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COOLING & HEATING

TO: MA Department of Energy Resources

December 1, 2017

FROM: Rick Nortz, Manager, Efficiency Programs
Mitsubishi Electric Cooling and Heating

Subject: APS – 225 CMR 16 Comments

CONCLUSION:

In our opinion, there are several provisions in the latest version of 225 CMR 16 that can cause confusion in the marketplace and limit participation. Of particular note:

1. The provision of requiring a COP of 2.5 at 17°F needs further clarification. The document does not define if the requirement is at rated capacity or maximum capacity. Maximum capacity eliminates 75% of the systems currently on the NEEP list.
2. The provision of requiring a COP of 1.9 at 5°F is very detrimental to the MassCEC approved list of qualified products, which are best positioned to displace fossil fuel. By raising COP from 1.75 to 1.9, over 33% of the approved MassCEC products are eliminated.
3. Requiring 50% of heating name plate capacity. The majority of homes in Massachusetts have heating systems that are 200 – 300% oversized. Requiring 50% of the name plate capacity of a house that is 300% oversized will require multiple systems. We believe “heating design load” is a better measure.
4. “Integration into heating distribution system, capable of distributing produced heat to conditioned areas of the building.” can be interpreted to mean that the heat pump must connect to existing ductwork or baseboard. The majority of products on the NEEP ccASHP list cannot integrate into a heating distribution system. This statement needs further clarification.

Further explanation is in the body of the comments.

INTRODUCTION

The MA APS has provided a unique opportunity for the State of Massachusetts to continue its national leadership in energy policy. By incorporating Renewable Thermal into the APS, this regulation will help to further establish a thriving market for GHG reductions and energy efficient heating and cooling systems. The entire value chain will benefit because it will serve to bring more awareness to thermal technologies that are just beginning to thrive, and accelerate them to mainstream. Manufacturers, Distributors, Contractors, Architects, Engineers, Builders, and building owners will all benefit as the pathway and economic model is established through higher volume of renewable thermal projects.

An important recognition that we have experienced via utility efficiency programs is the need for simplification. While those of us who have been working to establish, revise, and improve the APS Renewable Thermal regulations understand this need for simplicity in concept, the importance of constantly keying in on simplification is paramount to the programs’ success. Our experience has shown that even slightly complicated programmatic offerings will not be adopted by building owners. Complication and confusion has significant consequences – the utilities do not capture the required energy efficiency savings, the beneficial technology doesn’t get the benefit of raising its awareness, and other issues. In comparison, the MA CEC has launched simplified clean energy programs that are prescriptive in form, incentivizing at a \$/ton basis. In the case of the APS, we feel that an overly restrictive and complicated qualification process will again lead the program to be underutilized, having impacts down the line including the utilities not reaching



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their allocated APS requirement. We highly recommend that the MA DOER respectfully consider simplifying the programs as much as possible, and have made some suggestions below as to areas to consider.

SMALL CATEGORY – RTGU

The following comments in the Small Category will be concerning this section of the 225 CMR 16.00

16.05: Eligibility Criteria for APS Alternative Generation Units

(4) Special Provisions for APS Renewable Thermal Generation Units.

(e) Eligibility Criteria for Small Air Source Heat Pumps.

All small air source heat pump Renewable Thermal Generation Units, as prescribed in 225 CMR 16.05(4)(a), must meet all of the following requirements:

1. be ENERGY STAR™ certified;
2. meet the Cold Climate Air Source Heat Pump Specification Version 2.0 published by Northeast Energy Efficiency Partnerships effective January 1, 2017 or any version thereafter;
3. have a variable speed compressor;
4. be part of an Air-Conditioning, Heating, & Refrigeration Institute matched system; and
5. have a coefficient of performance greater than or equal to 1.9 at 5 degree Fahrenheit and a coefficient of performance greater than or equal to 2.5 at 17 degree Fahrenheit.

For new construction, the small air source heat pump Renewable Thermal Generation Unit must supply 100% of the building's total annual heating and cannot have any supplemental, non-renewable heating sources. In retrofit construction or existing buildings, all small air source heat pump Renewable Thermal Generation Units that do not meet the above requirement must be used as the primary source of heat, supply at least 90% of the total annual heating, be integrated to a heating distribution system, capable of distributing produced heat to all conditioned areas of the building, and have a heat-rate capacity at five degrees Fahrenheit that is at least 50% of the nameplate capacity of the existing heating source equipment.



The table below will be referred to throughout the Small Category

[Click here for a complete list of the table below, to include all brands.](#)

1. COMMENT: New COP requirements
 - a. The additional requirement of having a COP greater than or equal to 2.5 at 17°F is unnecessary and adds an element of confusion, since this is not a requirement on the NEEP list.
 - i. The document does not specify whether you require the COP at rated capacity or maximum capacity.
 - b. The additional requirement of having a COP greater than or equal to 1.9 at 5°F causes a similar element of confusion, since this is not a requirement on the NEEP list. Is MA DOER going to create a new qualified list as NEEP and Mass CEC have already done? This requirement also significantly affects the products that can actually produce heat efficiently at the lowest temperatures.



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2. COMMENT: New Construction

- a. For new construction, there is a statement that there can be no supplemental source of heat. Many new construction homes have fireplaces that burn either wood or have a gas insert. This requirement will eliminate these homes from eligibility.

3. COMMENT: Retrofit construction

- a. The statement “must be integrated to a heating distribution system, capable of distributing produced heat to all conditioned areas of the building” needs to be defined further. This statement can be interpreted to mean that it must connect to ductwork or piping for boilers. This requirement interpreted that way would limit the program to ducted systems, since ductless systems cannot integrate to a heating distribution system.
- b. Another issue in this section is the requirement to “have a heat-rate capacity at 5°F that is at least 50% of the nameplate capacity of the existing heating source equipment.” Nearly every heating system in the state is “oversized”. In many cases the existing system may have 2 to 3 times the required capacity. If a home has a 160,000 BTU/hour boiler, this this would mean that an 80,000 RTGU heat pump would be installed. The “heating design load” for this same home is probably only 60,000 BTU’s/hour, thus should only need 30,000 BTU’s to meet the requirements.

RECOMMENDATIONS:

1. Adopt the MassCEC approved equipment list since this has been widely accepted in Massachusetts as the most efficient, best performing heat pumps at cold temperatures. The MassCEC has an added requirement of 100% heating capacity at 5°F, which would better accomplish the goals of reducing the use of fossil fuels. The MassCEC list eliminates 70% of the NEEP list. The systems that remain on the MassCEC list are better performing systems that will actually give you the heating output you need at the coldest temperatures.
 - a. If you can’t adopt the MassCEC list, eliminate the COP of 1.9 at 5°F and 2.5 at 17°F. These requirements add confusion, since they are not the same as the NEEP ccASHP list. In addition, they eliminate 33% of the MassCEC approved products. Eliminating the COP of 1.9 at 5°F, help limit the impact on the MassCEC approved list.
 - b. If none of this is possible, then define COP of 2.5 at 17°F as rated capacity, since it is not currently mentioned. If you adopt COP at 17°F at maximum capacity, 75% of the approved systems become disqualified.
2. Change “Have a heat rate capacity at 5°F that is at least 50% of the name plate capacity of existing heating source equipment” to “Have a heat rate capacity at 5°F that is at least 50% of the heating design load, using ACCA Manual “J”. Requiring “name plate capacity” of the existing heating system assumes that the existing system is properly sized. Many boilers in homes are 200 – 300% oversized. Manual J is a more accurate determination of actual heating requirements.
3. Define: “Integrated to a heating distribution system, capable of distributing produced heat to all conditioned spaces”. This is extremely confusing, since ductless mini-splits generally can’t be integrated into a heating distribution system.



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4. Allow for partial home solutions, not just whole home solutions. Any displacement of fossil fuels is beneficial. Rather than require 50% of heating design load, we suggest qualifying everything and adjust the number of AEC's that the installation would qualify for. Perhaps something like the table below. This would provide access to the program for nearly everyone. If a home has a load of 72,000 BTU's, then an 18,000 BTU system would qualify for a multiplier of 1 (25%). As shown below, if you displace 25% of the heating load, you actually displace 55% of the fossil fuel, which is what the goal of this program is.

Heating Design Load	AEC Multiplier
100%	3+
50%	2
37.5%	1.5
25%	1
12.5%	.5

