

CHAPTER 3. MARKET AND TECHNOLOGY ASSESSMENT

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CHAPTER 3. MARKET AND TECHNOLOGY ASSESSMENT

3.1 INTRODUCTION

This chapter details the market and technology assessment that the U.S. Department of Energy (DOE) has carried out in support of the preliminary analysis for energy conservation standards for residential furnace fans. It consists of two sections: the market assessment and the technology assessment. The goal of the market assessment is to develop a qualitative and quantitative characterization of the residential furnace fan industry and market structures, based on publicly available information and data and information submitted by manufacturers and other interested parties. The key result of the technology assessment is a preliminary list of technologies that can improve the efficiency of residential furnace fans.

Because furnace fans are a component used in central residential heating, ventilation and air-conditioning (HVAC) products, DOE gathered relevant market information for residential furnaces, modular blowers, and hydronic air handlers. The majority of furnace fans covered in this rulemaking are components of residential furnaces. In addition, data are more extensive and readily available for residential furnaces compared to the other HVAC products that use furnace fans covered in this rulemaking. As a result, DOE relied heavily on residential furnace information to assess the furnace fan market. Little market data is available for electric furnaces/modular blowers. AHRI does not include information regarding electric furnaces/modular blowers in either its furnaces or central air conditioner (CAC) products databases. DOE expects that shipments of hydronic air handlers are significantly fewer than for furnaces. In addition, there are no DOE energy conservation standards for hydronic air handlers. Consequently, little market data is available for these products as well.

3.1.1 Product Definitions and Scope of Coverage

EPCA gives DOE authority to consider and prescribe new energy conservation standards or energy use standards for electricity used for purposes of circulating air through duct work. (42 U.S.C. 6295(f)(4)(D)) Consequently, DOE tentatively defines “furnace fan” to mean any electrically-powered device used in residential central HVAC systems for the purposes of circulating air through ductwork. DOE considers a typical furnace fan as consisting of a fan motor and its controls, an impeller, and a housing, all of which are components of an HVAC product that includes additional components, such as the cabinet.

DOE recognizes that a significant number of products may fit its broad interpretation of the statutory language. Figure 3.1.1 shows the various combinations of HVAC products that are used to construct typical residential HVAC systems. The boxes outlined in red represent HVAC products that include a furnace fan according to DOE's interpretation of the statutory language.

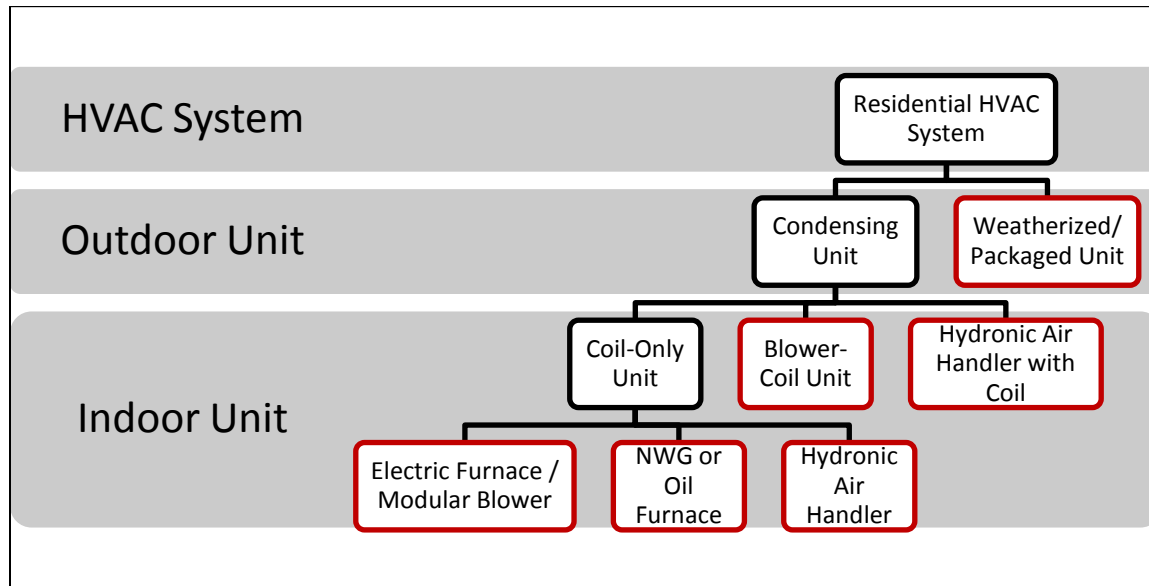


Figure 3.1.1: Residential HVAC System Component Combinations

DOE's preliminary approach is to address products for which DOE has sufficient data and information in this rulemaking, and DOE may consider other such products in a future rulemaking, as data become available. For this rulemaking, DOE considered furnace fans used in products: (1) for which circulation fan energy consumption is not already covered in associated rulemakings; (2) for which sufficient data were available for its analyses; and (3) that could be tested using a similar test method (*i.e.*, setup and equipment, instruments and methods of measure, and range of operating conditions). The following list describes the furnace fans which DOE plans to address in this rulemaking.

- Products addressed in this rulemaking: the furnace fans used in weatherized and non-weatherized gas furnaces, oil furnaces, electric furnaces, modular blowers, and hydronic air handlers
- Products not addressed in this rulemaking: other products that incorporate furnace fans, such as CAC blower-coil units, through-the-wall air handlers, SDHV air handlers, ERV, HRV, draft inducer fans, or exhaust fans

The products for which DOE is not considering standards in this rulemaking did not compare favorably to the included products based on the aforementioned criteria. DOE is not considering in this rulemaking fans used in any non-ducted products, such as whole-house ventilation systems without ductwork, CAC condensing unit fans, room fans, and furnace draft inducer fans because these products do not circulate air through ductwork. DOE did not prioritize furnace fans used in CAC blower-coil units, SDHV air handlers, and through-the-wall air handlers because the electrical energy consumption of these furnace fans is included in the

SEER and HSPF metrics that DOE uses to regulate residential CAC and heat pump products. Chapter 2 of this TSD includes a detailed discussion of how the SEER metric accounts for furnace fan electrical energy consumption as it relates to the scope of coverage of this rulemaking.

The HVAC products considered in this rulemaking can be broadly classified as either a furnace or central air conditioner (note that DOE’s definition of furnace extends to hydronic air handlers). 77 FR 28677 Therefore, using the identified scope of coverage, the energy conservation standard will be broadly applicable to HVAC products with heating input capacities less than 225,000 Btu per hour and cooling capacities less than 65,000 Btu/h. These specifications are consistent with the DOE definitions for residential “furnace” and “central air conditioner” (10 CFR 430.2).

Figure 3.1.2 depicts the market share by shipments of HVAC products that include furnace fans. The slices outlined in black represent products that are not addressed in this rulemaking. The provisional scope of coverage of this preliminary analysis includes 63% of HVAC products that include furnace fans.

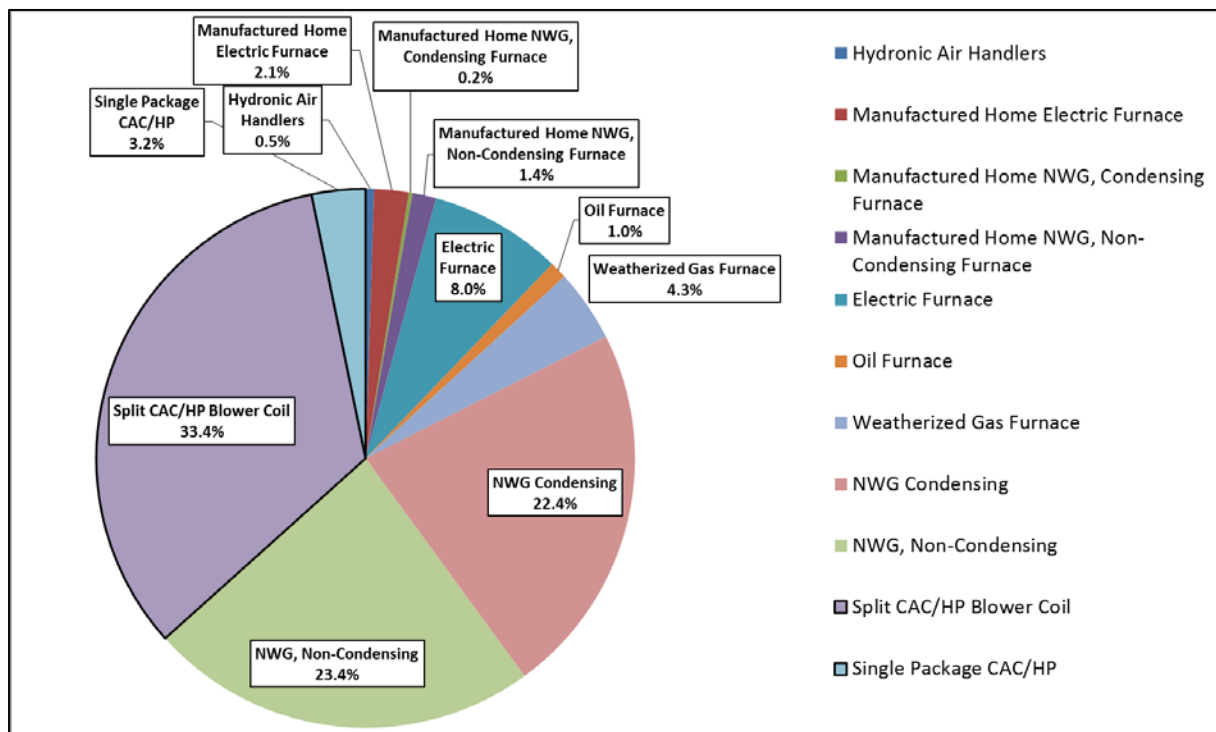


Figure 3.1.2: Market Share of Products Containing Furnace Fans (AHRI) ¹

According to Residential Energy Consumption Survey 2009 (RECS 2009) data, 61.6% (70 million) of U.S. homes have central warm-air furnaces.² Similar statistics are not available

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