



NEW YORK GEOTHERMAL ENERGY ORGANIZATION

NY-GEO FINAL REPORT NENY/Energy Efficiently Interim Stakeholders Feedback

NEW YORK STATE PUBLIC SERVICE COMMISSION

Case 14-M-0094 - Proceeding on Motion of the Commission to Consider a Clean Energy Fund

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

Comments by New York Geothermal Energy Organization on Department of Public Service Staff's Energy Efficiency and Building Electrification Report (EE/BE Report)

Submitted by
John Rath
Director of Operations
The New York Geothermal Energy Organization
16 West Main Street,
Cambridge, NY 12816
(518) 3136-GEO
nygeoinfo@gmail.com

Introduction

Thank you for the opportunity for NY-GEO members to respond to Department of Public Services staff regarding the Energy Efficiency and Building Electrification Report (EE/BE Report). Achieving NY-GEO's mission to grow the geothermal heat pump industry and develop its workforce, while educating policy makers and residents about the benefits of geothermal heat pumps makes providing this feedback a high priority.

Our approach to providing input was to identify approximately 20 questions of specific relevance to our industry and develop an on-line survey of members. We then held a series of focus groups to review and discuss the questions/answers. The comments below are from NY-GEO members who are involved in the design, installation, repair and maintenance of geothermal systems as well as members who participate in utility and NYSERDA energy efficiency and electrification programs.

Disclaimer: The views and opinions expressed in these responses are those of the individual NY-GEO members and do not necessarily reflect the views or positions of the NY-GEO Board of Directors or the NY-GEO staff members.

Performance Metrics

Given the necessity for energy efficiency and building electrification portfolios to evolve to support the State's ambitious climate goals and mandates, what performance metrics (i.e., beyond annual and lifetime MWh and MMBtu savings) should the Commission consider prioritizing to drive the types of programs, innovation, and outcomes needed?

Response # 1:Lifecycle greenhouse gas emissions reductions, including embodied carbon. Comfort and cost-savings can't be overlooked as a major driver of GHG reduction goals.

Response # 2:The only metric of value for energy efficiency upgrades, such as insulation and air sealing, is pre and post heating and cooling consumption. One recommendation would be to provide 80% of the incentive as prescriptive measures and then offer a 20% bonus for homeowners who want to share their utility bills a year later. This will give enough of a sample size to verify that the program is working, while minimizing the paperwork burden.

The Commission should include "negative" metrics, such as the amount of time per project that is spent filling out rebate paperwork and the rate of contractors leaving the Clean Heat program. They may also consider getting feedback every month rather than once or twice a year.

Response # 3:kW used when operating at peak capacity

Response # 4:For heat pumps, performance metrics should include peak COP (less so EER in this heating-dominant climate) during the winter design period. Measures which raise the peak COP, including installing extra ground loop, which raises peak COP, have an opportunity to lower the demand on the grid, including during winter extremes (during which electric resistant backup heat use would otherwise be expected to put a heavy strain on the grid), and should be incentivized. The extra ground loop incentive could be

measured in Entering Water Temperature (a common industry measure, which translates directly to COP), or BTUHs supplied / tonnage, or another way.

Response # 5: The best metric is green house gas/total emissions reduction including the CO₂ equivalent emissions for each portfolio as well as type of program. MMBTU's should be eliminated and KWh should be substituted if energy savings need to be part of the metrics and should include peak demand savings on the hottest and coldest days. Also if a program is targeting a specific project (i.e. space and hot water heating) then only that should be measured, not the entire building electrical use.

Performance Metrics

Would distinct metrics and targets for different types of programs (e.g., heat pumps, envelope/shell, electric energy efficiency, gas energy efficiency, etc.) be more appropriate than a single metric and goal? If so, what level of granularity would be optimal?

Response # 1: Total home energy consumption. Total home GHG emissions, including embodied carbon.

Response # 2: Absolutely. Each specialty should have its own metrics and own communications. For instance, GSHP should have their own metrics and communications that are separate from ASHP.

Response # 3: Yes. And heat pump efficiency should be expressed in terms of kWh-equivalents of heat rather than COP/EER for geothermal heat pumps and HSPF/SEER.

Response # 4: Yes, each type of program should have its own metric and targets. We need to be able to distinguish the prioritization of each as we pursue the CLCPA goal of green house gas emissions reduction.

Shareholder Rewards

Under what circumstances, if any, should utility shareholders be financially rewarded for meeting energy efficiency and building electrification targets that are necessary to achieve the GHG emissions reductions mandated by the CLCPA? Should the Commission consider adopting a negative shareholder revenue adjustment if energy efficiency and building electrification targets are not achieved?

Response # 1: Energy cooperative opportunities are needed to replace for-profit utilities.

Response # 2: The Commission recommended banning new gas lines and fossil fuels by 2025; this will be very disruptive to the business models of most utilities. They should

be allowed to make money by installing geothermal district loops and other cleaner alternatives.

Response # 3: Rather than rewarding shareholders when the utility meets the targets, they should get lower dividends (punished) when they are not met. Executives and management staff should be rewarded for meeting targets, since they are responsible for doing so. If dividends are lower, shareholders will be motivated to get rid of those decision makers in the utility who cannot meet the targets.

Response # 4: Shareholders should NOT be rewarded for meeting efficiency and electrification targets mandated by the CLCPA. Laws change the way many other enterprises have to conduct business without providing a soft landing for shareholders; utilities should be no different. Yes a negative revenue adjustment should be considered. Emissions reductions are so important and because customers have no alternative providers, a penalty needs to be in place.

Response # 5: Yes - additional incentives for reaching goals - negative impacts for not.

Utility Strengths

Do the various programs administered by the electric utilities recognize and take advantage of the unique strengths of the electric utilities? If not, in what areas could improvements be made?

Response # 1: Energy cooperative opportunities are needed to replace for-profit utilities.

Response # 2: Not at all. The rules change every 6 months, communication is cryptic and untargeted, and everyday the number of rules that separate the customer from their rebate gets longer. What could make it better: simplify everything. Get the entire application down to 1 page, keep the rules and rebate amount consistent and at the end of the day, give the customer their rebate. If I have an issue with natural gas at my house (non-emergency), my utility can be there within 24h to solve the issue and get things going again. That is very different from the way the rebate program is run. There is nothing worse as a contractor than worrying that your customer won't get their rebate because some box wasn't checked or the rebate amount changed, and knowing that you will be getting the blame and dealing with the angry customer at the end. Some utilities are better than others but all still have too much paperwork.

Response # 3: Public utilities have large financial reserves, market power to negotiate discounts, existing communication/marketing systems to customers, skilled employees who could apply their skills/training to electrification efforts, administrative expertise, access to capital via stock sales and extensive contractor networks. Utilities also have vast amounts of data regarding usage patterns, types of buildings/architecture, construction and design information which could be utilized to identify buildings/areas

needing the most help to electrify, buildings or geographic areas that would have the highest probability/most ease of electrifying etc. Relationships with customers, and efficient billing/communication infrastructure could allow for on-bill payback mechanisms which, if accessible to 3rd party lenders, could allow low cost financing by saving administrative costs. Improvements could also be made by using the communication/marketing systems to continuously educate customers about electrification, applying staff skills to the creation of electrification (i.e. thermal networks) and training contractors regarding electrification. It seems that only the buying power is being maximized with the offering of appliance rebates, reduced prices/discounts for customers.

Response # 4: Simplify the process. Expand the direct marketing to customers.

Rebates for Recycling of Equipment and Incentives for the Purchase of New Appliances/Equipment

Should Program Administrators continue to provide rebates and claim savings for the recycling of appliances such as refrigerators, freezers, and room air conditioners? If not, how should these programs be phased out? If so, are there certain criteria that should be imposed for the continued operation of these programs? Is there a benefit to streamlining and consolidating utility programs that provide incentives for the same measures across multiple market segments?

Response # 1: Removal for recycling of appliances is imperative and should be provided by the company replacing the appliance. In the case of an ASHP system replacing air conditioners that would be the ASHP installer. That company should be reimbursed by NYS taxes.

Response # 2: A deposit program should be set up, like soda cans.

Response # 3: Yes.

Response # 4: Yes rebate programs should continue to be offered to ensure proper disposal/recycling of materials and as an incentive for more efficient replacements. Consistency across all utilities regarding the program descriptions/rules/execution would be positive but allowing for regional differences in rebate amounts. Rebates for new equipment should not include any fossil fuel equipment where there is an electrification alternative. Incentives and/or financing options should be flexible enough that a fossil fuel replacement would not be considered. This system of programs should be as simple as possible.

Incentives For Major Appliances

Should incentives be provided for the purchase and replacement of new major appliances? If not, how should these appliance incentives be phased out? If so, are there certain criteria that should be imposed for the continuation of such program incentives? Should the program approach be revisited in conjunction with the review of online marketplaces?

Response # 1: Incentives should be provided for high efficiency electric appliances to match the fossil fuel appliances they are replacing.

Response # 2: In many cases, such as gas stoves or dryers, adding a heavy gauge wire where the gas line used to be may not be an easy task. But a prescriptive rebate or direct rebate will be the easiest way to get the rebate to the customer, that should be the path forward. Adding strings makes it harder and less likely that anyone will want to switch.

Response # 3: Purchase, replacement and recycling of major appliances. Higher efficiency appliances should get bigger incentives on a sliding scale.

Response # 4: Online marketplaces seem to be a good way of implementing new appliance purchases and would be better leveraging the economic power of all utilities jointly. (regional differences in purchase prices should be allowed). Such incentives for replacements should be made only when an efficient electric appliance is chosen, not one involving the burning of fossil fuel. Fossil fuel burning appliance incentives should be eliminated immediately. If affordability for an electric replacement is an issue, financial help should be provided in direct rebates, low(no) interest loans and other incentives available. An important key is to keep these programs simple and streamlined.

Response # 5: Yes - Program Administrators should continue to provide rebates and claim savings for the customer.

Phasing Out Gas fired Space and Hot Water Heating

Under what timeframe should the Commission require a phasing out of incentives supporting gas-fired space heating and domestic hot water heating equipment? Should different considerations be made for programs targeting LMI households or Disadvantaged Communities, or for different sectors (e.g., small residential, large multifamily residential, commercial, institutional, or industrial)?

Response # 1: Incentives for fossil gas equipment should have ended decades ago.

Response # 2: 2030 would be the best year, but let's keep in mind that the program is not working for anyone right now. Cut the program requirements in half and the cost may come down enough that LMI households can afford it.

Response # 3: Phasing out of incentives supporting gas-fired space heating and domestic hot water heating equipment should happen ASAP. Disadvantaged and LMI households should receive greater incentives to offset the costs of replacement.

Response # 4: Gas fired space and domestic water heating equipment incentives should be eliminated as soon as possible in all target areas. Incentives for LMI/DAC communities should be adjusted to make electrification available and could include low/no interest on-bill financing and use of utility staff to install equipment where unavailable through other means. Industrial and manufacturing facilities should be looked at separately and where no electrification alternative exists, equipment should be required to be the highest efficiency possible. Income eligibility should be reviewed for each transaction but the system must be simple and swift to execute.

Response # 5: The Commission should require an immediate phasing out of incentives supporting gas-fired space heating and domestic hot water heating equipment. Additional incentives should be provided for LMI households and Disadvantaged Communities. Incentives should be the same for all sectors.

Response # 6: Incentives for gas furnaces should be phased out immediately. To meet the building decarbonization requirements of the CLCPA, the Climate Action Council Scoping Plan estimated that New York will need to install 1.5 to 1.8 million heat pumps by 2030. This will require an average of 144,000 air source heat pump installations each year through 2030, compared to the approximately 15,700 air source heat pumps installed under the Clean Heat program in 2021—an increase by a factor of nine. Geothermal heat pump installations will need to scale even further, as the CLCPA would require more than 40,000 geothermal heat pump installations annually on average, compared to just 331 in 2021—an increase by a factor of more than 100. Given the tremendous growth in heat pump installations required, New York needs to transition as fast as possible to meet the CLCPA goals, and any incentives towards fossil fuel equipment threaten to further jeopardize New York's goals. The DPS Staff Report highlights that the current incentives have “a high prevalence of free ridership...[and] it is not clear that incentives provided through the programs for higher efficiency gas-fired equipment are driving any significant portion of the market toward higher efficiency equipment.” Given the low return on investment for gas equipment incentives and high potential for negatively impacting strategic electrification efforts, the Commission should phase out incentives for gas-fired equipment immediately.

Innovative Types of Behavioral Programs

Ultimately, achievement of New York's climate objectives will necessitate a wholesale shift in how consumers use energy. How can utilities deploy more innovative types of behavioral programs to provide greater benefit, for example full integration with various rate designs, or other demand management programs? How can these programs be expanded beyond the residential sector?

Response # 1: Simplify. Simplify. Simplify. Make behavioral results clear. Pull revenue from gas to incentivize high-efficiency electric systems.

Response # 2: Ambient temperature district loops for GSHP would be the best option. Utilities are really good at connecting homes to underground pipe, so this should be NY's principle approach in any urban or suburban environment. In addition, homeowners should be able to choose what type of system works best for inside their home. Don't allow district loop designers to decide how to heat a home- one size fits all will not work well.

Response # 3: First and foremost, the heating paradigm must change. People must understand that burning fuels is a poor way to generate heat and that heat pumps are the better choice by heating without fire. Comparing a heat pump to a refrigerator may help because everyone recognizes a refrigerator keeps food cold. They don't know why it works--and don't care!--but they know it does. The next step is to have them recognize that there is heat leaving the fridge and that in a whole house heat pump the house can be cooled the same way. When the process is reversed, heat can be pulled from the ground or the air to heat the house. Until heating without fire is entrenched in the public's mind, there will be resistance to believing in and switching to heat pumps. The Con Ed new residential SC-1 rate IV is a demand-based rate that deals directly with capacity issues--a critical factor in the grid build out. Time of use rates are a bridge to the SC-1 rate IV, but will not work well once heat pumps are fully utilized since the peak will swing to the winter at night and TOU rates will work against reducing capacity .

Response # 4: Energy audits seem to be a good start, with an initial behavior change but don't have a lasting effect. Electric rates will have an ongoing behavioral change, but must be equitable and cost based. AND as simple as possible. Recognizing rates can be confusing to even a knowledgeable building owner, and that trial and error may be the best teaching tool, a guaranteed rate program should be standard, allowing a customer to experiment without financial risk and switch back if their old rate was better. In addition, rates will need to incorporate possible different behaviors depending upon whether customers have heat pumps, solar panels and electric vehicles

Response # 5: Utilities should deploy more innovative types of behavioral programs to provide greater benefits via rate designs and other demand management programs

Response # 6: Opportunity to discuss rate design here; one possible example is the PSEG LI example of automatically enrolling customers in the heating rate.

Incentives to Mitigate Barriers to Deployment of Building Shell Measures

How can program incentives be structured to mitigate barriers associated with the deployment of building shell measures? What beyond program incentives can be done to support the shift to these types of measures?

Response # 1: Train/support whole home/building analyzers/team leaders who hire parties to follow this sequence: 1) remove pollutants, 2) perform basic energy audit, 3) seal and insulate, 4) perform blower door analysis, 5) perform Manual J, 6) upgrade electric panel if necessary, 7) install ASHP or GSHP heat pump system, 8) install solar panels if conditions are suitable. One composite price (reduced if done as a package), on-bill financing.

Response # 2: Give instant rebates or 1 page, prescriptive rebates for the work. Any homeowner can blow in cellulose insulation or spray foam rim joists. Make it easy and provide a generous incentive and the program will take off. Right now, there are FAR too many barriers to get incentives for building envelopes. First they need an audit, then they wait for a report, then they apply to some program, etc etc. I cannot say it enough; Make It Easy and Simple!

Response # 3: Incentives must cover pre-electrification issues in homes and buildings: sick house/office syndrome, mold issues, gas leaks, carbon monoxide build up, asbestos and lead all prevent a house energy audit from happening because the blower door test will spread these poisons all over the house and endanger occupants. In addition, if no home energy audit is done, sealing up the building will keep more of these poisons in the house and endanger occupants. The number of home energy audits canceled due to these conditions is surprisingly high. It is the leakiness of the house that makes them livable. Also, many buildings have insufficient service (150 amps or less) to be able to run a heat pump and/or solar panels. The electrical system needs to be checked out first, then a higher amperage line brought in before the building is heat-pump-ready.

Response # 4: A balance needs to be found between building envelope improvements and electrification appliances. But the CLCPA goal of ghg reductions must be kept as a priority. Oversizing a heat pump system could be wasteful and may negatively impact peak electric needs. Unnecessary building improvements could also be wasteful. The most energy efficient/effective and cost efficient building measures need to be identified and incentivized so that there aren't excessive building improvements that have little impact on peak demand. Low/no cost financing could be a big help. Building performance trade professionals may be beneficial. Electrification should be the first

priority, then building performance. Building codes for new buildings and retrofits must specify the proper balance.

Response # 5: Simplify the programs to overcome barriers associated with the deployment of building shell measures. Upgrade the building codes to mandate the shift to these types of measures for all new construction and major renovations.

Phase out of High Efficiency Gas Stoves Incentivised by Ratepayer Funds

Given the advancements in efficiency and options for commercial cooking equipment, how quickly should ratepayer-funded incentives for high efficiency gas commercial cooking equipment be phased out? During the transition period, should any criteria be imposed for the continuation of such program incentives?

Response # 1: No gas cooking equipment should be subsidized by any source. Stop 1) sending mixed messages to the public and 2) exacerbating climate chaos.

Response # 2: Immediately

Response # 3: Once chefs cook on induction stoves and see how much cooler the kitchen is, induction stoves will become the choice. Homes will follow. Again, it goes back to the heating paradigm. In this case, electromagnetism heating the pan, not burning gas. When people think about cooking with electric they think about red hot coils--just like they think of heating with electric. Heating with electromagnetism is another paradigm shift and people must be educated about it.

Response # 4: Induction cooking equipment should be the only rate-payer funded program for commercial cooking. Less emissions, better health for workers, fewer hazards and not increasing the demand for fossil fuels are compelling reasons. The phase out should be as soon as possible.

Response # 5: Immediately eliminate ratepayer-funded incentives for high efficiency gas commercial cooking equipment. Incentivize shifts to induction stovetops & high-efficiency electric ovens.

Budgets for Heat Pump Technology Type

Given the current imbalance of program activity between Air Source Heat Pumps (ASHP) and Ground Source Heat Pumps (GSHP), should the Commission dictate budgets for each heat pump technology type?

Response # 1: No. A composite retrofit package should be offered to customers, the cost being determined by what is best for each house/building.

Response # 2: Yes, because the Commission is also responsible for ensuring that NY has enough power on a peak day. Earlier this year, there was a day that was -15F, there are very few ASHPs that can operate at that temperature and using backup heat will cause a significant peak load spike. For this and other good reasons, the Commission should allocate a budget for each technology and favor efficient GSHPs and ambient temperature ground loops.

Response # 3: Yes, because the upfront costs of an air source heat pump is lower, it skews the purchase that way. People shy away from geothermal heat pumps due to the higher upfront cost. They don't care that the operating costs are lower than air source. They just see the price tag. The cost of ground loop of the geothermal system should be recompensed to even the playing field. Geothermal systems use less electricity on cold winter nights and thus lower the future winter peak.

Response # 4: Increasing the length of a GSHP loop field and incentivizing the loop field alone reduces winter peak load, minimizes the expansion of the electric grid, encourages adoption of GSHP systems over less efficient ASHP systems, eliminates or reduces the use of auxiliary heat, maximizes NYS's overall heating co-efficiency of performance, reduces NYS's greenhouse gas emissions and can better meet homeowner/building owner expectations for comfort on very cold days. I again caution that air-sealing and insulation are important for cost, comfort, and satisfaction with all heat pump systems and should be required prior to heat pump sizing and installation.

Response # 5: The incentives for ASHPs and GSHPs should be changed from their current form. The incentives should be shifted away from "type" of heat pump per se, and shifted towards the ground loop itself. A token incentive for the heat pump (whether ASHP or GSHP) can be retained, perhaps \$200 per ton, as an example, but the real meat of the incentives, on the order of \$1000+ per ton, should be applied only for the ground loop, which will achieve similar results of dictating percentages of budget, but in a more 'naturally' incentivizing way for the consumer, without the state appearing to be biased. The heat pump units themselves will be treated equally, but the part that drives the efficiency (and lowers the demand on the grid), the ground loop, which is also the main part of installation that raises the cost of a GSHP higher than an ASHP, will then be much more affordable, and will shift consumers towards GSHPs and away from ASHPs in a more precise and 'natural' way.

Response # 6: Yes there should be separate budgets for each technology type with ground source and air source budgets being equal if not more for ground source heat pumps. ASHP incentives should be completely phased out over the next 3 to 5 years as recognition of GSHP's peak and grid benefits become more known. Combining ground source and air source heat pumps into the same analysis skews the impact each type contributes to peak day energy savings as well as green house gas reductions. Consideration should be given to eliminating/reducing/providing only a token incentive

for the actual heat pump units and focusing the incentives on bore hole and ductwork installation. Boreholes and ductwork are the 2 biggest barriers to installing the most efficient systems. Standards should be developed to determine the necessary performance of boreholes and ductwork in order to receive any incentive. Also the true difference between gshp's and ashp's cannot be measured by annual MMBTU measurements. KWh would be a better metric.

Response # 7: Ground Source Heat Pumps (GSHP) should be highly incentivized. ASHPs should have smaller incentives.

Response # 8: There should be a dedicated budget and savings targets for geothermal heat pumps in the Clean Heat program to properly account for the electric grid benefits and long-term operational savings of geothermal systems. The CAC Scoping Plan modeled residential geothermal heat pump installations rising to 22-23% of all heat pump installations by 2035 and continuing at that pace through 2050, and the Clean Heat program should establish heat pump budgets to support the growth required by the CAC modeling. This level of geothermal heat pump adoption helps to meet statewide emissions targets and maximize overall system benefits by reducing maximum grid demand and providing long-term operational cost savings. The DPS Staff Report highlights that geothermal systems currently account for only 3% of plan savings; to help spur market growth to meet CLCPA targets, the Commission should set an interim Clean Heat program budget allocation of 10% for geothermal systems in 2024, rising to 20% in 2025 and 25% for 2026 and beyond.

Building Shell Prerequisites

Given the implications of a future winter-peaking electric system, should minimum levels of building envelope/shell conditions be a prerequisite for the receipt of heat pump incentives? If so, how could this practically be implemented?

Response # 1: Train/support whole home/building analyzers/team leaders who hire parties to follow this sequence: 1) remove pollutants, 2) perform basic energy audit, 3) seal and insulate, 4) perform blower door analysis, 5) perform Manual J, 6) upgrade electric panel if necessary, 7) install ASHP or GSHP heat pump system, 8) install solar panels if conditions are suitable. One composite price (reduced if done as a package), on-bill financing.

Response #2: No, but there should be greater incentives to do both so as not to reduce the likelihood of installing a heat pump because all the owner's money and incentives have gone into the shell. It must be additive and doing both should be made more advantageous than doing them separately. I have seen homes where adding \$10K of sealing and insulation will drop the heating load by a ton; this can lower the cost of a

geo heat pump by about \$10K, but it still doesn't put a heat pump into the price range that makes it affordable.

Response # 3: Yes, but only: uninsulated walls or attics, and single pane windows, should be required to be upgraded to receive incentives, if such insulation can be applied without requiring removal of drywall (blow in insulation in walls can be installed without major drywall removal, for example), and completed in a minimum (75%? 90%) of wall area. These requirements should be with only rare exceptions - for example, historic buildings that cannot be upgraded by law. The costs of these insulation and window upgrades should themselves be partially incentivized, perhaps 50% or more of the cost.

Response #4: Yes minimum levels of building envelope/shell should be a prerequisite, but keeping the goal of ghg reductions as a priority. An analysis of building envelope options that provide the most benefit for dollars invested should be done to determine appropriate levels.

The only thermal barrier requirements should be via code for new construction & renovations via the building codes. Additional incentives should be provided for exceeding code.

Response # 5: The Clean Heat program should ensure that homeowners who electrify heating for only a portion of their home remain eligible for incentives as long as the heat pump provides 100% of the required heating load for the covered area. With millions of households in New York, there are countless variations on home designs which can occasionally pose challenges for full electrification of heating for certain areas of the home (e.g. lack of ductwork, multiple existing heating systems, inaccessible areas of the home, etc.); retaining flexibility for homeowners is important to ensure that all households are able to take advantage of the Clean Heat program. Programs such as the Massachusetts MassSave program provide an enhanced incentive for whole-home electrification, while still preserving a significant \$2,000 per ton rebate for partial-home geothermal heat pump installations. To further incentivize decommissioning of existing systems, the Clean Heat program should also include cost reimbursement for removal of legacy fossil fuel systems. Removal of oil tanks and other equipment can often cost hundreds of dollars on top of heat pump installation costs, leading some homeowners to elect to retain their fossil fuel system as a backup simply to avoid removal costs. Including incentives in the Clean Heat program for fossil fuel system removal will further encourage full electrification of heating without retaining fossil backup systems.

Workforce Training and Scaling

It is generally recognized that the workforce necessary to scale building electrification to meet the CLCPA goals needs to be further developed and significantly expanded. What critical building electrification workforce training

and development needs are not currently being met, that should be further supported through ratepayer-funded programs?

Response # 1: All skills are needed in every one of these areas, including home analyzer/team leaders who manage the process/sequence I described above. Partially ratepayer funded, mostly carbon fee funded.

Response # 2: Need to teach the workforce in the way that they learn. Many employees at HVAC companies learn better through hands-on experience. Requiring contractors to spend a week studying a book is a sure way to deter contractor participation. Requiring contractors to do hours of paperwork following rules that are constantly changing to avoid getting blamed by the homeowner for not getting their incentive is very counterproductive. The internship and apprenticeship programs from NYSERDA are good, but again, there are too many rules and many contractors cannot qualify. For instance, there are tons of contractors that have only 1 or 2 employees, but the rules say that you must have 2 full time, salaried employees. There is no reason for this extra requirement. Make it easy!

Response # 3: In order to install GSHPs, much more drilling capacity is needed! An order of magnitude more, to allow costs to remain reasonable. The state should promote the training of drill-rig operators or we will *not* be able to get enough GSHP capacity installed to meet climate goals or fast grid electrification.

Response # 4: For ground source heat pumps the borehole drilling and system design workforce needs to be developed and expanded.

Response # 5: Need more entry level training for new HVAC workers, and re-training incentives for existing HVAC workers.

Response # 6: The Climate Action Council Scoping Plan projects that building decarbonization will create over 60,000 jobs in the residential HVAC subsector and recommends investing in a variety of training and resources for the building electrification workforce, including “partnering with industry to increase the number of qualified geothermal drillers.” Hiring enough qualified, experienced personnel to complete ground source heat pump installations represents one of the most significant barriers to growth for Dandelion. Dandelion has spent significant effort recruiting licensed drillers, HVAC installers, and electricians, for example, but there simply aren’t enough licensed professionals to meet customer demand. Expanded workforce development efforts to leverage federal, state, community, and industry training will be critical to growing the necessary workforce.

LMI Portfolio Programmatic Gaps

Are there programmatic gaps in the LMI Portfolio as is currently being administered? If so, what services or market segments are not adequately addressed?

Response # 1: Community Choice Aggregations shift people of all income levels to renewable ESCO products who may not want to make this shift, while LMI populations without CCAs are stuck with fossil-nuclear default utility plans. CCAs create high demand for current renewable capacity, increasing pricing for LMI communities and everyone not fortunate to live in more savvy areas with CCAs.

Response # 2: LMI needs easy access to low interest loans.

Response # 3: Incentives must cover pre-electrification issues in homes and buildings: sick house/office syndrome, mold issues, gas leaks, carbon monoxide build up, asbestos and lead all prevent a house energy audit from happening because the blower door test will spread this poisons all over the house and endanger occupants. In addition, if no home energy audit is done, sealing up the building will keep more of these poisons in the house and endanger occupants. The number of home energy audits canceled due to these conditions is surprisingly high. It is the leakiness of the house that makes them livable. Also, many buildings have insufficient service (150 amps or less) to be able to run a heat pump and/or solar panels. The electrical system needs to be checked out first, then a higher amperage line brought in before the building is heat-pump-ready.

Response # 4: More incentives for low/mod housing authorities.

Non-LMI Programs Benefiting Disadvantaged Communities

It is expected that benefits to Disadvantaged Communities will result both from LMI programs as well as non-LMI programs administered by the Utilities and NYSEERDA. Specifically, how can non-LMI energy efficiency and building electrification programs be altered in design, outreach, and implementation to increase benefits to Disadvantaged Communities? What other modifications should be made beyond potential increases in incentive levels?

Response # 1: Simplify programs. Complexity serves no one well. Every day best prices for all. Encourage/support microgrids. Create energy where we live so each community is invested in the total picture - pros/cons of its energy use....instead of LMI communities taking the hit and high-income neighborhoods reaping the benefits.

Response # 2: Many LMI and people who live in DCs are renters. They are not responsible for the condition or upgrading of their homes. Programs must incentivize landlords to upgrade their properties without raising rents. This is very tricky and probably the best people to ask how to do this are the landlords themselves. There is

some housing that is so substandard it might be better to pull it down and build anew. The costs might almost be equal to or lower than rehabilitating the building. Again, the landlords will know best, unless they are slumlords.

Response # 3: Low/no interest financing programs would help both LMI and non LMI communities.

Response # 4: Just increase the incentive levels

Gas Utilities Administering Building Electrification Programs

To date, programs providing support for building electrification have been predominantly funded by electric ratepayers and administered by electric utilities. Should gas utilities administer building electrification programs and if so, how should this be coordinated with electric utilities?

Response # 1: Require utilities to become coop models, serving the common good instead of serving shareholders.

Response # 2: Find a program administrator who has contractor experience.

Response # 3: Gas utilities do not want to be involved in electrification unless they are also an electric utility (like Con Ed).

Response # 4: Gas utilities and gas customers should contribute to building electrification programs due to the high societal benefits of building electrification. Rather than requiring gas utilities to establish parallel Clean Heat programs, the Commission should consider procedures to require gas utilities to contribute program funding to the Clean Heat electric utilities in support of building electrification. This would be especially impactful in the gas-constrained and gas-moratorium areas, as building electrification can help reduce gas demand in these supply-constrained areas, improving overall quality of service for gas ratepayers.

Overlap Between Electric and Gas Targeting the Same Building stock or Customers

Building envelope and shell measures are likely to become a larger component of energy efficiency and building electrification programs than in the past. What approach will work best in the marketplace, given the overlap between electric and gas service territories and the inherent complexities of programs co-existing with other programs targeting the same building stock or customers?

Response # 1: Train/support whole home/building analyzers/team leaders who hire parties to follow this sequence: 1) remove pollutants, 2) perform basic energy audit, 3) seal and insulate,

4) perform blower door analysis, 5) perform Manual J, 6) upgrade electric panel if necessary, 7) install ASHP or GSHP heat pump system, 8) install solar panels if conditions are suitable. One composite price (reduced if done as a package), on-bill financing.

Response # 2: Building envelope improvements for uninsulated envelope areas or single pane windows should always be incentivized. Large CO2 reductions will be achieved even in buildings using gas or oil if they go from uninsulated to insulated (or single to double pane windows), and future heat pump installation is less expensive and more feasible for insulated homes, which increases the likelihood of homeowner conversion.

Response # 3: Standardize the programs & application processes across all utility territories.

Economies of Scale/Pilot LMI marketplace

Are there economies of scale and therefore overall reduced costs to ratepayers for a statewide online marketplace, such as NYSERDA's statewide pilot LMI marketplace, that should be explored in lieu of the continued practice of each utility either contracting out or providing this platform in-house?

Response # 1: Online marketplaces work for simple purchases where customers are familiar with the product and can provide economies of scale. More complicated purchases require more education, references, expert advice etc. to provide a comfort level. Regional hubs and existing Heat Smart programs should be leveraged to provide the comfort level the purchaser needs. The "marketplace" could be funded by the utilities on a statewide basis to achieve scale, but rely on Heat Smart for customer education/guidance.

Response # 2: Yes

Partially Electrified Uses of Ratepayers Funds

Given the overall objective to electrify buildings' space and water heating uses, should ratepayer-funded programs continue to support projects that do not fully electrify these uses? If so, how can the program be structured to mitigate negative consequences such as heat pumps being installed only for cooling purposes, customers needing to maintain two systems, uncertainty with regard to resultant GHG emission reductions, etc.?

Response # 1: No. Ratepayer-funded programs should not support these projects.

Response # 2: Most of our customers (homeowners) want to keep their existing hot water boiler/furnace as a backup. This should be allowed, so long as there are some guidelines to limit fossil fuels as a backup. For instance, in our systems, the boiler cannot turn on unless the thermostat is more than 7 degrees behind the setpoint temperature. At this temperature, the heat pump would have to fail to turn the boiler on.

Response # 3: Have a program similar to the "cash for clunkers" program that requires heating equipment to be removed to get a full and substantial incentive. Offer a much smaller incentive for systems that can only keep a house warm in spring and fall. Fine contractors who install "Florida heat pumps" when people are looking to replace their system and are sold a product that cannot keep them sufficiently warm in winter.

Response # 4: No. Ratepayer funded programs should only support projects that fully electrify space and hot water heating. Stricter review for such negative consequences without making the approval process more complicated would be one answer. For customers who need to maintain 2 systems, low/no cost financing being available could help. Structure the incentives to be highest for all-electric with no back up, and phase out incentives for partial electrification over time.

Response # 5: The Clean Heat program should ensure that homeowners who electrify heating for only a portion of their home remain eligible for incentives as long as the heat pump provides 100% of the required heating load for the covered area. With millions of households in New York, there are countless variations on home designs which can occasionally pose challenges for full electrification of heating for certain areas of the home (e.g. lack of ductwork, multiple existing heating systems, inaccessible areas of the home, etc.); retaining flexibility for homeowners is important to ensure that all households are able to take advantage of the Clean Heat program. Programs such as the Massachusetts MassSave program provide an enhanced incentive for whole-home electrification, while still preserving a significant \$2,000 per ton rebate for partial-home geothermal heat pump installations.

To further incentivize decommissioning of existing systems, the Clean Heat program should also include cost reimbursement for removal of legacy fossil fuel systems. Removal of oil tanks and other equipment can often cost hundreds of dollars on top of heat pump installation costs, leading some homeowners to elect to retain their fossil fuel system as a backup simply to avoid removal costs. Including incentives in the Clean Heat program for fossil fuel system removal will further encourage full electrification of heating without retaining fossil backup systems.

Electrical panel Upgrades

Should ratepayer funds be used to incent electrical panel upgrades necessary for the installation and operation of heat pumps? If so, should this be restricted to LMI/DAC customers? How would it best be structured?

Response # 1: Yes, but at lower levels than LMI/DAC customers. Perhaps use a sliding scale incentive.

Response # 2: Yes, in the case that an existing electric panel is only 100 or 150 amps, there should be assistance with an upgrade towards 200 amps to allow the operation of a heat pump. Incentives for upgrades from 200 amps to a larger system would be rarer, and likely for homes already able to afford the upgrade.

Response # 3: Yes, if it is determined that electrical panel upgrades are necessary then all customers should be eligible for incentives. Without making the process overly complicated it could be based on an income level (or sliding scale) similar to the electrical appliance guidelines included in the IRA to allow for higher incentives for LMI/DAC customers. The minimum electrical panel upgrade should be 200 amps which would allow for full electrification including induction stoves, heat pump water heaters and clothes dryers etc. In addition to electrical panels there should be recognition/rules/reinforcement regarding the need for service line adequacy and upgrades if needed. A potential substitute/supplement for ratepayer funds would be to use other sources such as Regional Greenhouse gas Initiative (RGGI) and/or Infrastructure Reinvestment Act (IRA)funding.

Response # 4: Incentives only when showing load calcs that document the need for the additional upgrades - and make the application process simple and standard across the state."

Response # 5: The Clean Heat program should include incentives for electric panel/service upgrades or smart panels for all heat pump customers who require it. Electric panel and electric service requirements represent an important consideration for heat pump installations, and present a critical roadblock to heat pump installations for many homes, particularly for LMI households. Some customers may require full electric panel or electric service upgrades, while other customers may benefit from smart panels to better allocate and manage household demand, avoiding more expensive panel upgrades. Federal law recognizes the importance of electric service upgrades in encouraging heat pump installation, and includes electric panel work to support heat pump installation as eligible activities under both the section 25C and 25D energy tax credits. The Clean Heat program should similarly recognize the benefits of electric service upgrades by offering incentives to help defray the cost for smart panels or electric service upgrades for households in conjunction with heat pump installations.

Performance Targets for NYSERDA Market Development Activities

Given the nature of NYSERDA's market development activities, are there more appropriate performance targets, other than MWh and MMBtu savings, that should be imposed to track performance and the impacts of these investments?

Response # 1: Lifecycle greenhouse gas emissions reductions, including embodied carbon.

Response # 2: Greenhouse gas/CO2 equivalent emissions reductions is the metric that the CLCPA mandates. If a measure such as MMBTU's is needed, convert it to KWh's. (\$/CO2 equivalent reduced, \$/KWh). Also energy saved at peak demand times.

Response # 3: Demand reduction.

LMI Related Strengths of Utilities and NYSERDA

What are the unique strengths that the electric utilities, gas utilities, and NYSERDA possess as LMI program administrators? Do the various activities administered by the electric utilities, gas utilities and NYSERDA under the Statewide LMI portfolio recognize and take advantage of these unique strengths? If not, in what areas could improvements be made?

Response # 1: NYSERDA provides an important link to ensuring that New York LMI programs are effectively paired with federal rebate programs from the Inflation Reduction Act. The funding for the Home Electrification and Home Efficiency rebate programs will flow through state energy offices, making NYSERDA the critical link in accessing over \$317 million in federal funding for New York households. As significant portions of this funding will flow to LMI households, NYSERDA will play a critical role in aligning program applications and procedures to ensure that LMI households can seamlessly access both the New York and federal rebates

Response # 2: Use LMI organizations to market and administer the LMI programs

Miscellaneous Comments

Feel free to comment on any aspect of the [report](#) or questions in the report. Feel free to answer questions not asked above which are in the report. Give us your opinions, ideas, specific situations you think are relevant to improving the Clean Heat/Energy Efficiency programs.

Response # 1: There are really good people at ICF and NYSERDA, who enforce a large and ever changing set of rules. It's important for them to try to understand how contractors make their money by serving customers; not by filling out paperwork. Of the 10 documents that are required for a GSHP application, several should be considered for elimination; GSHP bore-well design, GSHP startup checklist and complete load calculation report (Manual J). These three documents are essential to a good geothermal system, I think we can all agree. However, most people who review these documents seem to be unfamiliar with them. They don't know if the ground conductivity is 1.2 or 1.4 or 1.6, they don't know if the walls are 2x4 or 2x6, they don't know what a reasonable delta T for the heat should be based upon the specific temperatures that a system is operating at. So why even require these? We use our own custom building model software, but then have to redo everything which takes time away from our main focus and creates extra administrative costs.

Response # 2: Simplicity for the customer and contractor, Greater customer education about the need for and benefit of electrification, low/no cost financing for projects, equipment, services funded by the utilities or NYSERDA in lieu of all other incentives would be less cumbersome and more streamlined than present programs.

Response # 3: Home Energy Reports should be reimagined as a customer engagement tool and marketing component of other programs and deployed to all utility customers "Lack of trust with the utilities.

New York Geothermal Energy Organization, Inc. (NY-GEO)

www.ny-geo.org • 518-3136-GEO • nygeoinfo@gmail.com

The New York Geothermal Energy Organization (NY-GEO) is a non-profit trade organization representing geothermal heat pump (GHP) installers, manufacturers, distributors, drillers, consultants and industry stakeholders from throughout New York State and beyond.