:** Gas tankless water heaters have been expanding their U.S. market share, in large part by replacing storage water heaters.
    - Since their introduction in 2004, GIWH have grown to 10% of the water heater market and are projected to grow to 12% by 2027.
- **Reduces emissions:** Sales of non-condensing gas tankless water heaters alone saved 339 million MMBtus (0.34 quads) and 37.7 billion pounds (17 million metric tons) of carbon emissions between 2005 and 2022.

Figure 1: Water Heater Marketshare 2012-2022

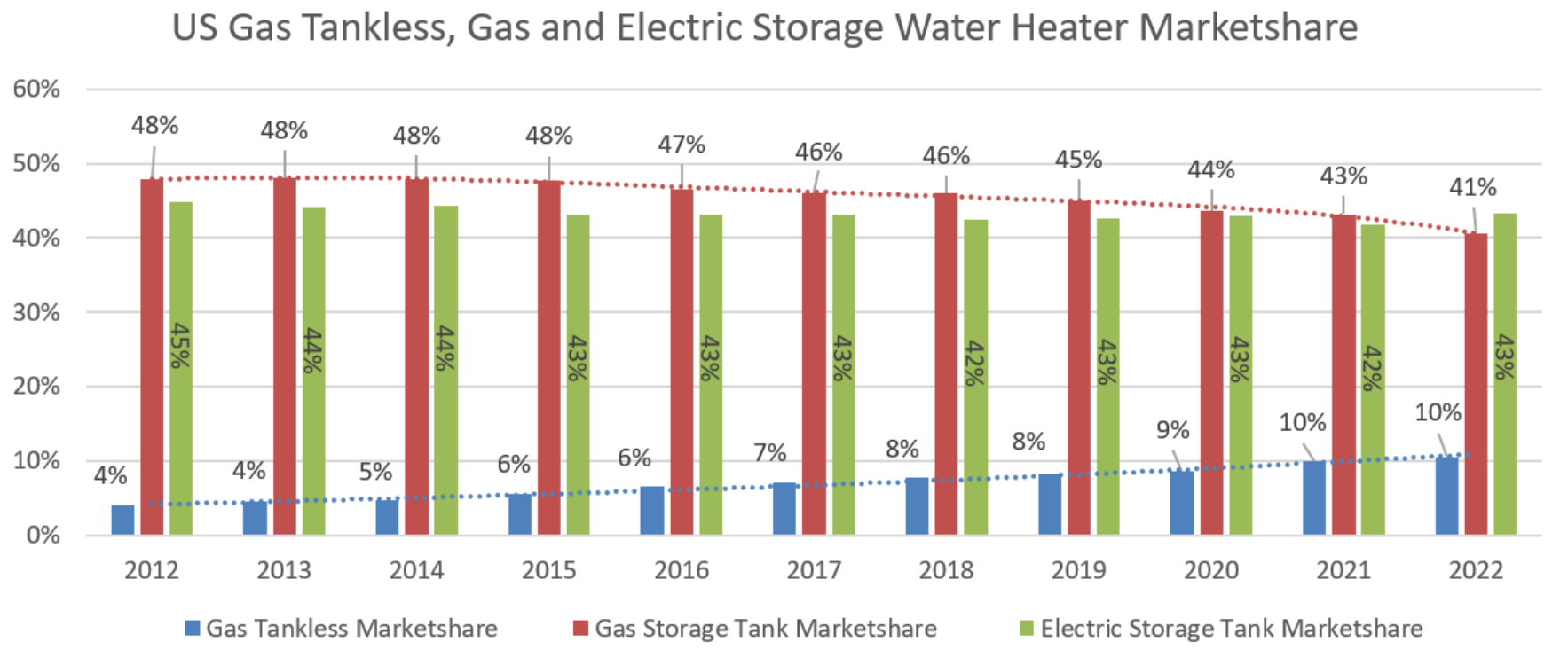
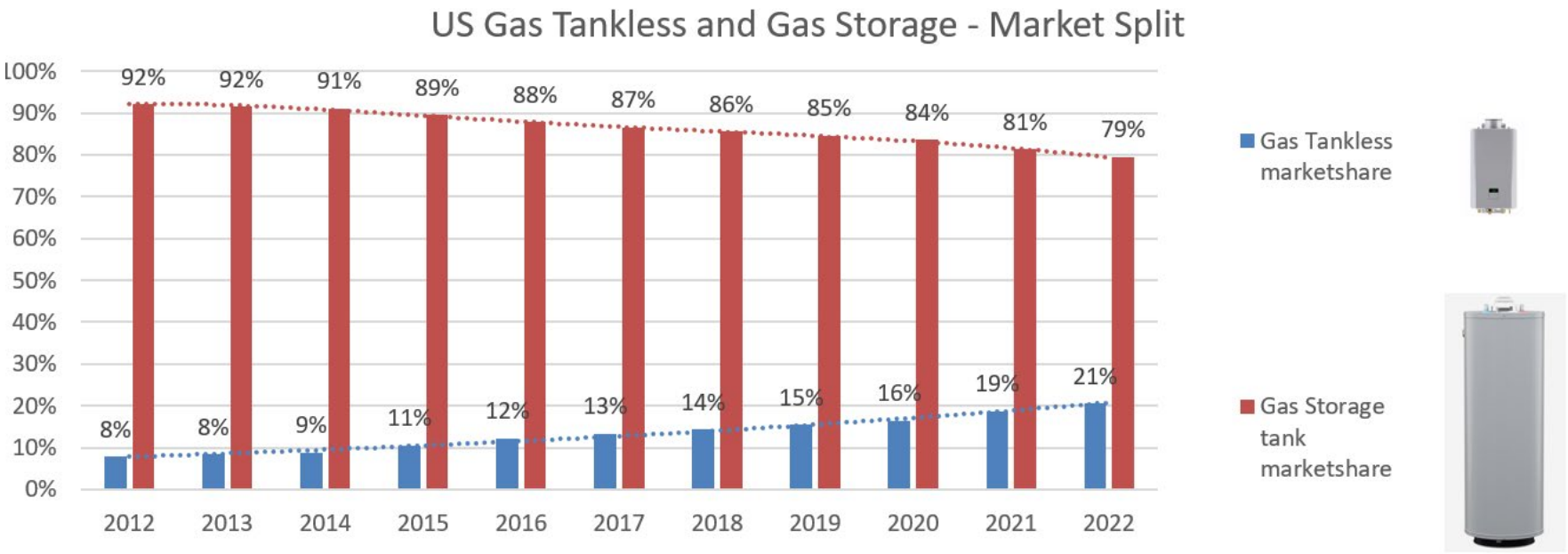


Figure 2: Gas Tankless and Gas Storage Market Share 2012-2022



Background: Technology Overview

- Five key differences between the condensing and non-condensing gas tankless technologies are:
  - venting
  - condensate
  - installation space requirements
  - cost
  - efficiency

Technology Overview

- **Condensing tankless water heaters** are more efficient but more expensive; they also use different venting materials and designs and require the addition of condensate management, i.e., drainage or a condensate pump and neutralizer.

- **Non-condensing tankless water heaters** cost less and are slightly less efficient; they are smaller in size, use different venting, and do not require condensate management.

Technology Overview

- Condensing tankless have **different installation requirements** that may not be compatible with existing buildings without substantial modifications and may therefore not be suitable for emergency replacements.
    - 70% of water heater sales are replacements.
- **The majority of existing buildings were constructed with non-condensing technology in mind.**
- Regional differences in adoption of non-condensing and condensing tankless due to climatic conditions.

Table 1: Average Efficiencies and Prices for Gas Water Heater Products

Product Class	UEF Level	Average Retail Price
Gas storage water heaters (non-condensing)	0.54-0.63	$580
Gas-fired tankless hot water heaters (non-condensing)	0.81	$1056
Gas-fired tankless hot water heaters (condensing)	0.91-0.93	$1509

*Average retail price difference between condensing and non-condensing tankless water heater is ~$450

Proposed Rule Would Decrease Efficiency: Existing Efficiency Standard

- The Department's **current** rules do not differentiate between non-condensing and condensing GIWH.

- The existing minimum efficiency standard is **0.81 UEF** – which is achievable by ***non-condensing GIWH***.

Impact of Proposed Standard

- The Department's **proposed** standard increases the minimum efficiency level for ***all*** GIWH to **0.91 / 0.93 UEF**, the average efficiency level of ***condensing GIWH***.
  - This proposed new standard is only technically achievable by condensing GIWH – non-condensing tankless will be **obsolete.**
  - It would eliminate one of Rinnai's two residential tankless water heater product offerings and significantly impact Rinnai's sales.
  - The proposed standard limits the affordable, efficient options available to consumers, will halt a market-driven shift toward more efficient water heaters, and will result in a net reduction in energy savings.

Table 2: Change From Existing Standard to Proposed Standard

Product Class	Current Baseline Efficiency Level	Proposed Baseline Efficiency Level
Gas Tank Water Heater*	0.54 – 0.63	0.59 – 0.68
Technology That Can Achieve	• Non-condensing • Condensing	• Non-condensing • Condensing
Gas Tankless Water Heater	0.81	0.91 / 0.93
Technology That Can Achieve	• Non-condensing • Condensing	• Condensing **only**

*For gas-fired storage water heater efficiency band leverages 28-, 38-, and 48-gallon storage capacity for respective draw pattern

**The minimal increase in efficiency level for Storage Gas Water Heaters keeps non-condensing as a viable option for Storage Gas Water Heaters

Proposed Rule Will Not Result in Energy Savings

- The Energy Policy and Conservation Act (EPCA) prohibits the Department from issuing a standard that does not result in significant energy savings. *See* Section 6295(o)(3).

- Under the Department's own analysis, its proposed rule for GIWHs will have **minimal** energy savings.

- Rinnai's analysis shows that it is likely that the energy savings are actually **negative** under the proposed rule.

The Department's Energy Savings Analysis

- The Department’s analysis forecasts **0.4 quads** of energy savings over 30 years.
  - This is **only 1.5%** of the 26.6 quad total savings across all water heater technologies.
- From 2005-2022, non-condensing tankless alone have contributed **0.34 quads** of energy savings.

Rinnai's Energy Savings Analysis

- According to Rinnai's calculation, if non-condensing GIWHs remain available, there would be an **additional 0.61 quads** of energy savings over 30 years.

- Predicted energy savings would increase from **0.4 quads up to 1.01 quads.**

- I.e., the Department's proposed standard **leaves energy savings on the table** as compared to current standard.

Proposed Rule Will Likely Result in *Negative* Energy Savings

- Rinnai estimates that under the proposed rule, **80% or more** of non-condensing GIWH sales will switch to GSWH sales.
- This would result in significant **losses** in energy savings and emissions reductions over the 30-year time frame.
  - This result holds true even if **only 30%** of sales switch to tank.
- The Department ignores the potential for product substitution when there is a **less efficient** product option on the market.

Table 4: Impact of Shift to Storage Water Heaters Upon LCC, Energy Savings, and Emissions Savings Until 2059

	% Allocation of NC TWH to Storage WH or CD TWH					
	100% Tank - 0% CD TWH		90% Tank - 10% CD TWH		80% Tank - 20% CD TWH	
	Total Saving Losses	% Loss	Total Saving Losses	% Loss	Total Saving Losses	% Loss
Lost Cost Saving ($)	$1,132,942,759	54%	$863,331,483	42%	$593,720,207	29%
Lost Energy Saving (Quads)	0.92	82%	0.80	71%	0.68	61%
Lost CO2 Saving (Metric Tons)	30,937,293	54%	26,457,944	47%	21,978,595	39%

Compared to EL-02 Storage Water Heaters, non-condensing TWH have saved the consumer between 2005 to 2022:

Cost Savings ($):	$628,186,634
Energy Savings (Quad):	0.34
CO_2 Savings (Metric Tons)):	17,153,906

If not eliminated, compared to EL-02 Storage Water Heaters, non-condensing TWH will contribute to additional savings between 2030 to 2059:

Cost Savings ($):	$1,132,942,759
Energy Savings (Quad):	0.61
CO_2 Savings (Metric Tons)):	30,937,293

Baseline: Non-condensing TWH Continue to Remain in Market - Total Savings 2005-2059

Cost Savings ($):	$2,080,101,807
Energy Savings (Quad):	1.12
CO_2 Savings (Metric Tons)):	56,801,385

Table 3: Impact of Shift to Storage Water Heaters Upon LCC, Energy Savings, and Emissions Savings, 2005 – 2049

	% Allocation of NC TWH to Storage WH or CD TWH					
	100% Tank - 0% CD TWH		90% Tank - 10% CD TWH		80% Tank - 20% CD TWH	
	Total Saving Losses	% Loss	Total Saving Losses	% Loss	Total Saving Losses	% Loss
Lost Cost Saving ($)	$554,066,897	37%	$422,213,207	28%	$290,359,517	19%
Lost Energy Saving (Quads)	0.30	37%	0.26	32%	0.21	26%
Lost CO2 Saving (Metric Tons)	15,129,917	37%	12,939,286	32%	10,748,656	26%

Compared to EL-02 Storage Water Heaters, non-condensing TWH have saved the consumer between 2005 to 2022:

Cost Savings ($):	$628,186,634
Energy Savings (Quad):	0.34
CO_2 Savings (Metric Tons)):	17,153,906

If not eliminated, compared to EL-02 Storage Water Heaters, non-condensing TWH will contribute to additional savings between 2030 to 2049:

Cost Savings ($):	$554,066,897
Energy Savings (Quad):	0.30
CO_2 Savings (Metric Tons)):	15,129,917

Baseline: Non-condensing TWH Continue to Remain in Market - Total Savings 2005-2049

Cost Savings ($):	$1,501,225,945
Energy Savings (Quad):	0.81
CO_2 Savings (Metric Tons)):	40,994,010

Key Takeaways

Keeping non-condensing TWHs will continue to provide savings to the consumer

Even going from 100% tank to 80% tank/20% condensing TWH has marginal impact on energy and CO_2 savings

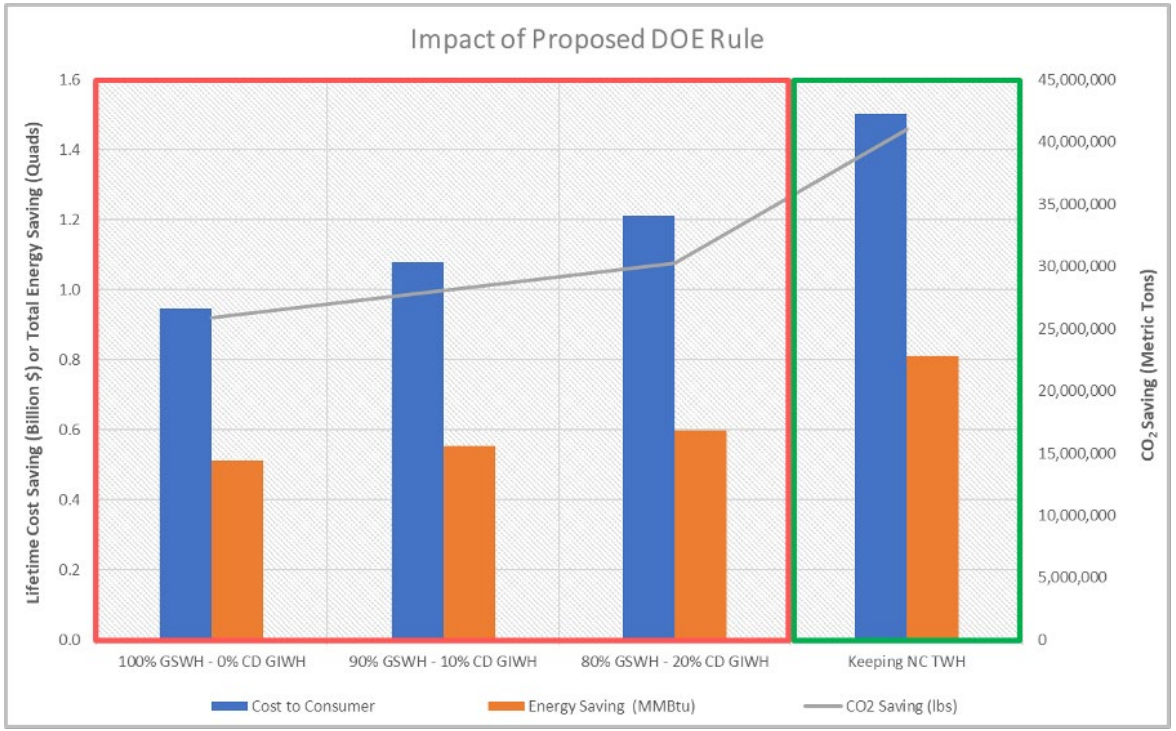
Keeping non-condensing TWHs can provide 19%-37% in cost savings to the consumer

Keeping non-condensing TWHs can provide 26%-37% in energy savings to the consumer

Keeping non-condensing TWHs can provide 26%-37% in CO_2 reduction

Estimated volumes leveraging modified version of 2023
Energy use and cost data leveraging Federal Register EERE-2017-BT-STD-0019 and Technical Support Document (TSD) EERE-2017-BT-STD-0019-0058

Figure 3: Comparison of Impact on LCC Savings, Energy Savings, and Emissions Savings for Existing Efficiencies and Proposed Tankless Gas Water Heaters, 2005 – 2049



Proposed Rule Violates EPCA: Not Economically Justified

- LCC savings for GIWH standard are **minimal**: moving from EL-0 to EL-2, savings are only **$135 for 20 years**.
- The Department's analysis understates the costs of the proposed standard.
- Given inaccuracies and modeling uncertainty, the LCC is likely negative.
- Other factors also support finding proposed rule is not economically justified.

The LCC Understates Product Cost

- **Product costs:**
  - The Department's teardown analysis is flawed and systematically underestimates costs.
  - Public pricing shows that condensing GIWHs cost roughly **$450** more than non-condensing GIWHs, while the Department estimates the difference at about **$310**.

The LCC Understates Installation Costs

- **Installation costs:**
  - **Venting costs** are too high for non-condensing:
    - The Department assumes the use of stainless steel 4” venting, which is only used in 25% of models. Rinnai’s models (60% of non-condensing sales) use aluminum 3” venting.
    - 20’ of venting is higher than average.
  - **Condensate management costs** are too low for condensing:
    - The Department allocates just **$5** for condensate management costs.
    - Ignores costs for condensate (drain pan, pump) included in its data.

The LCC Operating Costs Are Unreliable

- **Operating costs:**
  - 2015 RECS data is not a reliable measure of water use or energy use.
    - The Department used outdated data.
    - Rinnai recommends the UEF data / test procedure.
  - Gas price forecasts are consistently overstated.

The LCC Modeling Is Flawed

- The Department's use of random assignment ignores rational consumer economic choice.
- The Department's consumer choice modeling ignores possible product substitution with lower efficiency product still on market.
- Joint Commenter sensitivity analysis shows even slight changes in cost make the LCC turn negative (e.g., 6% increase in installed cost of condensing GIWH).

Other Factors: Minimal Energy Savings

- Overall benefits of all water heater rules are almost all from electric standards
- GIWH proposed standard has minimal energy savings
  - For 30 years, only 1.5% of energy savings are from GIWH: 0.4 quads out of 26.6 quads.
  - For 30 years, only 1.4% of total benefits are from GIWH.
  - Actual outcome likely to be negative.

Other Factors: Economic Impact

- The Department failed to adequately consider the economic impact on manufacturers.
  - Rinnai will lose a key product offering and millions of dollars in sales.
  - Rinnai may have to close its brand-new manufacturing facility.
  - That facility has 122 employees, and Rinnai has 450 additional employees supporting non-condensing GIWH.
- The impact of the proposed standard will be to lessen competition.
  - Three large players dominate the market.
  - Rinnai is a much smaller competitor making inroads into the GSHW market.
  - The proposed rule will shift more market share to two of the large players, who supported the proposed rule.

Proposed Rule Violates EPCA: Makes Non-Condensing Features Unavailable

- Section 6295(o)(4) states that the Department cannot amend a standard if the standard 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 [U.S. at the time].

Proposed Standard Makes Non-Condensing GIWH Unavailable

- The Department reads this provision to say that it cannot amend a standard if likely to result in:

> [the unavailability of] those features that provide a consumer unique utility during the operation of the appliance in performance of its major function(s).

Proposed Standard Makes Non-Condensing GIWH Unavailable

- Department's reading is too narrow.
  - In other rulemakings, the Department has considered size constraints and venting as distinct features.
- Section 6295(o)(4) uses broad language.
  - No reference to "consumer utility."
  - No basis to exclude categorically different technologies with different installation capabilities or suitability for certain buildings.
  - Characteristics or features that make products compatible with the existing utility infrastructure of a building and able to be used do provide utility.

Simple Solution: A "Higher or Lower" Standard For Non-Condensing GIWH

- Section 6295(q) says the Department "shall specify" a "higher or lower standard" for any group of products where the products "have a capacity or other performance-related feature" that justifies a "higher or lower standard."
  - "In making a determination . . . whether a performance-related feature justifies the establishment of a higher or lower standard, the Secretary shall consider such factors as the utility to the consumer of such a feature . . . ." *Id*.

Simple Solution: A “Higher or Lower” Standard For Non-Condensing GIWH

- The Department errs by limiting “**features**” to “non-condensing technology,” ignoring important associated features of non-condensing technology.

- Non-condensing GIWH avoid difficulties in installation where condensate management is technically difficult or economically impractical.

Simple Solution: A "Higher or Lower" Standard For Non-Condensing GIWH

- The Department reads "**utility**" too narrowly.
- Not having to face installation hurdles that exist with condensing tankless provides consumer utility.
  - Particularly in the replacement market where building modifications or re-location of equipment may not be timely or feasible.
- In other cases, the Department has issued separate standards for products with different installation and space limitations or requirements. *E.g.*, tabletop water heaters.

CONCLUSION

- Proposed rule will not save energy.
  - Leaving a less efficient product on the market.
- Proposed rule is not economically justified.
- Proposed rule makes performance characteristics and features unavailable.
- The Department should issue separate standards for non-condensing and condensing GIWH.

Questions?

Thank You

For Your Time