BEFORE THE
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
UNITED STATES DEPARTMENT OF ENERGY
WASHINGTON, D.C.

Docket Number EERE-2014-BT-STD-0031/ RIN NO. 1904-AD20

COMMENTS OF THE AMERICAN PUBLIC GAS ASSOCIATION

I. Introduction

The American Public Gas Association (APGA) appreciates this opportunity to submit preliminary comments regarding the Notice of Proposed Rulemaking (NOPR) issued in the above-referenced proceeding by the Office of Energy Efficiency and Renewable Energy, Department of Energy (DOE) and published in the Federal Register on March 12, 2015 (80 Fed. Reg. 13120). In the NOPR, DOE indicated it would be holding a public meeting on March 27, 2015, and would accept comments regarding the NOPR before and after the meeting. Accordingly, APGA is submitting these preliminary comments for the record at the March 27 conference.

APGA is the national association for publicly-owned natural gas distribution systems. There are approximately 1000 public gas systems in 37 states, and over 700 of these systems are APGA members. Publicly-owned gas systems are not-for-profit, retail distribution entities owned by, and accountable to, the citizens they serve. They include municipal gas distribution systems, public utility districts, county districts, and other public agencies that have natural gas distribution facilities.

APGA members serve over 5 million consumers, the vast majority of which use natural gas to fuel their furnaces (and in most instances accompanying water heaters). In promoting the well-being of its members, APGA participates in many federal regulatory proceedings affecting

natural-gas usage and fuel switching. In that regard, APGA participated in the 2011 Direct Final Rule (DFR) proceeding in which DOE established a 90% AFUE for non-weatherized gas furnaces in the Northern Region of the United States, and protested many aspects of the DFR as unlawful under the Energy Policy and Conservation Act (EPCA). The DFR was vacated and remanded to the agency for notice-and-comment rulemaking in 2014 by the Court of Appeals for the D.C. Circuit (*APGA v. DOE,* No. 11-1485).

In proposing a nationwide 92% AFUE for non-weatherized gas furnaces in the subject NOPR, it appears that DOE has made many of the same errors that infected the DFR, including, for example, a lack of transparency, failure to recognize non-condensing furnaces as a separate product class, failure to account properly for fuel switching, reliance on proprietary data, data averaging, etc. Of course, until the transparency issue is satisfactorily addressed, APGA and the other interested parties are precluded from meaningfully participating in this proceeding and informing DOE of the problems with the NOPR that must be addressed in order to comply with the EPCA.

APGA has jointly, along with the American Gas Association (AGA), retained the Gas Technology Institute (GTI) to assist it in analyzing the NOPR, and more specifically the technical support for the NOPR in the Technical Support Document (TSD) and accompanying spreadsheet. GTI is an independent, not-for-profit technology organization engaged in research, development and training addressing energy and environmental challenges to enable a secure, abundant, and affordable energy future. It develops technology-based solutions for industry, government, and consumers. Members of the GTI team will be present to participate in the March 27 public meeting, with the goal of securing as much information as possible about the NOPR and underlying TSD, concerning which we have many unanswered questions.

Finally, APGA has long been, and remains, an advocate for energy efficiency in those situations where it advances the public interest as articulated in various enabling statutes, including the EPCA; its members have long been active in promoting energy efficiency in their communities. The point of energy efficiency regulation is to address market failures causing consumers not to purchase higher efficiency products where they would benefit economically from such purchase; the point of energy efficiency is not to mandate outcomes that the agency may believe benefit society unless those outcomes meet the EPCA statutory criteria. A fuel

efficiency standard that promotes fuel switching and harms a significant percentage of consumers simply will not pass statutory muster.

II. Transparency

In this proceeding, as in the DFR proceeding, DOE has performed the life-cycle cost (LCC) and payback period (PBP) analyses using a spreadsheet model combined with Crystal Ball "to account for uncertainty and variability among the input variables." DOE describes Crystal Ball as " a commercial software program developed by Oracle and used to conduct stochastic analysis using Monte Carlo simulation. A Monte Carlo simulation uses random sampling over many iterations of the simulation to obtain a probability distribution of results. Certain key inputs to the analysis are defined as probability distributions rather than single-point values." (80 Fed. Reg. at 13148 n. 47.) According to DOE, "[e]ach Monte Carlo simulation consists of 10,000 LCC and PBP calculations using input values that are either sampled from probability distributions and household samples or characterized with single point values. The analytical results include a distribution of 10,000 data points showing the range of LCC savings for a given efficiency level relative to the base case efficiency forecast." (80 Fed. Reg. 13148.)

In short, the Crystal Ball analysis is critical to, among other things, the economic analysis underlying the NOPR. Thus, for the public to meaningfully participate in this proceeding, it is imperative that the public has a full and complete understanding of the Crystal Ball analysis, including the assumptions underlying it. The absence of such transparency was one of the many shortcomings in the DFR proceeding, a shortcoming that APGA is attempting to overcome in this proceeding.

APGA, along with AGA, submitted written questions to DOE regarding its spreadsheet analysis prior to the first public meeting in this proceeding on November 7, 2014. The November 7 meeting, though originally set up at the request of APGA/AGA to answer questions regarding DOE's pre-NOPR spreadsheet analysis, was converted by DOE into a 4-hour tutorial on the spreadsheet analysis. The key questions promulgated by APGA/AGA were not answered on grounds they involved the "deliberative" processes of government. But the clear implication at the meeting and in a subsequent January 14, 2015 letter from DOE's Assistant General

Counsel for Legislation, Regulation and Energy Efficiency was that once the NOPR issued, DOE would be forthcoming as to those questions that it was refusing to answer as involving the "deliberative" process.

On March 6, 2015, APGA/AGA again submitted a list of questions regarding the NOPR and the underlying TSD. Those questions are attached to this statement. While DOE acknowledged receipt of these questions by email dated March 10, it did not commit to answering these questions. It is our fervent hope and expectation that these questions (and any subsequent and/or follow-up questions) will be fully and promptly answered by DOE. We are beyond the deliberative process, and it is time for full disclosure from DOE. As certainly DOE appreciates, the Crystal Ball-driven spreadsheet on which it relies is far from self-explanatory, and thus without full explanation by DOE of the spreadsheet inputs, the public is denied the notice to which it is entitled under the Administrative Procedure Act.

III. Product Classes

On October 22, 2014, APGA and AGA submitted to DOE a White Paper on the importance and legal necessity for recognizing non-condensing furnaces as a separate product class from condensing furnaces under the EPCA (copy attached hereto). DOE refused to recognize the case for separate product classes in the DFR and has adhered to that position in the NOPR (80 Fed. Reg. 13137-138). With due respect, we believe that DOE's war on non-condensing furnaces has blinded it to the key venting and installation performance characteristics of non-condensing furnaces that warrant being treated as a separate product class under the EPCA and controlling DOE precedents.

IV. Fuel Switching

Any detailed comments on fuel switching are precluded at this point by the inability of our technical experts to penetrate the TSD analysis on this subject, not to mention DOE's reliance on proprietary data (see Part V, below); we are hopeful that DOE will answer all of our questions in a timely manner so that the necessary technical analysis can be performed. Suffice

it to say here that we believe the fuel switching analysis done by GTI and submitted to DOE prior to the issuance of the NOPR demonstrates that moving to a condensing furnace standard in the absence of treating non-condensing furnaces as a separate product class violates the EPCA mandate that new efficiency standards be economically justified.

Further, even accepting, for sake of discussion only, the fuel switching analysis done by DOE in the NOPR, it shows an unacceptable level of fuel switching. For example, DOE forecasts that at the 92% AFUE standard, over 21% of new residential consumers and 20% of residential replacement consumers in the South will switch from natural gas to electric heat (TSD, Tables 8J.5.3 & 8J.5.2). Such a level of fuel switching renders the proposed rule unacceptable. The purpose of energy efficiency standards is not to drive natural gas consumers to alternate, less efficient energy sources. It was in recognition of this fact that in the 2007 Furnace Rule DOE abandoned the condensing standard that was set forth in the proposed rule under consideration. Unfortunately, we believe that once the inputs to the Crystal Ball spreadsheet are fully understood and proper adjustments made, it will show that even greater fuel switching would accompany a 92% AFUE than is reflected in the TSD.

V. Proprietary Data

By its own admission, DOE relied on proprietary data, from Decision Analyst, Inc., to derive critical information. DOE states as follows (80 Fed. Reg. 13152-153; footnote omitted): "The decision criteria in the model are based on proprietary data from Decision Analysts, which identified for a representative sample of consumers their willingness to purchase more efficient space-conditioning systems." It was from these data that "DOE deduced that consumers would expect a payback period of 3.5 years or less for a more-expensive but more efficient product (see appendix 8J of the NOPR TSD for further discussion)." (80 Fed. Reg. 13153.) This deduction by DOE, based on proprietary data that is not available to the general public, is critical to its fuel switching analysis.

APGA has approached Decision Analyst about securing the proprietary data from, and was told that it was available for a price of $15,000 and only then if a confidentiality agreement limiting its use was signed. APGA submits that reliance on proprietary data to develop key

parameters underlying a proposed rule is inappropriate at several levels. First, the general public should not be required to pay money, not to mention at a hefty price tag, to access data underlying a proposed rule. Second, even if one pays the money for the underlying data, how does one use that data to show the proposed rule is wrongly based given the confidential nature of the information. And, third, how does a court of appeals assess a rule that is premised on a record that contains relevant information that is confidential. The answers to these points underscores why reliance on proprietary data that is confidential in nature to support a proposed rule is a violation of the Administrative Procedure Act.

VI. Data Averaging

DOE uses averages to mask actual impact numbers. This was dramatically illustrated in the DFR proceeding where DOE in its Notice declining to withdraw the DFR attempted to justify the 90% standard in the Northern Region using a positive LCC number of $44 (76 Fed. Reg. 67048), of which a constituent part was a negative LCC number of $9 in the North replacement market,[1] with more persons harmed than benefitted. While we will not know what the actual LCC and other impact numbers are in this proceeding until the parties have had an opportunity to complete their analyses of the NOPR and underlying TSD, it is evident that DOE is continuing to use national averages to justify end results for areas of the country and segments of the population for which the revised standard makes no sense, and does not pass the economic feasibility requirement of EPCA.

Respectfully submitted,

THE AMERICAN PUBLIC GAS ASSOCIATION

March 20, 2015

[1] Of course, the negative number in the replacement market was not set forth in the Notice but was apparent from the spreadsheet relied upon by DOE (Notice at note 21) and posted on DOE's furnace web site.

Questions related to DOE Furnace NOPR LCC model and TSD

Priority Questions

A) It appears that the assignment of base case efficiency for each individual home is chosen based on a random assignment in the Base Case AFUE sheet D12. This ignores the likelihood that there is an economic motive for consumers in selecting condensing vs. non-condensing furnaces. That is, consumers who have good payback economics for condensing furnaces are actually less likely to be affected by a rule than those with poor payback economics but they are being treated as if both are equally probable. Thus, as it is, payback economics does not appear to drive whether a consumer is affected by the rule or not. If economic decision making were used to determine which households are, or are not, affected by the rule, the projected LCC savings would likely be significantly lower. Why would the approach taken in the LCC model be reasonable?

B) In the discussion of product switching methodology, page 8J-5 of the TSD, it is indicated that in cases where payback is less than 3.5 years, switching will not take place. However, in the LCC model if the payback for the specified efficiency level is less than 3.5 years, switching does take place if switching options with paybacks over 3.5 are present. Please explain this apparent inconsistency?

C) What is the rationale behind including cases where switching options have a first cost advantage relative to the 80% case and operational costs below the specified EL when these clearly are economically viable and would be chosen in the absence of any rulemaking?

D) Following the logic contained in the NWGF Switching, in column AH the term "payback" means the time period after which the consumer begins to lose money. In column AI the term "payback" means the time period after which the consumer begins to save money. Is this intended to be the case? If so, why was the same term used with different meanings?

E) What is the basis of the large differential increase in the installed cost of a baseline 80% NWGF vs. the installed cost increase of condensing NWGFs in the 2014 LCC when compared with the 2011 LCC (present when comparing 2014 LCC in switching and non-switching configuration)?

Related to the switching logic contained in the NWGF Switching Sheet

1) On page 8J-6, the TSD discloses that proprietary data from the American Home Comfort Study was used to determine payback times. What is the distribution of payback times revealed by the analysis of the American Home Comfort Study?

2) What is the distribution of payback times revealed by the analysis of the American Home Comfort Study as a function of household income, or any other available demographics?

3) What is the rationale for choosing the switching option with the longest payback time rather than the lowest first cost as long as it is over some threshold?

4) What is the rationale behind including cases where switching options have a first cost advantage relative to the 80% case and operational costs below the specified EL when these clearly are economically viable and would be chosen in the absence of any rulemaking?

5) Following the logic contained in this sheet, in column AH the term "payback" means the time period after which the consumer begins to lose money. In column AI the term "payback" means the time period after which the consumer begins to save money. Is this intended to be the case? If so, why was the same term used with different meanings?

6) In the discussion of product switching methodology, page 8J-5 of the TSD, it is indicated that in cases where payback is less than 3.5 years, switching will not take place. However, in the LCC model if the payback for the specified efficiency level is less than 3.5 years, switching does take place if switching options with paybacks over 3.5 are present. Please explain this apparent inconsistency?

7) On page 8J-2 of the TSD it states that "the model rejects any option that has a payback period greater than 3.5 years and selects the option with the lowest payback period." However, the logic contained in the NWGF Switching sheet does not reject options with payback periods greater than 3.5 years; it actually selects options with payback periods greater than 3.5 years. Please explain this apparent inconsistency?

8) On page 3-16, DOE states that the industry standard for expected furnace lifetime is around 15 years. However, the LCC model does not seem to use this industry standard and instead uses a much longer lifetime based on many assumptions (including reliance on AHRI historical shipment data and a survival function that is assumed to be independent of product class (within furnaces) and potentially inaccurate survey results. On page 8G-6 DOE states that it has made assumptions "leading to large statistical uncertainty" in this model. Given this uncertainty, why did DOE choose to move away from using the 15 year industry standard lifetime? AHRI shipment data is provided by member companies on a voluntary basis, can DOE break this information out by year (member companies which contributed each year, what data was counted, and companies that did not contribute)?

9) DOE plans to monetize the societal cost of CO_2; will DOE also estimate a societal cost of SO_2, N_2O, and Hg emissions?

Related to the Base Case AFUE efficiency

1) On page 8I-11 of the TSD, it indicates that data from 1994-2004 was used to estimate shipments of condensing furnaces to avoid years 2005 to 2011 due to federal tax incentives. The data displayed on page 8I-12 of the TSD shows the results of this analysis. These figures seem to have significantly lower market shares of condensing furnaces compared to the table "Fraction of Condensing Furnaces" in the AFUE (Existing) sheet in the LCC model. Please explain what is different between these two?

2) In Figure 8I.5.1 there appears to be a much faster adoption curve (larger positive slope) in the period leading up to 2005 than there is in the projected period. Why was the growth in adoption of condensing furnaces projected to slow compared to the pre-incentive period which ended in 2005?

3) It appears that the assignment of base case efficiency for each individual home is chosen based on a random assignment in the Base Case AFUE sheet D12. This ignores the likelihood that there is an economic motive for consumers in selecting condensing vs. non-condensing furnaces. That is, consumers who have good payback economics for condensing furnaces are actually less likely to be affected by a rule than those with poor payback economics but they are being treated as if both are equally probable. Thus, as it is, payback economics does not appear to drive whether a consumer is affected by the rule or not. If economic decision making were used to determine which households are, or are not, affected by the rule, the projected LCC savings would likely be significantly lower. Why would the approach taken in the LCC model be reasonable?

4) On page 2-6 of the TSD, Figure 2.3.1, the map of regions for furnace standards indicates that West Virginia is considered to be in the North. However, in the LCC spreadsheet it is grouped with "DE, DC, MD, WV" in the Distributions table in the Base Case AFUE sheet. These other regions are labeled as being included in the South on the map but they all appear to be grouped together in the South. Also, West Virginia is listed separately in the LCC spreadsheet in what appears to be the South. Please clarify which region West Virginia is in and whether it is actually being counted twice in the furnace distributions?

Related to Installation Cost – Forecast Cells sheet

1) The count of analyzed buildings affected by a specific HVAC installation configuration as well as an average cost of such installation (cells columns N & O rows range 7019 to 7069) remains constant for runs with and without the switching option engaged. Why is there no change in the count and average costs of installations when electric equipment options are used?

Related to Installation Cost – Appendix 8D

1) Table 8D.2.5 on page 8D-9 showing the breakdown of typical replacement installation cost is missing costs associated with ductwork work estimated to be ~9% of typical replacement installation cost in 2011 version of furnace LCC TSD (Appendix 8B Table 8-B.24 page 8-B-5) . What is the reason for omitting ductwork work costs in the 2014 version?

2) Table 8D.2.15 on page 8D-22 showing the breakdown of typical PVC venting costs of replacement installation is missing materials costs associated with electric work valued at $35 ($2009) in the 2011 version of furnace LCC TSD (Appendix 8B Table 8-B.2.16 page 8-B-16) . What is the reason for not including materials costs?

3) How does the DOE model account for things like requirements to install "snorkel" style termination of vents or horizontal terminations where distance to windows and doors, decks, overhangs etc.?

4) How does the model deal with installations where more than one furnace is necessary and where this causes attic and closet installations?

Related to Maintenance Cost

1) Page 8-22 of the DOE furnace TSD lists the annualized maintenance cost of a non-weatherized gas condensing furnace as $40.06 in 2013 dollars for all levels (90% to 98% AFUE), only $1.86 more than for a non–condensing furnace. For mobile home condensing furnaces, the annualized maintenance cost is $39.62 (or $1.84 more than for a non-condensing furnace). The source for maintenance costs was estimated from RS Means data. Maintenance frequency data appears to have come from proprietary data. Can this data be made available? Please describe the methodology used to determine maintenance frequency? Also why was only one year of the American Home Comfort Study data used when four years were used for other portions of the analysis?

2) What is DOE's policy (with references) about relying on proprietary data as the basis for decisions underlying a proposed rule? How is the general public supposed to comment on such decisions and how is a court supposed to review such decisions if challenged?

Clarification Comments

The items in this section appear to be simple errors, but we wanted to bring them up so that they can be clarified.

1) 2014 LCC "Building Sample" sheet the cell B60 is labeled "Cooling + Furnace Replaced same time (50%)", while the actual CB distribution is 10%/90%.

2) 2014 LCC "Building Sample" sheet the cell B66 labeled "WH + Furnace replaced same time (25%)", while the actual CB distribution is 40%/60%.

3) 2014 LCC "Building Sample" sheet the cell B67 WH life labeled "Remaining Years (1-19)", while the actual CB function is 12 years with equal distribution.

4) 2014 LCC "Base Case AFUE" the cells D5 and E5 are copies of the cells E35 and F35 in the "Bldg Sample" sheet. In the "Bldg Sample" sheet they are labeled as option 1 being replacement and option 2 being new installation. In the "Base Case AFUE" sheet the labeling is the opposite.

Questions asked previously and not answered by DOE

Please note that our review of the TSD for answers to these questions is not entirely complete. So, in cases where we are saying that these are not answered in the TSD, it is possible that we may have missed an answer, in which case please indicate where the answer may be found.

1) The 2011 LCC spreadsheet predicted lower LCC savings, especially for replacements in the south region and for the highest efficiency (98%) condensing furnace cases, compared to the 2014 LCC spreadsheet even though the 2011 LCC spreadsheet did not include the potential of fuel switching.

    a) What are the major reasons for the significant changes in LCC savings?

    c) The 2014 LCC spreadsheet predicts first year operations cost savings averaging between $54 and $88 depending on the mandated efficiency level while the fuel switching impact analysis model provided by AGA and dated 7/11/2104 predicts a first year cost increase of $62 even

though both consider fuel switching impacts. What are potential reasons for this significant discrepancy in top level results?

2) DOE 2011 Furnace LCC Sheet "Forecast Cells" Installed Price (N58 to N62) converted from 2009$ to 2013$ and Installed Price in DOE 2014 Furnace LCC Sheet "Statistics" (L79 to L83) already in 2013$;

   What is the basis of the large differential increase in the installed cost of a baseline 80% NWGF vs. the installed cost increase of condensing NWGFs in the 2014 LCC when compared with the 2011 LCC (present when comparing 2014 LCC in switching and non-switching configuration)?

3) Sheet: Forecast Cells. Rows 2397-2406 and 2437-242446

   The installation and retail cost of electric water heating equipment predicted by the model is higher than the cost of gas equipment. This is an unexpected result. For example, RSMeans costs for electric water heaters are lower than for comparable gas water heaters, as expected. What is the rationale for higher electric water heater costs?

4) Sheet: Overall Spreadsheet

   How are the negatively and positively impacted homes segmented? This includes north/south, and new construction/replacement segments. Included in the segmentation would be replacement costs of different options in different home locations, sizes, and configurations, as well as other factors that would impact consumer classes differently. Averages do not show the marginal affected consumers.

5) Using the 2014 LCC spreadsheet and allowing fuel switching improves LCC savings compared to disallowing fuel switching if the 'payback' for switching decisions is long (15 years for sheet NWGF Switching cells D48 and D49). The effect is even larger in the South. Does this mean that fuel switching should be expected to reduce costs to consumers (e.g., in the South) as a result of the new minimum efficiency level?

6) Sheet: Prod Price. AC50

   What is the source of the factor of 1/3 that is multiplied by the cost differential (EF vs. NWGF)?

7) Sheet: Bldg Sample, E67, E61

   Why was a uniform distribution chosen for remaining lifetimes for cooling and water heating equipment?

8) Sheet: Installation Cost, Columns E and F

   The source for the assumptions regarding venting options and conditioned vs. unconditioned space is given as "Consultant Report." Is this report available? If yes, please provide; if not, please explain why not and how the general public is supposed to assess these assumptions.

October 22, 2014

The Honorable Ernest Moniz
Secretary, United States Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

RE: Separate Product Classes for Non-Weatherized Residential Gas Furnaces

Dear Secretary Moniz:

Thank you for the opportunity to brief your staff in recent weeks on an impact analysis of a national condensing furnace standard, which was conducted jointly by the American Gas Association (AGA), the American Public Gas Association (APGA), and the Gas Technology Institute (GTI). Our analysis strongly indicates significant adverse consequences are likely to accrue under a national condensing rule standard, if the rule is not structured to minimize the likelihood of fuel switching from natural gas to electrical space and water heating equipment.

Our analysis incorporates the results of a national survey of builders and contractors that AGA conducted earlier this year, to assess the equipment and fuel choices that would likely occur under a national condensing furnace standard. The model that we have developed shows that even small degrees of displacement of natural gas equipment would result in outsized adverse effects including greater overall energy usage, higher consumer costs, and increased carbon emissions. We have shared the detailed survey results, our spreadsheet-based model, and all the input data used in our analysis with your staff.

We are deeply concerned that, if not appropriately structured, this rule could prove to be the first energy efficiency standard issued in the history of the Department that has the real-world impact of *increasing* our nation's overall energy consumption and carbon footprint. We request the opportunity to work with you, and other stakeholders, to develop an approach to prevent these unintended outcomes and maximize the rule's potential to successfully contribute to our shared goals of improving energy efficiency and reducing emissions across the nation.

One possible approach to address this significant issue would be to establish separate product classes for non-condensing and condensing furnace technologies, consistent with the prescriptions of the EPCA and applicable DOE precedent. We believe this approach would largely eliminate pressure on consumers to switch from natural gas to electric space and water heating equipment when condensing natural gas furnace options are not viable alternatives.

Appended to this letter, please find a white paper that provides legal analysis we have developed that indicates, first, that the Department has the legal authority to establish separate product classes for condensing and non-condensing furnaces; second, that there is an ample technical basis to support two product classes; and, third, that applicable DOE precedents on the issue of product classes support treatment of condensing and non-condensing furnaces as separate product classes.

We look forward to working with you and your staff in developing a rule that assures real benefits to the nation.

Sincerely,

Dave McCurdy
President and CEO
American Gas Association

Bert Kalisch
President and CEO
American Public Gas Association

In the Upcoming Rulemaking on Amendments to the Minimum Efficiency Standards for Non-Weatherized Residential Gas Furnaces, DOE Should Employ Separate Product Classes for Condensing and Noncondensing Furnaces

October 22, 2014

The Department of Energy should, in pursuing the rulemaking on amended residential furnace standards required by the court's order in American Public Gas Association v. DOE (D.C. Circuit Case No. 11-1485), establish separate product classes for condensing and non-condensing non-weatherized residential gas furnaces.

This paper describes the relevant legal authority that governs DOE's decision on this product class issue, the technical characteristics of condensing and non-condensing furnaces indicating that separate product classes are appropriate, and the applicable DOE precedents that should guide DOE in its consideration of separate product classes in this case.

I. Legal Basis for Rulemaking

Under the April 24, 2014 order of the United States Court of Appeals for the District of Columbia Circuit approving a settlement among the parties including DOE, the previously promulgated amendments to the "energy conservation standards for non-weatherized gas furnaces, including but not limited to the Department of Energy's determination that such furnaces constitute a single class of products for purposes of 42 U.S.C. 6295(q)(1)(B)," were vacated and remanded to DOE for notice and comment rulemaking. Thus, DOE agreed, and the court ordered, that DOE reconsider the question of whether condensing and noncondensing non-weatherized gas furnaces should be treated as separate product classes in future rulemaking covering these products.

In setting standards, EPCA requires DOE to structure product classes to ensure the continued availability of a product's unique performance characteristics in light of the utility those characteristics provide to consumers. Specifically, DOE may not prescribe 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 already available.[1] Moreover, EPCA's "special rule for certain types or classes of products" requires the Secretary to establish separate standards for any group of covered products if the products "have a capacity or other performance-related feature which other products within such type (or class) do not have and such feature justifies a higher or lower standard from that which applies (or will apply) to other products within such type (or class)."[2] In determining "whether a performance-related feature

[1] 42 U.S.C. § 6295(o)(4).
[2] 42 U.S.C. § 6295(q)(1)(B).

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 . . . ."[3]

In light of the unique performance-related characteristics and utility that non-condensing non-weatherized residential gas furnaces provide to consumers, these provisions of EPCA require DOE to establish separate product classes for condensing and non-condensing non-weatherized residential gas furnaces.

II. The Unique Performance-Related Characteristics and Consumer Utility of Non-Condensing Furnaces

Condensing and non-condensing non-weatherized gas furnaces are significantly different in terms of the venting mechanisms they use, how they produce and dispose of condensate and the building environments in which they can be installed.[4] These differences create important differences in consumer utility, and must be appropriately considered in DOE's standards development process.

A. Distinct Venting Characteristics

Non-condensing (also known as Category I) and condensing (also known as Category IV) gas furnaces use separate and technically distinct types of venting systems. Non-condensing furnaces employ net negative vent pressures and require masonry chimneys or metal vents that are installed vertically. Condensing furnaces employ positive net pressures, and use plastic, pressurized, gas-tight venting that is typically installed horizontally. Condensing furnaces require blowers to exhaust combustion products, while non-condensing furnaces rely on an induced draft. Condensing furnaces require condensate drains to operate properly; non-condensing furnaces do not.

Neither type of furnace can be installed with venting designed for the other type of furnace, according to design certification standards for safety covering gas furnaces, gas installation codes, and safe installation practices. For example, installation of a Category IV condensing gas furnace that is certified for positive vent static pressure and vent temperatures

[3] 42 U.S.C. § 6295(q)(1).

[4] The distinguishing technical characteristics of a *condensing gas furnace* include: (1) exhaust gas temperatures generally ranging from 120 to 130°F; (2) the use of a fan for venting, because the exhaust gas is not hot enough to travel up a vertical chimney without propulsion; (3) PVC vent piping because PVC resists corrosion from moisture in the acidic exhaust gas, unlike metal piping, and exhaust gas temperatures remain well below the melting point of PVC pipe; and (4) a dedicated condensate drain for moisture produced during gas combustion. The distinguishing technical characteristics of a *non-condensing gas furnace* include: (1) exhaust gas temperatures of 275°F or above; (2) atmospheric venting – i.e., venting without propulsion via fan – because the temperature of the exhaust gas causes the gas to rise and exit a vertical chimney; (3) no condensate drain, because the moisture produced during gas combustion remains in a gaseous state (above 212°F, the boiling point of water) and vents with the exhaust gas through the chimney. *See generally* "Fundamentals of Venting and Ventilation," American Standard Inc., Pub. No. 34-4010-02 (1993), *available at* http://hvac.amickracing.com/Venting/Fundamentals%20of%20Venting%2034-4010-02.pdf.

that produce condensate from combustion cannot be vented into an "atmospheric" or buoyancy-driven venting system designed for a non-condensing appliance under the National Fuel Gas Code.[5] Doing so would also violate the furnace manufacturer's installation instructions and terms of sale, and applicable building codes. Such installations would pose a threat to the safety of building occupants by increasing the risks of venting system failures due to corrosion and of carbon monoxide poisoning due to incomplete venting of combustion products.

Non-condensing furnaces can also be vented through common vents with atmospherically vented gas water heaters, unlike condensing furnaces which require dedicated venting. Common venting non-condensing gas furnaces and atmospherically vented water heaters together is standard practice and requires proper sizing of the venting system to serve both appliances. In the case of a furnace replacement, a change from a non-condensing to a condensing furnace will require a new venting system for the furnace and may require significant modifications to the venting system of the existing water heater to maintain safe and proper venting of its flue gasses. The venting system requirements underpinning such modifications are well established in national installation codes, and if a consumer neglects to implement the needed venting system changes for cost or other reasons, he or she may be creating a safety hazard.

As discussed in section III.A below, DOE has previously made product class distinctions based on type of venting.

B. Building Constraints on Installation

Because a venting system is part of a building's infrastructure, it represents an installation constraint associated with the building environment for furnaces that need to be replaced in existing structures. Replacing a non-condensing furnace with a condensing furnace will require a new venting system. In many installation situations, switching to a condensing furnace may require abandonment of the existing venting system, structural changes to accommodate a new venting system path, and relocation of the furnace to meet the code and installation requirements of the new condensing furnace system. Because of these installation hurdles, replacing a non-condensing furnace with another non-condensing furnace has significant utility to consumers who, in replacing a furnace, do not anticipate needing to significantly alter their home venting system to maintain their safety.

In some cases, such as in certain multi-family dwellings, these installation hurdles may be significant enough to preclude installation of a condensing furnace. For consumers in such a situation, a non-condensing furnace may be the only feasible furnace alternative that relies upon natural gas. For these consumers, failure to create a separate product class for non-condensing non-weatherized gas furnaces would compel fuel-switching.[6]

[5] National Fuel Gas Code, ANSI Z223.1/NFPA 54.

[6] The record in the vacated Direct Final Rule proceeding contained voluminous record evidence on the extent of the fuel switching that would occur due to the up-front costs associated with replacing a non-condensing furnace

In many other circumstances, the building-related hurdles to installing a condensing furnace could be overcome as a technical matter but only with very significant installation costs. In these situations, building constraints make use of a condensing furnace an economically impractical option.

As discussed in section III.B below, DOE has previously made product class distinctions for products designed to meet building-related constraints.

C. Distinct Product Utility and Performance-Related Characteristics for Condensing and Non-Condensing Furnaces Require Separate Product Classes

Given that non-condensing furnaces provide unique utility and performance-related characteristics in terms of venting, condensate management and installation, DOE should establish separate product classes for condensing and non-condensing furnaces in its rulemaking action pursuant to the court's order. Failure to create a regulatory framework that permits the continued availability of non-condensing furnaces to consumers in building circumstances that require the particular utility of these furnaces would contravene the purposes of EPCA.

III. Relevant Precedents for Separate Product Classes

A large body of DOE precedent demonstrates that DOE has frequently considered venting characteristics and installation characteristics related to the building environment as bases for establishing separate product classes under EPCA. Establishment of separate product classes for condensing and non-condensing furnaces would be consistent with all of these precedents.

A. Precedents for Using Venting Characteristics as a Basis for Product Class Distinctions

DOE has previously created distinct product classes based on relevant venting characteristics, as is urged here.[7]

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with a condensing furnace. *Energy Conservation Program: Energy Conservation Standards for Residential Furnaces and Residential Central Air Conditioners and Heat Pumps,* Direct Final Rule, 76 FR 37524 (June 27, 2011)(rule vacated in relevant part). This fuel switching scenario was confirmed by a recent nationwide survey conducted by GTI (available at http://www.apga.org/i4a/pages/index.cfm?pageid=3881)

[7] In 2011, DOE declined to establish separate non-condensing and condensing classes for non-weatherized gas furnaces on this basis because the "utility derived by consumers from furnaces is in the form of the space heating function that the furnace performs," and because the two types of gas furnaces provide "virtually the same utility with respect to that primary function." *Energy Conservation Standards for Residential Furnaces and Residential Central Air Conditioners and Heat Pumps*, *Notice of Effective Date and Compliance Dates for Direct Final Rule*, 76 FR 67037, 67041 (Oct 31, 2011) (rule vacated in relevant part). That rationale does not square with the precedents listed here, all of which involve product class distinctions based on venting as a non-primary function

1. Residential Electric Clothes Dryers. DOE's standards for electric clothes dryers manufactured on or after January 1, 2015 distinguish between vented and ventless dryers, and include four vented dryer product classes and two ventless dryer product classes.[8] For example, DOE has created product classes for "Vented Electric, Compact (240V) (less than 4.4 ft3 capacity)" and "Ventless Electric, Compact (240V) (less than 4.4 ft3 capacity)"; the only difference between these two product classes is whether the product is vented or ventless. In finalizing these product classes, DOE expressly based its decision to create a product class designation on the utility that the relevant venting mechanism provides to consumers:

> DOE considered four product classes for vented clothes dryers and two product classes for ventless clothes dryers, ventless electric compact (240 V) and combination washer/dryers, recognizing the **unique utility that ventless clothes dryers offer to consumers.**[9]

DOE further explained that the new ventless designation "reflects the actual consumer utility (that is, no external vent required)."[10]

2. Residential Furnace Fans. DOE recently established the following product classes for furnace fans: (i) Non-weatherized, Non-condensing Gas Furnace Fan (NWG-NC); (ii) Non-weatherized, Condensing Gas Furnace Fan (NWG-C); (iii) Mobile Home Non-weatherized, Non-condensing Gas Furnace Fan (MH-NWG-NC); and (iv) Mobile Home Non-weatherized, Condensing Gas Furnace Fan (MH-NWG-C).[11] Thus, DOE created separate non-condensing and condensing classes – precisely the same product class distinction sought here – for non-weatherized gas furnace fans and mobile home non-weatherized gas furnace fans. In so doing, DOE distinguished between non-condensing and condensing furnaces as an appropriate basis for creating separate product classes under EPCA.

3. Commercial Packaged Boilers. DOE's standards for steam commercial packaged boilers include product subcategories for "Gas-fired—all, except natural draft" and "Gas-fired—natural draft."[12] This differentiation based on venting system is directly analogous to the "condensing" and "non-condensing" approach to categorizing furnaces – natural draft venting corresponds with venting of non-condensing furnaces, and positive vent pressure venting corresponds with condensing furnaces. For steam commercial packaged boilers, this distinction was based on the product classes defined in ASHRAE Standard 90.1-2007. [13]

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[8] 10 C.F.R. § 430.32(h).

[9] *Energy Conservation Program: Energy Conservation Standards for Residential Clothes Dryers and Room Air Conditioners*, *Direct Final Rule*, 76 FR 22453, 22485 (April 21, 2011) (emphasis added).

[10] *Id.* at n.28.

[11] 10 C.F.R. § 430.32(y).

[12] 10 C.F.R. § 431.87(b).

[13] *Energy Conservation Program for Certain Industrial Equipment: Energy Conservation Standards and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment*, *Final Rule*, 74 FR 36312, 36320 (July 22, 2009).

B. Precedents Using Installation Constraints and Costs as a Basis for Product Class Distinctions

DOE has previously created product classes expressly based on relevant installation characteristics that permit continued installation of a covered product in an existing building condition without undue burden.[14]

1. Packaged Terminal Air Conditioners (PTAC) and Heat Pumps (PTHP). In addition to its "standard-size" class for PTACs and PTHPs, DOE has adopted a "non-standard size" class for PTACs and PTHPs, reasoning that wall sleeve size (the housing into which the product is fitted in the wall) is a performance-related feature.[15] DOE created the non-standard product class because in facilities using non-standard size equipment, "altering the existing wall sleeve opening to accommodate the more efficient, standard size equipment could include extensive structural changes to the building, which could be very costly . . . DOE was concerned that, absent non-standard equipment, commercial customers could be forced to invest in costly building modifications to convert non-standard sleeve openings to standard size dimensions."[16]

2. Central Air Conditioners and Heat Pumps. DOE adopted a space-constrained product class for air conditioners and a space-constrained product class for heat pumps.[17] Originally established in 2004, DOE continued the space-constrained product class in 2011 - in the same rulemaking in which it declined to establish a non-condensing, non-weatherized gas furnace product class - pointing out that DOE believes that "a larger through-the-wall unit would trigger a considerable increase in the installation cost to accommodate the larger unit."[18]

3. Residential Water Heaters. DOE adopted a product class for tabletop water heater in 2001 due to "strict size limitations" for the products.[19]

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[14] In 2011, DOE declined to establish separate non-condensing and condensing classes for non-weatherized gas furnaces on the ground that avoiding the installation obstacles associated with switching from non-condensing to condensing furnaces was an "economic impact" rather than a "special utility" to consumers. 76 FR at 67042 (rule vacated in relevant part). That rationale is not consistent with the precedents listed here, all of which involve product classes developed to ensure that the installation of new covered products in certain building conditions is not foreclosed. This inconsistency is highlighted by the fact that all of the constraints that form the basis for these product class distinctions listed here can be overcome with changes to a building condition, but only at unreasonable cost.

[15] *Energy Conservation Program for Commercial and Industrial Equipment: Packaged Terminal Air Conditioner and Packaged Terminal Heat Pump Energy Conservation Standards*, *Final Rule*, 73 FR 58772, 58782 (Oct. 7, 2008).

[16] *Id.*

[17] 10 C.F.R. § 430.32(c).

[18] *Energy Conservation Program: Energy Conservation Standards for Residential Furnaces and Residential Central Air Conditioners and Heat Pumps*, *Direct Final Rule*, 76 FR 37407, 37446 (June 27, 2011)(rule vacated in relevant part).

[19] *Energy Conservation Program for Consumer Products: Energy Conservation Standards for Water Heaters*, *Final Rule*, 66 FR 4474, 4478 (Jan. 17, 2001).

4. Compact Products. DOE has created compact product classes for a large number of appliances, including refrigerators/refrigerator-freezers/freezers, dishwashers, clothes washers, and clothes dryers.[20] DOE has adopted such product classes because of the unique utility that compact appliances provide consumers by permitting installation of appliances in existing space-constrained environments.[21]

[20] *See* 10 C.F.R. 430.32(a), (f), (g), and (h).

[21] *See*, *e.g.*, *Energy Conservation Program: Energy Conservation Standards for Residential Clothes Dryers and Room Air Conditioners*, *Direct Final Rule*, 76 FR 22453, 22485 (April 21, 2011) ("DOE also notes that compact-size clothes dryers provide utility to consumers by allowing for installation in space-constrained environments."); *Energy Conservation Program: Energy Conservation Standards for Residential Dishwashers*, *Direct Final Rule*, 77 FR 31917, 31926 (May 30, 2012) ("compact dishwashers provide unique utility").