MAINE PUBLIC UTILITIES COMMISSION

FOLLOW UP REPORT TO JANUARY 15, 2014 REPORT ON EFFICIENT HEATING PILOT PROGRAMS

Presented to the
Joint Standing Committee on
Energy, Utilities and Technology
June 18, 2015

STATE OF MAINE
PUBLIC UTILITIES COMMISSION

Mark A. Vannoy
CHAIRMAN

Carlisle J. T. McLean
COMMISSIONER

Harry Lanphear
ADMINISTRATIVE DIRECTOR

June 18, 2015

Honorable David Woodsome, Senate Chair
Honorable Mark N. Dion, House Chair
Energy, Utilities and Technology Committee
100 State House Station
Augusta, Maine 04333

Re: Follow Up Report to the PUC's January 15, 2014 Report on Efficient Heating Pilot Programs

Dear Senator Woodsome and Representative Dion:

During its 2012 session, the Legislature enacted An Act To Improve Efficiency Maine Trust Programs To Reduce Heating Costs and Provide Energy Efficient Heating Options for Maine Consumers. PL 2011, ch. 637. Section 11 of the Act provided that T&D utilities may develop and implement, upon approval of the Commission pilot programs within their service territories to measure the effectiveness of efficient electric heating systems. It further required that each utility that implemented a pilot program report certain information to the Commission and that the Commission analyze those reports and submit them, together with any Commission analyses, findings or recommendations to the Committee by January 15, 2014. The Commission submitted that report, however, one of the utility reports to the Commission at that time was an interim report. The utility subsequently submitted a final report. The Commission submits this follow up report which discusses that utility's final report on its heat pump pilot program. We've also attached the utility's final report.

If you have any questions, please do not hesitate to contact us.

Sincerely,

Mark A. Vannoy, Chairman

On behalf of the Chairman and

Carlisle J. T. McLean, Commissioner
Maine Public Utilities Commission

Attachment
cc: Energy, Utilities and Technology Committee Members
Deirdre Schneider, Legislative Analyst

I. INTRODUCTION

During the 2012 session, the Legislature enacted An Act To Improve Efficiency Maine Trust Programs To Reduce Heating Costs and Provide Energy Efficient Heating Options for Maine Consumers ("Act").[1] Section 11 of the Act provides that transmission and distribution (T&D) utilities may develop and implement, upon approval of the Commission, pilot programs within their service territories to measure the effectiveness of efficient electric heating systems, specifically electric heat pumps or electric thermal storage (ETS) units. The Act provides that the pilot program be available to up to 500 residential or small business customers within a T&D's service territory, that the T&D utility must determine that the overall energy costs to each participating customer will decrease as a result of participation, that the utility may provide on-bill financing to participating customers, that it may offer rebates to participating customers and that it may enroll customers in the program only until December 31, 2013. However, the Act was amended in 2013 to provide that the number of efficient electric heat pumps provided to customers may exceed 500 if proposed by the utility and approved by the Commission.[2] The amendment also extended the enrollment end date for the heat pump pilot program to December 31, 2014, except that it may be extended further if proposed by the utility and approved by the Commission.

Section 11 of the Act required that each T&D utility that implemented a pilot program measure and report to the Commission by November 15, 2013 on:

A. The overall reduction in energy use by participating customers;

B. The reduction in energy costs for participating customers;

C. The repayment experience of participating customers;

D. The effectiveness of the heating equipment installed under the pilot program;

E. The extent to which participating customers also took advantage of any programs offered by the Efficiency Maine Trust; and

F. The effect of the program on the electric grid, including effects during off-peak and peak times and seasons.

The Act required that the Commission analyze the reports submitted and submit the reports, together with any analyses, findings or recommendations of the Commission to the Energy, Utilities and Technology Committee by January 15, 2014. The Commission submitted the report as required by the Act.[3]

[1] P.L. 2011, Ch. 637.

[2] An Act to Reduce Energy Costs, Increase Energy Efficiency, Promote Electric System Reliability and Protect the Environment ("Omnibus Energy Act") P.L. 2013, Ch. 369, Part G.

[3] Report on Efficient Heating Pilot Programs (January 15, 2014).

As described in the Commission report, Central Maine Power Company (CMP) finished enrolling customers in its electric thermal storage pilot program on December 31, 2013, and Emera Maine's heat pump pilot program was extended to December 31, 2014. However, by October 2013, the Emera Maine heat pump program was already fully subscribed, with 1,000 customers split evenly between the Maine Public and Bangor Hydro districts. The utilities submitted reports from outside evaluators on the pilot programs to the Commission in November 2013 and the Commission submitted its analysis of those programs to the Committee in its January 15, 2014 report. While the report that CMP submitted on its electric thermal storage pilot program was a final report, Emera Maine's November 2013 report was an interim report. In November 2014, Emera Maine submitted a final report. Accordingly, this Commission report to the Legislature discusses Emera Maine's final report on its heat pump pilot program.

II. ELECTRIC HEAT PUMP PILOT PROGRAM AND REPORT

On July 3, 2012, Bangor Hydro Electric Company and Maine Public Service Company (now Emera Maine) filed their proposal to implement an electric heat pump, on-bill financing pilot program. Following an initial technical conference, data requests, and a formal settlement conference, on September 19, 2012, the Commission approved a Stipulation filed by Emera Maine, the Efficiency Maine Trust (EMT), Environment Northeast (ENE), the Conservation Law Foundation (CLF), and the Natural Resources Council of Maine (NRCM), and thus approved Emera Maine's proposal to implement an electric heat-pump on-bill financing pilot.[4] The electric heat pump pilot program provided both a $600 rebate for the installation of ductless mini-split electric heat pumps and an optional on-bill financing program for heat pumps installed in residential and small commercial buildings. Ductless mini-split heat pumps use electricity to drive the refrigeration cycle and thereby transfer heat from one space to another. During winter the heat pump transfers heat into the home and during the summer it removes heat from the inside of the home.

On November 16, 2013, Emera Maine filed its Interim Report prepared by Energy Market Innovations on the Heat Pump Pilot Program as required by Section 11 of the Act. Emera Maine indicated that it would submit a more detailed report later in 2014 when it will have conducted in-depth interviews with pilot program participants. Emera Maine submitted its Final Report to the Commission on November 20, 2014.

As stated above, Section 11 of the Act outlined six issues the reports on the pilot programs were to address. Issue E was reported on in Emera's Interim Report as well as some information related to Issue C and this information was provided in the Commission's January 2014 report to the Committee. All issues were addressed in the Emera Maine November 2014 Final Report and are reported on below.

[4] *Bangor Hydro Electric Company, Maine Public Service Company, Request for Commission Investigation Into Proposed Electric Heat Pump On-Bill Financing Pilot*, Docket No. 2012-00343, Order Approving Stipulation (September 19, 2012).

A. The overall reduction in energy use by participating customers

While the participants' use of heat pumps increased their annual electricity consumption, the reduction in fuel oil use led to a net decrease in carbon emissions. Emera's Final Report found that when normalized for typical weather, the average participant in the Bangor Hydro district of Emera reduced their CO_2 emissions by 3,448 pounds per year, while the average Maine Public Service district participant reduced their CO_2 emissions by 4,976 pounds per year. Overall, participants reduced their CO_2 emissions by an average of 4,212 pounds per year.

B. The reduction in energy costs for participating customers

The Emera Maine Final Report found that, normalized for an average Maine winter, participants saved $622 on average in heating costs as the use of the heat pumps offset the use of fuel oil. These savings are the result of $310 worth of electricity offsetting $932 worth of fuel oil.[5]

C. The repayment experience of participating customers

As of October 7, 2013, 142 of the 945 (installed) program participants were taking advantage of on-bill financing and reported that they were pleased with the streamlined process. The Emera Maine Report noted that 77% percent of on-bill financing respondents stated that they were somewhat satisfied with on-bill financing but nobody stated that they were very satisfied. There was only one respondent who stated they were dissatisfied with on-bill financing, and cited the high interest rate as a reason for dissatisfaction. The Report states that for many customers, the streamlined process was more important than the financial (interest rate) considerations.

About three-quarters of the respondents in the pilot program (76%) indicated they did not use any financing to purchase their heat pumps, and therefore, no repayment was required. Sixteen percent of respondents used financing other than the on-bill financing option. The most common type of financing was a home equity loan, a bank or credit union loan, a credit card, or a loan from a contractor. The report indicates that some did not participate in the on-bill financing option because they had access to a loan at a better rate.

D. The effectiveness of the heating equipment installed under the pilot program

Emera's Final Report concluded that ductless heat pumps are a viable heating technology for cold weather climates such as Emera Maine's territory. Based on its analysis of heat pump usage and the customers' experiences, the Final Report found that, with a back-up heating source, heat pumps can effectively carry the heating

[5] These numbers are based on an assumption of offsetting 239 gallons of oil priced at $3.90 per gallon.

load for customers in Maine. The Report also noted that with recent improvements in heat pump technology, heat pumps can now operate even at very cold temperatures.

E. The extent to which participating customers also took advantage of any programs offered by the Efficiency Maine Trust

The Emera Maine Final Report notes that six months following heat pump installation, 38 of the 173 pilot participants had participated in additional Efficient Maine Trust programs. The Report also noted that 12 of the 38 customers participated in more than one EMT program and that these particular customers stated that the pilot program had a large influence on their decision to participate in additional programs.

F. The effect of the program on the electric grid, including effects during off-peak and peak times and seasons

The heat pumps created an increase in both winter and summer peak demand. For winter peak hours, participants in the heat pump pilot increased their electricity demand by 0.35 kW as the heat pumps created an additional source of electricity demand due to offsetting oil as the primary heating fuel for many of the participants. This results in a relative increase of 25% over baseline demand. The Final Report determined an average hourly demand during the baseline period of 1.32 kW and an average hourly demand from pilot program participants of 1.67 kW.

The Report showed an increase in summer peak demand of 0.14 kW. For participants who had previously had air conditioning before installing a heat pump, demand during the summer peak only increased by 0.07 kW during peak hours and 0.03 kW during off-peak hours. Among all participants, whether they previously had air conditioning or not, demand was higher than in the baseline period by 0.14 kW during peak hours and 0.11 kW during off-peak hours.

III. CONCLUSION

Emera Maine's Final Report is an in-depth analysis of its heat pump pilot program and concludes that heat pumps are a viable technology in cold climates, the pilot program increased savings for customers, and customer education was vital for the program's success.