



A 2020 Vision for Regulating Air System Efficiency

By WADE SMITH, PE, Executive Director,
AMCA International

On June 29, 2011, the Department of Energy issued a public notice of their intent to regulate the efficiency of fans,

blowers and fume hoods, requesting comments. AMCA chose to support the DOE in this effort, believing that regulation was inevitable with or without our support, and that our industry would fare better if AMCA and its members were proactive. On December 19, 2011, AMCA board members met with John Cymbalsky, who heads the DOE Appliance and Equipment Efficiency program. John suggested, and AMCA agreed, that AMCA work with key industry stakeholders, such as American Council for an Energy Efficient Economy, ASHRAE, and others, to develop a joint proposal on what a fan-efficiency regulation would look like. This process is now underway.

At the same time, many mechanical products are approaching what some call “max tech”—the point at which the Law of Diminishing Returns makes further efficiency improvements too costly. Consequently, building industry groups are now considering how to transition from regulating HVAC system component efficiencies, to instead measure and control installed system efficiency. Outcome-based and performance-based codes, standards and regulations are therefore being considered.

Vision 2020

In the case of air systems, a great deal more energy can be saved by altering design and installation practice than by driving manufacturers to improve the aerodynamic efficiency of fans. Certainly, fan product efficiency will be regulated in the same manner as appliances, light bulbs and air conditioners. DOE estimates that about 20% of energy consumed by industrial and commercial fans, blowers, and fume hoods can be saved through equipment-efficiency regulation. However, such dramatic improvements in fan aerodynamic efficiency will yield unattractive returns on investment (ROI) compared to the ROI available from system design changes that a) properly size and select fans; b) minimize system effects at the fan and within the duct systems; and c) minimize system leakage (see figure).

So the stars are aligned to support a change in how efficiency is regulated for air systems and components. While AMCA supports practical fan product efficiency improvements, a system level approach will yield greater savings. On this point, the facts are clear to all who might be party to a consensus agreement. The challenge for those who will draft air

system efficiency regulations is to determine what regulation and enforcement regimen will work to dramatically reduce fan energy of projects installed in 2020.

The long-term 2020 perspective accommodates DOE’s regulation-development process and the time required to build a broad-based consensus among stakeholders—manufacturers, engineers, regulators, building owners, contractors, etc. Essentially, we need to consider what air systems can and should look like in 2020, how well they can perform, and how regulations can be easy to understand and enforce.

DOE’s Simple Metric—watts/cfm

On May 16, 2012, the DOE issued its proposed regulation for residential furnace fans, which is based on a system-oriented metric of watts per cfm. If this metric was modified for variable commercial fan pressures based on simple field measurements, our industry would deliver the largest savings available from the least cost investment by 2020. It seems simple enough, but doing so will require a seismic shift from regulations and enforcement based solely on laboratory measurements to regulations that include field measurements.

There is strong support for this shift within ASHRAE and among environmental advocates. If this happens, our industry will change current practice over the next eight years:

1. System effects at the fan and in the duct system will be better documented, and incorporated into design software.
2. Fan selections will be based on total pressure, taking full advantage of duct static regain.
3. Air system leakage will be dramatically reduced.
4. Airflow measurement and energy use submeters will be added to system designs.
5. Periodic or continuous monitoring of fan energy, flow, and pressure will show initial regulatory compliance, and feed diagnostic algorithms to preserve air system efficiency over time.

Vision 2020—Will It Happen?

Many are skeptical. Some are optimistic. Others persist in denial. Personally, I am guided by a quote from William Arthur Ward that hangs in my office under a painting of a small sailboat in a stormy sea, which says, “The pessimist complains about the wind. The optimist expects it to change. The realist adjusts the sails.” 

