Energy Conservation Program: Test Procedures for Residential Furnaces [EERE-2011-BT-TP-0024 and/or RIN 1904-AC79]

Comments from American Public Gas Association
February 19, 2013

INTRODUCTION

The American Public Gas Association (APGA) appreciates this opportunity to submit comments in response to the Request for Information (RFI) issued by the U.S. Department of Energy (DOE) on January 4, 2013, to initiate the rulemaking and data collection process to consider amendments to DOE's test procedure for residential furnaces and boilers.

APGA is the national association for publicly-owned natural gas distribution systems. There are approximately 1,000 public gas systems in 36 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.

COMMENT 1. Ensure Consistency in DOE Policy. It is the position of APGA that DOE should follow-through on its commitment to incorporate a meaningful use of full-fuel-cycle (FFC) measures of energy use and emissions in the test procedures for residential furnaces.

In its August 2011 Statement of Policy, DOE stated its intention—

> *. . . to adopt several National Academy of Sciences (the Academy) recommendations, the U.S. Department of Energy (DOE) intends to modify the methods it uses to estimate the likely impacts of energy conservation standards for covered products on energy use and emissions and will work to expand the energy use and emissions information made available to consumers. Specifically, DOE intends to use full-fuel-cycle (FFC) measures of energy use and emissions, rather than the primary (or site) energy measures it currently uses. Additionally, DOE intends to work collaboratively with the Federal Trade Commission (FTC) to make readily available to consumers information on the FFC energy and greenhouse gas (GHG) emissions of specific products to enable consumers to make cross-class comparisons of product energy use and emissions.*

The example below demonstrates the distortion created by disregarding source energy efficiency (the latter as a proxy of FFC efficiency) when calculating the efficiency of furnace products.

Comparison of Site vs. Source
Warm Air Furnace
AFUE

Energy Source	$AFUE_{site}$	$AFUE_{full\ fuel\ cycle}$
Natural Gas:	0.80	0.73
Natural Gas:	0.90	0.83
Electric Resistance:	0.98	0.31

Full fuel cycle based on the following factors:

- Natural Gas: 92% source to delivery efficiency
- Electric: 32% source to delivery efficiency.

In response to a request from DOE to address the use of FFC for energy efficiency standards, the National Research Council (NRC) appointed its *Committee on Point-of-Use and Full-Fuel-Cycle Measurement Approaches to Energy Efficiency Standards* to conduct a study. Upon conducting the study and reaching its conclusions, the NRC's primary general recommendation was for DOE—

> *. . . to consider moving over time to the use of a full-fuel-cycle measure of energy consumption for assessment of national and environmental impacts. Using that metric would provide the public with more comprehensive information about the impacts of energy consumption on the environment, the economy, and other national concerns, through the use of labels and other means such as an enhanced website.*

Recommendation. To overcome the site-based shortcomings identified by both the Academy and NRC, and to remedy the disconnect between DOE's current methodology and the robust FFC approach recommended in both studies, APGA strongly urges DOE to employ a secondary energy descriptor to capture FFC efficiency in line with the recommendations from the Academy and the NRC.

NRC made recommendations which are applicable to the implementation of a secondary descriptor. For example, inclusion of a descriptor adjustment calculation for the current AFUE rating to allow:

- Direct comparability of gas furnace efficiencies to heat pump HSPFs in terms of site energy consumed, and

- Scaling of these site ratings to FFC efficiencies using these site energy consumption calculations for comparison of these competing products on an FFC basis.

This linkage is essential to address one of the NRC's recommendations since simply adding FFC information to the furnace rating procedures will only allow comparisons between gas and electric furnaces, which are rated on AFUE, while ignoring comparisons to heat pumps. Since a comparison between AFUE and HSPF (i.e., on either a site energy or FFC energy basis) cannot be done, end-use consumers are either not well-served or not served at all by the current descriptors.

Adding this adjustment for site and FFC comparability within the furnace test procedures is an important opportunity to formalize during the calculation methodology. Since the rulemakings for furnace test procedures and heat pump test procedures are on different timelines, the furnace test procedures presents the most immediate opportunity to remedy this omission and follow-through on its expressed intention set forth in DOE's August 2011 Statement of Policy.

COMMENT 2. B. Test Conditions Impacting Energy Efficiency (AFUE) Performance.

(4) Room ambient air temperatures are currently allowed to vary widely. Under the DOE test procedure, the room temperature is allowed to be between 65 °F and 100 °F, except for condensing furnaces and boilers, where the room temperature shall not exceed 85 °F. DOE plans to review whether it is appropriate to tighten the allowable room air temperature range. DOE seeks comment as to whether it should tighten the allowable room air temperature range.

DOE should take efforts to ensure that test procedures do not produce inaccurate AFUE performance. A furnace may test about a few points above AFUE a hot summer day. A 15°F difference could potentially result in the condensing furnaces and boilers having a lower AFUE if compared with a non-condensing furnace or boiler tested at 100 °F. To aid customers in comparing products, the testing conditions with regards to air quality should be similar.

(8) Currently, the DOE test procedure provides that water supply temperature must be between 120 °F and 124 °F for non-condensing hot water boilers and 120 °F (±2 °F) for condensing hot water boilers. DOE plans to review the value for the water supply temperature for non-condensing and condensing boilers. DOE seeks comment on the appropriate water supply temperature for measuring the performance of non-condensing and condensing boilers. Should DOE change the water temperatures for condensing boilers to reflect the lower temperatures encountered in low-temperature radiant installations?

DOE should take efforts to ensure that test procedures do not produce inaccurate AFUE performance. Supply water temperatures can vary in different regions and seasons. These regional and seasonal variances should be taken into account when measuring performance.

(9) The current DOE test procedure does not specify that the tested equipment is set up according to recommended field settings as defined in the product's installation and operation manual. This potentially allows the unit to be tested under conditions that are different from the field or may not be recommended for safety reasons. Examples of such test conditions include a different flue CO_2 percentage or reduced input rate from the recommended field settings. DOE plans to review the use of manufacturer-recommended values in testing, such as the minimum firing rate for testing a unit equipped with manually-adjustable controls (see ASHRAE 103-2007, section 8.4.1.1.2) and target flue gas CO_2 levels. Should DOE change the test procedure to specify that the tested equipment is set up according to recommended field settings as defined in the product's installation and operation manual?

DOE should test these appliances according to field recommended field settings. First, to set up products in manner inconsistent with recommended field guide settings, raises safety concerns for the testing professional as well as future customers. Second, testing appliances in a manner inconsistent with recommended field guide settings may yield inaccurate data. Accurate installation procedures are important for performance, especially with vent configurations.

Again, APGA welcomes and appreciates the opportunity to submit our comments to DOE in response to its Request for Information.

Respectfully submitted,
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