

Caiazza Comment Summary for Climate Action Council

Summary

I have been following the Climate Leadership and Community Protection Act (Climate Act) process since it started. I used [information](#) published on my blog to submit 26 comments on various aspects of the Draft Scoping Plan since the comment period opened. This comment is an executive summary of the comments I submitted that highlights the most important points that I think the members of the Climate Action Council should know about the Draft Plan. I summarize the most important points in this section and then provide a summary of all the comments that I submitted with links to the actual comments. Given the breadth and scope of the Climate Act transition and the Draft Scoping Plan it is unreasonable to expect that any Council member could devote enough time to evaluating it to understand the substantive nuances that have not been forthcoming from the authors of the Integration Analysis or the leadership of the Climate Action Council.

I believe that the Climate Action Council has lost sight of its primary objective to inform the next Energy Plan in the context of its Climate Act mandates. In § 75-0103. New York State Climate Action Council (11) the goal of the scoping plan is spelled out:

The council shall on or before two years of the effective date of this article, prepare and approve a scoping plan outlining the recommendations for attaining the statewide greenhouse gas emissions limits in accordance with the schedule established in section 75-0107 of this article, and for the reduction of emissions beyond eighty-five percent, net zero emissions in all sectors of the economy, which shall inform the state energy planning board's adoption of a state energy plan in accordance with section 6-104 of the energy law. The first state energy plan issued subsequent to completion of the scoping plan required by this section shall incorporate the recommendations of the council.

I submitted comments that [explained](#) that there are specific Climate Act mandates are related to expertise, an implementation safety valve, costs and benefits documentation, and consideration of the experiences of other jurisdictions. Instead of focusing on specific technical issues, the Council should be considering how to address those mandates in their review of the Draft Scoping Plan that will inform the state energy plan.

My primary concern is reliability. In that context expertise is an issue. Section 2 of [§ 75-0103](#) notes that “at large members shall include at all times individuals with expertise in issues relating to climate change mitigation and/or adaptation, such as environmental justice, labor, public health and regulated industries.” It is extremely telling that energy sector expertise is not mentioned as a specific criterion, unless you assume that regulated industries refer to the energy utilities. At the [May 26, 2022 Climate Action Council meeting](#) some members of the Council stated that concerns about reliability with a 100% renewable grid were mis-information. This directly contradicts the experts who authored the New York Independent System Operator (NYISO) [Power Trends 2022](#) report that notes: “Long-duration, dispatchable, and emission-free resources will be necessary to maintain reliability and meet the

objectives of the CLCPA. Resources with this combination of attributes are not commercially available at this time but will be critical to future grid reliability.”

There are members of the Climate Action Council who believe that the energy transition must proceed no matter what because the law says so. However, [New York Public Service Law § 66-p](#). “Establishment of a renewable energy program” includes a safety valve condition: “(4) The commission may temporarily suspend or modify the obligations under such program provided that the commission, after conducting a hearing as provided in section twenty of this chapter, makes a finding that the program impedes the provision of safe and adequate electric service; the program is likely to impair existing obligations and agreements; and/or that there is a significant increase in arrears or service disconnections that the commission determines is related to the program”. I believe that instead of getting bogged down in details of specific technologies, the Council should be defining criteria for safe and adequate electric service, impairing existing obligations, and increase in arrears or service disconnections for Climate Act implementation. I recommend that those conditions be established up front, implementation plans should be evaluated against those criteria, implementation only proceed if the conditions are met, and then tracked during implementation to see if they are being maintained.

I think [New York Public Service Law § 66-p](#) is a clear mandate to address reliability. Therefore, the most important thing that has to be done before the Scoping Plan is finalized is to [reconcile the NYISO projections](#) for future resource capacity with the Integration Analysis projections. It is also critical that the Final Scoping Plan include reliability provisions acceptable to the NYISO and New York State Reliability Council are established that meet the safety valve provisions in [§ 66-p](#).

My background as a meteorologist led me to [comment](#) on the analyses done to date for the worst-case renewable resource availability because I believe address this is a critical reliability issue. No electric grid proposal that relies primarily on wind and solar resources can plan adequately for the amount of backup resources unless the worst-case intensity, duration, and frequency of occurrence for winter-time wind lulls is known. I believe that the best way to do that is to use the longest period of historical data as possible and it has not been used as far as I can tell. I submitted a [comment](#) that made specific recommendations for this analysis.

I am also very concerned about affordability. Every jurisdiction that has attempted to transition their energy system away from fossil fuels to wind and solar has seen significant price increases that significantly impact those who can afford them the least. As a first step, I recommend that the Climate Action Council establish criteria for affordability.

There is a related affordability Council mandate. In section 14,b of [§ 75-0103](#) the Climate Act specifically states that the costs and benefits analysis must:

“Evaluate, using the best available economic models, emission estimation techniques and other scientific methods, the total potential costs and potential economic and non-economic benefits of the plan for reducing greenhouse gases, and make such evaluation publicly available.”

This information is not currently available. There is no breakdown of costs within sectors that is needed to evaluate the validity of Integration Analysis cost estimates. I recommend that the Council address this mandate by defining what will meet this requirement. In my opinion in order to fulfill this obligation, the Final Scoping Plan must describe [all](#) control measures, assumptions used, the expected costs for those measures and the expected emission reductions for the Reference Case, the Advisory Panel scenario and the three mitigation scenarios.

Additional information was made available in May describing the cost methodologies. I [found](#) this additional documentation describes the calculation methodology but little else. I note that electrification of home heating is dependent upon building shell improvements. This recently provided documentation does not provide sufficient information to understand how typical homeowners will be affected by that control measure. Providing net system costs relative to the Reference Case is not sufficient because stakeholders don't know the total costs.

The final Climate Action Council mandate is section 16 of [§ 75-0103](#) where there is a requirement to consider efforts at other jurisdictions: "The council shall identify existing climate change mitigation and adaptation efforts at the federal, state, and local levels and may make recommendations regarding how such policies may improve the state's efforts." There has been very little discussion of efforts at other jurisdictions. My [comments point](#) out that there have been recent issues at other jurisdictions that affect both reliability and affordability that should be considered by the Council.

I believe that the Climate Action Council should develop criteria for schedule implementation. A collective crossing of fingers that a new technology will maintain existing standards of reliability and affordability is inappropriate. I submitted a [comment](#) that explained that the Department of Environmental Conservation's decision to disapprove two proven interim solutions eliminates reliability options when there is no other commercially proven option available. The Scoping Plan should establish the milestones and conditions that have to be met before any existing technology is dismantled. The Integration Analysis and the Draft Scoping Plan zero-emissions electric grid transition plan depend on a long-duration, dispatchable, and emission-free resource that does not exist. Another [comment](#) explains why there are reasons to believe that a commercially viable and affordable resource like this may never be developed. I conclude that the Final Scoping Plan must include a conditional implementation schedule based on the availability of this resource.

Climate Action Council members should be aware of the [games played](#) to be able to conclude that "The cost of inaction exceeds the cost of action by more than \$90 billion". The reality is that the [benefits](#) are imaginary but the costs are real and the Integration Analysis that provides the basis of the Draft Scoping Plan consistently over-states benefits and [under-estimates the costs](#).

I did an extensive analysis of the [claimed benefits](#). The plan claims \$235 billion [societal benefits](#) for avoided greenhouse gas emissions. I estimate those benefits should be no more than \$60 billion. The Scoping Plan gets the higher benefit by counting benefits multiple times. If I lost 10 pounds five years

ago, I cannot say I lost 50 pounds but that is what the Draft Scoping Plan says. Correcting that mis-characterization reduces the benefits below the costs.

There are issues with the other benefit claims. The Scoping Plan claims air quality improvement benefits range between \$100 billion and \$172 billion. These benefits are due to an air quality improvement for PM_{2.5} of 0.35 µg/m³ that is supposed to “avoid tens of thousands of premature deaths, thousands of non-fatal heart attacks, thousands of other hospitalizations, thousands of asthma-related emergency room visits, and hundreds of thousands of lost workdays”. However, the modeled impacts rely on a linear no-threshold model. The observed PM_{2.5} reduction in New York City since 2005-2007 is 5.6 µg/m³ and that is 16 times higher than the projected decrease due to the Climate Act. Using the linear no-threshold model that means that we should be able to observe sixteen times tens of thousands of premature deaths, sixteen times thousands of non-fatal heart attacks, sixteen times thousands of other hospitalizations, sixteen times thousands of asthma-related emergency room visits, and sixteen times hundreds of thousands of lost workdays. When the Climate Action Council and Final Scoping Plan verifies that these reductions have been observed I will accept these benefits. Benefits are also claimed for active transportation but the Final Scoping Plan benefits should be revised to take into account the number of places where this might work. The majority of the health benefits from energy efficiency interventions in Low and Middle Income (LMI) homes are the result of “non-energy interventions” and should not be included in the Final Scoping Plan that covers energy interventions

The [key point](#) regarding the Draft Scoping Plan benefit/cost claim is that there is a caveat that the comparison is relative to the Reference Case. It is very rarely mentioned but it makes all the difference. Instead of using a business-as-usual case for comparing impacts, the Integration Analysis defines the Reference Case to include already “implemented” strategies. That approach excludes legitimate Climate Act costs by mis-categorizing initiatives such as the 2035 zero-emission vehicle legislation and the 9 GW of off-shore wind mandate in the Climate Act as part of the business-as-usual Reference case. This raises the Reference Case costs relative to the mitigation scenarios so that the final costs are under-estimated. If the costs to convert to zero-emissions vehicles and the off-shore wind are properly accounted for, the costs exceed the benefits by at least an order of magnitude.

Time limitations and lack of documentation prevented me from providing many specific comments on plans for the electric system. I [evaluated](#) the capital costs for generating resources in the different scenarios and concluded that in order to fully verify the costs of the Scoping Plan, the Climate Action Council should insist that the authors of the Integration Analysis provide more detailed analyses. I commented that the [retirement assumptions](#) for wind, solar, and energy storage need to be changed to reflect expected lifetimes of those technologies. This mis-characterization reduces costs on the order of 40%. A key technology for reliability is the dispatchable, emissions-free resource. The place-holder for this resource is hydrogen in one form or other. My concern is that the Plan does not provide enough reliable documentation to support the speculated use of hydrogen as the technology for this critical resource. My [comments](#) describe specific issues that need to be explicitly addressed in the Final Scoping Plan if the Climate Action Council is to make a compelling argument that hydrogen technology will keep the lights and heat on when needed most.

I [compared the capital costs](#) (2020 \$/kW) in the IA-Tech-Supplement-Annex-1-Input-Assumptions spreadsheet Resource Costs tabs against the EIA Table 1: Cost of new central station electricity generating technologies. I show that with the exception of the capital costs for large hydro and a gas-fired combined cycle unit in Upstate New York all the other technology costs are lower and, in some cases, much lower in the Integration Analysis. If my comparison interpretation is correct then these numbers are outrageous. The capital costs for offshore wind are half of the EIA costs. While there may be some interpretation of the battery energy storage cost that can explain why EIA costs are five times higher, I don't think there is any interpretation issue with the hydrogen fuel cell technology that is five times higher in New York City and four times higher Upstate. The Climate Action Council must explain why the Draft Scoping Plan numbers are so high for these technologies.

There was a specific request for [comments](#) on the three mitigation scenarios. There are significant technical issues that have to be addressed to maintain current standards of reliability and affordability. There are technologies in all the sectors that are included in all the mitigation scenarios of the Draft Scoping Plan that are not commercially available at this time but will be critical to the transition requirements. As a result of these technical constraints, I believe that mitigation scenario 2, Strategic Use of Low-Carbon Fuels should be the recommended path forward for the Final Scoping Plan simply because it relies on fewer untested technologies.

My [comments](#) on the scenarios showed that the Integration Analysis documentation for the control strategies in the three mitigation scenarios is inadequate. There isn't sufficient information about each control measure to be able to compare emission reductions, costs, and viability to be able to meaningfully comment on the components of the mitigation scenarios. More importantly, the Draft Scoping Plan does not include a feasibility analysis that explains how the control measures will work in the Climate Act transition plan. The strategies are simply listed and the citizens of New York are expected to believe that the projected emissions reductions will occur. The Climate Action Council should address the feasibility of the Integration Analysis control measures as part of the Final Scoping Plan.

I also submitted a [comment](#) on the proposal for carbon pricing. It is a great theory but in practice there are practical considerations that make it a poor choice for funding decarbonization efforts. I explained why I believe carbon pricing will always be a regressive tax and list a number of practical reasons that carbon pricing will not work as theorized. My comment also referenced an analysis in Canada that concluded: "There may be many reasons to recommend carbon pricing as climate policy, but if it is implemented without diligently abiding by the principles that make it work, it will not work as planned, and the harm to the Canadian economy could well outweigh the benefits created by reducing our country's already negligible level of global CO2 emissions." Substitute New York for Canada and I believe this describes this policy option. I recommend that this economy-wide proposal be abandoned.

Additional time for comments would have been needed for me to provide extensive scenario specifics for key sectors. I did manage to spend a lot of time trying to figure out how [electrification of residential](#)

[heating](#) was supposed to work and how the mitigation scenarios were different. The primary difference for new heat pump sales for the scenarios is the ramp rate. Scenarios 3 and 4 accelerate the deployment of heat pumps in 2030 by mandating early retirement of existing furnaces instead of waiting until their end of useful life. It is easy to include this in a framework but there are at least a couple of implementation issues. What criteria would be used to determine who would get stuck with the added expense for premature retirements? Shouldn't the affected owners get an additional subsidy to cover their costs? Do those issues make this infeasible? Without a feasibility analysis the Final Scoping Plan will be incomplete. The Climate Action Council needs to address these questions because this sector is a primary concern for homeowners.

My comments on the mitigation scenarios noted that [Mark Mills](#) made the point that “based on today’s physics and technology, the only path to an energy system with a material intensity lower than hydrocarbons would be one focused on nuclear fission.” Given that nuclear power is also the only scalable dispatchable emissions-free generating resource that has been proven to work, the Final Scoping Plan should include a Scenario that takes advantage of those capabilities. The Climate Action Council needs to address why this approach has not been considered.

I submitted a couple of comments on electric vehicles. The emphasis in the first [comment](#) was my finding that the Integration Analysis is simply making assumptions about future zero-emissions transportation implementation strategies without providing adequate referenced documentation. I provided numerous recommendations for additional documentation in these comments so that New Yorkers can understand what will be expected and how much it will cost.

As far as I can tell, the electric vehicle costs are based entirely on new vehicle sales. There is no acknowledgement that the used car market will likely change because of the cost of battery replacement. Sellers will likely get less relative to new cars in the battery electric vehicle market. Buyers may get a relative deal but will lose in the end when the batteries have to be replaced. This is a particular concern for low and middle-income citizens who cannot afford new vehicles.

There is no bigger disconnect between the zero-emission vehicle (ZEV) proposed strategy and reality than the ZEV charging infrastructure requirements. The biggest problem is that millions of cars will have to rely on chargers that cannot be dedicated for the owner’s personal use because the owners park on the street or in a parking lot. In order to provide a credible ZEV strategy, the final Scoping Plan has to describe a plan how this could possibly work. It is not enough to simply say it will work.

I also submitted a [comment](#) addressing electric vehicle costs. the Integration Analysis vehicle cost projections rely on a single vehicle type for light-duty vehicles. As a result the projections are not particularly useful for many vehicle owners. The Climate Action Council should consider updating the Integration Analysis to better represent the types of vehicles used.

One of my biggest concerns about the massive transition to diffuse wind and solar generating resources is the cumulative effect on agriculture and the environment. I [recommended](#) that the Climate Action

Council place a moratorium on the development of utility-scale solar projects until permitting requirements have been established for responsible solar siting and protection of prime farmlands. The problem with cumulative environmental impacts. The most recent environmental impact analysis only addressed a fraction of the total number of wind turbines and area covered by solar PV installations. In addition, the environmental impacts of battery energy storage were not addressed. It is impossible to project the impacts of the environmental impacts of the dispatchable emissions-free resource that it included in the capacity projections because a specific technology has not been specified. My [comments](#) quantify the renewable energy resource difference between the most recent environment analysis and the Integration Analysis projections.

I [recommended](#) that the Department of Environmental Conservation propose thresholds for unacceptable environmental impacts. I believe that without addressing this problem that it is likely that the environmental impacts from the massive wind and solar resource developments will have far worse impacts than those that can be ascribed to climate change. For example, I project that at least 216 Bald Eagles could be killed every year when there are 9,445 MW of on-shore wind. There were [426 occupied bald eagle nest sites](#) in New York in 2017. I am not a wildlife biologist but those numbers indicate to me that there will be major threats to the survivability of Bald Eagles in New York. The Final Scoping Plan must include proposed thresholds for unacceptable environmental impacts like this.

I submitted [comments](#) that refuted many of the claims made in Section 2.1, Scientific Evidence of a Changing Climate, of the Draft Scoping Plan. I argued that if documentation is not included that explicitly supports the claims made and contradicts my comments and the [attachment](#), then I think those claims should be removed from the final Draft Scoping Plan.

I recommend that the Final Scoping Plan include a conditional schedule that considers the availability of necessary technology and potential impacts to reliability and affordability before implementing certain control measures. I expect the response will be that because there is an “existential” threat due to climate change and we are seeing the effects of climate change now that we cannot wait to act. I submitted [comments](#) that provide references by noted experts that explain why there isn’t a climate crisis and why the Draft Scoping Plan’s reliance on the Intergovernmental Panel on Climate Change summaries for policy makers is mis-placed. I also explain that it is inappropriate to claim that every observed extreme weather event is evidence of climate change. The risks of an unreliable and unaffordable electric system are far greater than the over-hyped risks of climate change in New York.

My [final point](#) for the Climate Action Council is that the Draft Scoping Plan does not quantify how New York’s net-zero transition will affect global warming. My calculation shows that the expected impact on global warming would be an immeasurable 0.01°C by the year 2100. If you cannot measure the change in temperature there is no way you can detect a change in the purported effects of that temperature change. In addition, New York’s emissions are less than one half of one percent of global emissions and global emissions have been increasing by more than one half of one percent on average since 1990. Consequently, New York emission reductions will not have an appreciable effect on global warming.

Summary of Comments Submitted to the Climate Action Council

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Introduction

Ultimately the Climate Leadership and Community Protection Act is an air pollution meteorology problem affecting all sectors of society but with major impacts on the electric sector. I am a retired air pollution meteorologist. I have bachelors and master's degrees in meteorology, was certified as consulting meteorologist, worked for EPA consulting firms for five years, and then worked in the electric generating business primarily in New York for 40 years. In my time in the electric generation business, I analyzed energy and environmental regulations that could affect operations among other responsibilities. I mention this only to make the point that I am uniquely qualified to comment on the Climate Act Draft Scoping Plan.

In January 2017 I started a blog called [Pragmatic Environmentalist of New York](#) to address New York environmental issues from a practical and rational viewpoint. Pragmatic environmentalism is all about balancing the risks and benefits of both sides of issues. Because New York's Climate Act is the major energy and environmental issue affecting the state I have followed the process since its inception and have [published over 200 articles](#) on it. Those articles provided the basis for the over 20 comments I submitted on the Draft Scoping Plan. Based on that work I believe the ambitions for a zero-emissions economy outstrip available renewable technology such that it will adversely affect [reliability](#) and [affordability](#), [risk safety](#), [affect lifestyles](#), will have [worse impacts on the environment](#) than the purported effects of climate change in New York, and [cannot measurably affect global warming](#) when implemented.

Process

[Climate Act Mandates that must be Considered in the Scoping Plan](#) June 24, 2022

There are four Climate Leadership and Community Protection Act (Climate Act) mandates for the Climate Action Council that have been overlooked to this point. In brief those mandates are related to expertise, an implementation safety valve, costs and benefits documentation, and consideration of the experiences of other jurisdictions. Instead of focusing on specific technical issues, the Council should be considering how to address those mandates in their review of the Draft Scoping Plan.

The Climate Act specifies expertise criteria but does not give energy expertise priority. Obviously, the State's experts responsible for maintaining current standards of reliability have to have the final say whether the recommendations for the [New York Energy Plan](#) are acceptable. I strongly recommend that the Climate Action Council lay out a plan to work with the New York Independent System Operator (NYISO) and New York State Reliability Council experts to resolve differences between the electric generating projections in the Draft Scoping Plan and those made by the NYISO.

[New York Public Service Law § 66-p](#). "Establishment of a renewable energy program" has safety valve conditions for affordability and reliability that have been ignored thus far in Climate Action Council deliberations. The Climate Action Council should develop criteria that define specific conditions to guide the implementation and status of the net-zero transition.

Cost and benefit data are not presently included that fulfill the Climate Act mandate to make details publicly available. I recommend that the Council address this requirement by defining what will meet

this requirement. In my opinion this requirement will only be fulfilled if the Final Scoping Plan describes all control measures, assumptions used, the expected costs for those measures and the expected emission reductions for the Reference Case, the Advisory Panel scenario and the three mitigation scenarios.

The Final mandate requires the Council to consider results from other jurisdictions. The recent reliability problems in Texas and Australia have to be considered so that similar problems do not occur in New York. The United Kingdom and German affordability problems are also a concern that should be addressed by the Council. If we do not learn from the experience of others than we are certainly doomed to make the same mistakes.

[Scoping Plan Comment Process](#) 5 February 2022

In early February I provided a comment on the [Draft Scoping Plan Overview](#). At the time it was not clear how the leadership of the Climate Action Council was going to deal with comments. I assumed that it would be an on-going process whereby someone would review comments as they came in and screen the comments for timeliness and relevance to the Council. In this instance I hoped that the comment would be passed on to the Council for their deliberation.

At 53:25 of the [recording](#) for the May 26, 2022 Climate Action Council meeting, Sarah Osgood talked about the planned response for written comments. At the time of the meeting, they had received nearly 18,000 written comments. Obviously, those will take an enormous effort to review. She summarized the process as follows:

- Every comment will be reviewed
- Reviews will bin comments
- Summarizing and synthesizing comments for the council and subgroups in public meetings
- Council will decide how to handle the comments
- Comments will be posted eventually

Later in the meeting Sarah Osgood (1:12:27 of the [recording](#)) responded to the question why the State couldn't be doing some of this work while the comment period is open. She claimed that it was not possible to summarize while they are still coming in. However, the first step is classifying and the classification categories certainly could have been defined on January 1, 2022. In my opinion, not doing this from the start is a sure sign that the public stakeholder process is not being taken seriously. The leadership of the Climate Action Council has taken the convenient position that they cannot respond until they have all the information claiming that it is difficult to respond to comments until you have the whole set of comments available. Frankly, I have developed comments that rise to the level where the Climate Action Council has to eventually respond. There is no reason that they could not have started discussions as meaningful comments were submitted.

The comment I submitted in early February was not considered but there still are relevant points. The Overview notes that one of the next steps is "to identify areas where additional clarity is needed in the scoping plan". I believe that a feasibility analysis accepted by all the organizations responsible for New York electric system reliability is the most important clarification item that needs to be addressed.

The Overview also notes that another next step is “to further understand relevant needs and priorities of members of the public and how they connect to existing (or additional) climate strategies”. I think that the Council should prepare overview presentations of various aspects of the strategies needed to meet the Climate Act. Until the public understands what is required, they cannot be expected to understand the relevant needs and priorities of the Scoping Plan.

[Caiazza Comment Cost Methods Overview](#) July 1, 2022

This comment reviews information made available in May describing the cost methodologies. I have made the point in many of my comments that I believe the Integration Analysis documentation should describe all the control measures proposed, provide references for the assumptions used, supply the expected costs for those measures and list the expected emission reductions for the Reference Case, the Advisory Panel scenario and the three mitigation scenarios.

This documentation describes the calculation methodology but little else. I note that electrification of home heating is dependent upon building shell improvements. This recently provided documentation does not provide sufficient information to understand how typical homeowners will be affected by that control measure. Providing net system costs relative to the Reference Case is not sufficient because stakeholders don't know the total costs.

Draft Scoping Plan

[Caiazza Comment on Draft Scoping Plan Scenarios](#) June 30, 2022

This comment addressed the request for feedback on the components of the three mitigation scenarios as well as an implicit request for a recommendation for the appropriate scenario going forward. My comments address all sectors except the electric sector. Because of the importance of the electric generating sector, I have devoted a comment specifically to issues with the Draft Scoping Plan associated with it.

Contrary to the pre-conceived notion of the Climate Leadership and Community Protection Act (Climate Act) that a transition to net-zero by 2050 is only a matter of political will, there are significant technical issues that have to be addressed to maintain current standards of reliability and affordability. For example, the New York Independent System Operator (NYISO) [Power Trends 2022](#) report notes: “Long-duration, dispatchable, and emission-free resources will be necessary to maintain reliability and meet the objectives of the CLCPA. Resources with this combination of attributes are not commercially available at this time but will be critical to future grid reliability.” There are technologies in all the sectors that are included in all the mitigation scenarios of the Draft Scoping Plan that are not commercially available at this time but will be critical to the transition requirements. As a result of these technical constraints, I believe that mitigation scenario 2, Strategic Use of Low-Carbon Fuels should be the recommended path forward for the Final Scoping Plan simply because it relies on fewer untested technologies.

The Integration Analysis documentation for the control strategies in the three mitigation scenarios is inadequate. There isn't sufficient information about each control measure to be able to compare emission reductions, costs, and viability to be able to meaningfully comment on the component of the

mitigation scenarios. More importantly, the Draft Scoping Plan does not include a feasibility analysis that explains how the control measures will work in the Climate Act transition plan. The strategies are simply listed and the citizens of New York are expected to believe that the projected emissions reductions will occur. The Climate Action Council should address the feasibility of the Integration Analysis control measures as part of the Final Scoping Plan.

Given the inadequate documentation it was not possible to do anything but remark on the glaring inconsistency that Scenario 3: Accelerated Transition Away from Combustion and Scenario 4: Beyond 85% Reductions are projected to cost less than Scenario 2: Strategic Use of Low-Carbon Fuels.

In my opinion, it is necessary to do a feasibility analysis for all three mitigation scenarios. For example, the primary difference for new heat pump sales for the scenarios is the ramp rate. Scenarios 3 and 4 accelerate the deployment of heat pumps in 2030 by mandating early retirement of existing furnaces instead of waiting until their end of useful life. It is easy to include this in a framework but there are at least a couple of implementation issues. What criteria would be used to determine who would get stuck with the added expense for premature retirements? Shouldn't the affected owners get an additional subsidy to cover their costs? Do those issues make this infeasible? Without a feasibility analysis the Final Scoping Plan will be incomplete.

In 2050 the percentage of electrified buildings is 92% for all three mitigation scenarios. Scenario 2 projects that 631,351 housing units will still use combustion heating sources and in Scenarios 3 and 4 634,66 housing units will use combustion sources. I believe that the Integration Analysis determined that these buildings could not be electrified and then assumed that they could continue to use their existing combustion heating sources. This is another feasibility issue. How can the Climate Action Council's Final Scoping Plan guarantee that those housing units will have access to their current fuel supplies at a reasonable cost when there are so few of them left? If, for example, those housing units use fuel oil or propane what business model can sustain a delivery company with many fewer customers?

Even in my cursory review it was apparent that the Integration Analysis has calculation assumption errors and there is a tremendous amount of wishful thinking regarding the proposed control strategies. The best example of wishful thinking concerns the transition to electric vehicles before the zero-emission vehicle legislative mandate in 2035. For all motor vehicle registrations in New York in May 2022 there are only 62,123 electric vehicles statewide. The Integration Analysis projects that there will be 138,156 light-duty electric vehicles in 2025 in the Reference case. Scenario 2 projects 257,718 LDEV in 2025 and both Scenarios 3 and 4 project 275,417. My comments argue that in the absence of compelling documentation, there is little reason to believe that the transition targets in 2025 will be met and the thought that by 2030 there will be 2.7 million zero-emission light-duty vehicles and that 90% of all new sales will be zero-emission vehicles is highly unlikely.

[Caiazza Comment on Economy Wide Strategies](#) June 9, 2022

Carbon pricing can be summarized very simply. It is a great theory but in practice there are practical considerations that make it a poor choice for funding decarbonization efforts.

My comments explain why I believe carbon pricing will always be a regressive tax. I also explain that there are a number of practical reasons that carbon pricing will not work as theorized. Leakage is an insurmountable problem. A fundamental problem with all carbon pricing schemes is that funds decrease over time as carbon emissions decrease unless the carbon price is adjusted significantly upwards over time. There are gaps between the theory of carbon pricing and market reality, especially regarding how affect sources can act with limited control options. Based on investment results for RGGI proceeds, the programs funded are not cost-effectively reducing emissions. The Climate Act mandate for funding in Disadvantaged Communities will exacerbate that issue.

In addition to my practical concerns "[A Practical Guide to the Economics of Carbon Pricing](#) by Ross McKittrick defines how carbon pricing is supposed to work in theory. His guide is at odds with the Draft Scoping Plan for every point. He explains that "First and foremost, carbon pricing only works in the absence of any other emission regulations", but the proposal is in addition to the emission regulations of the Climate Act itself. The Guide goes to note "another important rule for creating a proper carbon-pricing system is to be as careful as possible in estimating the social cost of carbon". He argues that "whatever the social cost of carbon is determined to be, the carbon price must be discounted below it by the marginal cost of public funds (MCPF) — that is, the economic cost of the government raising an additional dollar of tax, on top of what is already being raised". The Draft Scoping Plan does not even recognize the importance of this aspect of carbon pricing. He concludes: "There may be many reasons to recommend carbon pricing as climate policy, but if it is implemented without diligently abiding by the principles that make it work, it will not work as planned, and the harm to the Canadian economy could well outweigh the benefits created by reducing our country's already negligible level of global CO2 emissions." Substitute New York for Canada and I believe this describes this policy option.

[Caiazza Comments on Section 2.1 Scientific Evidence of Our Changing Climate](#) 2 June 2022

At a recent Climate Action Council meeting one of the council members noted that very few comments were presented at the public hearings questioning the necessity of greenhouse gas emission reduction action inherent in the Climate Leadership and Community Protection Act (Climate Act). I believe that was primarily because presenters were only given two minutes so they had to pick their battles. These comments have been prepared for the record based on my long experience in air pollution meteorology, my education and direct experience with many aspects of New York climate. I believe that until specific climate catastrophes can be shown to be the result of anthropogenic greenhouse gas emissions using observational data, that there is no existential climate threat that can be alleviated by reducing New York emissions.

In the comments I refuted many of the claims made in Section 2.1 of the Draft Scoping Plan. I argued that if documentation is not included that explicitly supports the claims made and contradicts my comments and [attachment](#), then I think those claims should be removed from the final Draft Scoping Plan.

[Caiazza Comment on the Alleged Climate Crisis July 1, 2022](#)

I recommend that the Final Scoping Plan include a conditional schedule that considers the availability of necessary technology and potential impacts to reliability and affordability before implementing certain control measures. I expect the response will be that because there is an existential threat due to climate change and we are seeing the effects of climate change now that we cannot wait to act.

I provide references by noted experts that explain why there isn't a climate crisis and why the Draft Scoping Plan's reliance on the Intergovernmental Panel on Climate Change summaries for policy makers is mis-placed. I also explain that it is inappropriate to claim that every observed extreme weather event is evidence of climate change.

[Caiazza Comment Overlooked Impacts and Life Cycle Analysis June 30, 2022](#)

In this comment I address the environmental and life cycle costs and benefits discussion in the Draft Scoping Plan. In general, the Plan over-estimates benefits and under-estimates costs throughout the document and associated documentation. This extends beyond financial costs and includes environmental impacts, upstream emissions, and life-cycle emissions.

I maintain there is a major shortcoming in the analysis of the environmental impacts of the transition to net-zero electric generation by 2040. The most recent environmental impact analysis only addressed a fraction of the total number of wind turbines and area covered by solar PV installations. In addition, the environmental impacts of battery energy storage were not addressed. It is impossible to project the impacts of the environmental impacts of the dispatchable emissions-free resource that it included in the capacity projections because a specific technology has not been specified. The comments quantify the renewable energy resource difference between the most recent environment analysis and the Integration Analysis projections.

I recommend that the Department of Environmental Conservation propose thresholds for unacceptable environmental impacts. I believe that without addressing this problem that it is likely that the environmental impacts from the massive wind and solar resource developments will have far worse impacts than those that can be ascribed to climate change. For example, I project that at least 216 Bald Eagles could be killed every year when there are 9,445 MW of on-shore wind. There were [426 occupied bald eagle nest sites](#) in New York in 2017. I am not a wildlife biologist but those numbers indicate to me that there will be major threats to the survivability of Bald Eagles in New York. The Final Scoping Plan must include proposed thresholds for unacceptable environmental impacts like this.

The Climate Act includes a mandate to consider the upstream emissions associated with the extraction, production, and transmission of fossil fuels imported into New York State. I argue that the Final Scoping Plan should address the upstream emissions of renewable technologies. While touted as "zero-emissions" the fact is that there are significant environmental, economic, and social justice impacts associated with the production of those technologies. I believe that information should be provided to help inform the state energy planning board's adoption of a state energy plan.

I included the article [The Hard Math of Minerals](#) in my comments because it gives an excellent overview of the renewable technology issues ignored in the Draft Scoping Plan. The Draft Scoping Plan does not recognize that the massive expansion in the use of wind, solar, and energy storage technologies significantly changes the material requirements. There are tradeoffs and consequences in this regard that the Final Scoping Plan should acknowledge.

The Draft Scoping Plan does not consider the impacts of the material requirements on the implementation plans in the mitigation scenarios. There is no consideration at all the New York plan will be competing with other jurisdictions with similar initiatives for the necessary materials. The Final Scoping Plan has to include a backup plan if material shortages affect the deployment schedules. The Integration Analysis has optimistic cost reduction assumptions for future years but does not consider that the materials component of batteries, wind turbines, and solar panels will become increasingly important in the future. As other jurisdictions compete for those limited and difficult to obtain resources it is likely that costs will rise so much that the Integration Analysis projections are invalid.

There is another aspect of the materials requirements that should be addressed by the Climate Action Council. Mills explains that Jennifer Dunn, [a pioneer in social life cycle assessment](#), has noted that “technologies that are designed to solve grand challenges such as climate change must consider both their environmental and social impacts to understand their true consequences. The Climate Action Council should bring this issue to the attention of the Climate Justice Working Group. I recommend that it should be addressed in the Final Scoping Plan.

Mills concludes that “based on today’s physics and technology, the only path to an energy system with a material intensity lower than hydrocarbons would be one focused on nuclear fission.” Given that nuclear power is also the only scalable dispatchable emissions-free generating resource that we know will work, the Final Scoping Plan should include a Scenario that takes advantage of those capabilities. The Climate Action Council needs to address why this approach has not been considered.

Costs vs Benefits

[Caiazza Personal Comment on the Benefits Greater than Costs Claim](#) May 30, 2022

The scoping plan claims that “The cost of inaction exceeds the cost of action by more than \$90 billion”. In my [verbal comments](#) at the Syracuse Climate Act public hearing I said that statement is inaccurate and misleading. This comment explains why the Draft Scoping Plan must address this issue and makes recommendations for changes to language to clarify the caveats associated with the claim.

These comments show that the trick used to deceive the public into understanding that benefits outweigh costs is neglecting to mention the caveat that the statement is relative to the Reference Case. Instead of using a business-as-usual case for comparing impacts, the Integration Analysis defines the Reference Case to include already “implemented” strategies. That approach excludes legitimate Climate

Act costs by mis-categorizing initiatives such as the 2035 zero-emission vehicle legislation and the 9 GW of off-shore wind mandate in the Climate Act as part of the business-as-usual Reference case. The final Scoping Plan should describe all the control measures, provide the assumptions used for the strategies, and list the expected costs and expected emission reduction for each measure for the Reference Case, the Advisory Panel scenario and the three mitigation scenarios so the public can decide for themselves which costs associated with “already implemented” program are appropriate.

Benefits

[Caiazza Comment on Draft Scoping Plan Benefits June 22, 2022](#)

These comments address the Scoping Plan benefit claims and explain how the value of carbon is used incorrectly.

The Scoping Plan air quality improvement benefits range between \$100 billion and \$103 billion for the low values and the high values range between \$165 billion and \$172 billion. These benefits are due to an air quality improvement for PM_{2.5} of 0.35 µg/m³ that is supposed to “avoid tens of thousands of premature deaths, thousands of non-fatal heart attacks, thousands of other hospitalizations, thousands of asthma-related emergency room visits, and hundreds of thousands of lost workdays”. However, the modeled impacts rely on a linear no-threshold model. The observed PM_{2.5} reduction in New York City since 2005-2007 is 5.6 µg/m³ and that is 16 times higher than the projected decrease due to the Climate Act. Using the linear no-threshold model that means that we should be able to observe sixteen times tens of thousands of premature deaths, sixteen times thousands of non-fatal heart attacks, sixteen times thousands of other hospitalizations, sixteen times thousands of asthma-related emergency room visits, and sixteen times hundreds of thousands of lost workdays. When the Climate Action Council and Final Scoping Plan verifies that these reductions have been observed I will accept these benefits.

The Scoping Plan admits that the health benefits from increased active transportation “should be considered a first-order approximation of the benefits of increased active transportation”. The active transportation health theory claims that as people are forced out of their personal vehicles some will switch to walking and biking. Those activities are healthier so there is a benefit. However, the analysis was conducted at the state level, rather than modeling changes in walking and biking activity due to changes in vehicle miles traveled within counties or individual communities. Because the actual number of places where this strategy could actually encourage more walking and bicycling to work is small relative to the state as a whole, the \$39.5 billion health benefit claim is far too high. The Final Scoping Plan active transportation benefits should be revised to take into account the number of places where this might work.

The majority of the health benefits from energy efficiency interventions in Low and Middle Income (LMI) homes are the result of “non-energy interventions”. The Climate Act intends to transform the energy sector so it is disingenuous to claim health benefits not directly related to energy efficiency programs themselves. Of the \$8.7 billion in benefits claimed \$3 billion is due to reduction in asthma-related incidents resulting from better ventilation not directly due to energy efficiency. The \$2.4 billion in benefits from reduced trip or fall injuries and reduced carbon monoxide poisoning benefits are non-energy interventions and should not be claimed as benefits for GHG emission reduction programs. The “non-energy interventions” benefits should not be included in the Final Scoping Plan.

The Scoping Plan claims that 2020-2050 societal benefits are greater than societal costs by between \$90 and \$120 billion. The largest proposed benefits come from avoided GHG emission impacts on climate

change due to emission reductions. The Climate Act Scoping Plan manipulates the emissions, the emissions accounting, and calculation of social cost of carbon benefits to inflate these benefits to claim that there are net benefits. In order to maximize the benefits from emission reductions the Scoping Plan uses non-conventional assumptions to contrive increased emission estimates that are 1.9 times higher in 1990 and 2.3 times higher in 2019 than conventional, or UNFCCC, format for emissions accounting used by other jurisdictions. New York's [Value of Carbon guidance](#) chooses a lower discount rate that places lower value on immediate benefits relative to higher delayed benefits received in the future. The combined effect of the higher emissions and lower discount rate means that New York's societal benefits of GHG emission reductions are 4.5 times higher for 1990 emissions and 5.4 times higher for 2019 emissions than other jurisdictions. Most importantly, it is inappropriate to claim the benefits of an annual reduction of a ton of greenhouse gas over any lifetime or to compare it with avoided emissions. The Value of Carbon guidance incorrectly calculates benefits by applying the value of an emission reduction multiple times. If you lost five pounds five years you cannot claim that you lost 25 pounds but that is what the Draft Scoping Plan is doing. Using that trick and the other manipulations results in New York societal benefits more than 21 times higher than benefits using everybody else's methodology. When just the over-counting error is corrected, the total societal benefits range between negative \$74.5 billion and negative \$49.5 billion. The Final Scoping Plan should only take credit for societal climate change benefits based on total emission reductions from the baseline, the maximum observed total emissions or the most recent total emissions.

[Caiazza Personal Comments on Benefits of Climate Action](#) May 31, 2022

The Draft Scoping Plan asserts that there will be benefits from the implementation of the Climate Act but provides no documentation to support that claim. These comments highlight the claims that must either be substantiated by analysis and documentation or removed from the final Scoping Plan.

These comments include my personal analyses of the potential effect of the Climate Act on global warming and global emissions both as an example of the analysis necessary to make claims and as a cautionary tale. The fact is that any expectation that the Climate Act will have any detectable effect on the severity of current or future climate change is mis-placed because the expected impact on global warming is an immeasurable 0.01°C by the year 2100. If you cannot measure the change in temperature there is no way you can detect a change in the purported effects of that temperature change.

In addition, when New York's emissions are considered in the context of global emissions it is unreasonable to expect that other jurisdictions will be encouraged to implement similar restrictions. In the first place, New York's emissions are less than one half of one percent of global emissions. At the same time, New York's 2020 Gross State Product (GSP) [ranks ninth](#) if compared to the Gross Domestic Product (GDP) of countries in the world. That ranking was achieved in no small part because New York has had access to abundant, reliable, and affordable energy for many years. Expecting that countries without our wealth will be encouraged to develop costly zero-emissions energy resources is naïve and [immoral](#).

[Caiazza Comment on the Scoping Plan Social Cost of Carbon Benefit Calculation](#) 18 March 2022

This comment addresses two issues with the Draft Scoping Plan Social Cost of Carbon Benefit calculations. I explain that the methodology is flawed and that I cannot reproduce the values in the

Scoping Plan. This is important because the only way that the Scoping Plan can claim that the “cost of inaction exceeds the cost of action by more than \$90 billion” is by using a defective approach.

The societal cost of carbon reduction flawed methodology argument is the same as in my [June 22, 2022 comment](#). I was unable to reproduce the numbers in Appendix G – Integration Analysis Technical Supplement Section I – Page 63 that states: “Reducing GHG emissions in line with Climate Act emissions limits avoids economic impacts of damages caused by climate change equaling approximately \$235 to \$250 billion.” The comment explained what I did and asked for an explanation.

Costs

[Caiazza Draft Scoping Plan Transportation Scenario Incremental Cost Comment June 25, 2022](#)

This is a technical comment on a trivial problem and has no major bearing on Climate Act implementation. However, it raises a pervasive issue that needs to be addressed. All indications from the Climate Action Council meetings this year are that the plan for public involvement is simply going through the motions. There was no attempt to start identifying comments as they were submitted to determine if they rose to the level where the Council would have to address them specifically. Instead, Council leadership has insisted that they can only respond once the comment period closes. In addition, there is no provision for the kind of discrepancy documented here to be reconciled. While this problem is not a big deal, the terrifying prospect is that the issues associated with reliability raised at last summer’s [Reliability Planning Speaker Session](#) could possibly be treated the same, that is to say ignored.

Every time I have dug into the numbers, the Draft Scoping Plans numbers are not a reasonable estimate compared to my work. I have consistently found that the Scoping Plan costs estimates are biased high and the benefits proposed are biased low. This is a specific example that shows that one of the conclusions for Scenario 4 is not correct.

In particular, this comment evaluated the transportation sector vehicle miles traveled difference between Scenarios 2 and 3 compared to Scenario 4 due to rail passenger improvements. The Draft Scoping Plan claims that “Incremental reductions from enhanced in-state rail aligning with 125 MPH alternative detailed in Empire Corridor Tier 1 Draft EIS” will provide a reduction of 200 million light duty vehicle miles at a per unit cost of \$6 per mile or \$1.2 billion. I estimate that the only valid cost for the difference between the rail alternatives is \$8.4 billion and that it would only provide a reduction of 64.7 million miles. While my estimate is for 2035, consistent with the Empire Corridor evaluation, and the Draft Scoping Plan is for 2050, I don’t think there is any question that the numbers are inconsistent.

I conclude that the Final Scoping Plan must provide more detailed documentation because there is little reason to trust the cost estimates in the Draft Scoping Plan because of the pervasive issues I have found. I believe that the Final Scoping Plan documentation should provide sufficient information so that anyone can readily determine the costs and emission reductions for their particular concerns. In my opinion in order to fulfill this obligation, the Final Scoping Plan must describe all control measures, assumptions

used, the expected costs for those measures and the expected emission reductions for the Reference Case, the Advisory Panel scenario and the three mitigation scenarios.

[Caiazza Comment Electric Service and Distribution System Upgrades Needed for Electric Heating](#) 15 May 2022

These comments estimate costs associated with the distribution network for upgraded residential electric service; electrical distribution system improvements so that all homes can heat with electricity and use the “more usual and affordable” overnight electric vehicle chargers; and disconnecting natural gas supplies. I found that these costs range from \$16.8 to \$43.1 billion. These costs don’t include the costs to homeowners, who must pay for the service upgrade, service entrance wires, and circuit breaker panel box. And, of course, does not include the purchase new appliances or the installation of EV chargers. This cost estimate also does not include disconnection costs for fuel oil or propane heated homes. Finally, these estimates only apply to single family homes and not the 4.2 million housing units that are in multi-family buildings. The only way to determine if these costs were properly accounted for in the Integration Analysis is to describe all the control measures, provide references for assumptions, list the expected costs for those measures and list the expected emission reductions for the Reference Case, the Advisory Panel scenario and the three mitigation scenarios.

[Documentation for Caiazza Comments at Public Hearing in Syracuse on April 26, 2022](#)

This comment documents the written comments I submitted on April 22 to the Council. I don’t think the Council, much less the public, appreciates the Draft Scoping Plan’s claimed benefits, costs, threats to reliability, or effect of the proposed reductions on global climate change.

The scoping plan claims that “The cost of inaction exceeds the cost of action by more than \$90 billion”. That statement is inaccurate and misleading. The plan claims \$235 billion societal benefits for avoided greenhouse gas emissions. I estimate those benefits should only be \$60 billion. The Scoping Plan gets the higher benefit by counting benefits multiple times. If I lost 10 pounds five years ago, I cannot say I lost 50 pounds but that is what the plan says.

The cost estimates are poorly documented but I have determined that they misleadingly exclude the costs in the transportation investments category needed to make the necessary reductions. The semantic justification is that the program is already implemented. Adding \$700 billion for that and using the correct avoided cost of carbon means that costs are at least \$760 billion more than the benefits.

Reliability will be risky. When buildings are 100% electric and transportation relies on electric vehicles, what happens when there is an ice storm? There are many similar “what if” scenarios not considered.

New York emissions are less than one half of one percent of total global emissions. Global emissions have been increasing on average by more than one half of one percent per year.

Anything we do will be displaced in a year, cost a lot of money and risk catastrophic blackouts. The plan must be revised to one based on technically achievable incremental steps that maintain current standards of affordability and reliability.

Electric System

[Caiazza Electric System Comments](#) June 30, 2022

These comments address a few Draft Scoping Plan electric system issues. The ultimate problem is that the Climate Act presumed that converting the electric grid from its current reliance on fossil fuels to provide reliable electricity when needed most was just a matter of political will. However, the New York Independent System Operator (NYISO) [Power Trends 2022](#) report notes: “Long-duration, dispatchable, and emission-free resources will be necessary to maintain reliability and meet the objectives of the CLCPA. Resources with this combination of attributes are not commercially available at this time but will be critical to future grid reliability.” The Draft Scoping Plan projects that the long-duration, dispatchable, and emission-free resource capacity requirement is about the same as the current fossil-fired generating capacity.

I estimated the costs for the projected generating capacity described in the Draft Scoping Plan Integration Analysis. My estimate of the overnight cost to develop the resources needed to transition to a zero-emissions electric system in 2040 are generally consistent with the Appendix G Figure 48 net present value of system expenditures. I estimate that the Reference Case capital costs are only \$82.5 billion and that the mitigation scenarios range from \$220 billion to \$400 billion. There are variances that I address to the extent possible.

The Draft Scoping Plan does not provide sufficient documentation to reconcile all the differences. My estimates only include the capital costs for the projected generating resources and do not include transmission ancillary services that must be included for a true estimate of the total costs to go to zero-emissions generation. In order to fully predict the costs of the Scoping Plan, the Climate Action Council should insist that the authors of the Integration Analysis provide more detailed analyses.

I submitted [other comments](#) that explained that the New York Independent System Operator (NYISO) is currently updating its System and Resource Outlook. I projected costs for their capacity projections and found that their cost numbers are 30% higher. I strongly recommend that the Climate Action Council reconcile the differences between these projections.

I quantified costs associated with some particular issues with the Integration Analysis cost projections. The Integration Analysis does not consider the effect of end-of-life retirements for wind, solar, and energy storage. I showed that in 2040 incorporating retirements would increase costs by at least 6%. However, costs jump considerably when costs to 2050 are considered. For example, my projected cost for Scenario 4 in 2040 is \$399,530 million but the cost to replace all the equipment that ages out between 2020 and 2050 is \$304,428 million. I also showed that the biomass and wind capacity factors are biased high. The observed statewide average wind capacity is trending down since 2015 and that

effect is not addressed in the Draft Scoping Plan. The Climate Action Council should ensure that the Final Scoping Plan addresses these issues

Finally, I explain that the future reliability of the electric system is dependent upon a robust estimate of worst-case renewable resource availability. The percentage of weather dependent capacity is different for mitigation scenarios and the NYISO projections and I believe that is something that needs to be reconciled by the Climate Action Council. I also re-iterated my concern that all the estimates of future renewable resource availability need to use as long a period of historical meteorological data as possible. The Climate Action Council should insist that a more detailed evaluation of worst-cast wind and solar resource availability be completed as soon as possible.

[Caiazza Comment on Hydrogen as a Zero-Carbon Firm Resource June 23, 2022](#)

This comment addresses the use of hydrogen in some form or other as the Draft Scoping Plan placeholder technology for the Zero-Carbon Firm Resource or Dispatchable Emissions-Free Resource (DEFR) generally accepted as a complementary requirement when intermittent resources like wind and solar make up a significant portion of the electric grid resource mix. Energy storage is required for intermittent resources but the cost for exclusive reliance on batteries is unacceptably high. These resources are included to maintain reliability when the wind does not blow and the sun does not shine for long periods. I conclude that the Final Scoping Plan has to do a much better job documenting the use of hydrogen for this resource to be considered credible.

My comments summarize background information in the Draft Scoping Plan and from the New York Independent System Operator (NYISO). I describe the Integration Analysis description of the Carbon-Free Electric Supply and the hydrogen costs provided in an Integration Analysis spreadsheet. I also describe the on-going NYISO update to their System and Resource Outlook that addresses DEFR. I used a relevant article, [Hydrogen Is Unlikely Ever To Be A Viable Solution To The Energy Storage Conundrum](#), as the outline for these comments.

The NYISO Power Trends 2022 report notes: “Long-duration, dispatchable, and emission-free resources will be necessary to maintain reliability and meet the objectives of the CLCPA. Resources with this combination of attributes are not commercially available at this time but will be critical to future grid reliability.” The Draft Scoping plan speculates without sufficient justification that the “zero-carbon firm resource” projections for the future can be met using hydrogen in one form or another. My concern is that the Plan does not provide enough reliable documentation to support the speculated use of hydrogen as the technology for this critical resource. The comments describe specific issues that need to be explicitly addressed in the Final Scoping Plan if the Climate Action Council is to make a compelling argument that this technology will keep the lights and heat on when needed most.

The Draft Scoping Plan calls for the use of so-called “green hydrogen” whereby hydrogen is produced by a carbon-free process of electrolysis from water. The first problem is that the costs for hydrogen produced using this technology are entirely speculative and by any reasonable basis of estimation will be

extraordinarily high. Compared to the cost of production using natural gas natural gas to produce hydrogen, “green” hydrogen will be more than five times more expensive.

I used a [Seeking Alpha](#) analysis to estimate the hydrogen needed if it was combusted to make electricity or used to power fuel cells. For the NYISO and Integration Analysis scenarios I found that between 73 and 155 turbines sized at 288 MW would have to be dedicated for this resource application. At this time the world’s largest hydrogen fuel cell is only 79 MW so between 266 and 566 fuels cells of that size would be required.

My analysis calculated the generation energy needed for electrolysis to support DEFR projections. Scenario 2 requires 3,342 GWh of energy for DEFR and 12,812 GWh for electrolysis which is about half the projected imported wind total in 2040. The Integration Analysis emphasizes the use of solar over wind and it appears that the electrolysis requirements are covered by these solar generation projections. Importantly, the NYISO draft Outlook Study projected DEFR requirements are an order of magnitude higher than the mitigation scenarios. As a result, the energy needed for the hydrogen to cover that need (130,353 GWh) is more than the projected total solar, land-based wind, and wind imported energy (121,875 GWh) in 2040. The Climate Action Council must reconcile the differences between these two estimates because of the ramifications on the energy needed for DEFR using green hydrogen.

The difference in projections also exacerbates the problem associated with the critical winter-time wind lull DEFR condition problem. The mitigation scenarios call for much more solar capacity 43,432 MW than the combined land-based wind, imported wind, and offshore wind (26,606 MW) capacity. The Final Scoping Plan must ensure that an adequate amount of hydrogen is stored before the winter because the solar resource is so poor in the winter that it is unlikely that much if any replenishment during the winter can be expected. It is also critically important that the worst-case wind lull is defined correctly because if it is not then there will not be sufficient hydrogen available to cover the DEFR resources and blackouts will occur. The Climate Action Council must ensure the Final Scoping Plan addresses both of these issues to ensure a reliable electric system when it is needed the most.

There is a clear need for a feasibility analysis for the use of hydrogen as the DEFR. For example, where will all the combustion turbines, electrolyzers, pipelines, and fuel cells be located? I suspect that there will be significant permitting issues with all the resources needed. The capacity factors for this resource in the Draft Scoping Plan are 2% for all mitigation scenarios so there will be implementation issues. In the existing system the generating sources designed for peaking power for this reliability requirement used the cheapest technology available (simple-cycle gas turbines). Meeting this requirement in the future using the hydrogen DEFR resource will be using the most expensive generating technology available.

There are numerous technical concerns that were not addressed in the Draft Scoping Plan. It is not clear whether the Draft Scoping Plan addressed the complex and energy intensive process of compressing and liquifying hydrogen for storage and transport. That will require large amounts of additional energy

which may be additional cost not yet figured into the calculations. I could not determine if the Draft Scoping Plan proposed to use the existing natural gas network in all or part. Metal embrittlement caused by exposure to hydrogen will no doubt require major modifications and replacements for the existing infrastructure. These costs must be clearly identified and included in the Draft Scoping Plan

[Caiazza Comment on Retirement Input Assumptions June 16, 2022](#)

In what appears to be a egregious attempt to reduce the published costs of wind, solar, and battery storage the Integration Analysis assumes that the expected lifetimes of those technologies is indefinite. As a result, units are assumed to remain online throughout the study period and no costs for replacements between now and 2050 are included. However, that is a poor assumption because it is totally unreasonable to expect that, for example, the existing land-based resources will still be in operation in 2050.

These comments document the contents of the Integration Analysis and Draft Scoping Plan lifetime assumptions. The results of a brief literature search for expected lifetimes for wind, solar, and battery storage are presented. Then the resource estimates in the IA-Tech Supplement Annex 2 Emissions Key Drivers spreadsheet are used to estimate the effect of the indefinite lifetime assumptions.

Using an indefinite retirement date for wind, solar and battery storage resources underestimate the total builds needed for 2050. For land-based wind between 3,814 MW and 4,600 MW are not included and for offshore wind between 6,200 and 6,600 MW are not included. The amount of solar not included ranges between 22,639 MW and 19,983 MW. Finally, for battery storage between 10,713 MW and 12,207 MW of additional resources will be need to be developed to meet the 2050 projected value.

Another way to look at the exclusion of these resources is that land-based wind development costs could be up to 45% higher than the projections that don't include reasonable retirement dates simply because that much more needs to be developed. Off-shore wind costs could be up to 38% higher, solar costs could be up to 35% higher, and battery storage could be up to 64% higher than projections that exclude reasonable retirement dates.

I conclude that there are questions that the Climate Action Council needs to address. Why shouldn't reasonable retirement dates be included in the Final Scoping Plan. What would the revised costs be if retirements were included?

[Reconcile NYISO and Integration Analysis Capacity Projections](#) Comment June 6, 2022

The New York Independent System Operator (NYISO) is currently (June 6, 2022) updating its System and Resource Outlook. The last [Outlook Study Status presentation](#) (April 26, 2022) noted that the draft report will be issued in June 2022. One of the supporting documents for this study is the [Capacity Expansion Zonal Results Analysis](#) spreadsheet. The projected new generating resources in the preliminary modeling results are different than the capacity additions in the Draft Scoping Plan Integration Analysis.

This comment documents the differences between the current preliminary draft NYISO capacity projections and the Draft Scoping Plan Integration Analysis. The point of this comment is that although the total generation capacity is pretty close between the analyses, the Climate Action Council and the NYISO have to reconcile four significant differences in the projections. The NYISO analysis projects dispatchable emissions-free resources capacity on the order twice as much as the three Integration Analysis mitigation scenarios. The NYISO analysis projects land-based wind capacity development about three times larger than the three Integration Analysis mitigation scenarios. The NYISO analysis projects off-shore wind capacity about 50% less than the three Integration Analysis mitigation scenarios. The NYISO analysis projects that solar will provide about one tenth the projected capacity of the three Integration Analysis mitigation scenarios.

The presentation notes it should be finalized this summer: “July 2022: Seek Board of Directors review and approval”. When the NYISO report and projections are finalized the differences between the Integration Analysis and this report must be reconciled.

At one of this year’s Climate Action Council meetings, I believe the idea of workshops to consider specific issues as suggested. I think this would be an ideal candidate topic for just such a meeting.

[Caiazza Comment Renewable Energy Systems and the Second Law of Thermodynamics](#) July 1, 2022

The Integration Analysis and the Draft Scoping Plan zero-emissions electric grid transition plan depend on a long-duration, dispatchable, and emission-free resource that does not exist. This comment explains why there are reasons to believe that a commercially viable and affordable resource like this may never be developed. I conclude that the Final Scoping Plan must include a conditional implementation schedule based on the availability of this resource.

[Caiazza Comment on Astoria Repowering Application and the Draft Scoping Plan](#) 16 March 2022

This submittal referenced [comments](#) I submitted on the New York State Department of Environmental Conservation (DEC) decision to deny the NRG Astoria Gas Turbine Power Replacement Project Title V Permit Application. In my comments I argued that the Climate Act has the obligation to not impede the provision of safe and adequate electric service. DEC’s denial of the Astoria Gas Turbine Title V application because it: “Does not demonstrate compliance with the requirements of the Climate Leadership and Community Protection Act” is at odds with that mandate. The Climate Action Council should step in and make sure that agencies are not prematurely enacting policies or making decisions that could be at odds with the Final Scoping Plan.

The bottom line is that New York State should be grateful that someone is willing to come in and provide an interim solution that will guarantee New York City electric system reliability standards are maintained. All that DEC needs to do is to add a permit condition that makes it clear that the operating certificate will be pulled if certain conditions are met. If technology is proven available to replace the proposed Astoria Replacement Project on the Climate Act schedule, then the facility gets shut down at

that time. If it turns out that the “zero-emissions” technology solution is hydrogen combustion in a turbine designed to burn that fuel as well as natural gas as proposed by the applicant, then the facility can continue to operate with that fuel. It is not clear how DEC can reconcile throwing away these reliability options when there is no other option available.

I believe that the Climate Action Council should develop criteria for schedule implementation. A collective crossing of fingers that a new technology will maintain existing standards of reliability and affordability is inappropriate. In this instance, DEC’s decision to disapprove two proven interim solutions eliminates reliability options when there is no other commercially proven option available. The Scoping Plan should establish the milestones and conditions that have to be met before any existing technology is dismantled.

[Caiazza Personal Comment on Renewable Energy Resource Availability](#) 11 March 2022

This comment explains why an accurate and detailed evaluation of renewable energy resource availability is crucial to determine the generation and energy storage requirements of the future New York electrical system. I describe the history of blackouts in New York and specific lessons from Texas that must be incorporated into New York planning to prevent a similar problem in New York. I explain that in order to ensure electric system reliability for an energy system that depends on renewable generators and energy storage, the resources available during periods of low wind and solar energy production must be known. To date, many studies do not consider the importance of worst-case conditions on reliability planning and I believe that the Draft Scoping Plan also fails to address this issue. I show that there is a viable approach that could robustly quantify the worst-case renewable energy resources and provide the information necessary for adequate planning. I recommend that such a study be commissioned as soon as possible to determine if the existing estimates of New York’s electrical energy renewable resources are adequate.

Technologies

[Caiazza Personal Comment Electric Vehicles](#) June 3, 2022

I prepared this comment because I found that the Integration Analysis is simply making assumptions about future zero-emissions transportation implementation strategies without providing adequate referenced documentation. There are numerous recommendations for additional documentation in these comments so that New Yorkers can understand what will be expected and how much it will cost.

The Integration Analysis projections for electric vehicle costs start in 2020. The observed data is not consistent with the projections. The final Scoping Plan should address those discrepancies. In addition, it may also be necessary to revise the Integration Analysis.

As far as I can tell, the electric vehicle costs are based entirely on new vehicle sales. There is no acknowledgement that the used car market will likely change because of the cost of battery replacement. Sellers will likely get less relative to new cars in the battery electric vehicle market. Buyers may get a relative deal but will lose in the end when the batteries have to be replaced.

A common theme in the Draft Scoping Plan is that any doubts that the public has about any aspect of the net-zero transition can be simply addressed by convincing them with appropriate information. This is also evident in the zero-emissions vehicle presentation. The problem is that the draft Scoping Plan only tells one-side of the story instead of presenting all the issues and making a case for their preferred approach. Simply put, that is propaganda and it has no place in the Scoping Plan.

There is no bigger disconnect between the ZEV proposed strategy and reality than the ZEV charging infrastructure requirements. The biggest problem is that millions of cars will have to rely on chargers that cannot be dedicated for the owner's personal use because the owners park on the street or in a parking lot. In order to provide a credible ZEV strategy, the final Scoping Plan has to describe a plan how this could possibly work. It is not enough to simply say it will work.

There is another disconnect between the public and the Climate Action Council when it comes to grid-interactive assets. This refers to using electric vehicle batteries as storage for the grid at times when the grid needs the power. I cannot imagine widespread public acceptance when told that their vehicles will be grid-interactive assets and that means that they will lose control of their vehicle's range because someone, somewhere decides that the power they have stored in their car for their use is needed somewhere else.

The Draft Scoping Plan assumes without documented analysis that zero-emissions trucks will be viable alternatives to current equipment. Moreover, there is no recognition that the trucking industry is nation-wide. If the proposed zero-emissions technologies costs are cheaper and don't impose marked changes to operations then everyone will convert because it is a better solution. However, if it is not a better, cheaper solution that drives adoption of zero-emissions vehicles everywhere what is the plan for out-of-state vehicles? I cannot imagine that trucks will have to meet New York registration requirements if they are just passing through the state. If deliveries to New York must use zero-emissions vehicles that would mean swapping the motive power and that would markedly increase costs. Because of its importance to the viability of the Integration Analysis the final Scoping Plan should account for these issues.

My comments analyzed the Integration Analysis spreadsheet documentation. The analysis presumes an unprecedented adoption rate for light-duty electric vehicles but provides no reason why this is possible. The biggest problem in the analysis is that the device costs for zero-emissions charging technology and the vehicles themselves is presumed to decrease significantly over time. Home EV chargers and battery electric vehicles both are claimed to go down 18% between 2020 and 2030. The overall cost decreases are so large that the total costs for the zero-emissions vehicles adoption is cheaper than using existing technology. I cannot accept this optimistic assessment of future cost reductions without documentation that addresses at least the potential for battery supply chain issues.

There are many specific issues with zero-emissions vehicles that are not addressed in the Draft Scoping Plan. As the United Kingdom implements their own EV mandates electric system upgrade costs have

become obvious. California is leading New York in EV adoption but there are warning signs that implementation is not working out as expected. None of the apparent unintended consequences are addressed. Safety issues related to fires are becoming an issue but the Draft Scoping Plan does not recognize the issue.

[Caiazza Personal Comment on Electric Vehicle Costs](#) June 12, 2022

I prepared this comment because I thought that a concern Ms. Arbetter brought up in a recent [interview](#) was appropriate for a comment. In particular, the Integration Analysis vehicle cost projections rely on a single vehicle type for light-duty vehicles. In the first place the value for regular vehicles seems high and, relative to all electric-vehicle prices last fall, the battery-electric costs seem low. The Climate Action Council should consider updating the Integration Analysis to better represent the types of vehicles used. The Council should also consider whether the costs of used cars should be incorporated into the analysis particularly because low and middle-income households purchase used cars rather than new cars. Finally, I question the optimistic rate of battery-electric cost price decreases used in the Integration Analysis. Of particular note is that there is no difference between the low-technology trajectory and the reference trajectory in the Integration Analysis spreadsheet IA-Tech-Supplement-Annex-1-Input-Assumptions.

[Caiazza Comment Calling for a Moratorium on Utility-Scale Solar Development](#) 18 March 2022

This comment is another example of one I submitted hoping that someone would be reviewing comments as they were submitted. I recommended that the Climate Action Council impose a moratorium on the development of utility-scale solar projects until permitting requirements have been established for responsible solar siting and protection of prime farmlands. Although the New York State Department of Agriculture and Markets (Ag & Market/Department) has policies on solar energy projects, the Article Ten [Trelina Solar Project](#) application to build and operate an 80-megawatt solar farm in the Town of Waterloo, Seneca County was approved despite the fact that it did not adhere to that policy. At a minimum all utility-scale projects should adhere to those policies.

One of my biggest concerns with the Climate Leadership and Community Protection Act (Climate Act) is that there hasn't been any kind of plan for development of the renewable energy resources necessary to meet the energy transition goals. As a result, there has been a land rush of utility-scale development projects on prime farmland because it is easiest and there isn't a state policy preventing it. This is particularly disappointing because, according to [New York's 10 GW Distributed Solar Roadmap: Policy Options for Continued Growth in Distributed Solar](#), there is a plan to protect farmlands from distributed solar development.

In addition, there have been other initiatives to develop responsible solar development guidelines. The American Farmland Trust [Smart Solar Siting on Farmland: Achieving Climate Goals While Strengthening the Future for Farming in New York](#) document and the New York State Energy Research & Development Authority [Agricultural Technical Working Group](#) both have developed or are developing recommendations for siting requirements that would protect farming communities and prime farmland.

Until those policies are in place it is appropriate for a moratorium. That action would not only protect communities and farmland but it would also help meet Climate Act goals. Using the Draft Scoping Plan solar projections and land use estimates for solar projects in the Article Ten queue in 2020 suggest that the smallest Scoping Plan scenario solar equipment area covered will be 353 square miles. Moreover, there are Climate Act considerations. The Climate Act has a “net-zero” target by 2050 that requires 15% sequestration. One of the strategies to meet that target is soil carbon management. Taking productive farmland out of production hinders that goal.

[Draft Scoping Plan Residential Heating Electrification Estimates](#) 15 February 2022

In my opinion, home electrification is a primary concern for New Yorkers given the importance of affordability and the impact to every household. Accordingly, I spent a lot of time trying to replicate the costs to retrofit existing furnaces with heat pumps as documented in these comments. I found that the existing documentation is too incomplete to be able to reproduce the cost projections.

These comments found that a primary driver of home heating electrification is the building shell cost. Given its importance all the assumptions used to generate the numbers must be available but there is insufficient documentation. The Draft Scoping Plan claims only 26% of residences need deep shell upgrades. I estimate that more than half actually will need to have deep shell upgrades using a more refined climatology. I estimate that the entire building sector component cost is \$230 billion relative to the reference case in the Draft Scoping Plan. I calculated that just the residential retrofit heat electrification costs range between \$259 billion and \$370 billion using one methodology and between \$295 billion and \$370 billion based primarily on the number of residences that need deep building shell upgrades.

I conclude that all of the material described in the section “What needs to be provided” must be publicly available to fulfill the obligations of the Climate Act and ensure that cost information necessary to determine whether PSC mandates are met. The Integration Analysis documentation has to be supplanted and the Draft Scoping Plan needs to be revised to specifically address these obligations.