Air-Conditioning, Heating, and Refrigeration Institute (AHRI)

Comments to the

Massachusetts Department of Energy Resources (DOER) draft regulations to include renewable thermal in the Massachusetts Alternative Portfolio Standard (APS) pursuant to Chapter 251 of the Acts of 2014.

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Background

The Air-Conditioning, Heating, and Refrigeration Institute (AHRI) is the trade association representing more than 300 manufacturers of quality, safe, efficient, and innovative residential, commercial, and industrial air conditioning, space heating, water heating, and commercial refrigeration equipment and components for sale in North America and around the world. AHRI's members account for more than 90 percent of HVACR and water heating equipment manufactured, sold, and installed in North America. Additionally, the HVACR industry, through manufacturers, distributors, and contractors, supports over 22,000 jobs in the Commonwealth of Massachusetts.

AHRI was supportive of legislation passed by the Massachusetts General Court in 2014 (S.2214) that paved the way for new renewable heating and cooling technologies to be eligible for Alternative Energy Credits under the Commonwealth's Alternative Energy Portfolio Standard (APS).

Specifically, S. 2214 will help Massachusetts' utilities meet APS benchmarks that require a certain percentage of the state's electricity consumption be met by low-carbon or carbon-free technologies by awarding alternative energy credits (AECs) to any building heating or cooling system that uses renewable energy sources, including "solar heating, geothermal and air source heat pumps, biofuels and wood pellets, wood chips, renewable bio-oils or renewable natural gas".

This legislation was another example of Massachusetts being a national leader in the development of policies and programs that promote renewable energy, improve public health, and combat greenhouse gasses (GHGs).

Heat Pump Technology

As the trade association representing the manufacturers of highly innovative and advanced heating and cooling technologies, we are encouraged DOER is considering air, ground, and water source heat pumps as an eligible technology for APS. Our members produce highly efficient heat pumps and the incentive to use these technologies will be an added benefit to Massachusetts residents and businesses.

Air-to-Air Energy Recovery Ventilation Equipment (AAERV) Technology

S. 2214 defines "useful thermal energy", as energy in the form of direct heat, steam, hot water or other thermal form that is used in production and beneficial measures for heating, cooling, humidity control, process use or other valid thermal end use energy requirements and for which fuel or electricity would otherwise be consumed.

Further, S. 2214 defines the specific classes of alternative energy sources that can qualify for Alternative Energy Credits:

i. Combined Heat and Power
ii. Flywheel energy storage
iii. Energy efficiency steam technology
iv. Any facility that generates useful thermal energy using sunlight, biomass, biogas, including renewable natural gas that is introduced into the natural gas distribution system, liquid biofuel or naturally occurring temperature differences in ground, air, or water.
v. Any other alternative energy technology approved by the department under administrative proceeding conducted under chapter 30A.

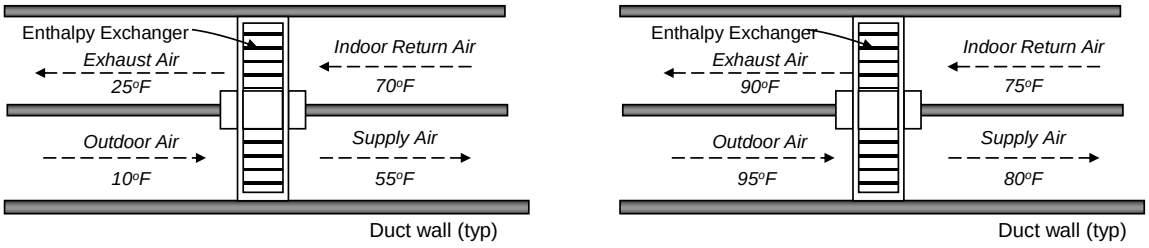
These definitions clearly outline the many types of technology that can be included in the APS to help Massachusetts improve public health and mitigate greenhouse gases through alternative energy sources. Air-to-air energy recovery ventilation equipment is one technology that falls under the definitions provided in S.2214.

AHRI encourages DOER to include air-to-air energy recovery ventilation equipment (AAERVE) in the final Alternative Energy Portfolio Standard. This well developed and tested equipment provides significant benefits to energy reduction and building performance. In fact, AHRI's AAERVE product section is one of our fastest growing sections with 32 manufacturer member companies to date.

AAERVE uses the naturally occurring temperature difference between indoor and outdoor air to pre-condition outdoor ventilation air thereby reducing the workload and energy consumption of a building's HVAC system. Ventilation systems are responsible for approximately 30 percent of commercial building energy usage. AAERVE can decrease this usage by more than 50 percent by lessening the load on heating and cooling equipment.

AAERVE technology should qualify under category (iv) of S.2214's definitions as the technology is driven by a naturally occurring temperature difference in air, namely that between the building exhaust air and the outdoor air. The temperature difference between building exhaust air and outdoor air is a naturally occurring temperature difference in the same sense as it is for other technologies such as a ground source heat pump which uses the naturally occurring temperature difference between the ground and return water.

Air-to-air energy recovery produces useful thermal energy (for preheating or precooling ventilation make-up air) with no emissions of either greenhouse gases or criteria air pollutants. It operates by exchanging sensible and latent heat between the ventilation make up air entering the building and the exhaust air leaving the building, as shown below. This heat exchange is driven by the naturally occurring temperature difference between outside air and the exhaust air leaving the building, resulting in useful thermal energy being supplied to the incoming ventilation air. In this case, the useful thermal energy supplies heating or cooling (depending on whether the outdoor air is cooler or warmer, respectively, than the indoor temperature), which would otherwise need to be supplied by active (energy consuming) heating or cooling capacity. (TIAX 2014)



a) At Representative Heating Season Design Temperatures, with 75% Recovery Effectiveness

b) At Representative Cooling Season Design Temperatures, with 75% Recovery Effectiveness

(TIAX 2014)

The key point is that transferring energy between the building exhaust and supply air streams using an air-to-air energy recovery heat exchanger brings together a clean, continuous, non-fossil source of thermal energy and a system to deliver a significant portion of that thermal energy as useful thermal energy for the end-use of preconditioning outdoor ventilation make-up air.

The transfer of energy between building exhaust and supply air streams using AAERVE does exactly what is sought from renewable energy sources – satisfy a necessary energy end use with minimum energy consumption from conventional energy sources, with negligible greenhouse gas emissions, and no adverse impact on the environment. Further, unlike many renewable energy sources which are highly variable and intermittent, energy from building exhaust air is always available when it is needed, in direct proportion to the need. (TIAX 2014).

Conclusion

We applaud the Commonwealth of Massachusetts for taking a leadership role in providing alternatives to traditional energy consumption. AHRI encourages the inclusion of air-to-air energy recovery ventilation equipment as DOER works to finalize their APS regulations. This well-developed and internationally recognized equipment will provide significant benefits to energy reduction and building performance in the Commonwealth.

Additionally, Massachusetts will continue to be a national leader in policies that promote environmentally responsible energy use practices by including AAERVE technology as an alternative energy generating source.

We look forward to serving as a resource for DOER in this and future rulemakings concerning the heating, air conditioning, water heating, and commercial refrigeration industry.

References

These comments reference a white paper developed by TIAX on October 9, 2014.