April 16, 2018

VIA ELECTRONIC MAIL

The Honorable Kathleen H. Burgess
Secretary
New York State Public Service Commission
Empire State Plaza, Agency Bldg. 3
Albany, NY 12223-1350

Re: Case #18-M-0084: In the Matter of a Comprehensive Energy Efficiency Initiative

Dear Secretary Burgess:

Renewable Heat Now hereby submits these comments in support of a comprehensive, aggressive, equitable energy efficiency standard that reduces greenhouse gas emissions and consumption of all dirty fuels in all sectors of the New York energy system.

Respectfully submitted,

/s/
Jessica Azulay
Alliance for a Green Economy
On behalf of Renewable Heat Now

NEW YORK STATE
PUBLIC SERVICE COMMISSION

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In the Matter of a Comprehensive Energy Efficiency Initiative Case #18-M-0084

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COMMENTS BY RENEWABLE HEAT NOW IN SUPPORT OF A COMPREHENSIVE, AGGRESSIVE, EQUITABLE ENERGY EFFICIENCY STANDARD THAT REDUCES GREENHOUSE GAS EMISSIONS AND CONSUMPTION OF ALL DIRTY FUELS IN ALL SECTORS OF THE NEW YORK ENERGY SYSTEM.

Submitted by,
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Dated: April 16, 2018

NEW YORK STATE
PUBLIC SERVICE COMMISSION

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In the Matter of a Comprehensive Energy Efficiency Initiative Case #18-M-0084
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COMMENTS BY RENEWABLE HEAT NOW[1] IN SUPPORT OF A COMPREHENSIVE, AGGRESSIVE, EQUITABLE ENERGY EFFICIENCY STANDARD THAT REDUCES GREENHOUSE GAS EMISSIONS AND CONSUMPTION OF ALL DIRTY FUELS IN ALL SECTORS OF THE NEW YORK ENERGY SYSTEM

INTRODUCTION

In 2015, New York set ambitious goals as part of the State Energy Plan to grow renewable energy, support energy efficiency and reduce greenhouse gas emissions. By 2030, NY aims to see a 40% reduction in greenhouse gases from 1990 levels, 50% of its electricity coming from renewable energy, and a 23% reduction in energy consumption from buildings. On February 28, 2018, the New York Public Service Commission ("Commission") instituted the above referenced proceeding to "consider issues related to energy efficiency targets and policy." The Commission also noted that the Department of Public Service had been directed by Governor Cuomo to "engage stakeholders and to propose a comprehensive energy efficiency initiative by Earth Day, April 22, 2018."

As the electric grid becomes cleaner through the growth of renewable energy, we can significantly reduce our greenhouse gas emissions by converting more of our appliances, vehicles, and heating and cooling to run on electricity rather than on-site burning of fossil fuels. This conversion is known as "environmentally beneficial electrification" or "strategic electrification" ("beneficial electrification").

In the spirit of providing stakeholder feedback to inform the proposal scheduled for Earth Day, we submit the following comments and recommendations related to the role that beneficial electrification can and should have in a comprehensive energy efficiency framework.

Experts have analyzed the state and regional greenhouse gas reduction goals and concluded that it is impossible to meet them without widespread efficient electrification of our building heating and cooling

[1] Renewable Heat Now is a campaign of Alliance for a Green Economy, Fossil Free Tompkins, FrackAction, HeatSmart Tompkins (a project of Solar Tompkins), New York Geothermal Energy Organization (NY-GEO), New Yorkers for Clean Power, and Sane Energy Project

needs.[2] Heating and cooling in buildings represent 32% of New York State's combustion-related greenhouse gas (GHG) emissions,[3] and small, incremental efficiency improvements will not be enough.

To reduce greenhouse gases at the rate and scale necessary to meet the 2030 goals, New York must spur the widespread adoption of efficient geothermal and cold-climate air source heat pumps, which run on relatively small amounts of electricity to capture renewable heat from the ground and air. State policies must reflect the scale and urgency of the work necessary to make these conversions. In 2017, Jerry Acton of Physicians, Scientists, and Engineers (PSE) for Healthy Energy estimated that at least 126,000 fossil fuel heating systems will need to be replaced by heat pumps each year in order to meet a 40% reduction in greenhouse gases in the heating sector by 2030.[4]

NYSERDA has taken steps to address this need by developing its Renewable Heating and Cooling Framework, consumer and installer incentives for heat pumps, and the Clean Heating and Cooling Communities program. These programs will assist building owners in converting to air-source and ground-source heat pumps for warming and cooling their homes. Additionally, the recently approved National Grid rate case includes a small program to further incentivize heat pump adoption.

But far more needs to be done. The energy efficiency framework for the state is one appropriate policy area through which the Commission can and should support the beneficial electrification necessary to meet our climate goals. The energy efficiency gains that heat pumps provide can and must be counted as the state sets targets, identifies responsible entities for meeting those targets, and develops programs for energy efficiency.

To meet NY's goals, we need to account for *all* fuel uses in the state and aim for an overall goal of reducing them. Ultimately, electric utilities are key to this transition, as the ultimate source of energy to power almost everything will be electricity delivered through the an increasingly renewable grid. Therefore, we think enforceable utility targets for driving efficiency in all sectors and for all fuels are an appropriate and important plank of any comprehensive efficiency framework.

New York's forthcoming Energy Efficiency initiative at a minimum should be structured so as not to discourage beneficial electrification. In developing the Earth Day proposal, we encourage the Department of Public Service to go beyond this minimum and put New York squarely on the leading edge of efficiency policy nationwide by establishing an efficiency policy that accounts for energy use and greenhouse gas emissions from all fuel sources, including those that are not currently metered, such as gasoline, heating oil, and propane.

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[2] Northeast Energy Efficiency Partnerships, Meister Consulting Group, and Synapse Energy Economics. "Northeastern Regional Assessment of Strategic Electrification," July 2017. http://www.neep.org/sites/default/files/Strategic%20Electrification%20Regional%20Assessment.pdf.

[3] "Clean Heating and Cooling - NYSERDA." Accessed April 4, 2018. https://www.nyserda.ny.gov/Researchers-and-Policymakers/Clean-Heating-and-Cooling.

[4] "Direct Testimony of Thomas G. (Jerry) Acton on Behalf of Alliance for a Green Economy" in the National Grid Rate Case. Filed August 25, 2017. http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={8B7D997B-0EF9-43E3-A0A8-95619EFCE252}

THE NEED: Beneficial Electrification

New York's electrical grid continues to become greener, thanks to efforts to close coal-fired power plants and dramatically ramp up renewable energy production statewide. As the grid becomes greener, so do all electric powered end uses. Compare, for example, an electric hot water heater and a gas fired hot water heater. Over time, the electric hot water heater creates fewer greenhouse gas emissions for the same amount of hot water produced, because its source electricity is becoming cleaner. In contrast, a gas fired hot water heater will have the same (or worse, as appliances' own efficiency can degrade over time) emissions. Not only are there greenhouse gas emissions from the combustion of the fossil fuel, but there are also the leaks of methane throughout the drilling and transmission process, which are not yet appropriately counted in New York's cost benefit analyses and other underlying metrics. By electrifying our heating and cooling, we move from a source energy that will always be a source of greenhouse gas emissions to one that will consistently have its greenhouse gas emissions being reduced.

Not only are the sources of electricity becoming cleaner, ground-source and air-source heat pumps are inherently more efficient because a significant portion of the BTUs they produce are captured from the environment around them, leveraging free energy. Converting from fossil fuel heating to heat pumps is a more efficient use of energy, even as these energy systems may increase a home's electrical load. Energy efficiency gains in other parts of the household or grid can build the capacity needed into our existing system to incorporate these new end uses.

There are additional benefits to electrification as well. At a time of stagnant or declining overall electric demand, but rising peak demand, beneficial electrification can help stabilize energy demand for electric companies. Further, it's not just the climate that benefits: fossil fuel combustion is a source of many on-site pollutants that have effects on human health, including deadly carbon monoxide. Remove the combustion from the home, remove the potential negative health impacts.

THE CONCERN

Traditional energy efficiency programs have focused on reducing the amount of energy consumed. Over time, we've learned the importance of counting and reducing our greenhouse gas emissions, but our energy efficiency programs have not moved past the metrics that count total electricity and total gas usage as separate, discouraging switching from dirty fossil fuels to cleaner electric. If NY sets an energy efficiency standard that is in its essence an electricity reduction standard, many beneficial electrification technologies would be disincentivized. It is very important to set goals and use metrics that account for the efficiency gains in other sectors and greenhouse gas emissions.

> *Beyond ensuring that our efficiency metrics and policies promote positive environmental outcomes and produce less CO2, it is also imperative that they not create disincentives to*

achieving GHG emissions reductions through the electrification of loads that are less carbon-intensive than existing practices.[5]

SOLUTIONS

Hold Beneficial Electrification Harmless in the Efficiency Metric

There needs to be a clear, verifiable way to hold the energy companies harmless for any beneficial electrification that may reduce the signal of energy efficiency gains. This is the bare minimum of what must be done.

Quickly Ramp Up Energy Savings to at least 3% of Annual Retail Sales

Currently under the ETIP programs, utilities are accounting for the success of their energy efficiency programs through deemed values and other estimated methods. Annual utility targets are currently set at a calculated energy savings equivalent to 0.5% of their annual retail sales. This significantly lags surrounding New England states; 2016 net savings were 1.2% in Maine, 1.5% in Connecticut, 2.4% in Vermont, 2.8% in Massachusetts, and 2.8% in Rhode Island.[6] We support a goal for utilities to achieve a verifiable savings equivalent to at least 3% of their annual retail sales, while holding them harmless for any electricity load gained through beneficial electrification.

Set Additional Beneficial Electrification Goals to Increase Overall Efficiency

In addition to electric efficiency standards, there needs to be further expectations for utility companies to support beneficial electrification, and appropriate incentives available to consumers. Vermont's Tier 3 Energy Transformation Projects require conversion of 2% of sales (BTU equivalency) in 2017 rising to 12% in 2032, setting targets for utility-led or utility-partnership projects that reduce customer fossil fuel consumption and save money, such as weatherization and heat pumps.[7]

The Northeast Energy Efficiency Partnership (NEEP) estimates that the air source heat pump market in the Northeast must grow 15% or more per year through 2025 to meet the emission reduction goals.[8] Physicians, Scientists, and Engineers for Healthy Energy estimate that in New York, 2.7 million homes need to convert from oil, propane, and natural gas to cold climate air-source or ground-source heat pumps by 2030 to reduce emissions by 12.7 million metric tons per year from the 2015 level. An average of 16,000 electric systems were installed per year between 2005 and 2015. An average of at least 126,000 efficient electric heat pump systems (air source and geothermal) must be installed per year between 2018 and 2030 to keep us on track of meeting our climate goals. In more practical terms,

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[5] Dennis, Keith, Ken Colburn, and Jim Lazar. "Environmentally Beneficial Electrification: The Dawn of 'Emissions Efficiency.'" *The Electricity Journal* 29, no. 6 (July 1, 2016): 52–58. https://doi.org/10.1016/j.tej.2016.07.007.

[6] The Regional Energy Efficiency Database (REED). Developed by Northeast Energy Efficiency Partnership (NEEP). https://reed.neep.org. Note that in 2014, Rhode Island achieved 3.5% savings.

[7] Act 56, Renewable Energy Standard. 30 V.S.A. § 8005a.

[8] Northeast Energy Efficiency Partnerships, Meister Consulting Group, and Synapse Energy Economics. "Northeastern Regional Assessment of Strategic Electrification," July 2017. http://www.neep.org/sites/default/files/Strategic%20Electrification%20Regional%20Assessment.pdf.

if NY started by installing 20,000 heat pumps in 2018, in would require increasing the number of heat pumps installed by a 50.5% per year compounding growth rate to get to 2.7 million by 2030.[9]

In addition to holding utilities harmless under an energy efficiency standard for the electricity served to electrify transportation and heating, utilities should be credited for the efficiency gained through this electrification. For instance, geothermal heat pumps are 400% efficient.[10] The energy savings realized through a conversion to a geothermal heat pump -- even if the conversion is from a non-metered fuel such as home heating oil -- should be encouraged (and even mandated) through New York's energy efficiency standard and should be counted toward the overall goals (with the goals set accordingly).

Evaluation Measurement & Verification

New technologies always require improvements as they are rolled out. Cold climate air source heat pumps are a relatively new technology, and heat pumps in general require a level of user awareness to fully achieve advertised efficiencies. Proper accounting for energy use by heat pumps will be key to further assessing and improving their efficiency, as well as for accounting for their impact on the grid. While "assumed avoided MT CO2"[11] may be used in the short term, such as in the National Grid rate case, programs need to be ground-truthed to truly promote efficiency. However, meters now exist to precisely measure the energy use of heat pumps and electric vehicles. A comparison of assumed values and recorded values should be used to true-up program expectations.

Account for Lifecycle GHG Emissions

When utilities select equipment for their energy efficiency programs or an RFP for Non-Pipe Alternatives, they do not include all methane emissions in their calculations. Heat pumps will be disadvantaged until we can require calculations that reflect the full impact of the equipment choices on greenhouse gas emissions.

The benchmarks and assessments of progress toward the state's greenhouse gas reduction goals must be based on accurate greenhouse gas inventories, taking into account the most up to date science on life cycle emissions of all sources. For natural gas, this currently includes at least a 5% leakage rate,[12] and applying the 20-year global warming potential (GWP) of methane, as the world is expected to hit

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[9] Jerry Acton. Personal Communication via email. 4/11/2018

[10] New York State Joint Utilities. *New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs – Residential, Multi-Family, and Commercial/Industrial Measures.* Version 5.1. Public Service Commission Case 14-M-0101, Case 15-M-0252, & Matter 15-01319. March 15, 2018. http://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/72c23decff52920a85257f1100671bdd/$FILE/ATTF3QGG.pdf/TRM%20Version%205.1%20-%20January%202018.pdf

[11] Joint Proposal filed in the recent National Grid rate case. Appendix 7 Public Service Commission Case 17-E-0238 & 17-G-0239. http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C43AA3B9-3E5B-44C6-937E-63B3729A4D87}

[12] Howarth, Robert W. "Methane Emissions and Climatic Warming Risk from Hydraulic Fracturing and Shale Gas Development: Implications for Policy." *Energy and Emission Control Technologies* 2015, no. 3 (October 8, 2015): 45–54. https://doi.org/10.2147/EECT.S61539.

critical climate change tipping points within this timeframe. Once these are taken into account, the next request becomes obvious.

All Sources Accounting and Promote Fuel Switching to Electric

An overall energy efficiency standard and determination of success should account for efficiency and emission of all source fuels that are used, including oil and propane, even though the Public Service Commission does not currently have direct regulatory oversight over these fuels. To be more specific, account for the emissions impacts that result from displaced direct combustion of fossil fuel. Incentives for fuel switching that promote beneficial electrification are one method for encouraging progress despite the lack of regulation. New York State officials need to also consider enacting new laws as appropriate to further encourage fuel switching from fossil fuels to electricity. Further, we support others' calls for "fuel-neutral" standards, but only insofar as they can break down the silos between electricity and gas, or between electricity and non-metered fuels. At this stage in the climate crisis, we cannot afford to take any detours (such as switching from oil to gas). We must directly leapfrog gas and go immediately to beneficial electrification through heat pumps. The tallest building in Shanghai runs entirely on heat pumps - buildings in New York City can do it too.[13]

To this end, we encourage the Department of Public Service to propose a gas savings standard that can be achieved through weatherization and other measures to mitigate the economic and climate costs of the current generation of fossil-fuel burning furnaces and boilers that are installed in buildings across the state. But when it comes time to replace those fossil-fuel burning appliances, all investments should be going toward heat pump installations and all infrastructure investments should be geared toward that transition with the expectation that the state's gas distribution infrastructure will become rapidly unnecessary.

Stop Subsidies for Oil-to-Gas Conversions

All fuels are not equal when it comes to emissions reductions, the ultimate goal of the state's energy policies. It is clear that the path towards meeting our greenhouse gas emission goals is through electrifying end uses, not only of oil and propane but including systems run on natural gas.

> *Conversions from heating oil to natural gas results in 5% more direct fuel use CO2 emissions per housing unit and 74% more CO2 equivalent emissions per housing unit due to upstream methane emissions at a 2.6% leakage rate; this leakage estimate is likely conservative and therefore the greenhouse gas footprint of homes using natural gas may be even higher.* [14]

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[13] "Construction World Magazine India | Shanghai Tower - Here Are the Innovative Building Solutions That Form the Heart of China's Tallest Building." Accessed April 9, 2018. http://www.constructionworld.in/News/Shanghai-Tower---Here-are-the-innovative-building-solutions-that-form-the-heart-of-China-s-tallest-building/107107.

[14] DIRECT TESTIMONY OF THOMAS G. (JERRY) ACTON ON BEHALF OF ALLIANCE FOR A GREEN ECONOMY BEFORE THE NEW YORK STATE PUBLIC SERVICE COMMISSION. Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation d/b/a National Grid for Electric Service (Case 17-E-0238) and Gas Service (Case 17-G-0239). August 25, 2017.

Methane gas is not a "bridge fuel," but a bridge to nowhere, a costly diversion from the real need to convert to efficient electric systems. Currently, a range of subsidies are promoting oil-to-gas conversions. We need to leapfrog over natural gas and invest our money and energy in efficient electric systems. Any energy efficiency program released by New York State needs to avoid subsidizing or promoting conversions to natural gas.

Mandate the Most Efficient Heating and Cooling in New Construction

The easiest installation for ground source heat pumps, the most efficient of the heat pumps, is in new construction. Air source heat pumps also benefit from being installed from the start. Currently there are only stretch codes and voluntary net zero codes that promote the use of heat pumps in new construction. In the meantime, conventional fossil fuel heating systems are being installed, moving us backwards. As part of New York's overall energy efficiency program, building codes should be updated to eliminate fossil-fuel heating in new construction starting in 2020.

Move Towards Emissions Efficiency

The gold standard for a statewide energy efficiency goal would be to implement measurement of an emissions efficiency metric. Keith Dennis, Ken Colburn, and Jim Lazar coined the term "emiciency" in 2016, proposing that in calculating power sector emissions, utilities and regulators should apply emissions factors that reflect the changing nature of the generation fleet. To our original point, as the grid gets cleaner, so too do all devices connected to the grid, and a straight % of annual retail sales does not provide a way of evaluating this.

> *Greater emissions efficiency reflects fewer emissions created per unit of useful output of an energy- consuming service. For example, fewer pounds of CO2 emitted per mile traveled by a car or fewer pounds of CO2 emitted per gallon of hot water provided by a water heater... a heat pump water heater may reduce kWh by 50% compared to a resistance water heater, but a heat pump water heater controlled so as to have its load met by PV during the middle hours of the day may reduce emissions 75% or more. The energy efficiency of the former is good, but the "emissions efficiency" of the latter is far better. It is important, particularly to state air quality agencies, to capture this "emiciency" opportunity in future program and policy planning.* [15]

To truly weigh fossil fuel use vs. electricity as we make policy choices going forward, emissions efficiency will be an important metric to begin to incorporate. As a new metric, time is needed to further develop and become familiar with it before goals are set in its terms. "Deemed emissions reductions" should be developed, just as "deemed kWh savings" are often applied today in the evaluation, measurement, and verification (EM&V) of energy efficiency programs. New York should require utilities to begin to report their efficiency savings in terms of emissions efficiency, based on the energy mix in their service area.

[15] Dennis, Keith, Ken Colburn, and Jim Lazar. "Environmentally Beneficial Electrification: The Dawn of 'Emissions Efficiency.'" *The Electricity Journal* 29, no. 6 (July 1, 2016): 52, footnote 2. https://doi.org/10.1016/j.tej.2016.07.007.

CONCLUSION

We urge the Department of Public Service to propose an aggressive energy efficiency standard designed to catapult New york into national leadership. This standard should include ambitious enforceable electricity and gas savings targets to be met by the utilities in line with leading states in the efficiency space. But for New York to take a true leadership position, we must also take advantage of the enormous opportunity for efficiency gains that can be achieved through beneficial electrification and the rapid reduction of fossil fuel used for home heating and electric vehicles. We urge the Department of Public Service to propose a policy that breaks down the traditional fuel silos and focuses reducing all dirty fuels in all sectors.

Electric utility programs and procurement are key to New York's plans for decarbonization and our renewable energy goals. Our greenhouse gas reduction goals will only be met if we electrify our heating and transportation sectors while maximizing energy efficiency in all end uses. To that end, New York's utility regulations should be designed to rapidly move our electric utilities toward an efficient, renewable grid that powers nearly all of our energy needs (including heating and transportation) through electricity.

Respectfully submitted,

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