Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Program
Mailstop EE-2J
1000 Independence Avenue, SW.
Washington, DC 20585–0121

Re: Energy Conservation Standards Rulemaking for Furnace Fans
Docket Number: **EERE-2010-BT-STD-0011**
RIN: **1904-AC22**

Dear Ms. Edwards,

Thank you for the opportunity to comment on the recently released Framework Document for Residential Furnace Fans.

Northeast Energy Efficiency Partnerships (NEEP) NEEP is a regional nonprofit organization founded in 1996 whose mission is to promote the efficient use of energy in homes, buildings, and industry in New England, New York, and the Mid-Atlantic states through regionally coordinated programs and policies that increase the use of energy efficient products, services and practices, and help achieve a cleaner environment and a more reliable and affordable energy system.

NEEP strongly encourages the Department of Energy (DOE) to consider a number of suggestions for improving the analytical process for developing its Preliminary Technical Support Document and, ultimately, a Notice of Proposed Rulemaking. The effort to set strong energy efficiency standards for this product is of paramount importance for Northeastern states. The region is home to several of the country's energy efficiency leaders, including several states who have set some of the most aggressive energy use reduction goals; is home to an electrical grid that faces serious capacity challenges; and is home to consumers who live with energy costs that surpass most of the nation, costs that unnecessarily drain the local economies. Strong energy efficiency standards on furnace fans offer the region, and nation, a smart, affordable strategy to sharply reduce consumption of electricity, directly impact peak electricity demand, significantly reduce pollution and create new economic opportunities.

We view this stage of the rulemaking as an important opportunity to highlight issues at an early stage while there is sufficient time to have issues considered and analyzed before the process is too far along. In order for these standards to ultimately realize the stated goal of affecting the maximum energy savings that is economically achievable, stakeholders throughout the Northeast would like to share their perspective on a number of issues that, if addressed, will enable that goal to be achieved.

1. SCOPE

The statute in the Energy Policy and Conservation Act (EPCA) clearly states that the scope of this product's rulemaking includes any fan device that is used "for purposes of circulating air through duct work." The Department has correctly interpreted this to include furnace fans or air handlers used in all residential central HVAC systems, including in heating (i.e. furnace/heat pump), cooling (i.e. central air conditioner, heat pump) and ventilation/circulation applications. We disagree with some of the perspectives shared at the public workshop that this rulemaking should be limited to furnace fans used exclusively in the operation of heating (furnaces). Because furnace fans, in actuality, are used in a broad range of applications, it only makes sense to require a minimum level of efficiency for furnace fan's operated in all of these applications.

The Northeast does not see any downside to regulating a product that may, in some situations (i.e. central air conditioners), act as a component of a larger system that is already under the federal standards program. There may actually be a large number of applications of a furnace fan outside of the two most common. A surprising frequency of other applications was suggested at the public workshop (i.e. heat pump air handlers) which would support a stand-alone rating of the furnace fan. As part of this rulemaking, DOE should attempt to determine the prevalence of furnace fans in all central HVAC applications.

Although the Seasonal Energy Efficiency Rating (SEER) metric utilized to measure the efficiency of central air conditioners does include the energy used by the fan, and thus accounts for its efficiency in a sense, the metric does not properly account for, or reward, the efficiency gains available in the furnace fan. For instance, a manufacturer may elect to improve the fans efficiency to meet a minimum standard, when there may in fact be other opportunities to improve efficiency through the other components. Again, a stand-alone efficiency requirement would ensure that the SEER metric was targeting improvements in the core functions of the air conditioning unit, and not simply using the furnace fan to achieve higher SEER values.

2. SCHEDULE and PROCESS

The Northeast region stands to benefit greatly from a minimum efficiency standard for furnace fans, as many homes utilize both forced hot air furnaces and split air conditioning systems, the two most common applications for furnace fans. Because any delay to establish such a standard represents a lost opportunity for energy savings in the region, the Northeast urges the Department to consider the following;

- Accelerating the final rule completion date (required by December, 2013) and similarly accelerate the effective date (estimated at five years following the final rule). The Department has remarked that synchronizing the effective dates of the forthcoming furnace revision, as well as the central air conditioner revision would be beneficial to the broad cross section of stakeholders. With the effective date for furnaces scheduled for 2016 (five years following 2011 final rule) and the central air conditioner/heat pumps scheduled for 2016 (five years following final rule), it seems advantageous to bring the furnace fan standard in at, ideally, the first of those two dates in 2016. This would limit the number of disruptions to the various market stakeholders.
- Developing a robust, yet straightforward test procedure that accurately measures a fan's efficiency, while avoiding an overly complex testing protocol that creates a resource-intensive burden on manufacturers. For obvious reasons, much of what we recommend with respect to standards will greatly depend on this test procedure. A decision on the test procedure prior to the NOPR stage is absolutely crucial.
- Confirming the planned publication date of a Preliminary Technical Support Document. The Northeast expects that this document will be publicly available well in advance of the Notice of Proposed Rulemaking. We appreciate any attempt to accelerate the timeframe on this rulemaking, but stakeholders should certainly be provided an opportunity to carefully review the analysis that the DOE will be using to propose efficiency levels in the NOPR.

3. TEST PROCEDURE

The final Test Procedure should strive to answer one central question: how many watts does a furnace fan draw to deliver specified amounts of moving air measured in cubic feet per minute (CFM) under certain external static pressure (ESP) conditions? We believe the Department has appropriately looked to the CSA C823 test procedure as a useful framework to developing a suitable protocol for measurement. We support the suggested use of CSA C823, with a couple of suggested alterations. According to manufacturers, the development of performance curves included in CSA C823 is already

part of many testing activities conducted by manufacturers, so this testing protocol should not be foreign or burdensome to manufacturers.

While we, in theory, find value in calculating an Annual Electricity Consumption Rating (AECR) as part of C823, we view the metric to be overly complex in its method of determining operating points and introduction of numerous assumptions that may not accurately represent the majority of consumers. We recommend specifying a default static pressure for which to test and not attempt to estimate the various operating hours at various fan speeds and external static pressures. The Department admits that usage patterns can vary widely depending on geography, ductwork, etc. The Department should carefully balance the need to be accurate with a level of simplicity that does not place too heavy of a burden on the manufacturers.

4. EFFICIENCY METRIC/DESCRIPTOR

Based on the issues raised in the test procedure section above, we would recommend that the efficiency metric be based on cubic feet per minute (CFM)/Watt (W) or W/CFM. This approach would, again, avoid making the calculation overly complicated and potentially watered down with conditional assumptions. The numerous assumptions contribute to a very difficult and, potentially, misleading metric to use for comparison. That being said, we do expect that the Department will include an AECR-type calculation in its Energy Use analysis.

We would like to acknowledge that a CFM/W metric will have a challenging time reflecting the benefits of variable speed electronically commutated motors (ECM) if only analyzed at one fan speed. Trying to accurately reflect the benefits of ECM motors in furnace fan efficiency can be tricky since there can be many operating conditions to account for. To be clear, testing should be done at **a minimum of two or three points**. The inclusion of CFM/W at multiple points will recognize the efficiency benefits of an ECM motor. It has to be multipoint to be meaningful. According to the Department, "While permanent split capacitor (PSC) motors operate most efficiently at a single speed with significantly diminishing operating efficiency at others, ECM motors are capable of maintaining a high operating efficiency at a broad spectrum of speeds". They can also make gradual adjustments to fan speed versus the binary on/off operation of PSC motors. The research that DOE does as part of the Technical Support Document needs to explore the energy savings opportunities variable speed motors offer. We believe that this can still be accomplished in the context of a CFM/W metric, if tested at a variety of fan speeds.

5. DEFAULT STATIC PRESSURES

There appears to be disagreement between the Department's proposed static pressure of .5 inches water column (in. w.c.) in the Framework Document and suggested levels by several industry representatives during the public workshop. Several representatives argued that the value used in test procedure should be in the range of .1 to.2 in w.c. range and that this was the pressure/condition they designed their systems to operate under. The DOE, in the framework document, referenced the .5 in w.c. level found in the CSA C823 procedure and asked if this may be more representative of the pressures found in the field. Although there may need to be further field testing done to raise the confidence level of average static pressures found on the field, the Northeast believes the static pressure should, most importantly, be representative of typical field conditions and not reflect some idealized operating scenario created in the lab.

An elevated static pressure would also prevent a situation where ECM motors, tested at the lower ESP, might actually use more energy in the real world. The issue is; If we keep the lower default pressures, we may actually boost energy consumption in the real world as ECM (variable speed) motors respond to the need for CFM, compared to PSC motors that would not maintain the same speed in the field, fail to

deliver the CFM necessary, and ultimately provide low performance conditioning. It's important to avoid this scenario by testing at higher default static pressures that represent the conditions these furnace fans will likely encounter.

We realize that the static pressure specified in the furnace/CAC test procedures is lower than .5 (.1 to .2 in w.c. depending on capacity) however that does not necessarily mean we should not correct this inaccuracy for furnace fans. The Department should strive to reflect realistic operating conditions. Although it may be a difficult transition to a new static pressure value, the Department should try to align the test procedure with field conditions as soon as possible. Based on initial reactions during the public workshop, it appears DOE's proposal of .5 in w.c. as a default pressure is reasonable and would reflect the actual situations found in the field. We suggest that in the next revision of test procedures for furnaces and central air conditioners, that the Department consider shifting the static pressure values used for testing those products to align with the value published in the final rule for furnace fan test procedures.

6. TECHNOLOGY OPTIONS

The Northeast encourages the Department to include cabinet configurations and airflow path design in the list of technology options to consider, and believes that there may be significant potential savings by doing so. The design of airflow with various heat exchangers have direct effects on the turbulence required for good heat transfer, but simultaneously have impacts on the static pressures created internally. While there may be implications for how the test procedure is designed to take these factors into account, we suggest that the Department take this into consideration and possibly conduct preliminary testing on the feasibility of evaluating these factors.

7. UTILITY IMPACTS

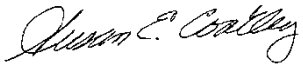
The Northeast would like to stress the importance of appropriately valuing demand reductions due to minimum efficiency standards. The demand reductions achieved by furnace fan standards will provide important alleviation to capacity constraints, an important challenge faced by much of the Northeast. While the Department plans to project demand reductions due to any potential standards, we urge the Department to begin quantifying those reductions in financial terms. The Avoided-Energy-Supply-Component (AESC) Study Group contracted Synapse Energy Economics, Inc. to develop the study, "Avoided energy supply costs in New England; 2009 Report" (Attached). According to the report, efficiency measures that enable energy use/demand reductions provide a number of benefits, including;

> "Avoided electric capacity costs due to the reduction in the annual quantity of electric capacity and/or demand reduction that ISO-NE requires load serving entities (LSEs) to acquire from the Forward Capacity Market (FCM) to ensure an adequate quantity of generation during hours of peak demand."

Section 6 of the report provides forecasts of avoided capacity cost resulting from energy efficiency measures in New England. For example, it is estimated that a measure that achieves one kW reduction in capacity would be worth $67 per kw-year in 2010 and $32 per kw-year out to 2024. These values are based on recent and forecasted ISO-NE Forward Capacity Market auction prices. We urge the department to use this report as a resource to help develop these sorts of financial quantifications for the product in this rulemaking, and in all other standards rulemakings.

At this point in the rulemaking, we would like to communicate our strong hope that the Department earnestly considers the issues raised here. By carefully addressing these areas of concern, we believe that the DOE will be in better position to develop a more accurate, informed proposed rule. Thank you for your consideration.

Sincerely,



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