Background from the Registry Notice for this proceeding:

"The Public Service Commission (Commission) is considering a White Paper filed by Department of Public Service (Department) Staff on February 27, 2025, proposing a reasonableness standard needed to implement Section 11-104(7)(e) of the Energy Conservation Construction Code (Energy Code) as revised by the All-Electric Buildings Act (Part RR of Chapter 56 of the Laws of 2023). As revised by the All-Electric Buildings Act, the Energy Code will prohibit the installation of fossil-fuel equipment and buildings systems in certain newly constructed structures. These provisions will apply to new buildings seven stories or less, with the exception of commercial or industrial buildings in excess of one hundred thousand square feet in conditioned floor area, effective December 31, 2025, and will apply to all new buildings effective December 31, 2028. Energy Code Section 11-104(7)(e) provides an exemption to the prohibition on fossil-fuel equipment when "electric service cannot be reasonably provided by the grid" and grants the Public Service Commission the authority to "determine reasonableness for the purposes of this exemption."

The White Paper proposes that the Commission adopt a standard whereby a project will qualify for the exemption pursuant to Energy Code Section 11-104(7)(e) if construction of necessary electrical system upgrades necessary to serve an all-electric development would take 18 months longer than upgrades necessary to serve a building with both electric and fossil-fuel fired equipment. The White Paper also proposes that the Commission direct the State's regulated investor owned and municipal utilities (the Utilities) to prepare filings, including draft tariff language, to evaluate how, upon presentation of a request for service, the utility will provide these estimates of how long it would take to construct any necessary electrical system upgrades.

Further, the White Paper suggests that the Commission should require the Utilities to submit filings detailing how geographic areas where exemptions, pursuant to Energy Code Section 11-104(7)(e), would be evaluated for inclusion in other planning processes and to provide annual reporting on implementation of this standard."

Introduction

NY-GEO commends DPS Staff for the effort and thought put into this White Paper and for the degree to which it follows through on state policy and conforms with data that has been produced in processes guided by the Commission. The White Paper agrees with data from the NY Climate Action Council, stating "The buildings sector is the largest source of greenhouse gases in New York State." (p3). The White Paper references the Scoping Plan produced by the Climate Action Council pursuant to New York's Climate Leadership and Community Protection Act: "The Scoping Plan envisioned that in order to support the level of adoption of non-fossil fueled systems necessary to achieve the goals of the CLCPA, State codes would have to be updated to, among other things, 'require new construction to be highly efficient, zero-emission, and resilient to the effects of climate change.' The Scoping Plan specifically identified the importance of adopting these code changes in the context of new construction in order to eliminate the installation of fossil-fuel equipment in new construction."(p3) The White Paper recognizes "the State's goal of building electrification" (p4) and notes the efforts of the Commission to promote energy efficiency and building electrification through various initiatives and programs including the Clean Heat Program and the Utility Thermal Energy Network Pilot Programs.

Congruent with these factors, the White Paper states "…the Commission should interpret Subdivision7(e) narrowly. This narrow interpretation is supported by the plain text of Subdivision 7(e), which the Commission is required to implement. This narrow reading is also supported by the statutory principle that an exception to a general rule is intended to be read narrowly so as to avoid frustrating the intent of the original rule." (p7)

Interests -
In evaluating the terms of a capacity exemption, it is important to understand the interests of the involved parties. The two primary parties in this instance are the building developer and the electric utility.

A) Developers:

We project some building developers will be in favor of electrification of their project(s) for the following reasons, among others:

- It shows market leadership in relation to NY's climate goals, and can build goodwill and trust
- It protects their customers from having to change their HVAC systems relative to climate goals and from projected policies such as Cap & Invest that may result in higher fossil fuel prices and lower electricity costs.
- It can be less expensive to build all-electric depending on the current and future status of tax credits, rebates and the potential repeal of polices like the 100-foot rule that provides free gas infrastructure.

At the same time there will be developers who would prefer to build with fossil fuels and who will seek an exemption from electrification for reasons such as:

- It's the way they are used to building under longstanding state policies, and change can be difficult and can appear to be more expensive
- The fear of heat pump technology has been stoked by the interests that have been railing against New York's climate initiatives
- The true climate, health, safety and environmental costs of burning fossil fuels are not reflected in the prices consumers pay, leaving gas, in particular, relatively inexpensive per unit of energy compared to electricity in spite of the costs gas imposes on society. The efficiency of heat pumps, particularly geothermal heat pumps, can bridge that gap, but developers, and some of their customers, may feel they can play it safer with gas heating.

B.) Utilities

New York's utilities have a decidedly mixed record on New York's electrification efforts, ranging from stellar initiatives, to willing compliance with regulations, to foot dragging, to outright opposition. Utilities make their revenue on the building of infrastructure, so for an electric-only utility, electrification may equate with self-interest, all other factors being equal. In contrast, for the large swaths of NY State that are covered by a combined gas and electric utility, installing both a gas and electric hookup may be more profitable than an electric-only hookup because profits regulated by the Commission are designed to be a percentage of the amount the utility has invested in wires, pipes and other infrastructure.

It is important to recognize the interests cited above in designing a capacity exemption that is both "reasonable" per the language in 7E and effective in the real world as NY depends on all-electric building practices to help meet its climate goals.

Exemption Recommendations:

In the opinion of NY-GEO, the major flaw in the White Paper is its lack of recognition of differences in the nature of projects being considered for exemption. This is particularly concerning because, at its essence, the issue that triggers the need for an exemption is one of grid capacity, and grid capacity is one of the main questions casting shade on New York's electrification initiatives as they are unfurled. Different all-electric project designs can have significantly different impacts on the amount of grid capacity and electric service upgrades they require.

NY-GEO has been strongly focused in recent years on helping regulators and the public understand the unique role that geothermal heat pumps can play in implementing electrification in a way stays within the capacity of the grid to remain reliable and resilient.[i]

Geothermal, or "Ground Source" heat pump systems maintain their efficiency on the coldest and hottest days of the year, and thus they minimize the contribution of heating and cooling to peak building electric load. In order to minimize the expense of system-wide grid infrastructure upgrades and generation buildout resulting from building

decarbonization, installation of HVAC systems that use a steady, reliable, renewable heat source - such as a ground loop, a thermal energy network, or waste heat - should be prioritized and maximized. These heat sources are ones that NY-GEO has been championing under the geothermal label.

In contrast, air source heat pump systems are dependent on outside air for their heat source or sink and when that air becomes very hot or very cold their efficiency shrinks significantly. Compared with a typical ground source system, the peak demand of an air source system is often three times larger.

Of course, infrastructure needs aren't determined by peak demand in a one-to-one fashion. If a 50 kW peak demand causes the need for $500 in additional electric distribution infrastructure, it doesn't mean that a 55 kW peak demand will cause a $550 additional need. There are often step increases involved, for example when a series of 30, 40 and 50 amp appliances are added to a single-family residential load at some point a 200 amp electric panel may be required instead of a 100 or a 150 amp panel.

The change from the smaller to higher load panel may or may not require a heavier gauge wire to connect the meter to the power pole, and therefore may or may not trigger an infrastructure expense or a delay when more infrastructure is required to be installed.

However, even though the need for distribution infrastructure comes in steps instead of a smooth curve, that need is almost always caused by a project's peak demand, and the best way to eliminate the expense or time required to install infrastructure is to reduce projected peak demand. In other words, appliances that perform well at peak conditions will tend to require less investment in electrical utility infrastructure.

Because their interests cited in the section above can cause either a utility or developer to be biased in favor of seeking a capacity exemption for a given project, it will be important to build in protections from the exemption being gamed through a developer offering, or a utility requiring, systems that perform inefficiently at peak.

There are many ways to design a project and there are many ways to influence the electrical infrastructure requirements of a project. Infrastructure needs are largely determined by the peak power demand a project is protected to cause. If a developer wants an exemption to use gas on a project under the 18-month criterion recommended in the White Paper, and doesn't intend to build an efficient all-electric project, she or he increases the chance of attaining the exemption by submitting a project that is most likely to maximize the peak demand of the project.

NY-GEO proposes two additions to the exemption requirement that will tend to weed out gaming of the capacity exemption.

1) Set the Eligibility Floor at Geothermal

The first is to not allow a capacity exemption when a request for service based on a geothermal HVAC design stays within the designated time limit relative to a fossil fuel heated version of the project (18 months per the White Paper or 24 months per our recommendation). A geothermal design would be defined as one using a consistent source of thermal energy from a ground or water geoexchange loop, a thermal energy network, or a waste heat source.

Using this standard, if a request for service is submitted to a utility using an air source HVAC design which exceeds the designated time limit, the utility would not be obligated to provide the service upgrade necessary to support that design.

However, in order for a capacity exemption to be granted to allow both electric and fossil-fueled equipment, the project would need to exceed the designated time limit with a geothermal design. To receive a capacity exemption, the developer would need to generate and submit a second design with a geothermal HVAC system. If that peak load would require electric system upgrades in excess of the designated time limit, the utility could grant the capacity exemption. If not, the developer could proceed to build if they use a geothermal design.

If a dollar limit is the direction ultimately chosen by the Commission as opposed to the time limit, the same type of requirement could be applied relative to the dollar limit.

2) Prohibit Auxiliary Heat Sources from Exemption Eligibility

The second addition we propose is to prohibit heating systems designed with auxiliary electric resistance heat from eligibility for a capacity exemption. Auxiliary heat here is defined as electric resistance heat that is designed in the heating system to supplement heat pump heat when temperatures go beneath a given range.

When auxiliary heat turns on, its efficiency is a maximum of only 100%, placing stress on grid resources. If a developer is motivated to build with fossil fuels, submitting a design that maximizes auxiliary heat could force the utility's hand to provide a capacity exemption.

It is possible for heat pump systems, particularly geothermal systems, to keep homes comfortable in the full range of temperatures experienced in NY State without the use of auxiliary heat. As per the proposed addition above, if the submitted design without auxiliary heat stays within the designated time or dollar limit, the project would not be eligible for the capacity exemption.

3) Factor Cooling Load Appropriately

The All-Electric Building Act is primarily seen as a measure that requires the use of electric appliances where fossil fuel appliances are currently the norm in New York State. This includes clothes dryers, stoves, and water and space heaters, with space heating being projected as the lead factor in adding to the electric load when buildings are all-electric.

The two recommendations proposed above primarily relate to buildings whose load is heating dominated and there is a common perception that most buildings in a Northern state like New York are heating dominated. However, a surprising fraction of New York's buildings are cooling dominated.

Cooling load often dominates over heating load, particularly in residential buildings housing more than one family and in commercial settings where body heat and heat from equipment collects and rises from floor to floor, reducing the heating load in winter and increasing the cooling load in the summer.

And we can expect the ratio of cooling dominated buildings to increase. The warming of our climate is increasingly making cooling hardware a necessity, where in the past it has often been seen as a luxury. The greenhouse gases that are built up in earth's atmosphere, coupled with ongoing emissions that may or may not significantly drop, depending on the success of efforts like New York's, assures that uncomfortable warming will continue to build up, at least over the next couple decades, increasing demand for cooling .

For new buildings that will be cooling dominated, there is no logic to granting a capacity exemption because air source heat pumps should be able to match or reduce the peak day cooling day load of conventional air conditioning, and geothermal heat pumps will invariably and substantially reduce that load.

Furthermore, a capacity exemption will lower the load factor of the building, and lower load factors lead to more expensive electricity. The load factor is defined as the *average load divided by the peak load in a specified time period*. Low load factors make electricity more expensive for ratepayers because fixed costs - which are directly related to the expense of the infrastructure needed to meet peak demand - are spread over fewer kilowatt hours, meaning each kilowatt hour used needs to cover more of those fixed costs.

Heat pump use tends to increase load factors because heat pumps are used consistently through most of the year to control building temperatures. New York has a relatively low load factor, and thus relatively expensive electricity, at least partially because fossil fuels are generally used for heating and electricity is used for cooling, throwing electricity use off balance over the course of the year.

NY-GEO recommends that all projects considered for a capacity exemption include cooling technology when calculating building electric load and projecting additional electric system upgrades. Electrical infrastructure needs in cooling dominated buildings are not reduced by fossil fuel HVAC systems. The only technology that significantly reduces load for cooling, and therefore electrical infrastructure needs, is geothermal cooling. Therefore, in the many cases where cooling load is projected to be larger than heating load, those projects should be ineligible for a capacity exemption.

4) Increase the Time Limit to 24 Months

NY-GEO agrees with this proposed addition as developed by Rewiring America:

"*While creating the reasonableness standard based on additional time it would take a utility to construct the necessary electric system upgrades, DPS considered timeframes between 12 and 24 months. DPS staff selected the 18-month threshold as a "middle ground" between the various electric system upgrades needed for different types and sizes of buildings.*

The AEBA applies to newly constructed buildings, as existing buildings are already exempted by the law. The greatest percentage of new buildings being built in NYS are large multifamily buildings with 5 units or more.[ii] *Since large multifamily buildings require more electricity than smaller single-family (1-4 families) buildings, the vast majority of potential electric system upgrades for newly constructed buildings will take longer to complete, since such buildings may need greater electric infrastructure support, and therefore the exemption trigger should be longer as well. Accordingly, the PSC should expand the proposed 18-month threshold to a 24-month threshold*."

New Privately Owned Housing Units Authorized Unadjusted Units for Regions, Divisions, and States						
202399						
	Total	1 Unit	2 Units	3 and 4 Units	5 Units or More	Num of Structures With 5 Units or More
United States	1511102	919973	34224	20492	536413	18795
Northeast Region	140816	55463	4156	2778	78419	2757
New England Division	33849	16646	1306	829	15068	624
Connecticut	6272	2050	124	161	3937	145
Maine	6183	4540	246	90	1307	93
Massachusetts	13214	5075	482	358	7299	273
New Hampshire	4555	2969	206	134	1246	46
Rhode Island	1169	709	120	23	317	13
Vermont	2456	1303	128	63	962	54
Middle Atlantic Division	106967	38817	2850	1949	63351	2133
New Jersey	32840	13228	1406	728	17478	980
New York	48807	9677	1056	658	37416	834
Pennsylvania	25320	15912	388	563	8457	319

Oversight Recommendations:

1.) Tariff Language

As part of the process outlined in the White Paper, utilities would need to file tariff language on their approach to exemptions and would need to file annual; reports on implementation of the exemption, which would be open to scrutiny by the Commission.

We recommend the following:

- That Commission provide an expedited mechanism for public review and input on the draft tariff language before the exemption goes into effect; and
- That Commission stipulations for the annual reports be designed to provide a clear and complete picture of the use of exemptions with enough documentation to allow public evaluation of the reasonableness of the exemptions both in relation to the design of the project and the utility decision to grant the exemption.

2.) Utility Time Estimates

As noted above, different utilities may have different interests relative to granting capacity exemptions. It is not hard to imagine utility officials with an interest to do so pressing the borders of reasonableness when estimating infrastructure timing. NY-GEO recommends that the Commission either assigns staff with electrical infrastructure expertise or hires a consultant to oversee utility timeline estimates. The designated person(s) would be tasked with communicating with interested parties on the exemption requests as they arrive. They would have authority to bring questionable cases before the Commission for a decision.

3) Developer Load Estimates

NY-GEO has observed wide variations of building load estimates in the field which have tended to overestimate projected building loads. In some cases, developers could intentionally present a utility with a high enough project load number to trigger a desired infrastructure need sufficient to produce a capacity exemption. This potential is reinforced by a natural tendency for project designers and developers to want to err on the conservative side in order to assure customer satisfaction with newer heat pump technology. We are concerned that we may be in a "Wild West" milieu as New York eases its way into its all-electric future, where load estimates don't keep up with system performance, resulting in missed opportunities or systems that are oversized and more expensive as a result.

One example from the field to illustrate the magnitude of current load perceptions relative to actual performance is the Zero Place project, a 4-story, mixed residential/commercial building in New Paltz, New York. For that project, an air source system would have required a load service of 1,000 kW using a 2.5 ton air source heat pump per apartment to meet peak load. The load letter to the utility was for a 343 kW geothermal service using .75 ton heat pumps per apartment. The actual summer peak demand of the building, measured by a Owahgena Consulting[iii] for NYSERDA was 71 kW, and the peak winter demand was 65.5 kW.

The consultant study notes "A monitoring system was installed to collect detailed energy data at 5-minute intervals for more than a year to confirm the system performed as expected. The performance data showed that the GSHP system efficiently met both space conditioning and DHW (Domestic Hot Water) loads with little to no impact on the electric grid."

Zero Place illustrates the point that a building using air source heat pumps can present a very different electric load profile than one with ground source heat pumps.

The data from Zero Place is also a prime real-world example of the point made in our third exemption recommendation above. In Climate Zone 6a in the Hudson Valley, Zero Place was still cooling load dominated. Granting an exemption and connecting it to the gas grid would have done nothing to mitigate the cooling load, and would have increased the peak load on the electrical grid, with conventional air conditioning

performing with far less efficiency than ground source equipment, and no better than air source equipment, during peak cooling.

Discrepancies in load estimates lead to several questions for the Commission to examine:

- What is DPS' role, if any, in establishing and following up on load calculations given their looming importance in sizing a clean grid with the capacity to meet projected demand?
- Does the NYS Technical Resource Manual establish any standards for projecting peak demand from air source and ground source systems?
- Does DPS have a role in informing utilities and the development community about measured data related to peak that is helpful in making choices about how to proceed with projects relative to the cost of their impact on the grid?
- Is there an orderly process that can be established that makes sure these considerations are adequately considered as a project progresses?
- Are there any guardrails against mechanical system designers building in excessive load calculations primarily to protect themselves from any liability relative to peak outages?

If these questions can be answered in time to help ensure an effective capacity exemption that would be helpful. To the degree they can't, we urge the Commission to take them up in as timely a manner as possible.

About NY-GEO:
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.

[i]

- **New York ISO Heat Pump Assessment Study – an EPRI Report** – 2022 12 19 presentation to the NYISO Load Forecasting Task Force - https://www.nyiso.com/documents/20142/35104194/2022%20LFTF%20Dec%2019%20-%20EPRI%20Heat%20Pump%20Assessment%20Study.pdf/171575b4-3329-17b1-feb2-07dea7770092 - accessed 2025 05 20 – The presentation notes – "Air source heat pump performance decreases with decreasing outdoor air temperature, resulting in the need to provide supplemental heat at an increasing rate in order to meet the home's heating load. As a result, heat pumps are much less effective at reducing winter peak demand. At the design winter conditions in Albany of -3°F the calculated COP of the heat pump was 1.43; including supplemental heat, the COP was 1.12."
- **Monitoring the Ground Source Heat Pump System at Zero Place – a Multifamily, Mixed-Use Building in New Paltz, NY** – Owahgena Consulting for NYSERDA – December 2024 - https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Other-Technical-Reports/24-37-ff.pdf. Accessed 2025 05 21.- p49 "The overall system heating COP for space and water heating combined exceeded 3.6 on the coldest day of the year (average temperature of 15°F; low of -6°F). In contrast, an air source heat pump would have operated at COP of 1 to 1.5 at these same conditions –and closer to a COP of 1 at below zero conditions."
- **Grid Cost and Total Emissions Reductions Through Mass Deployment of Geothermal Heat Pumps for Building Heating and Cooling Electrification in the United States** – Xiaobing Liu, et. al. – Oak Ridge National Laboratory - https://www.osti.gov/biblio/2224191 - accessed 2025 05 20
- **Residential ccASHP Building Electrification Study** – Neil Veilleux et. al. - Cadmus – April 22,2022 - file:///C:/Users/billn/Downloads/Residential%20ccASHP%20Building%20Electrification%20StudyAugust%202022.pdf – Accessed 2025 05 20
- **Analysis of Water Furnace Geothermal Heat Pump Sites in New York State with Symphony Monitoring Systems** Final Report | Report Number 18-03 | December 2017 https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Other-Technical-Reports/18-03-Water-Furnace-Geothermal-Heat-Pump-Sites.pdf - Accessed 2025 05 20
- **Geothermal Gas REV Demonstration Project Long Island, New York Final Report** – National Grid – April 3, 2020- https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Community-Heat-Pump-Systems/National-Grid---District-Geothermal-Rev-Demonstration-Project-Final-Report---PSC.pdf - Accessed 2025 05 21 - pdf page 159 of 253 – Peak heating COP of 10 systems averaged 2.97
- **Heating Sector Transformation in Rhode Island - Brattle** - https://energy.ri.gov/sites/g/files/xkgbur741/files/documents/HST/RI-HST-Final-Pathways-Report-5-27-20.pdf

[ii] **Census.Gov Buildings Permit Survey** - https://www.census.gov/construction/bps/index.html

[iii] **Monitoring the Ground Source Heat Pump System at Zero Place –a Multifamily, Mixed-Use Building in New Paltz, NY** - – Owahgena Consulting for NYSERDA – December 2024- https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Other-Technical-Reports/24-37-ff.pdf - Accessed 2025 06 26 – pp. 44 (winter) and 46 (summer)