



# AMERICAN PUBLIC GAS ASSOCIATION

July 10, 2015

Ms. Brenda Edwards  
U.S. Department of Energy  
Building Technologies Office  
Mailstop EE-2B  
1000 Independence Avenue, S.W.  
Washington, D.C. 20585-0121

Re: NOPR for Energy Conservation Standards for Residential Furnaces,  
Docket No. EERE-2014-BT-STD-0031.

Dear Ms. Edwards:

Attached for filing in the above-referenced proceeding are (i) the Comments of the American Public Gas Association (dated July 10, 2015) and (ii) the Technical Analysis of DOE Notice of Proposed Rulemaking on Residential Furnace Minimum Efficiencies, including six Excel spreadsheets (GTI Report).

The American Public Gas Association is pleased to have this opportunity to file comments with DOE in this very important proceeding, and welcomes the opportunity to answer any questions that DOE may have regarding the APGA Comments and accompanying GTI Report.

Respectfully submitted,

AMERICAN PUBLIC GAS ASSOCIATION

By: Bert Kalisch  
APGA President & CEO

cc: John Cymbalsky  
Eric Stas  
Daniel Cohen

**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**

July 10, 2015

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**I. Introduction**

The American Public Gas Association (APGA) submits these 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, among other things, proposed a 92% AFUE nationwide standard for non-weatherized gas furnaces and, by refusing to set a separate standard for non-condensing furnaces, has banned such furnaces from the marketplace as of the compliance date of the new 92% standard. APGA believes that DOE has made significant analytical, technical and legal errors in the NOPR and underlying technical support document, which errors are described below and in the Technical Analysis of DOE Notice of Proposed Rulemaking on Residential Furnace Minimum Efficiencies and accompanying spreadsheets authored by the Gas Technology Institute (“GTI”), which is submitted with, and incorporated in, these comments (“GTI Report”). The net effect of these errors is that the NOPR should be withdrawn as unsupportable; alternatively, if DOE declines to abandon the NOPR, it should, at a minimum, issue a revised NOPR based on a corrected version of the TSD and Spreadsheet and providing separate standards for condensing and non-

condensing furnaces, and provide for a minimum 120-day comment period from the date of publication.<sup>1</sup>

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 five 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. APGA and its members promote the use of fuel-efficient appliances, including furnaces,<sup>2</sup> but oppose setting fuel efficiency standards that promote fuel switching to less efficient alternative energy sources, measured on a source-to-site basis, and for which economic support is wanting.

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. GTI was retained by APGA and the American Gas Association (“AGA”) to conduct a detailed review of the NOPR and the accompanying Technical Support Document (“TSD”) and Crystal-Ball driven Excel spreadsheet (“Spreadsheet”) to determine the

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<sup>1</sup> Regarding the requirement under these circumstances to issue corrected technical analyses under the Information Quality Act (Public Law 106-554, Section 515), see *Final Report Implementing Office of Management and Budget Information Dissemination Quality Guidelines*, 67 Fed. Reg. 62446, 62453 (Oct. 7, 2002) at Section IV.A.1.(A).

<sup>2</sup> The record shows clearly that local distribution companies (“LDCs”), both privately and municipally-owned, have been proactive in promoting appliance efficiency, including providing rebates to promote the sale of condensing furnaces throughout the United States (TSD Ch. 17, Appendix 17A, Table 17A.5.4; see also AGA presentation, slides 4 and 5, at <http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0004>; see also transcript of March 27, 2015 public meeting in this proceeding at pages 12 (DOE), 20 (AGA), and 37 (NRDC); GTI Report at page 9).

validity of the data and analyses underlying the NOPR. As noted, the GTI Report is made a part of these comments.<sup>3</sup>

## **II. Background**

Efficiency standards for many household appliances, including non-weatherized gas furnaces, were established by the Energy Policy and Conservation Act of 1975, as amended (“EPCA”), 42 U.S.C. § 6295, which also provides for DOE to periodically review the standards to determine if more stringent standards are warranted under the various criteria set forth in the statute. 42 U.S.C. § 6295(f). The EPCA established an AFUE of 78% for residential home furnaces, with a compliance date of January 1, 1992. *Id.*

In the 2007 Furnace Rule, 72 Fed. Reg. 65136, DOE set a nationwide AFUE standard for residential gas furnaces of 80% to apply to products manufactured for sale on or after November 19, 2015. Under consideration at the time was whether a nationwide condensing furnace standard should be adopted. In rejecting the condensing furnace standard, DOE noted, among other things, that a majority of the affected consumers in the South would be expected to experience a “significant increase in total installed cost”; that “55 percent of households in the south purchasing a non-weatherized gas furnace would experience a life-cycle net cost”; and that the “average LCC increase to the southern consumers purchasing a non-weatherized gas furnace is \$82.” (72 Fed. Reg. at 65165.) DOE noted that its decision was informed by a fuel switching analysis that was done after the notice of proposed rulemaking had issued and that showed “a larger drop in shipments of non-weatherized gas furnaces at higher efficiency levels than reported in the NOPR.” (72 Fed. Reg. at 65144.) DOE concluded that at the 90% condensing standard, “the benefits of energy and cost savings and emissions impacts would be outweighed by the economic burden on southern households and the capital conversion costs that are likely to result in a significant reduction in INPV for manufacturers.” (72 Fed. Reg. at 65165.) DOE noted in the 2007 Final Rule that it was obliged to look at regional impacts in determining

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<sup>3</sup> The GTI Report is a “Final Report” (dated July 10, 2015) and is available on the APGA web site and at the following link: [http://www.gastechnology.org/reports\\_software/Pages/Residential-Furnace-Minimum-Efficiencies.aspx](http://www.gastechnology.org/reports_software/Pages/Residential-Furnace-Minimum-Efficiencies.aspx); however, due to the complexity of the matters addressed in the report, the abbreviated time to address these matters, and the ongoing nature of the review process, GTI will update the report as necessary to reflect any corrections that may be warranted. Appropriate notice of such changes, if any, and a link to the revised report will be provided to the public.

economic feasibility (72 Fed. Reg. at 65146-47) but that, despite “recogniz[ing] the potential benefit that could be achieved through regional standards” (72 Fed. Reg. at 65151), it could not set standards on a regional basis under the EPCA as then constituted (72 Fed. Reg. at 65150-51).<sup>4</sup>

In 2011, DOE issued a Direct Final Rule (“DFR”) setting a 90% AFUE for residential gas furnaces in the northern region of the U.S. and retaining the 80% standard established in the 2007 Furnace Rule for residential furnaces not in the northern region, with a compliance date of May 1, 2013 (76 Fed. Reg. 37407). The technical analysis underlying the DFR purported to show that if a 90% standard were implemented in the northern region, there would be LCC savings of \$155, whereas in the southern region, the average LCC “savings” would be -\$13, with far more consumers experiencing a net cost (48%) than a net benefit (28%).<sup>5</sup> The results were even more dramatically adverse in the southern replacement market – with LCC “savings” of -\$160, resulting in a net cost to some 59% of consumers (versus only 18% benefitted).<sup>6</sup> APGA did not take exception to the regional approach in the DFR, which was consistent with the then recently amended EPCA, but did take exception to, among other things, (i) the use of the direct final rule process to reach the outcome, given the exclusion of many interested parties in the direct final rule process and their substantive objections to the DFR, (ii) DOE’s failure to set a separate standard for non-condensing furnaces, and (iii) the failure to correct the opaque and non-transparent underlying technical support document to correct for certain enumerated errors. Despite these objections, DOE declined to withdraw the DFR.<sup>7</sup> APGA appealed the DFR and Notice, and they were vacated and remanded by the United States Court of Appeals for the D.C. Circuit pursuant to a joint motion filed by all parties and intervenors to the case.<sup>8</sup>

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<sup>4</sup> Shortly after the issuance of the 2007 Furnace Rule, Congress in December 2007 amended the EPCA to authorize regional standards for furnaces, air conditioners, and heat pumps, in recognition of the impact of weather on the operating costs of those appliances (42 U.S.C. § 6295(o)(6)).

<sup>5</sup> See <http://www.regulations.gov/#!documentDetail:D=EERE-2014-BT-STD-0031-0062>, Summary Tab.

<sup>6</sup> *Id.*

<sup>7</sup> Notice of Effective Date and Compliance Dates for Direct Final Rule, 76 Fed. Reg. 67037 (Oct. 31, 2011)(“Notice”).

<sup>8</sup> See *APGA v. United States of America*, CADC No. 11-1485, Order issued April 24, 2014 (unpublished).

In the subject NOPR, DOE is proposing a nationwide 92% AFUE for residential gas furnaces, which will eliminate non-condensing furnaces from the marketplace nationwide on the compliance date. In the NOPR (and underlying TSD and Spreadsheet), DOE has made significant substantive errors, including, for example, the failure to establish a separate standard for non-condensing furnaces, use of a technical support document premised in important part on false logic and on incorrect or stale input data, failure to account properly for fuel switching, a lack of transparency (including reliance on proprietary data), and use of data averaging to camouflage adverse regional and subgroup impacts. DOE has failed to recognize the severe regional impact differences that make a condensing furnace mandate in the non-northern region completely impractical (as well as unlawful under the EPCA criteria). In that regard, DOE has made no effort to reconcile its proposed rule with the technical analyses in the 2007 and 2011 furnace rulemaking proceedings, which showed that a condensing furnace standard caused net harm to consumers in the southern region; rather, it explains away the dramatic differences by simply referencing the newly minted TSD input data and analysis,<sup>9</sup> which DOE now maintains supports a nationwide condensing standard but which the attached GTI Report shows is erroneously premised, which errors, when corrected, show that the proposed 92% standard provides no net savings for consumers, results in fuel switching by different consumers than forecasted by DOE, and will have an adverse impact on consumers, energy consumption, emissions and the economy. Further, in addition to ignoring the important impact differences by region, DOE also papers over the adverse impact on certain subgroups, most especially low income persons, in its haste to adopt a nationwide condensing standard. These and other issues will be addressed in more detail below.

### **III. Threshold Legal Impediments**

#### **A. DOE May Not Proceed on the Basis of a TSD and Spreadsheet That Have Not Been the Subject of Peer Review as to Key Features.**

The Final Information Quality Bulletin for Peer Review of the Office of Management and Budget (“OMB Bulletin”) requires each federal agency to conduct a peer review of all influential

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<sup>9</sup> See DOE letter of Jan. 14, 2015, to APGA counsel, attachment, answer to question 1, available at <http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0030>.

scientific information that the agency intends to disseminate.<sup>10</sup> The term “influential scientific information” is defined as scientific information that the agency reasonably can determine does or will have a clear and substantial impact on important public policies or private sector decisions.<sup>11</sup> In turn, “scientific information” means “factual inputs, data, models, analyses, technical information, or scientific assessments based on the behavioral and social sciences, public health and medical sciences, life and earth sciences, engineering, or physical sciences.”<sup>12</sup>

The data set forth in the TSD upon which DOE relies in this proceeding is indisputably “influential scientific information” that DOE has disseminated. This much has been conceded by DOE.<sup>13</sup> Accordingly, the technical information underlying the NOPR is subject to the peer review requirements of the OMB Bulletin.

The NOPR asserts that, in response to the OMB Bulletin, “DOE conducted formal in-progress peer reviews of the energy conservation standards development process and analyses and has prepared a Peer Review Report pertaining to the energy conservation standards rulemaking analyses.”<sup>14</sup> The report DOE cites (referenced in note 13 in the margin below) is dated February 2007.

It is clear from a review of the February 2007 report and an ensuing Energy Conservation Standards Rulemaking Peer Review Report – Supporting Documentation dated March 2007<sup>15</sup> that the peer review culminating in the 2007 reports did *not* include critical components of the Crystal Ball-driven spreadsheet analysis underlying the NOPR. A few examples should suffice, keeping in mind that probably only Lawrence Berkeley National Laboratory (“LBNL”) knows the full extent to which the Crystal Ball-driven spreadsheet analysis underlying the NOPR differs

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<sup>10</sup> *Final Information Quality Bulletin for Peer Review*, 70 Fed. Reg. 2664, 2675 (Jan. 14, 2005).

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> See Energy Conservation Standards Rulemaking Peer Review Report (“Peer Review Report”), February 2007, at page 6 (available at: <http://energy.gov/eere/buildings/downloads/energy-conservation-standards-rulemaking-peer-review-report-0>).

<sup>14</sup> NOPR at 13195.

<sup>15</sup> Available at: <http://energy.gov/eere/buildings/downloads/energy-conservation-standards-rulemaking-peer-review-report>.

from the edition subjected to peer review in the pre-2007 timeframe. For example, the NOPR relies on a fuel switching analysis, premised on proprietary data, that has the counterintuitive (and, in APGA's view, erroneous) result of materially increasing LCC savings and reducing payback periods. This ultra complex fuel-switching analysis, which is confusingly and inadequately explained in the TSD,<sup>16</sup> has not undergone peer review and thus fails to meet the requirements of the OMB Bulletin with respect to the NOPR in the instant proceeding.

Other examples of significant changes that require peer review include: (i) DOE's reliance on random assignment to separate affected from non-affected consumers despite the availability of consumer data that allows such a separation to be made on the basis of rational economic decision-making – another critical analytical approach that has not been peer-reviewed and which results in substantially overstated LCC savings; (ii) use of gas and electric marginal rates without real explanation how they were calculated; the TSD does not provide details on the marginal gas and electric rate calculation methodology used by DOE in the LCC Spreadsheet, only a general description of the approach and use of EIA Gas Navigator information; understanding the actual methodology to determine the DOE marginal rates required a laborious process of identifying and interpreting multilayered equations contained in the spreadsheet “rf\_nopr\_analysis\_inputs\_2014-02-06.xlsm”; and (iii) a new methodology of assigning weighting factors to buildings that are selected from the RECS 2009 database for calculation of furnace heating loads; in the 2011 version of the LCC spreadsheet, DOE used the same weighting factors as in the RECS 2005 database for that particular representative building randomly selected by Crystal Ball; the 2014 version of the LCC spreadsheet assigns different weighting factors than provided in the RECS 2009 database; for example, in the 2009 RECS database, there are 12,083 different buildings surveyed. The weighting factor for building No. 12,083 is 7,703; DOE replaced that weighting factor with a new value of 404 without explanation.

The peer review mandate on its face applies to “factual inputs,” “data,” and “technical information” as well as “models” and “analyses” that the agency uses in generating such inputs, data and information. DOE was therefore required to subject the TSD and Spreadsheet *as*

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<sup>16</sup> See GTI Report at section 2.4 and at Appendix A, section A.2.2; *see also* subpart IV.A.2.b., below.

*presently constituted* to peer review. DOE reliance on an eight-year-old report on its general process clearly fails to meet the standard, given the important changes in the Crystal-Ball driven analysis that have been made since that time, changes that substantially influence the outcomes in pro-rule fashion.

Accordingly, to meet the requirements of the OMB Bulletin, DOE must withdraw the NOPR and must only re-issue it following a compliant peer review of the TSD and the underlying Crystal-Ball driven spreadsheet now being relied upon to support the NOPR.

**B. DOE May Not Issue the NOPR Prior to Completing the Test Procedures.**

The NOPR correctly recites that “DOE is further required to develop test procedures to measure the energy efficiency, energy use, or estimated annual operating cost of each covered product prior to the adoption of a new or amended energy conservation standard. (42 U.S.C. 6295(o)(3)(A) and (r)).” (80 Fed. Reg. at 13128-129.) Likewise, in the 2007 Furnace Rule (72 Fed. Reg. at 65139), DOE recognized that: “Section 7(c) of the Process Rule indicates that, if modifications are needed to its test procedures for a covered product, DOE will issue a final, modified test procedure before issuing a proposed rule for energy conservation standards for that product.”<sup>17</sup> DOE has not followed that mandate.

On March 11, 2015, DOE posted a notice of proposed rulemaking in which it proposed “to revise its test procedure for residential furnaces and boilers established under the Energy Policy and Conservation Act.” (80 Fed. Reg. 12875, 12876.) DOE announced it would receive comments on the proposed rule until May 26, 2015, following which it would issue a final rule. By notice issued May 22, 2015, DOE extended the date for filing comments in this proceeding to July 10, 2015.

The subject NOPR is premature since it may not issue until the test procedures are determined in the pending rulemaking proceeding. DOE tries to rationalize this prematurity away as follows: “DOE has tentatively determined that this amendment to the test procedure would not be substantial enough to merit a revision of the proposed AFUE efficiency levels for

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<sup>17</sup> See 10 C.F.R., Part 430, Subpart C, Appendix A, § 7(c).

residential furnaces.” 80 Fed. Reg. at 13142. APGA submits that such facile excuses for not following the required sequencing scheme of implementing test procedures before proposing revised efficiency standards does not pass statutory or regulatory muster. DOE should, at a minimum, suspend the subject proceeding until the new test procedures are established, following which a revised NOPR reflecting those test procedures (and the other corrections noted below) should issue (unless, as suggested below, the NOPR is withdrawn due to the substantive flaws discussed below).<sup>18</sup> The notice requirements of the Administrative Procedure Act<sup>19</sup> not to mention the specific mandate of the EPCA<sup>20</sup> require no less.

**C. DOE Must Establish a 2025 Compliance Date for Any New Standard for Residential Non-Weatherized Gas Furnaces.<sup>21</sup>**

DOE’s proposed compliance date for the 92% efficiency standard for residential non-weatherized gas furnaces fails to meet two requirements of EPCA: the 10-year window between the compliance dates for the first and second rounds of furnace rulemaking, and the six-year window between compliance dates for new appliance standards in general. Both mandate a compliance date no earlier than 2025.

**1. The 10-year requirement**

Section 325(f)(4) of EPCA requires that DOE issue two final rules determining whether the efficiency standards for furnaces should be amended: one no later than January 1, 1994, and the other between January 1, 1997 and January 1, 2007.<sup>22</sup> The provision also mandates that any new efficiency standard established in the first of these two rulemaking proceedings apply to products manufactured on or after January 1, 2002, and that any new efficiency standard

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<sup>18</sup> It appears that this is not the only proceeding in which DOE is attempting to circumvent the requirement to have test procedures in place before revising efficiency standards. *See, e.g.*, Comments of Association of Home Appliance Manufacturers re DOE NOPR in Energy Conservation Standards for Residential Dishwashers, Docket No. EERE-2014-BT-STD-0021, at 12-14 (Mar. 25, 2015).

<sup>19</sup> 5 U.S.C. §§551 *et seq.*

<sup>20</sup> 42 U.S.C. §§6295(o)(3)(A) and 6295(r).

<sup>21</sup> This point affects both the compliance date *per se* and the data sets that must be used in the NOPR and TSD. The NOPR incorrectly uses data for the period 2021-2050 for its analyses (NOPR, *passim*; *e.g.*, TSD, Appendix 8I, section 8I.4), versus the post-2025 period.

<sup>22</sup> 42 U.S.C. § 6295(f)(4).

established in the second such proceeding apply to products manufactured on or after January 1, 2012.<sup>23</sup> Hence, Section 325(f)(4) establishes a 10-year window between the first and second compliance dates. DOE's proposed compliance date for the 92% efficiency standard for non-weatherized gas furnaces fails to meet this requirement.

DOE asserts in the NOPR that it completed the first round of required rulemaking by issuing of its November 2007 final rule prescribing amended efficiency standards for residential furnaces manufactured on or after November 19, 2015.<sup>24</sup> DOE also asserts that its June 2011 direct final rule revising energy conservation standards for residential furnaces satisfied the second-round requirement.<sup>25</sup> However, DOE explains that, because the standard established by that rule for non-weatherized gas furnaces was vacated, the instant rulemaking proceeding constitutes the second round of rulemaking for non-weatherized gas furnaces.<sup>26</sup> For these furnaces, the NOPR proposes a compliance date of five years after publication of the final rule.<sup>27</sup> In support of that date, DOE explains that EPCA dictates a five-year period between the rulemaking publication date and compliance date for the second round of amended residential furnace standards.<sup>28</sup> Presumably, DOE is referring to the five-year period between January 1, 2007 and January 1, 2012.

While DOE is correct that EPCA establishes a minimum five-year period between rule publication and compliance, DOE's analysis ignores the second and equally important timing element of this statutory scheme: the mandatory 10-year period between the first and second compliance dates. DOE's reference to and compliance with the five-year requirement is acknowledgement that the timeframe elements of Section 325(f)(4) continue to apply to DOE even though DOE missed the original deadlines for both rounds of rulemaking.

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<sup>23</sup> *Id.*

<sup>24</sup> NOPR at 13130, 13136.

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

<sup>27</sup> *Id.* at 13198.

<sup>28</sup> *Id.* at 13136.

The 10-year window between the two compliance dates is critical because it gives manufacturers an opportunity to earn a fair return on their investments in the technologies necessary to meet the standards resulting from the first round before having to invest in those necessary to meet the second. Other interested parties similarly need time to make adjustments during this 10-year period. For example, gas distribution utilities, including members of APGA, need time to deal with any reduction in load resulting from the imposition of amended standards, as well as with any fuel-switching implications of a new rule. Furthermore, furnace installers face a learning curve in installing furnaces with varying efficiency levels, especially in the situation where DOE sets a nationwide standard that eliminates the type of furnace regularly installed in a large section of the United States.

In any case, DOE simply may not disregard the plain language of the statute. As noted, the compliance date for the amended standards resulting from the first round of rulemaking is November 19, 2015. Accordingly, the compliance date for any non-weatherized gas furnace standard resulting from the instant proceeding must be November 19, 2025.

## **2. The six-year requirement**

Section 325(m)(4)(B) of EPCA provides that “[a] manufacturer shall not be required to apply new standards to a product with respect to which other new standards have been required during the prior 6-year period.”<sup>29</sup> DOE recently issued new efficiency standards for furnace fans, including furnace fans for non-weatherized gas furnaces, that will apply to products manufactured on or after July 3, 2019.<sup>30</sup> As DOE expressly acknowledges, both the standard that it proposes in the instant proceeding and the furnace fan standard “impact the same products (*i.e.*, residential furnaces).”<sup>31</sup>

Accordingly, under Section 325(m)(4)(B) of EPCA, any amended furnace standard resulting from the instant proceeding may not apply to products manufactured before July 3, 2025.

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<sup>29</sup> 42 U.S.C. § 6295(m)(4)(B).

<sup>30</sup> *Energy Conservation Program for Consumer Products: Energy Conservation Standards for Residential Furnace Fans*, Final Rule, 79 Fed. Reg. 38129 (July 3, 2014).

<sup>31</sup> NOPR at 13122.

#### **D. DOE May Not Omit Gas Utilities from Its Utility Impact Analysis**

DOE regulations require as a predicate to a rule setting a new efficiency standard a Utility Impact Analysis, which “will include estimated marginal impacts on electric and gas utility costs and revenues.” 10 C.F.R Part 430, Appendix A to Subpart C, section 4(a)(7)(v). The Utility Impact Analysis in the NOPR (80 Fed. Reg. at 13162) is silent as to the impact of the proposed rule on gas utility costs and revenues, focusing entirely on the “effect on the power generation industry.” (*Id.*) This omission is inexcusable under any circumstances, but particularly so in a proceeding in which DOE is proposing to set a new condensing-only standard that, by DOE’s own estimation, will cause substantial fuel switching, with obvious impacts on gas distribution system revenues and operations. Hence, DOE’s failure to include in its Utility Impact Analysis a complete review and analysis of these impacts is fatal to the validity of the NOPR.

#### **IV. Comments on the NOPR, TSD, and Spreadsheet**

##### **A. DOE’s Economic Analysis Is Flawed in Numerous Significant Respects.**

The GTI Report discusses in detail the significant errors underlying DOE’s economic analysis and the impact of these errors, which drive LCC savings into negative territory and thus undermine the putative economic basis for the NOPR. These errors will be enumerated and discussed in subparts A.2, A.3, and A.4, below, with appropriate references to the GTI Report. Initially, however, APGA observes in subpart A.1 below that, these GTI-documented errors aside, APGA does not believe that DOE’s own uncorrected numbers justify the 92% nationwide standard that it is proposing.

##### **1. DOE’s own, uncorrected data fails the economic feasibility test.**

According to the NOPR, the nationwide 92% standard is justified because it results in average LCC savings of \$305, with a simple payback period of 7.2 years (80 Fed. Reg. at 13122), with 20% of consumers experiencing a net cost (*id.* at 13164).<sup>32</sup> When viewed on a

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<sup>32</sup> The 7.2 year payback period is over double the payback period that DOE states will cause fuel switching (TSD at 8J-5 – 8J-6); however, as pointed out below (subpart A.2.b), DOE’s use of the term “payback” is confusing and ill-defined.

regional and subgroup basis, the economic feasibility of a nationwide 92% standard is undermined by DOE's own uncorrected TSD.

The NOPR, while it addresses generally the statutory authority to set regional standards (NOPR at § III.F, 80 Fed. Reg. at 13135) and produces underlying data on a regional basis (*see id.* at § IV and accompanying TSD and Spreadsheet), is silent on the basis for adopting a nationwide standard in the face of data showing adverse regional and subgroup impacts. For example, in the South for residential replacement furnaces, the Spreadsheet shows LCC savings of only \$188, with a payback period of 12.5 years (some 74% above the national average relied upon by DOE to justify the nationwide condensing standard), and only 42% of such consumers benefitting, versus 39% harmed and 19% not impacted; for the southern commercial replacement market, the numbers are equally bad, with LCC savings of \$179, a payback period of 12 years (almost 67% above the national average number relied upon by DOE), and only 32% being benefitted, versus 40% harmed and 28% not impacted (Spreadsheet, Summary Tab).<sup>33</sup>

There are several remarkable aspects to these numbers. First, DOE, through the use of inputs and assumptions skewed toward rule adoption (discussed in detail in the GTI Report and in subpart A.2 below) has turned upside down its own determinations in the 2007 Furnace Rule and in the DFR that a condensing standard would have negative impacts on the southern market, especially the southern replacement market. Unfortunately, this flip-flop seems to speak to the DOE agenda, which is driving this NOPR in directions not supported by the data. Second, the DOE's use of averages to support a national number is misleading and is an unacceptable basis for ignoring adverse regional and subgroup impacts. DOE may not lawfully set a new nationwide standard that has such adverse regional and subgroup impacts, and it certainly may not attempt to camouflage such adverse regional impacts by the use of national average numbers, as it has done here, without at least explaining how it has met the economic feasibility, benefit/burden requirements of the EPCA (42 U.S.C. § 6295(o)(2)(B)).

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<sup>33</sup> As for why the absolute LCC savings numbers shown in the DOE Spreadsheet are larger in the South than in the North, that is explained by DOE's use of all households in the denominator, whether or not impacted (GTI Report, Appendix A, at section A.9); if only the loss on the impacted consumers is measured, the numbers flip as shown on Tables 79 and 80 (*id.* at page A-77).

It was because of, and to avoid, distorted regional impacts of this sort that Congress in 2007 amended the EPCA to authorize regional standards for weather-sensitive appliances like furnaces (42 U.S.C. § 6295(o)(6)). It is noteworthy that efficiency advocates, such as the Appliance Standards Awareness Project<sup>34</sup> and the California Energy Commission,<sup>35</sup> were some of the strongest proponents of recognizing regional impact differences in setting efficiency standards for weather-sensitive appliances like furnaces – differences that DOE now glosses over.

While low income persons are a key sub-group that requires separate focus in any economic feasibility analysis, as DOE seems to concede (TSD, p. 2-12), DOE does not break the low income data down by new and replacement market, so it effectively conceals the real impact from the public. But even DOE's aggregated data reveals that the average (versus simple) payback period for low income persons in the southern region is an unacceptable 18.9 years (Spreadsheet, Statistics Tab), virtually the same as DOE's projected furnace life of 21 years (a projection that is itself suspect). The percent of low income consumers in the South that experience a net cost is 39% (TSD, p. 11-4), some 95% greater than the 20% national average figure relied on by DOE to support the nationwide condensing standard. These numbers are unacceptable on their face and more than warrant abandonment of the NOPR. (The devastating

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<sup>34</sup> “DOE's rulemaking analyses for furnaces and central air conditioners have thoroughly, but not surprisingly, demonstrated that different minimum standards make sense in different regions of the country. But DOE concluded in the current furnace docket that it lacks legal authority to set regional standards. In the recent Notice of Proposed Rulemaking for residential furnace standards, DOE invited cold weather states to apply for waivers from federal preemption. But a state-by-state waiver process is very slow and uncertain for the states and, if successful, would result in precisely the patchwork of standards that manufacturers most dislike. Regional standards established on a federal level would provide larger energy and dollar savings and improved regulatory certainty. Such regional standards have existed for manufactured homes (with respect to energy use, roof strength and wind resistance) since 1978. The manufactured home standards, administered by HUD, rely on manufacturer labeling and state-level enforcement of the federal requirements. States already routinely adopt federal appliance standards into state building codes (they are preempted from adopting any other standards), so the state-based enforcement system is already in place for regional appliance standards. In our view, Congress should permit up to three regional standards, far fewer than might result from a variety of individual state waiver requests.” Statement of Andrew deLaski, Executive Director of Appliance Awareness Standards Project, before the House Energy and Commerce Subcommittee on Energy and Air Quality, May 1, 2007, at p. 4.

<sup>35</sup> “A key barrier in setting efficiency standards for space heating and cooling appliances has been DOE's position that Congress intended to prohibit the agency from adopting standards that reflect the conditions in the country's different climate zones. This meant that DOE was forced to adopt space conditioning standards based on “average” weather that ignored climates that were hot or cold. Fortunately DOE has recently indicated that it is open to the idea that heating appliances should be more efficient in northern climates, so as to effectively break the U.S. into two climates for heating.” Statement of Arthur H. Rosenfeld, Commissioner, California Energy Commission, before the House Energy and Commerce Subcommittee on Energy and Air Quality, May 1, 2007, at pp. 3-4.

impact of the NOPR on low income consumers becomes even clearer once the logic flaws and input errors in the Spreadsheet are corrected (*e.g.*, GTI Report, sections A.4.12 (Tables 34-37) and A.8 (Tables 67-70).)

In tacit recognition that the impact numbers on low income consumers were unacceptable, DOE attempted in the April 13, 2015 public meeting to downplay this impact on low income persons through the false logic that some 60% of low income households are tenants and tenants usually pay energy bills but do not choose the equipment, from which it concludes, citing to a working paper by a Ph.D candidate,<sup>36</sup> that “tenants benefit from lower energy bills,” “rent increases may not cover higher incremental cost,” and “overall, tenants are probably better off than suggested by LCC results.”<sup>37</sup> While the first point is undoubtedly true (all else being equal) and the second point is possibly true in some instances in the short run,<sup>38</sup> the conclusion is demonstrably false. First, the large majority of tenants where gas is the primary fuel pay the gas bill.<sup>39</sup> Second, the DOE’s principal contention regarding whether a given efficiency standard is economically feasible rests on the relationship between the incremental costs of more efficient appliances and operating cost savings by the owner of the equipment (*i.e.*, payback). If, as is the case with most low income tenants using natural gas, the landlord absorbs the first-cost hit of the more efficient and more expensive appliance and the tenant gets the benefit of the investment, it does not take a rocket scientist to understand that the landlord, having no financial stake in the operating cost savings to be had from the more efficient appliance, will opt for the appliance with the lowest first costs, which is typically less efficient in terms of operating costs (and hence will drive up the fuel costs being paid by the low-income tenant). This fuel-switching scenario

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<sup>36</sup> “Asymmetric Information in Residential Rental Markets: Implications for the Energy Efficiency Gap,” by Erica Myers (Job Market Paper) (Jan. 12, 2014) (“Myers Job Market Paper”). The Job Market Paper, on the basis of a host of assumptions and a model constructed by the author, concludes (at page 36) that “[w]hen tenants lack information, landlords underinvest in energy efficiency because they cannot capitalize their investments into higher rents.”

<sup>37</sup> The DOE “additional presentation slides (handout) for the April 13, 2015 public meeting” are available at <http://www.regulations.gov/#!docketDetail; dct=FR+PR+N+O+SR:rpp=10;po=0;D=EERE-2014-BT-STD-0031>. The presentation was made by an LBNL economist who “spent the last week thinking about this problem” (Tr. 10), no doubt at the behest of DOE, which seemingly now understands that a rule that crucifies low-income persons will not withstand review.

<sup>38</sup> As was pointed out during the May 13 public meeting, over the long run the landlord always wins, *i.e.*, if indeed the landlord absorbs the cost of a higher efficiency appliance, the landlord will recover that cost (Tr. 23-26).

<sup>39</sup> Myers Job Market Paper at 22.

was not considered by the economist making the presentation (Tr. 18-21). In short, the plight of the 40% of low income persons that do not rent is every bit as bad as the LCC analysis indicates and, if anything, the plight of the other 60% of low income consumers (i.e., those that do rent) is likely understated in the NOPR and underlying TSD.

The LCC savings numbers recited in the NOPR and discussed above are also overstated due to the DOE's treatment of fuel switching in determining LCC savings. As Slide 80 in the DOE's March 27, 2015 presentation shows, DOE derives *greater* savings for the 92% furnace with fuel switching (\$305) than without (\$238) (*see also* GTI Report, Appendix A, section A.4.12, Table 35, Scenarios 0 and 19). The numbers in the South are even more dramatic -- \$336 with switching and \$232 without switching. That makes no sense (as shown in the GTI Report at Appendix A, sections A.4.8 and A.4.9 and in subpart A.2 below). There are two classes of fuel switchers – beneficial fuel switchers (i.e., those that will switch to an alternate fuel because it makes economic sense with or without a rule) and perverse fuel switchers (i.e., those that switch because DOE sets a nationwide condensing standard that drives them to an alternate fuel). The beneficial fuel switchers should be excluded from the analysis (i.e., treated as not affected) because they would switch regardless of this proceeding; the perverse fuel switchers drive down LCC savings and drive up the number that experience a net cost, as the GTI Report (at sections 2.4 & 2.5 and at Appendix A, sections A.2.2 & A.3.2 and Table 35, Scenarios 1, 2, and 3) shows and as the AGA survey and associated GTI analysis likewise demonstrated. Hence, the regional and subgroup numbers discussed in the preceding paragraphs of this section are substantially overstated in term of benefits and understated in terms of the harm to affected regional and subgroup consumers caused by the NOPR condensing standard.

Even taken at face value, the DOE fuel switching analysis is a further indictment of the proposed 92% standard. It shows an unacceptable level of fuel switching. For example, DOE forecasts that at the 92% standard, approximately 20% of replacement consumers and 21% of new residential consumers in the South will switch from natural gas to electric heat (TSD, Tables 8J.5.3 & 8J.5.2), approximately double the switching forecast for the replacement market in the North and 26% more than the switching forecast in the new construction market (*id.*). Such a level of fuel switching renders the proposed rule unacceptable on its face. The purpose of energy efficiency standards is not to drive natural gas consumers to alternate, less efficient energy

sources. Ironically (as noted above), though perhaps not surprisingly, DOE's fuel switching analysis *increases* LCC savings,<sup>40</sup> whereas a properly constructed fuel switching analysis, which removes from the equation those not affected by the rule, has the opposite effect, as discussed in subpart A.2 below.

It was DOE's recognition of the fact that a standard that caused substantial fuel switching in a region was unacceptable that prompted DOE in the 2007 Furnace Rule to abandon the condensing standard that was under consideration in that proceeding. And while DOE inappropriately issued the DFR without benefit of a fuel switching analysis, it limited the application of the condensing standard in the DFR to the northern region in tacit recognition of the harm that such a standard would cause in the non-northern region (which harm was demonstrated in the spreadsheet analysis underlying the technical support document in that proceeding<sup>41</sup>). Thus, even if the fuel switching analysis underlying the NOPR were not flawed (which flaws are discussed in subpart A.2.b, below), its outcome would preclude application of a nationwide condensing standard.

In short, the DOE's own LCC savings and payback numbers, viewed in the perspective of the EPCA criteria, show that a nationwide 92% standard is economically unsupportable, and should be abandoned. This conclusion becomes incontrovertible upon examination and correction of only the most basic of the various logic and input flaws embedded in the Spreadsheet and TSD, as discussed in subpart A.2 below.

## **2. DOE failed to account for rational decision-making, which renders its economic analysis skewed and unreliable.**

### **a. Affected versus non-affected consumers**

A critical flaw underlying DOE's analysis is that DOE does not rely on economic decision making to separate affected from non-affected consumers, which is a critical threshold step in the LCC analysis; rather, it relies on the Crystal Ball software to make that determination based on a random selection number and extrapolated furnace shipment data (80 Fed. Reg. at

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<sup>40</sup> GTI Report, Appendix A, at section A.4.8; *see id.* at section A.4.12, Table 34-37 (Scenarios 0 and 19).

<sup>41</sup> *See* DOE spreadsheet, 2011 Furnace DFR tab, available at <http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0063>.

13148<sup>42</sup>; *see* GTI Report at section 2.3). This random-sampling approach produces irrational outcomes, as demonstrated when the trial samples relied upon by DOE are themselves examined in more granular fashion. For example, DOE is showing as “affected” by the proposed rule numerous consumers that would experience lower first cost and lower operating costs with a 92% condensing furnace (*see* GTI Report at section 2.3), which consumers would rationally purchase a condensing furnace without a rule (and hence should be deemed not affected); and DOE is showing as “not affected” consumers that experience substantial first costs and *de minimus* operating cost savings under a 92% standard and hence would be directly and adversely affected by the proposed rule (*id.*). DOE also assumes that condensing furnace shipments will follow a linear trend into the future and simultaneously that the total installed cost of condensing furnaces relative to non-condensing furnaces will drop to the point that, in many cases, non-condensing furnaces will be more expensive than condensing furnaces. These two assumptions, which cannot be logically combined, result in an overestimate by DOE of the total number of “affected” cases. The effect of these patent threshold logic errors, resulting in a misallocation of some 22% of residential trial cases, is to substantially overstate LCC savings and understate cost burdens and payback periods (GTI Report at section 2.3; Appendix A at sections A.2.1, A.3.3, A.4.2, A.4.6, and Tables 34-37 (*e.g.*, Scenarios 4, 5, 6, and 10)).

DOE incorrectly states in the NOPR that “[b]y accounting for consumers who already purchase more-efficient products, DOE avoids overstating the potential benefits from increasing product efficiency.” (80 Fed. Reg. at 13148.) In point of fact, DOE has not properly accounted for such consumers; rather, its random distribution approach to separating affected from non-affected households results in consumers that would substantially benefit from purchasing a condensing furnace being incorrectly classified as “affected” (some glaring examples are shown in Table 11 of the GTI Report at section 2.3) and consumers that would be substantially harmed by a condensing standard as “not affected” (some glaring examples are shown in Table 12 of the GTI Report at section 2.3). This misclassification flaw, which is “not a technically defensible proxy for rational residential decision making processes” (GTI Report at page 13), is not

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<sup>42</sup> “DOE performed the LCC and PBP analyses using a spreadsheet model combined with Crystal Ball [footnote omitted] to account for uncertainty and variability among the input variables. Each 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.” *Id.*

insubstantial, as shown in the GTI Report at section 2.3, Table 13 and Figure 8), and thus it materially skews the results reached in the NOPR, as demonstrated in the GTI Report and below.

GTI used the data from the 10,000 runs relied upon by DOE to determine which consumers would rationally select a condensing furnace and which would not based on economic decision making. GTI builds an economic decision-making parametric (D4) that relies on DOE payback data (GTI Report, Appendix A, section A.3.3). The combination of DOE payback data and DOE extrapolated shipment data, however, produces some improbable outcomes in some states as relates to negative payback periods (*see id.* at Figure 24 and Tables 31 and 32), which need to be accounted for as part of the economic decision-making process.<sup>43</sup>

Thus, as the GTI Report makes clear, “[b]ecause of the prevalence of negative payback periods ... Parametric D4 was never run alone. It was always combined with another scenario to remove these highly improbable negative and extremely low payback periods from the ‘Net Benefit’ category” (GTI Report, Appendix A, at page A-17). This process of aligning Parametric D-4 with other parametrics to account for the anomalies in the DOE data is explained in the GTI Report at section 2.6 and Appendix A at sections A.3.3 & A.3.4.

While one can argue that consumers do not always make perfectly rational economic decisions, though such arguments are far less persuasive in the context of essential home appliances like furnaces,<sup>44</sup> one cannot credibly argue that random assignment, with its demonstrably false underpinnings and irrational outcomes, is superior to rational economic decision making in selecting affected and non-affected consumers. GTI has accounted for the fact that consumers do not always act in a perfectly economically rational manner by building a series of conservative scenarios from which to choose the most likely and foreseeable outcomes

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<sup>43</sup> The extreme number of negative payback periods results from DOE’s linear extrapolation of historical shipment data past the point where, in new construction at least, they also project that the first costs for condensing furnaces will become lower than non-condensing furnaces. This does not make sense and is the underlying reason for GTI not being able to rely entirely on the extrapolated shipment data.

<sup>44</sup> Furnaces and other significant investments have a higher cost of irrational consumer choice than lower cost, shorter life appliance purchases such as vacuum cleaners or microwave ovens. Consumers know this after they receive one or more quotes for a replacement or alternative option (e.g., fuel switching), and are thus prone to seriously consider economics in their decision making for the furnace purchase or fuel switching option. DOE confirms in its TSD the first-cost sensitivity of furnace consumers (TSD at pages 8-35, 8J-2).

(GTI Report at sections 2.8, 3.1, 3.2, and 3.3; Appendix A at section A.3.4),<sup>45</sup> and has explained in detail which scenarios it believes are the most technically defensible (GTI Report at section 2.6). The plain and irrefutable fact is that the DOE random assignment approach, which arbitrarily skews outcomes in a pro-rule fashion, is unsupportable and must be abandoned in favor of reliance on data that allows the classes of affected and not-affected consumers to be identified with reasonable certainty based on rational economic decision making.

A ready comparison of the random assignment approach versus rational economic decision making is shown on Table 13 (GTI Report at page 17). That table shows 2,239 residential trial cases with a payback of zero years or less (i.e., consumers that would experience lower total installed cost for a condensing furnace compared to a non-condensing furnace), of which DOE has classified 1,385 cases (or 62%) as impacted by the rule; under the GTI rational economic decision making approach, none of these cases is shown as impacted by the proposed rule. Table 13 also shows that for the 3,083 residential trial cases with payback periods greater than 15 years (i.e., consumers that would obviously not benefit from a condensing furnace standard), DOE shows 1,060 cases (or 34%) as not impacted by the rule; under the GTI rational economic decision making approach, only 266 of these cases are shown as not impacted – but importantly, they are shown as not impacted because of rational fuel switching (versus DOE’s random assignment to the not impacted category) (GTI Report at page 17).

Once rational decision-making is introduced into the equation, such that the separation of consumers between the affected and unaffected categories reflects rational economic (versus arbitrary random) assignment, the only question is just how much harm would the 92% nationwide standard cause, and the answer is, a great deal. While the true extent of the harm is only revealed when the fuel-switching errors in the DOE analysis are also corrected (per subpart

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<sup>45</sup> GTI has even gone so far as to show what happens if you only remove the most extreme outliers (i.e., those with negative payback periods from the affected category and those with extremely long payback periods from the unaffected category) and if you use random distribution as to the remainder, along with conservative assumptions regarding fuel switching (GTI Report, Appendix A, sections A.3.7 and A.4.11). These scenarios (26 and 27) likewise demonstrate that even if random assignment is used in lieu of economic decision-making as to the non-outliers, the economic support for the rule virtually disappears (GTI Report, Appendix A at Tables 34-37). The impact of these scenarios on an integrated basis is discussed in Appendix A at section A.7.3 and shown on Tables 67-70. GTI does not support this combination of scenarios as appropriate, because of their substantial reliance on random assignment, but provides these scenarios as further illustration of the arbitrary and unreliable results that reliance on random assignment produces.

A.2.b., below), conservative scenarios, which assume, in lieu of random assignment, economic decision making using payback periods of 0 and 3.5 years, respectively, show negative (or *de minimus*) LCC savings across the board except in the new construction market, where the savings are greatly reduced (*see* GTI Report at Appendix A, sections A.4.2 and A.4.12 (Tables 34-37, Scenarios 4 & 5)). When economic decision making is combined with certain necessary refinements in the fuel switching analysis (discussed in subpart A.2.b below), LCC savings move further into negative territory – a move which is accentuated still further with the correction of certain stale or flawed input data used by DOE in the TSD (discussed in subpart A.3 below).

### **b. Fuel switching**

DOE's fuel switching analysis is flawed *ab initio* since it is based on an incorrect classification of affected and unaffected consumers (discussed above). Whereas DOE shows fuel switching as enhancing LCC savings, in point of fact fuel switching has the opposite effect once those who are not affected by the rule are removed from the equation (GTI Report at section 2.4). All one has to do to show that is to replace random assignment with assignment based on economic decision-making, and immediately the benefits from fuel switching shown in the DOE LCC analysis disappear, as discussed in more detail below.

As a threshold matter, it needs to be pointed out that the DOE fuel-switching analysis is hopelessly confusing in that it apparently uses two totally different measures, both called payback, one to gauge when switching occurs and the other to calculate actual payback used in the LCC savings analysis, the latter of which measures the period of time for a consumer to recover increased first costs through operating cost savings; DOE calls payback in its switching analysis as the period of time for increased operating costs of a switching alternative to exceed the first cost savings of the switching alternative (denominated "switching payback" in the GTI Report and herein). The confusion in terminology is heightened by the fact that DOE does not describe the two payback criteria in the TSD (*see* TSD at pp. 8J-5 – 8J-6); rather, one only knows that DOE relied on the switching payback approach from an investigation of the cells within the Spreadsheet (*see* GTI Report at section 2.4; Appendix A at section A.2.2). That investigation reveals that the switching payback period used by DOE is 3.5 years, and is presumably the same 3.5 years derived from proprietary data in the American Home Comfort Survey ("AHCS") (*see id.*). This confusion in terminology (i.e., using the same term to mean

two distinctly different things) was pointed out on the record of DOE's March 27, 2015 public meeting on the energy conservation standards for residential furnaces by a participant (at transcript page 285), to which Mr. Franco, the LBNL moderator of the meeting, stated: "we will try to define that better and I can see that could be misunderstood because they are using the same term we will correct that, thank you." (*Id.*) To APGA's knowledge, no correction or clarification has been forthcoming from DOE.

Putting aside the opaqueness of DOE's switching analysis, there are a number of easily identifiable flaws in the selection and use of the average 3.5 year switching payback period (GTI Report at sections 2.4 and 2.5; Appendix A at sections A.2.2 and A.3.3). While DOE relied on AHCS consumer data to derive the 3.5 year switching payback period, it essentially ignored the AHCS data in assessing whether such an average number should be applied indiscriminately across the board or in a more granular fashion to the affected consumers.<sup>46</sup> As explained in the GTI Report (at sections 2.5, 2.6), GTI drilled down into the AHCS data, which was very revealing in terms of, among other things, the distribution of paybacks among income groups. Figure 19 in the GTI Report (Appendix A, page A-12) shows the full distribution of switching payback times from the AHCS data for each income group, calculated following the DOE methodology described in the TSD but for the whole distribution of data from the AHCS instead of an average, and Figures 20 and 21 (*id.* at pages A-13 & A-14) show allowable switching payback distribution by income group and tolerable switching payback periods for lower and higher income households, respectively. And Figure 18 (*id.* at page A-11) reflects the relationship between LCC savings and switching payback periods.

As GTI explains, the "distribution of responses reported by Decision Analyst was used to simulate 5,000 data points for each income group in each of the four years (2006, 2008, 2010, and 2013) of the AHCS." (GTI Report, Appendix A at section A.3.2, page A-10.) GTI correctly observes that "there is a clear trend with income; lower income households are more tolerant of short switching payback periods than higher income groups" – *i.e.*, "low income households are more first cost sensitive on average than higher income households." (*Id.*) GTI also observed

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<sup>46</sup> It is not clear whether DOE realized that the full distribution of responses was available since the distribution of responses is not included in the AHCS report (though it was certainly available upon request). In any event, DOE clearly failed to appropriately examine the response of its own model to this average, which would have immediately revealed that the average will necessarily overstate the LCC benefit.

from the data that the distributions are “skewed, with a large number of consumers having very short switching payback periods, and a small number of consumers having very long switching payback periods. Averaging these disparate distributions into a single value results in an average switching payback period of 3.5 years.” (*Id.*) In short, DOE’s reliance on an average 3.5 years switching payback period is revealed by the more granular data to be both inaccurate and misleading, and results in overstated LCC savings, particularly as to low income consumers (GTI Report, Appendix A, section A.4.1; Tables 34-37, Scenarios 1, 2 and 3), as discussed in more detail below.

To account for the fuel-switching errors in the DOE analysis, which failed to account for the more granular AHCS data, several parameters were derived for use in the decision making analysis. Parametric D1 uses full AHCS distribution to define switching payback times; Parametric D2 uses linear function of income derived from AHCS to define switching payback times; and Parametric D3 uses linear function of income derived from the 2013 AHCS to define the switching payback times (GTI Report, Appendix A, at section A.3.2). As discussed below, these parameters using distribution based on AHCS data substantially reduce LCC savings and, when used in combination with other reasonable assumptions regarding economic decision making, turn the LCC savings into negative territory.

Scenario 1, for example, which reflects only Parametric 1, turns all LCC savings negative except those in the new construction market (GTI Report, Appendix A, section A.4.12, Tables 33-37). If you combine Parametric D1 with Parametric D8 (set any case where switching has first cost benefits relative to the 80% furnace and operational cost benefits relative to the mandated efficiency level as not affected), which is done in Scenario 8, the negative savings shown in Scenario 1 grow in magnitude and the positive savings in the new construction market diminish (*id.*). If you combine Parametric D1 with economic decision making (Parametric D4 and D5) and set any case where switching has first cost benefits relative to the 80% furnace and operational cost benefits relative to the mandated efficiency level as not affected (Parametric D8), then, as shown in Scenario 23, all LCC savings are substantially negative (*id.*).

If you adopt only Parametric D2 (linear versus full distribution of AHCS data), then as shown in Scenario 2 LCC savings decline substantially but remain positive (GTI Report, Appendix A, section A.4.12, Tables 34-37); however, if you combine Parametric D2 with

economic decision making (Parametric D4 plus either D5 or D6) along with Parametric D8 (set any case where switching has first cost benefits relative to the 80% furnace and operational cost benefits relative to the mandated efficiency level as not affected), the results as shown in Scenarios 9 and 24 are mostly across-the-board negative savings, with only modest LCC savings in certain categories (*id.*).

Finally, if you only adopt Parametric D3 (linear distribution using only 2013 AHCS data), then, as shown in Scenario 3, the LCC savings are substantially diminished vis-à-vis Scenario 2, and even negative in several categories (especially for the low income group) (GTI Report, Appendix A, section A.4.12, Tables 34-37). If you combine Parametric D3 with economic decision making (Parameters D4 and D5) and set any case where switching has first cost benefits relative to the 80% furnace and operational cost benefits relative to the mandated efficiency level as not affected (Parametric D8), the results as shown in Scenario 25 are substantial across-the-board negative savings in almost every category (*id.*).

In brief, curing the DOE analysis of just the two fundamental flaws discussed above, namely random assignment to differentiate between affected and non-affected households and reliance on average (versus granular) AHCS data in the fuel switching analysis, shows that there is no economic basis for the proposed rule. When necessary corrections to certain outdated and/or unsupportable input data in the LCC analysis are also made, as discussed below, the absence of economic support for the rule becomes even more dramatic.

### **3. DOE relied on incorrect and indefensible input data.**

DOE relied on a number of inputs in calculating the LCC savings and payback periods to which APGA takes exception (*see* GTI Report at section 2.7; Appendix A, section A.5). Where more current and reliable market data, including survey data, are available, it is incumbent upon DOE to use that data, even if it was not available at the time the NOPR was issued. As GTI points out, input data scenarios should be based, in priority order, on market data, targeted surveys, construction and engineering principles, and persuasive anecdotal information (GTI Report at section 2.7). DOE must use the best data available to it at the time a final rule is issued to ensure that what it is requiring by way of new efficiency standards passes the rigorous standards of the EPCA. The need to rely on the most current, most accurate market and targeted

survey data available is especially important for a rule that is premised on long-range projections and that will not become effective for at least five years (per the NOPR) or 10 years (per the EPCA requirements; *see* Part III.C, *supra*, for a discussion of this timing issue). The effect of relying upon superior data is to reduce the putative LCC savings shown in the NOPR analysis, as discussed below.

#### **a. Retail prices**

DOE derived retail prices from a complex tear-down analysis of furnaces; and because of the complexity of the DOE approach (*see, e.g.*, TSD Chapters 5 and 6) and its lack of transparency (*see* Part IV.B., *infra*), the likelihood of errors at each stage of the process is substantial. This is shown most dramatically by comparing the results of the DOE analysis with real-world retail data (GTI Report, Appendix A, sections A.5.2 & A.5.10).

The approach used by GTI to derive realistic retail prices based on the 2013 Furnace Price Guide (<https://www.furnacecompare.com/furnaces/price-guide.html>) is described in the GTI Report, Appendix A, at section A.5.2. The parametric used by GTI “represents real offered prices rather than a large number of manufacturing cost estimates for every component and assembly where each aggregation is subject to error.” (GTI Report, Appendix A at page 44) Perhaps not surprisingly, the DOE approach shows an 80% AFUE furnace price that is much higher than the 2013 Price Guide numbers, as illustrated on Figure 34 (GTI Report, Appendix A, at page A-48), in contrast to the numbers for the condensing furnaces, and therefore is immediately suspect.

Parametric I-2 is used to replace the DOE engineering data with the more reliable market data, and the impact of this single correction on LCC savings is significant, as shown in Tables 54-57, Scenario I-2 (GTI Report, Appendix A, section A.6.4; *see also* Parametric I-10, Appendix A, section A.5.10).

#### **b. Marginal pricing**

GTI used the marginal pricing data developed by AGA in its analysis as it is more refined and accurate than the data relied upon by DOE (GTI Report at section 2.7 and Appendix A at

section A.5.6; *see* AGA Comments in this docket<sup>47</sup>). Both DOE and AGA relied on EIA residential natural gas sales and revenues by state (per EIA 2013 NG Navigator). But, in contrast to the DOE approach, which DOE declines to describe in the TSD,<sup>48</sup> AGA developed the fixed cost component of natural gas rates for each state and applied it to EIA data to develop state level residential marginal price factors. This state level data was then weighted according to furnace shipments in the same manner that DOE used to generate marginal rates on a regional basis (GTI Report, Appendix A, at section 5.6). These AGA-developed marginal price factors compared to the DOE factors are shown in Table 52 (Appendix A, at page A-55).

The parametric used to identify the use of the superior AGA marginal pricing data is Parametric I-6, and the impact as to the various condensing standards considered in the NOPR of substituting the AGA-developed marginal pricing data for the DOE data is shown in the GTI Report, Appendix A, section A.6.4, at Tables 54-57 in Scenario I-6. Since the marginal prices used by DOE are overstated, the use of more accurate marginal pricing data predictably reduces LCC savings.

### **c. Current EIA data.**

DOE relied on 2014 EIA AEO forecasts to derive its analytical numbers. It is important, especially in a proceeding in which DOE is forecasting far into the future (2021 and beyond), to rely on the most current EIA data available at the time DOE issues a final rule. Thus, it is incumbent upon DOE to rely on 2015 AEO in running its numbers for purposes of a final rule. The impact of this change (Parametric I-8, described in the GTI Report, Appendix A, section

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<sup>47</sup> AGA calculated natural gas utility marginal cost by deducting the fixed charge portion from the total bill. The full 12 month residential gas bill was calculated from the reported total monthly residential sales data collected by EIA. AGA conducted an internet search of utility tariffs to obtain the customer charges for about 200 of the largest utilities (representing roughly 90 percent of the total market). A month's worth of customer charges for all 200 companies was deducted from each monthly bill for total residential sales. The resulting net monthly bill was divided by the monthly usage to get the marginal cost per Mcf or therm. Dividing the net bill by the total bill yielded the marginal cost factor. The remainder of the calculations followed DOE methodology – seasonal rates, and use of shipment data to develop weighting of the state rates. This approach is conservative in estimating the marginal cost. Use of the customer charge by itself ignores other changes in gas rates as the volume changes. For example, at least 20 large utilities use declining block rates, which if incorporated into the analysis would reduce the marginal cost factor even more.

<sup>48</sup> The TSD does not provide the actual methodology used by DOE, but only a general description and source of EIA data used. A laborious process of tracking multilayered equations in “rf\_nopr\_analysis\_inputs\_2014-02-06.xlsx” is required to determine the DOE marginal rates calculation logic.

A.5.8) is shown on Tables 53-57 in Scenario I-8 (*id.* at section A.6.4); it also meaningfully reduces LCC savings.

#### **d. Current shipment data**

DOE's forecast of market shares was based on data available to it at the time of the NOPR. AHRI has in the meantime released shipment data for the years 2010-2014, which, when properly applied, results in substantially different market shares for 2021 (58.3%) than projected by DOE (47%) (GTI Report, Appendix A, at section A.5.13) and the years thereafter (*see id.* at Figures 36 & 37). To be conservative, GTI only used the AHRI data for 2014 since federal energy credits were still available in 2010 to 2013 and thus were likely influencing shipment numbers to some extent.

As described in the GTI Report (Appendix A at section A.5.13), DOE used 1994 to 2004 furnace shipment data for future trending, which resulted in predicted 2014 condensing technology saturation of 40%; that is much smaller than the actual saturation of 48.5% reported by AHRI. GTI used 1998 to 2005 trending years, which resulted in 2014 saturation of 48%, closely matching the AHRI 48.5%. DOE excluded 2005 data, citing 2005 tax credit act impact on shipments; GTI included that 2005 data in trending because the 2005 tax credit act was actually implemented in 2006 (<http://energy.gov/savings/residential-energy-efficiency-tax-credit>). GTI also started data trending two years later than DOE to exclude the earliest time period when condensing technology was less mature.

The impact of using the more current data and applying it conservatively, as described above (which is Parametric I-13), is shown in Tables 54-57 in Scenario I-13 (Appendix A, section A.6.4). This superior parametric also reduces LCC savings.

The combined effect of these four input upgrades just discussed, shown in Tables 54-57 in Scenario I-16 (Appendix A, section A.6.4), is to materially reduce LCC savings, especially in the South, in the replacement market and in the low-income market, to the point that, even without consideration of the decision-making errors in the TSD, a condensing standard is not economically justifiable.

**e. Realistic discount rate**

The use of the proper discount rate is extremely important to the LCC savings analysis; an understated discount rate shows savings where none exists. The DOE's approach to determining the discount rate, and the flaws in that approach, are described in detail in the GTI Report, Appendix A, section A.5.5, at pages A-50 – A-52. As explained in the GTI Report (*id.* at page A-52):

Even if repeating the DOE discount rate analysis were feasible, the fundamental rationale for the DOE methodology is arguably flawed. Aggregating debt and equity together to determine a discount rate based on opportunity cost appears to ignore that the purchase of a furnace, particularly in the replacement market, is not likely well represented by an aggregate of all debt and equity for a particular consumer. A marginal rate that is specific to the financial instrument used to purchase the furnace would be a more defensible value. For example, a homeowner with a mortgage of \$100,000 and savings of \$1,000 that needs to purchase a new furnace which costs \$3,000 will not experience the weighted average rate of 99% mortgage interest rate and 1% savings interest rate. They will more likely experience a rate represented by 1/3 savings and 2/3 credit card, yielding a rate closer to 12% than to 3%.

Using a more realistic and justifiable discount rate (reflected by using the DOE distribution of discount rates times four), GTI prepared Scenario I-5, which shows that the discount rate utilized by DOE results in substantially overstated LCC savings (GTI Report, Appendix A, Tables 54-57). This correction alone undermines the economic basis for the proposed rule.

**4. Selection of the most technically defensible scenarios**

The GTI Report, as summarized in Parts IV.A.1-3 above, shows beyond cavil that the NOPR relies on faulty premises and inferior inputs to justify its proposed 92% standard for residential furnaces. Clearly, random distribution to separate affected from non-affected households produces arbitrary and capricious outcomes, as reflected by the many trial case misfits identified by GTI. DOE shows homes as affected even though the consumers would benefit both in terms of first costs and operating cost savings from purchasing a condensing furnace; and DOE shows homes as unaffected where the selection of a condensing furnace would have dramatically adverse financial consequences on consumers. The record shows that this random assignment approach results in significantly overstated LCC savings in the NOPR.

Likewise, the fuel switching payback algorithm used by DOE is both opaque and unsupportable in light of the more granular analysis of the AHCS data. And while many of the input numbers used by DOE are suspect, there are at least five that are inarguably indefensible in light of superior data now available.

The only real question is which of the various scenarios developed by GTI to reflect the correction of these various errors is most technically defensible. As noted in the GTI Report many scenarios were constructed to isolate a given questionable input parameter and show its impact, while other scenarios combined different parametrics to show the aggregated impact of the disputed input parameters (GTI Report at section 2.6). GTI explains in section 2.6 why it believes Scenario 24 best reflects economic decision making and fuel switching that incorporates household income into the switching decision, with the corresponding impact data shown in section 3.1; and it explains in section 2.7 why it believes Input Data Scenario I-16, which incorporates furnace pricing data from the 2013 Furnace Price Guide (Parametric I-2), substitutes marginal gas prices derived from AGA tariff analysis for the DOE marginal gas prices (Parametric I-6), uses updated AEO 2015 forecasts (Parametric I-8), and relies on current AHRI condensing furnace penetration data to revise the DOE 2021 forecast of condensing furnace market share (Parametric I-13), should be used to gauge the effect on LCC savings of corrected inputs, with the corresponding impact data shown in section 3 of the GTI Report.

The combination of Decision-Making Scenario 24 and Input Data Scenario I-16 is reflected in the integrated scenario, Int-5. As GTI explains in section 2.8 (at page 26):

Scenario Int-5 was preferred over the other integrated scenarios evaluated based in three key factors:

- Baseline furnace assignment that aligns with historical AHRI condensing furnace fractions and consumer economic decision making criteria;
- Application of American Home Comfort Study information for fuel switching decisions that results in reasonable alignment with DOE fuel switching fractions;
- Improved data for furnace prices, condensing furnace fractions, and marginal gas prices; and more current AEO forecast information.

These factors increase the confidence that GTI Integrated Scenario Int-5 produces credible and technically defensible results that are well-suited for direct comparisons with the DOE NOPR LCC model results.

The impact of Scenario Int-5 on LCC savings for all condensing furnace AFUE levels is shown in the tables in section 3.3 of the GTI Report. In all instances the LCC savings are negative, with low income persons predictably suffering the most dramatically adverse consequences. With these relatively few but important enhancements to the TSD, the economic underpinnings of the NOPR are exposed as non-existent. Equally importantly, to the extent other either more or less conservative GTI integrated scenarios are deemed more technically defensible than Int-5, they show the same thing: the proposed rule has no economic legs (GTI Report, Appendix A, section A.8, Tables 67-70). That fact, of course, becomes obvious once economic decision-making and market data are introduced into the analysis (*see* GTI Report at section 3.1; Appendix A, section A.4.12, Tables 34-37, Scenarios 17, 18, 23, 24), and simply becomes accentuated once the most obvious input errors are corrected.

**B. The DOE Process Has Been Insufficiently Transparent.**

In this proceeding, as in the DFR proceeding, DOE has performed the LCC and PBP analyses using a spreadsheet model combined with Crystal Ball “to account for uncertainty and variability among the input variables.” (80 Fed. Reg. at 13148.) 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.” (*Id.* at note 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. at 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.<sup>49</sup> The absence of such transparency was one of the many shortcomings in the DFR proceeding, a shortcoming that APGA and AGA have attempted to overcome in this proceeding (GTI Report at sections 1 & 2.1).<sup>50</sup> Ultimately, the general public will *never* understand the Crystal Ball analysis undertaken by DOE's contractor, LBNL (*id.*), which underscores the need for an updated peer review (*see* Part III.A, *supra*); one has only to review the DOE handout preceding the March 27, 2015 public meeting<sup>51</sup> and the transcript of that meeting<sup>52</sup> and the April 13 meeting<sup>53</sup> to understand both the complexity of the Crystal Ball analysis and the scores of questionable assumptions underlying it.

However, putting to one side the complexity and impenetrability of the Crystal Ball spreadsheet analysis underlying the NOPR, equally troubling in terms of the lack of transparency for the general public is DOE's reliance on 10,000 trial runs that are not in the public domain and on proprietary data for key inputs to the Crystal Ball analysis.<sup>54</sup> Regarding the 10,000 trial runs, these are essential to understanding the impact of what DOE has done (and, equally importantly, has not done), and yet it was only by taking extraordinary measures that GTI was able to penetrate the 10,000 runs and thereby to assess the impact of the key errors underlying the TSD (GTI Report, at section 2.1, page 7: "To explore the impact of various parameters on LCC results, GTI analysts added Excel Visual Basic for Applications (VBA) code to the DOE LCC spreadsheet. The VBA code extracted outputs of interest from each of the 10,000 Crystal Ball

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<sup>49</sup> This point was made emphatically in the February 2007 Peer Review Report (*see* note 13, *supra*) at 28: "The complexity is beyond most of the end users. Crystal Ball is a powerful but costly product and is typically available only to a few, especially in the Utility markets. To properly understand and use these tools requires training, which adds costs." Oracle Crystal Ball costs \$1200 to purchase; in addition, it will not run the DOE LCC Model using its default settings, so that is left to anyone seeking to understand the Spreadsheet and TSD results to figure out.

<sup>50</sup> APGA and AGA have also submitted many questions to DOE regarding its technical analysis in an effort to gain a better understanding of same; see items posted on the furnace rule web site on March 11 and April 27, 2015, available at <http://www.regulations.gov/#!docketDetail;dct=FR+PR+N+O+SR;rpp=10;po=0;D=EERE-2014-BT-STD-0031>.

<sup>51</sup> Available at <http://www.regulations.gov/#!docketDetail;dct=FR+PR+N+O+SR;rpp=10;po=0;D=EERE-2014-BT-STD-0031>.

<sup>52</sup> *Id.*

<sup>53</sup> *Id.*

<sup>54</sup> DOE apparently does not consider energy prices, equipment costs, or switching payback times to be "key inputs" or consider them to be absolutely certain as they do not assume any probability distributions for these items; rather, they are single point values.

trial cases and enabled a detailed analysis of the DOE LCC spreadsheet as well as GTI's parametric scenarios. "); *see also* GTI Report, Appendix A, section A.1 The errors themselves were detectable from a detailed and laborious inspection of the unexplained DOE Spreadsheet itself (GTI Report, Appendix A, section A.2.1).

By DOE's own admission (80 Fed. Reg. at 13152; footnote omitted): "The decision criteria in the model are based on proprietary data from Decision Analysts [sic], 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. at 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 approached Decision Analyst about securing the proprietary data, 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. Because of the obvious significance of this proprietary data to the DOE analysis, APGA felt compelled to pay the price so that GTI could determine how the proprietary data was used in the DOE analysis and if it was used appropriately. Had APGA determined that \$15,000 was beyond its means (which frankly was a close call for it), the false logic applied by DOE in the NOPR would have gone undetected and unchallenged. APGA questions whether a party's financial resources should be the determining factor in whether a federal agency's analysis is subject to meaningful scrutiny. Administrative agencies are delegated broad legislative powers, and that delegation comes with a heavy responsibility to err on the side of public awareness and understanding of agency action, versus relying on data not available to the general public to generate misleading economic analyses in order to justify pushing the efficiency needle as far up the dial as possible.

DOE also relied on confidential data in its teardown analysis, observing that the BOM spreadsheets, "which are the main input to our cost estimate," "contain a lot of sensitive

manufacturing information, so we generally haven't made those public.”<sup>55</sup> As one participant at the meeting stated, this lack of transparency “undermines the integrity of the Department’s process to be relying on proprietary data. There is a solution here. If you are not able to release the data, don’t rely on it for assessment.”<sup>56</sup> There was some question about whether the furnace used in the teardown is still in production. A representative from Southside Heating and Air Conditioning, Inc., from Bloomington, Minnesota, pointed out that as far as cost analysis, “we don’t buy broken down furnaces. We buy them all assembled together, and our cost on an 80% PSC motor furnace can be as low as \$350.00. For the 98% ECM furnace, it can be anywhere from \$1,800.00 on up, depending on size.”<sup>57</sup> In other words, real-world sales prices differ markedly from the bottoms-up teardown, behind-the-scenes analysis results of DOE, casting further doubt on the DOE’s approach; when secretive engineering analyses produce results at odds with real-world data, as is the case here (GTI Report, Appendix A, sections A.5.2 & A.5.10), the former should be discarded and the latter should be relied upon. The public should not be faced with a black box that allows an agency free reign to dictate outcomes on the basis of biases versus transparent data.

Not surprisingly, a comparison of the manufacturer production costs (“MPC”) generated by DOE in 2011 versus those in the current (2014) model shows a substantial increase for the non-condensing furnace as compared to a very minor increase for condensing furnaces (*see* GTI Report, Appendix A at section A.5.1, Table 46). This unlikely and illogical spread, of course, serves to inflate the LCC savings for condensing furnaces shown in the NOPR. GTI corrected for this counter-intuitive outcome by substituting an inflation-adjusted MPC from 2011 (in lieu of the DOE-generated numbers in the TSD), and the result was an unsurprising and not insubstantial decrease in LCC savings (*see id.* at Tables 47-50, Scenario I-1).

In brief, DOE’s reliance on non-public data presents many challenging issues to the participants in EPCA proceedings, which issues are magnified by DOE’s use of such data in the extremely complex Crystal Ball driven Excel spreadsheet. While APGA has been able, at great

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<sup>55</sup> March 27, 2015 U.S. Department of Energy Public Meeting, the Energy Conservation Standards for Residential Furnaces, transcript page 71.

<sup>56</sup> *Id.* at 78-79.

<sup>57</sup> *Id.* at 79.

expense, to penetrate the data sufficiently to determine that the technical underpinnings of the proposed rule are unsound and hence that the NOPR should be abandoned, the fact of the matter is that the general public would have no way of determining that, nor would it have been determined in this proceeding if APGA and AGA had been unwilling to underwrite the use of skilled analysts and the acquisition of expensive proprietary data. Correct outcomes should not depend on such extraordinary measures, as DOE's own regulations make clear.<sup>58</sup>

**C. The Bottom Line: the Record Shows That the Market, Rather Than an Arbitrary and Unsubstantiated Rule, Should Dictate the Outcomes for Residential Furnaces.**

The GTI Report shows that the subject NOPR does not pass a number of economic feasibility tests, and thus should be abandoned. The record also shows that the market is working when it comes to the sale of high efficiency condensing furnaces in those areas of the country where condensing furnaces make economic sense.

In the North, where there are significant operating cost savings associated with condensing furnaces for most consumers, condensing furnaces dominate the market despite the absence of a rule requiring that condensing furnaces be used for replacement or new construction. In point of fact, consumers in the North may be purchasing condensing furnaces even when they do not make economic sense due to heightened sensitivity to weather as a driver of monthly fuel bills. The DOE numbers, which materially *understate* the size of the condensing furnace market share (GTI Report at section A.5.13 and Figures 36 and 37 at page A-57; *see* AHRI letter of May 12, 2015, to DOE, available at <http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0052>), show that in 2021 (i.e., before the proposed rule compliance date), the six New England states and the five states in the upper Midwest will have 95% saturation of condensing furnaces. TSD Table 8I.4.1

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<sup>58</sup> For example, DOE's procedures for implementing revised energy efficiency standards provide explicitly for it to "[u]se transparent and robust analytical methods." 10 C.F.R. Part 430, Subpart C, Appendix A, section 1(g). That section further specifies that DOE is to "use qualitative and quantitative analytical methods that are fully documented for the public and that produce results that can be explained and reproduced, so that the analytical underpinnings for policy decisions on standards are as sound and well-accepted as possible." *See also* Final Report Implementing Office of Management and Budget Information Dissemination Quality Guidelines, 37 Fed. Reg. at 62452, Part III, DOE Information Quality Guidelines, subsection C.1., calling for "a high degree of transparency of data and methods [to be] ensured to facilitate the reproducibility of such [influential] information by qualified third parties."

at p. 8I-6. In fact, as DOE concedes, condensing furnaces with efficiencies above 90% (the level prescribed in the DFR) now predominate in the condensing furnace market.<sup>59</sup> Further, the DOE data (uncorrected to reflect the AHRI update noted above) shows that, absent a rule, the market share of the condensing furnace in the North would be 88% in 2050 (TSD at page 8I-11). When this DOE data is corrected for the latest AHRI shipment data, the saturation number in the North is even more telling, approximating 95% (GTI Report, Appendix A, section A.5.13 and Figures 36 and 37 at page A-57; *see* GTI Report at section 2.7).

The flip side of what is occurring in the North is that in the southern states, where operating cost savings often do not justify purchasing condensing furnaces, the DOE uncorrected data shows what one would expect: condensing furnace saturation in states like Georgia, Florida, Arkansas, Louisiana, Oklahoma, Texas, Nevada, and New Mexico is low, ranging from 3% to 13% (TSD Table 8I.4.1 at p. 8I-6). DOE's projection of condensing furnace market share in the South in 2050, absent a rule, is around 35% (TSD at Figure 8I.5.1), though it would be much higher if DOE's projections for equipment costs come to pass and consumers can buy them for less than 80% furnaces, as DOE suggests. Based on more current AHRI data, the saturation percentage in the South in 2050 will be closer to 60+% (GTI Report, Appendix A, Figure 37 at page A-57), once again demonstrating that the market is working as it should without a rule.

A furnace rule legislating a condensing standard is self-defeating if the result is to force consumers either to switch fuels or to purchase a furnace that causes financial loss. A rule adopting a condensing standard only makes economic sense to the extent that it forces consumers to choose a condensing furnace and that choice brings with it financial benefit. When the DOE LCC analysis is corrected to account for only the flaws noted in the GTI Report, the result is that there are no nationwide (or regional) net savings from a condensing standard, and the impacts on the low income consumer are devastatingly adverse. In short, the residential furnace market is working: in areas where condensing furnaces make economic sense (due to the relationship between incremental installed costs and operating cost savings), consumers overwhelmingly are choosing condensing furnaces – *without a rule that requires that result*. In the rest of the

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<sup>59</sup> DOE April 13, 2015 meeting, Tr. 104 (Cymbalsky): "...as our market share data indicated, the market has moved beyond -- if it's going to go condensing, it goes higher than 90%, and we've seen that in the market data. So actually, 92% and 95% get higher market shares than 90%, ...."

country, where the economics of a condensing furnace are more problematic, consumers are making mostly rational decisions to purchase the furnace that makes economic sense, which may or may not be a condensing furnace. The proposed rule will simply remove an economic choice for consumers and force consumers either to install a furnace that does not make economic sense or, more likely, to switch to an alternate fuel – hardly what was envisioned by the authors of the EPCA (*see* discussion in GTI Report, section 2.2).

DOE’s regulations and relevant Executive Orders make quite clear that non-regulatory approaches are to be preferred over involuntary (and necessarily arbitrary) rules dictating customer choices. DOE is instructed by its own regulations to “fully consider non-regulatory approaches,” as follows (10 C.F.R., Appendix A to Subpart C, § 12(a)):

The Department recognizes that voluntary or other non-regulatory efforts by manufacturers, utilities and other interested parties can result in substantial efficiency improvements. The Department intends to consider fully the likely effects of non-regulatory initiatives on product energy use, consumer utility and life cycle costs, manufacturers, competition, utilities and the environment, as well as the distribution of these impacts among different regions, consumers, manufacturers and utilities. DOE will attempt to base its assessment on the actual impacts of such initiatives to date, but also will consider information presented regarding the impacts that any existing initiative might have in the future. Such information is likely to include a demonstration of the strong commitment of manufacturers, distribution channels, utilities or others to such voluntary efficiency improvements. This information will be used in assessing the likely incremental impacts of establishing or revising standards, in assessing appropriate effective dates for new or revised standards and in considering DOE support of non-regulatory initiatives.

In the same vein, Executive Order 12866,<sup>60</sup> Section 1(a), provides in pertinent part as follows:

The Regulatory Philosophy. Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in

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<sup>60</sup> *Regulatory Planning and Review*, 58 Fed. Reg. 51735 (Oct. 4, 1993).

choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

Whether one relies on the DOE uncorrected data, or more properly on the data corrected to account for the errors identified in the GTI Report, it is clear beyond cavil that legislating a condensing furnace standard is arbitrary and capricious both on its face and in the context of interfering with functioning market forces. There is no market failure to be corrected. APGA makes this point not as an opponent of high efficiency furnaces (or appliances generally), as its members and LDCs generally have a long track record of supporting installation of high efficiency furnaces and water heaters (*see* note 2, *infra*); what APGA does not support is interfering with a well-functioning market with a standard that will promote fuel switching, especially in the South and among lower income consumers in the North and South, where the economics often do not support a condensing standard. The irony, of course, is that if DOE properly established a separate standard for non-condensing furnaces under the EPCA (*see* Part V, *infra*), the market-interference issue would go away – those for whom a condensing furnace makes economic sense would purchase it, as they are doing in large numbers in the North today (and in not inconsequential numbers in the South); and those for whom a non-condensing furnace does not make economic sense would purchase a non-condensing furnace, versus a less efficient, on a source-to-site basis, electric alternative.

The DOE's Regulatory Impact Analysis (TSD Chapter 17), like the National Impact Analysis (TSD Chapter 10), is based on flawed shipment and other data, as described in the GTI Report and recounted above, and hence provides no basis for DOE not to rely on market forces to achieve fuel efficiency in the residential furnace market.

It is time for DOE to stop waging war on non-condensing furnaces, which have shown they have a vital place in the overall furnace marketplace; market forces are working such that the market share of condensing furnaces is substantial and growing. Overlaying a 92% standard on the residential furnace market, as DOE is proposing, is a regulatory fix in search of a market problem – a fix that ironically will create problems in the marketplace that do not exist today and need not exist tomorrow. It is a time for regulatory self-restraint, which in this context means abandonment of the proposed condensing standard for residential furnaces.

#### **D. Energy Use and Emissions**

DOE claims substantial cumulative primary and full-fuel-cycle savings for the various condensing AFUE standards (NOPR at Tables V.23 and V.24; 80 Fed. Reg. at 13173). These savings numbers are generated on the basis of the analysis underlying the LCC savings numbers; once the falsely-grounded LCC analysis is corrected (*see* Part IV.A.2, 3, & 4, above and GTI Report, *passim*), the DOE energy savings numbers likewise are unsupported and unsupportable (GTI Report, section 4).

GTI was not able to adjust the DOE NIA model inputs to determine the national impact of the DOE NOPR LCC model technical flaws; but, as GTI points out, the LCC analysis provided enough annual energy consumption information to estimate the national impact of the proposed rule. The GTI analysts conducted a 30-year analysis of the projected national impact of the proposed furnace rule based on the DOE NOPR LCC model results and the GTI Integrated Scenario (Int-5) results (GTI Report, section 4). The assessment methodology is explained in detail in the GTI Report at section 4, page 37.

There are two aspects to the comparative analysis: fuel savings attributable to those that install more efficient condensing furnaces and increased fuel use and emissions due to fuel switching. As to the former, whereas DOE projected that 49% of homes would incrementally install high efficiency furnaces, under GTI Scenario Int-5, about 34% of homes would incrementally install high efficiency furnaces (a decrease of over 30%). Thus, rather than average per home annual savings of 4.4 MMBtu/year (per DOE), the actual number (per the corrected DOE model, under GTI Scenario Int-5) will be closer to 3.4 MMBtu/year. Thus, instead of DOE's projected 30-year primary energy savings of 3.48 Quads, the more accurate number is 1.85 Quads under the corrected version of the DOE Spreadsheet (GTI Report, section 4, at page 39).

As for the fuel switching impacts, whereas the DOE uncorrected LCC analysis indicates 30-year primary energy and carbon emission quantities of 2,279.5 TBtu and 142.3 MMT CO<sub>2</sub>e, respectively, the corrected version (per GTI Scenario Int-5) shows primary energy and carbon emissions of 2,328.9 TBtu and 145.3 MMT CO<sub>2</sub>e, respectively (GTI Report, section 4, at Tables 26 and 28). The DOE numbers are substantially understated due in significant part to the fact

that the GTI analysis shows that a larger portion of homes select a low first cost electric resistance device (36% more than in the DOE LCC model) (*id.* at page 41).

In brief, the energy savings that are touted by DOE as resulting from mandating a condensing furnace standard under the NOPR are substantially overstated due, in large part, to the faulty assumptions underlying the DOE LCC model, again illustrating that interfering with a well-functioning market, even assuming the best of intentions, is not only bad policy *per se* but also bad policy that runs afoul of the EPCA. Action of the sort proposed in the NOPR will disrupt a functioning market, to the detriment of all U.S. citizens.

## **V. DOE Has Violated the EPCA and Its Own Precedent in Not Establishing a Separate Standard for Non-Condensing Furnaces.**

EPCA prohibits DOE from prescribing an efficiency standard if the standard is likely to result in the unavailability in the United States in any covered products of performance characteristics, features, sizes capacities and volumes that are substantially the same as those that are generally available today.<sup>61</sup> It is indisputable that the 92% efficiency standard for residential non-weatherized gas furnaces would eliminate non-condensing furnaces from the United States market. This would result in the unavailability of several performance-related features that are unique to non-condensing furnaces and would therefore violate EPCA. To avoid this unlawful result, DOE must create a separate efficiency standard for non-condensing furnaces.

### **A. Performance-Related Features of Non-Condensing Furnaces**

The two main residential non-weatherized gas furnace designs in the United States are the non-condensing furnace and the condensing furnace. A non-condensing furnace venting system is not pressurized and uses either a masonry chimney or a metal vent, which can be (and frequently is) used as a “common vent” with a gas water heater. By contrast, a condensing furnace venting system uses positive pressure (supplied by a blower) and a plastic (PVC) vent that is typically installed horizontally (where possible). Whether vented horizontally or vertically, a condensing furnace requires pressurized gas-tight venting, separate venting for any companion gas appliances, and a condensate drain to the outside.

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<sup>61</sup> 42 U.S.C. § 6295(o)(4).

A non-condensing gas furnace cannot be replaced with a condensing gas furnace without addressing these venting and condensate-disposal issues. To replace a non-condensing furnace with a condensing furnace, a dedicated, positive-pressure gas-tight vent must be installed, preferably horizontally through a side-wall (which is often impossible in row houses, townhouses and multi-family dwellings ) or vertically through the chimney or gas vent, which is even more disruptive. Condensing furnaces cannot be directly vented into chimneys because the condensate can freeze and expand, damaging the chimney or chimney-liner, or can leave acid that erodes the chimney mortar. A condensing furnace also requires a blower to push the exhaust gas out the furnace vent, as well as a separate vent for the water heater to meet code.

Venting systems are part of the infrastructure of buildings, and the need to replace such a system to accommodate the replacement of a non-condensing furnace with a condensing furnace represents a significant installation constraint. It can require the abandonment of the existing venting system, changes to the building's structure to accommodate the new venting path, and relocation of the furnace. In some multi-unit and multi-story dwellings, these necessary structural changes could preclude the installation of a condensing furnace. In other circumstances, the structural changes and installation could only be undertaken through significant disruption to the consumer's home.

In either case, the unique features of non-condensing furnaces clearly provide utility to consumers in that they avoid the need to significantly alter their homes to accommodate new venting and condensate drains. Specifically, these performance-related features consist of the following:

- the ability to be vented through a chimney;
- the ability to be common-vented with other gas appliances;
- the ability to be common-vented in multi-unit, multi-story housing; and
- the ability to vent without having to address disposal of flue gas condensate.

All of these features would be eliminated from the market if the proposed 92% efficiency standard were applied to all non-weatherized gas furnaces.

## **B. Statutory Requirements**

Section 325(o)(4) of EPCA provides that DOE may not prescribe an efficiency standard that is “likely to result in the unavailability in the United States in any covered product type (or class) of performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as those generally available in the United States.”<sup>62</sup> It is indisputable that all of the performance-related features of non-condensing furnaces discussed above would be eliminated from the market if the 92% efficiency standard were applied to all non-weatherized gas furnaces as proposed. Accordingly, DOE must establish a separate efficiency standard for non-condensing furnaces pursuant to Section 325(q) of EPCA.

Section 325(q)(1) provides that “[a] rule prescribing an energy conservation standard for a type (or class) of covered products shall specify a level of energy use or efficiency higher or lower than that which applies (or would apply) for such type (or class) for any group of covered products which have the same function or intended use, if the Secretary determines that covered products within such group . . . 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).”<sup>63</sup> In determining whether a performance-related feature justifies a separate standard, the Secretary must consider “the utility to the consumer of such a feature” and other factors the Secretary deems appropriate.<sup>64</sup>

As discussed above, the unique venting and installation features of a non-condensing furnace are performance-related features that provide significant utility to consumers. These features allow the installation of the furnace without making the significant and disruptive alterations to the consumer’s home that installation of a condensing furnace would entail. They also permit installation in multi-unit and multi-story dwellings, where installation of a gas furnace might otherwise be impossible.

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<sup>62</sup> 42 U.S.C. § 6295(o)(4).

<sup>63</sup> 42 U.S.C. § 6295(q)(1).

<sup>64</sup> *Id.*

## **C. DOE Precedent on Separate Standards**

DOE precedent makes clear that features relating to installation of covered products are performance-related features that provide consumer utility and therefore justify separate efficiency standards. DOE has also established separate standards for products based on venting characteristics. Relevant precedent with respect to both installation and venting is discussed below. This precedent requires DOE to establish a separate efficiency standard for non-condensing furnaces.

### **1. Precedent for establishing separate standards based on installation features**

On numerous occasions, DOE has established separate efficiency standards for products based on how or where the products are installed. For example, DOE explained that “compact-size clothes dryers provide utility to consumers by allowing for installation in space-constrained environments.”<sup>65</sup> This installation feature was among the benefits that the DOE cited in determining that there should be a separate standard for compact clothes dryers under EPCA.<sup>66</sup> Similarly, in proposing new efficiency standards for residential water heaters, DOE declined to amend the standards for “tabletop” water heaters because doing so would require manufacturers to increase the size of such units, and space constraints do not allow them to be any larger.<sup>67</sup> Thus, the DOE concluded, adopting a higher efficiency standard “would force this class of covered product off the market, in violation of 42 U.S.C. 6295 (o)(4).”<sup>68</sup> In both of these proceedings, DOE looked beyond the general functions of the respective products (clothes drying and water heating) and determined that installation-related features provide utility warranting separate standards.

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<sup>65</sup> *Energy Conservation Program: Energy Conservation Standards for Residential Clothes Dryers and Room Air Conditioners*, Direct Final Rule, 76 Fed. Reg. 22453, 22485 (April 21, 2011); *see also Energy Conservation Program: Energy Conservation Standards for Residential Dishwashers*, Direct Final Rule, 77 Fed. Reg. 31917, 31926 (May 30, 2012) (“compact dishwasher[s] provide unique utility in their countertop or drawer configurations”).

<sup>66</sup> *Residential Clothes Dryers*, 76 Fed. Reg. at 22485.

<sup>67</sup> *Energy Conservation Program: Energy Conservation Standards for Residential Water Heaters, Direct Heating Equipment, and Pool Heaters*, Notice of Proposed Rulemaking, 74 Fed. Reg. 65852, 65867 (Dec. 11, 2009).

<sup>68</sup> *Id.*

In fact, DOE has expressly relied on installation *costs* in determining that separate standards are necessary for products. For example, DOE found that the space-saving aspect of certain space-constrained residential heat pumps and air conditioners is beneficial precisely because it reduces installation costs:

DOE believes that through-the-wall equipment intended for replacement applications can meet the definition of space-constrained products because they must fit into a pre-existing hole in the wall, and a larger through-the-wall unit would trigger a considerable increase in the installation cost to accommodate the larger unit.<sup>[69]</sup>

Similarly, in establishing separate standards for certain non-standard size commercial heating and air conditioning equipment, DOE explained that it was “concerned that, absent non-standard equipment, commercial customers could be forced to *invest in costly building modifications* to convert non-standard [wall] sleeve openings to standard size dimensions.”<sup>70</sup> Hence, in both instances, DOE determined that separate standards for less-efficient products were justified due to the lower installation costs of such products. There is no rational basis for DOE to decline to establish separate standards for gas furnaces for the same reason.

## **2. Precedent for establishing separate standards based on venting features**

In addition to taking into account installation burdens associated with various products, DOE has specifically considered venting-related features in establishing separate standards. For example, in a ruling classifying clothes dryers as either vented or ventless, DOE explained that ventless dryers provide “actual consumer utility” due to the fact that they do not require an external vent.<sup>71</sup>

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<sup>69</sup> *Energy Conservation Program: Energy Conservation Standards for Residential Furnaces and Residential Central Air Conditioners and Heat Pumps*, Direct Final Rule, 76 Fed. Reg. 37407, 37446 (June 27, 2011).

<sup>70</sup> *Energy Conservation Program for Commercial and Industrial Equipment: Packaged Terminal Air Conditioner and Packaged Terminal Heat Pump Energy Conservation Standards*, Final Rule, 73 Fed. Reg. 58772, 58782 (Oct. 7, 2008) (emphasis supplied).

<sup>71</sup> *Residential Clothes Dryers*, 76 Fed. Reg. at 22485 n.28.

Even more relevant to the instant proceeding, DOE's recent rule on efficiency standards for residential furnace fans establishes separate standards for condensing and non-condensing products, which is the same distinction APGA seeks with respect to gas furnaces.<sup>72</sup>

Similarly, for gas-fired steam commercial packaged boilers, DOE has separate efficiency standards for "natural draft" and "except for natural draft" products.<sup>73</sup> This categorization applies directly to the distinction between non-condensing and condensing furnaces, as non-condensing furnaces rely on natural-draft venting, while condensing furnaces require positive-vent pressure. There is simply no logical reason for DOE to apply the distinction to one set of product standards and disregard it for another.

#### **D. Analysis of the NOPR**

In the NOPR, DOE makes several points in support of its decision not to propose separate efficiency standards for condensing and non-condensing furnaces. For the reasons discussed below, APGA respectfully submits that DOE's analysis is based on incorrect premises and otherwise fails to justify its decision. APGA observes at the outset that this issue, as ruled upon by DOE in the DFR, was specifically vacated and remanded by the Court of Appeals,<sup>74</sup> and yet the DOE rationale is essentially a rehash of the points made in the DFR.

The NOPR asserts that DOE has "consistently" viewed consumer utility "as an aspect of the product that is accessible to the layperson and is based on user operation, rather than performing a theoretical function."<sup>75</sup> Thus, DOE claims that it has previously determined utility "through the value the item brings to the consumer, rather than through analyzing more complicated design features, or costs that anyone, including the consumer, manufacturer,

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<sup>72</sup> *Energy Conservation Program for Consumer Products: Energy Conservation Standards for Residential Furnace Fans*, Final Rule, 79 Fed. Reg. 38129 (July 3, 2014).

<sup>73</sup> 10 C.F.R. § 431.87(b).

<sup>74</sup> The direct final rule and notice of effective date "as they relate to 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), 6295(o)(4), are hereby vacated and remanded...." *APGA v. United States of America*, CADC No. 11-1485, Order issued April 24, 2014 (unpublished).

<sup>75</sup> NOPR at 13137.

installer, or utility companies may bear.”<sup>76</sup> As an example of this “everyday needs” approach, DOE cites its conclusion that it would be impermissible to eliminate oven door windows.<sup>77</sup> What the NOPR ignores, however, is DOE’s precedent establishing separate efficiency standards based on features that are not so “accessible to the layperson.” As noted, DOE has, for example, established separate efficiency standards for condensing and non-condensing gas furnace fans, as well as for “natural draft” and “except for natural draft” gas-fired steam commercial packaged boilers.<sup>78</sup> Moreover, the assertion that DOE does not determine utility by analyzing costs to the consumer or installer is directly contradicted by its precedent on residential heat pumps and air conditioners (“a larger through-the-wall unit would trigger a considerable increase in the installation cost”) and commercial heating and air conditioning equipment (“customers could be forced to invest in costly building modifications”), as discussed above.<sup>79</sup>

While declining to address this precedent, DOE attempts to distinguish its ruling on ventless dryers by noting that such dryers “can be installed in locations where venting dryers would be precluded due to venting restrictions,” such as “an apartment in a high-rise building.”<sup>80</sup> But this same constraint applies to condensing furnaces. As explained, in certain multi-unit and multi-story dwellings, the structural changes needed to accommodate a condensing furnace could make the installation of such a furnace physically impossible. In addition, due to the prohibitive cost of installation of a condensing furnace in many homes,<sup>81</sup> installation is a practical

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<sup>76</sup> *Id.*

<sup>77</sup> *Id.*

<sup>78</sup> *Supra* nn. 72-73.

<sup>79</sup> *Supra* at 43 and nn. 69-70.

<sup>80</sup> NOPR at 13138.

<sup>81</sup> The “average” costs relied upon in the NOPR TSD (*e.g.*, Table 8D.2.26 at page 8D-31) effectively camouflage the extreme costs that can be incurred in, for example, space-constricted row houses in urban areas. Thus, examination of the 10,000 trial cases revealed cases such as those shown in Table 12 of the GTI Report (at page 16) in which the cost penalties associated with installing a condensing furnace were very high and the associated payback periods very long (*e.g.*, Trial Case 6467, with a cost penalty of \$4,620 and payback period of 201 years; Trial Case 8377, with a cost penalty of \$3,287 and payback period of 90 years, etc.). The DOE data also shows that of the 9,717 residential trial cases, 3062 residential replacement households (32% of the total) would experience payback periods of greater than 15 years (GTI Report, Table 13, at page 17) – over twice the payback period relied upon by the DOE NOPR to support the 92% standard (NOPR at 13122) and a payback period well above that determined by DOE to cause fuel switching (3.5 years, per NOPR TSD at pp. 8J-5 – 8J-6). Based on DOE’s uncorrected data, some 26% of residential replacements (92% in lieu of 80%) would incur increased installation costs of over \$1,000; using the GTI corrected data (per Scenario I-16), the number is 37%.

impossibility, and hence, absent a separate standard for non-condensing furnaces, such home owners will abandon natural-gas fired furnaces altogether.

DOE next refers to its finding that heat-pump water heaters need not be placed in a separate product class from traditional electric-resistance water heaters despite their differing installation requirements: “DOE found that regardless of these installation factors, the heat pump water heater and the conventional water heater still had the same utility to the consumer: Providing hot water.”<sup>82</sup> Presumably DOE’s intent here is to analogize that finding with its statement in the NOPR that “the utility of a furnace involves providing heat to a consumer” and that “[s]uch utility is provided by any type of furnace.”<sup>83</sup> But DOE’s reliance on the water heater proceeding is misplaced for two reasons.

First, the water heating ruling that DOE cites does not make any attempt to explain DOE’s departure from the precedent in which it *has* established separate efficiency standards based on features that provide utility beyond the primary function of the product (*e.g.*, providing heat or hot water).<sup>84</sup> Such precedent includes DOE’s determination that oven door windows must be preserved because they provide consumer utility, a ruling that DOE made despite the fact that all ovens provide the same general function of cooking food.<sup>85</sup> The D.C. Circuit held that an agency’s duty to explain a departure from precedent was not discharged by its reference to two of its recent decisions “since they do not contain announcement of a new standard and supporting rationale either.”<sup>86</sup> Similarly, DOE cannot base its ruling in the instant proceeding on its finding in the water heater proceeding – as that finding itself sharply departs from DOE precedent without explanation.

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<sup>82</sup> NOPR at 13138.

<sup>83</sup> *Id.*

<sup>84</sup> *Residential Water Heaters*, 74 Fed. Reg. 65852.

<sup>85</sup> *Energy Conservation Program for Consumer Products; Energy Conservation Standards for Electric Cooking Products*, Final Rule, 63 Fed. Reg. 48038, 48041 (Sept. 8, 1998).

<sup>86</sup> *Hatch v. FERC*, 654 F.2d 825, 834 (D.C. Cir. 1981); *see also Ramaprakash v. FAA*, 346 F.3d 1121, 1129 (D.C. Cir. 2003) (“even if we assume...that *Ikeler* is controlling, that assumption would not defeat the argument that the Board has departed from its precedent; it would merely require us to examine whether *Ikeler* itself contains an explanation for its departure from cases such as *Brea* and *Zanlunghi*”); *Pittsburgh Press Co. v. NLRB*, 977 F.2d 652, 660 (D.C. Cir. 1992) (“We do not think it enough to say that this latest decision is consistent with the general drift of NLRB precedent, as it is that very drift that troubles us.”).

Second, and more fundamentally, the apparent conclusion that DOE need only look to the “basic function” of a product (*e.g.*, providing heat or hot water) to determine whether a feature justifies a separate efficiency standard is flawed on its face. The base level from which DOE must make appropriate product distinctions is “any group of covered products which have the same function or intended use.”<sup>87</sup> EPCA requires DOE to prescribe different standards if it finds that “covered products *within such group*” have certain distinguishing features.<sup>88</sup> In determining whether a performance-related feature justifies the establishment of a higher or lower standard, DOE must consider factors such as “the utility to the consumer of such a feature.”<sup>89</sup> In other words, even if all products in a group have the same function or intended use, DOE must prescribe separate standards for products within the group if there are useful features justifying different standards. In direct contravention of this requirement, DOE proposes to rule that there is no need to prescribe different standards for non-condensing and condensing furnaces because both perform the same “basic function of providing heat.”<sup>90</sup> In so ruling, DOE would effectively nullify the standard-differentiation requirement of the EPCA. Under that logic, no covered product type could ever be subject to varying efficiency standards: All furnaces perform the function of providing heat, all dishwashers perform the function of washing dishes, all clothes dryers perform the function of drying clothes, and so on. Thus, such a reading of EPCA “would subvert the statutory plan and contravene the elementary canon of construction that a statute should be interpreted so as not to render one part inoperative.”<sup>91</sup>

DOE asserts that “[t]ying the concept of ‘feature’ to a specific technology would effectively lock-in the currently existing technology as the ceiling for product efficiency and eliminate DOE’s ability to address technological advances that could yield significant consumer benefits in the form of lower energy costs while providing the same functionality for the consumer.”<sup>92</sup> But APGA is not suggesting that features be tied to specific technologies. Rather,

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<sup>87</sup> 42 U.S.C. §6295(q)(1).

<sup>88</sup> *Id.* (emphasis supplied).

<sup>89</sup> *Id.*

<sup>90</sup> NOPR at 13138.

<sup>91</sup> *CSX Transp., Inc. v. Ala. Dep’t of Revenue*, 562 U.S. 277, 291 (2011) (internal quotations omitted).

<sup>92</sup> NOPR at 13138.

as EPCA requires, DOE must consider “the utility to the consumer” in determining whether a particular feature justifies a separate standard. The unique features of non-condensing furnaces currently provide clear practical utility to consumers not offered by condensing furnaces. However, if and when the technology of condensing furnaces improves to a point at which they can offer such utility – *e.g.*, the ability to common vent with other appliances – it may no longer be necessary to apply separate standards to the two furnaces types. As of now, however, that point has not been reached. And it is not appropriate to analyze the issue based on potential technological advances that “may soon allow” for common venting, as DOE suggests.<sup>93</sup> The efficiency standards that DOE prescribes must be based on technology available now – not technology that might or might not be available at some unspecified time in the future.<sup>94</sup>

The NOPR also asserts that “[i]f DOE is required to maintain separate product classes to preserve less-efficient technologies, future advancements in the energy efficiency of covered products would become largely voluntary, an outcome which seems inimical to Congress’s purposes and goals in enacting EPCA.”<sup>95</sup> First, as noted, APGA is not suggesting that DOE must maintain separate product classes to preserve less-efficient technologies. Rather, DOE must maintain separate efficiency standards to preserve performance-related features that provide utility to consumers – including the unique venting and installation features of certain products, as DOE’s own precedent makes clear. The very purpose of Section 325(q)(1) of EPCA is to preserve useful product features that would not be retained if stricter standards were applied. Second, DOE’s concern that separate standards could deter technological advancements is mere speculation, and it stands in contrast to DOE’s actions with respect to other products. In declining to eliminate oven door windows as a technology option, DOE expressed no such concern that its ruling would freeze technologies in place. To the contrary, it noted with optimism the opportunity “to improve the oven door window in the future.”<sup>96</sup>

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<sup>93</sup> *Id.*

<sup>94</sup> See, *e.g.*, *Electric Cooking Products*, 63 Fed. Reg. at 48041 (“Until such a technology is proven, DOE will eliminate this design option.”).

<sup>95</sup> NOPR at 13138.

<sup>96</sup> *Electric Cooking Products*, 63 Fed. Reg. at 48041.

Finally, DOE returns to its discussion of ventless clothes dryers, and, in doing so, appears to set a new bar for when DOE must preserve product features pursuant to Sections 325(o)(4) and 325(q)(1):

Unlike the consumers of ventless dryers, which DOE has determined to be a performance-related feature based on the impossibility of venting in certain circumstances (*e.g.*, high-rise apartments), consumers of condensing NWGFs are homeowners that may either use their existing venting or have a feasible alternative to obtain heat, which is the furnace’s singular utility to the consumer. *In other words, homeowners will still be able to obtain heat regardless of the venting.* In contrast, a resident of a high-rise apartment or condominium building that is not architecturally designed to accommodate vented clothes dryers *would have no option* in terms of installing and enjoying the utility of a dryer in their home unless he uses a ventless dryer.<sup>97]</sup>

The apparent implication here is that separate efficiency standards are only required if the failure to establish a separate standards would mean that some consumers “would have no option” to obtain any version whatsoever of a given product – whether it be a dryer, a furnace or any other basic product type. In other words, if the standard set by DOE for residential gas-fired furnaces means that a consumer must as a practical or financial matter switch from its existing gas-fired non-condensing furnace to, for example, an oil-fired or kerosene-fired or electric furnace (as the record demonstrates will be the case in many situations, especially among lower income consumers), DOE seems to be suggesting it is relieved of its responsibility under EPCA to set a separate efficiency standard for condensing furnaces since those fuel-switching consumers will still have access to heat. APGA submits that such a reading of Sections 325(o)(4) and 325(q)(1) is impermissible based both on the plain meaning of the statute and DOE’s own precedent. Rather, as the NOPR itself explains, DOE has established separate efficiency standards to accommodate features that consumers “may value,” such as the ability of an oven to self-clean.<sup>98</sup> This is consistent with the plain statutory language of Sections 325(o)(4) and 325(q)(1), which require DOE to preserve *features* of products that are useful to consumers – not to merely ensure that consumers will have access to some version of a product that performs the same general function.

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<sup>97</sup> NOPR at 13138 (emphasis supplied).

<sup>98</sup> *Id.*

Without doubt, the unique performance-related features of a non-condensing furnace – including its ability to be vented through a chimney, to common-vent with other gas appliances, and to common-vent in multi-unit, multi-story housing, as well as its ability to vent without having to address disposal of flue gas condensate – are all features that a consumer “may value” because they eliminate the need for the consumer to make significant and disruptive structural changes to their homes to accommodate a condensing furnace. Further, DOE overlooks the utility that consumers place on heating their homes with natural gas versus an alternate fuel. By adopting a condensing standard that results in substantial fuel switching (*see* Part IV.A.2.b, *supra*), DOE is depriving consumers of the utility of gas heat, with its ability to warm a home more efficiently than the most likely alternative, electricity, and at lower monthly costs.

Accordingly, DOE must, under Sections 325(o)(4) and 325(q)(1) of EPCA and in accordance with the record in this proceeding, establish a separate efficiency standard for non-weatherized non-condensing residential gas furnaces.

## **VI. Conclusion**

APGA respectfully requests that, for all of the reasons discussed above and in the GTI Report, DOE withdraw the subject NOPR.

Respectfully submitted,

AMERICAN PUBLIC GAS ASSOCIATION

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