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Thank you for the opportunity to present our building electrification recommendations to establish interim goals to you and your staff last week. We were happy to hear your positive feedback on our recommendations. We hope we can continue to work with you as you develop the state’s building electrification roadmap this year and hopefully expand incentives for cold climate heat pumps.

We would like to run a concept by you that we have started to work on that we think could help to advance the goals of the 2019 Energy Master Plan (EMP) to electrify 90% of the residential and commercial buildings by 2050. Per the Northeast Energy Efficiency Partnership (NEEP) reports, cold climate heat pumps can be up to three times more energy efficient than fossil fuel heating systems. Per the NJDEP’s 80x50 Report commercial and residential sector snapshot, the electrification of buildings could result in significant GHG emissions reductions.

However, as noted in the New Jersey Conservation Foundation’s Acadia study and NEEP reports, cold climate heat pumps can have higher initial capital cost when just replacing the heating system. Ground source heat pumps, while the most energy efficient heat pumps, also have the highest capital cost heating system because of the added expense needed for thermal loops. But cold climate air source heat pumps can have about the same installation costs when compared to a full separate AC and fossil fuel heating system.

Per the Acadia report, it is the difference in the operating cost of various systems that determines the cost effectiveness of cold climate heating systems over various heating systems. As noted in the EMP, cold climate air source heat pumps are cost effective with paybacks less than 7 years, when compared against electric resistance heating and fuel oil and propane heating systems that have higher operating costs.  However, new cold climate heat pumps have about the same operating costs as a new high efficiency natural gas heating system. (The difference can vary a few percentage points depending on the comparative costs of electricity vs. gas among the various utilities in New Jersey.) Because of New Jersey’s relatively low cost for natural gas there is little to no real annual operating savings to make the systems payback over time. In addition, the retrofit of a cold climate heat pumps may require an upgrade to the electric system to handle the increased electric load in the home, which adds to the cold climate heat pump overall costs.

Per the Energy Information Agency (EIA) natural gas makes up about 75% of the New Jersey residential heating systems. Natural gas heating accounts for 87% of the fossil fuel heating systems. In order to achieve the 50 x 30 goal or to make any progress on the 2019 EMP goal of 90% building electrification by 2050, the State will have to retrofit a significant portion of the existing natural gas heating systems. Despite the significant energy and CO2 emission savings, given the low overall operational cost savings of cold climate heat pumps over natural gas heating systems, achieving this objective may require a significant increase in heat pump incentive funding.

Only a funding mechanism that values energy efficiency or CO2 emissions reduction like a cap and trade or a carbon tax could potentially change the payback economics of cold climate heat pumps. It is not likely that the U.S. will adopt a carbon tax anytime soon and the current CO2 cap and trade programs adds cost to electricity usage. The current CO2 cap and trade program structure works in the opposite direction to the 2019 EMP policies to advance the electrification of the transportation and building sectors. This is also somewhat true in the current electric utilities’ energy efficiency incentive programs.

This was the same issue New Jersey faced with solar. New Jersey established the Renewable Energy Portfolio Standard (RPS) under the authority in the 1999 Electric Discount and Energy Competition Act (EDECA). EDECA established both Class I and Class II renewables energy certificates (REC) with solar in the Class I category. The Act also gave the BPU the authority to establish a renewable energy trading program. But the Class I REC value was not enough to make solar a cost-effective option within the Class I renewable energy category. Even though solar had a significantly greater CO2 emissions reduction and greater environmental benefits compared to other Class I renewables, solar had a higher capital cost and lower operational savings

To address this issue, New Jersey invented the solar renewable energy certificate (SREC) trading program that help to finance solar. The establishment of the SREC program allowed NJBPU to expand the solar program which helped the New Jersey solar market take off. In the alternate to SREC funding, the NJBPU under the New Jersey Clean Energy Program (NJCEP), could have increased the clean energy annual budget for solar rebates. However, that would have significantly increased the NJCEP total budget and increased the overall rate impact of the NJCEP budget. The use of SRECs for funding and financing solar projects lowered the overall annual rate impact of the solar program and allowed the NJBPU to increase it solar goals at a lower annual cost and lower rate impact.

Given similar issues with cold climate heat pumps, the BET thinks the NJBPU could develop the same financing program for cold climate heat pumps by establishing a new Class III REC for "clean" thermal energy (CTE) or a CTE certificate (CTEC).  The BET thinks NJBPU has the legislative authority as set forth at N.J.S.A. 48:3-51 “energy efficiency portfolio standard” and N.J.S.A. 48:3-87 g and h, to establish a new clean thermal energy Class III energy efficiency REC.[[1]](#footnote-1) The BPU would set up the Class III REC program just like they are now doing for SREC II.  BPU would set up the value of the clean thermal energy REC based on the energy savings of the cold weather heat pump system. This program could also include financing for community geothermal just like the SREC program does for community solar.

According to the National Conference of State Legislatures (NCSL), there are currently 33 states that have some form of energy efficiency technologies in their RPS or as a separate energy efficiency resource standard (EERS). The majority of these states (27) have mandatory requirements, while the other states implement voluntary goals. Of the 33 states, 27 have requirements for natural gas savings. In addition, per the Clean Energy States Alliance (CESA), 13 states (12 of which have EERS) have established renewable thermal energy portfolio standard (RTPS) within their state RPS. These 13 states have different definitions and technologies that are included in their RTPS that includes biomass, biogas and solar thermal; and geothermal.

While the EERS and the RTPS policies as described by NCSL or CESA, could address a potential funding and financing source for cold climate heat pumps, the BET is proposing the development of a specific Class III CTEC limited to air source or ground source heat pumps that are replacing an existing natural gas heating system. We would suggest the Class III CTEC program be available only to retrofits or upgrades to a cold climate heat pump where the operation costs are equal to or less than the operating cost of natural gas combustion systems. Since the upgrade or conversion from an electric resistance, oil or propane heating system to a cold climate heat pump system is cost effective, the retrofits of electric resistance, oil or propane heating system could be more efficiently managed through a cost-effective rebate program by the utilities. The same would be the case for new construction in a rebate program managed by the NJBPU.

However, in increasing the cold climate heat pumps rebate for replacing existing electric resistance, oil or propane heating systems and new construction budgets, we suggest that these rebate budgets for cold climate heat pumps be set on the natural gas energy efficiency budget as a polluter pays requirement. Since the electric and natural gas customers combined would be paying the same total amount with the same rate impact regardless of where this charge is collected, this would be the same or equivalent total rate impact but just shifting these costs to the natural gas utilities. In this manner the cost for electricity would decrease as it becomes cleaner with more renewable and as the use of electricity for efficient buildings increases, but the cost for natural gas that results in GHG emissions would increase.

While not trying to design the Class III Clean Thermal Energy Certificate (CTEC) program, you could convert the BTUs savings to MWh savings on an annual basis so they can be tracked in PJM Generator Attributes Tracking System (GATS). But the payment to the customer would be managed directly through the natural gas utilities, similar to the current mechanism for SREC, OREC and ZEC are through the electric distribution companies. In addition, the budget cost of the Class III CTEC program should be set on the natural gas utilities as a non-by-passable charge in the natural gas rates.

Basically, the value of the Class III CTEC would be set to just buydown the cost of the cold climate heat pump to make cold climate heat pumps cost-effective. This could be set as a 7-year payback equivalent to the requirements as set in N.J.S.A. 52:27D-123b. You could also manage the overall cost of this new Class III CTEC program by having a specific sunset date for the program that could also be extended based on the cost effectiveness of cold climate heat pumps.

One of the benefits of the Class III CTEC to incentivize cold climate heat pumps retrofits of existing natural gas heating systems over a rebate system is that it would achieve the clean energy goals at a lower overall rate impact and at essentially the same total costs. The BET believes if New Jersey enacted the BET goals of 100,000 residential units by 2025 and 800,000 by 2030, a significant portion of these goals will occur in existing electric resistance and fuel oil and propane, heating system and with new construction because of the lower operating costs. However, as an outside example, if New Jersey achieved the BET goals of 100,000 residential units by 2025 and 800,000 by 2030 as 100% retrofits from existing natural gas heating systems and funded these retrofits at the Massachusetts cold climate heat pumps max rebate rate, the NJ budget for retrofits from natural gas to cold climate heat pumps could require up to $500,000,000 per year in incentive costs. This could result in an approximate 5% rate impacts, but a Class III CTEC program could achieve the same goals in this example at around a 0.5% annual rate impacts.

Again, thank you for the opportunity to present our report and goals of the BET and offer the opportunity to discuss this concept in more detail.

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1. N.J.S.A. 48:3-51 "Energy efficiency portfolio standard" means a requirement to procure a specified amount of energy efficiency or demand side management resources as a means of managing and reducing energy usage and demand by customers;

N.J.S.A 48:3-87g. The board shall adopt, pursuant to the "Administrative Procedure Act," P.L.1968, c.410 (C.52:14B-1 et seq.), an electric energy efficiency program in order to ensure investment in cost-effective energy efficiency measures, ensure universal access to energy efficiency measures, and serve the needs of low-income communities that shall require each electric public utility to implement energy efficiency measures that reduce electricity usage in the State pursuant to section 3 of P.L.2018, c.17 (C.48:3-87.9).  Nothing in this subsection shall be construed to prevent an electric public utility from meeting the requirements of this subsection by contracting with another entity for the performance of the requirements.

N.J.S.A. 48:3-87h. The board shall adopt, pursuant to the "Administrative Procedure Act," P.L.1968, c.410 (C.52:14B-1 et seq.), a gas energy efficiency program in order to ensure investment in cost-effective energy efficiency measures, ensure universal access to energy efficiency measures, and serve the needs of low-income communities that shall require each gas public utility to implement energy efficiency measures that reduce natural gas usage in the State pursuant to section 3 of P.L.2018, c.17 (C.48:3-87.9).  Nothing in this subsection shall be construed to prevent a gas public utility from meeting the requirements of this subsection by contracting with another entity for the performance of the requirements. [↑](#footnote-ref-1)