Caiazza Cap-and-Invest Regulation Overarching Comments

These are my personal comments on the New York Cap-and-Invest (NYCI) program. These comments address the overarching issues that I believe need to be addressed as part of the proposed NYCI implementation. I have included an introduction as well as comments on the major design elements that the Department of Environmental Conservation (DEC) and New York State Energy Research & Development Authority (NYSERDA) are seeking feedback on currently. In order to provide hyperlink documentation and supporting information my comments are being submitted in a document that lists comments by themes and I have also filled out the on-line comment form.

These comments do not address the list of questions posed in the June webinar series dated June 23 that was released on June 28 simply due to time constraints.

Introduction

The NYCI implementation plan is to "Advance an economywide Cap-and-Invest Program that establishes a declining cap on greenhouse gas emissions, limits potential costs to economically vulnerable New Yorkers, invests proceeds in programs that drive emission reductions in an equitable manner, and maintains the competitiveness of New York industries." There will be significant consequences if the dynamics between these stated goals are not resolved. Unfortunately, there is no indication that tradeoffs between these goals are even being considered. Furthermore, implementation of this sophisticated and complicated economy-wide program is handicapped by the aspirational legislative constraints. In short, the timeframe is too short to get such a program in place by the end of the year.

If the influential book *Making Climate Policy Work* had been considered by the Climate Action Council or Governor's Office I believe that there would be substantive changes to the plan. Authors Danny Cullenward and David Victor show how the politics of creating and maintaining market-based policies render them ineffective nearly everywhere they have been applied. They recognize the enormity of the challenge to transform industry and energy use on the scale necessary for deep decarbonization. They write that the "requirements for profound industrial change are difficult to initiate, sustain, and run to completion." Because this is hard, they call for "realism about solutions."

I evaluated the *Making Climate Policy Work* analysis of RGGI. I agree with the authors that the results of RGGI and other programs suggest that programs like the NYCI proposal will generate revenues. However, we also agree that the amount of money needed for decarbonization is likely more than any such market can bear. The problem confronting the Administration is that in order to make the emission reductions needed I estimate they have to invest between $15.5 and $46.4 billion per year. The first issue that NYCI implementation must address is the revenue target relative to what is needed for investments to meet the Climate Leadership & Community Protection Act (Climate Act) 2030 GHG emission reduction target.

The use of NYCI as a compliance mechanism is more of a problem. The NYCI webinars have not acknowledged or figured out that the emission reduction ambition of the Climate Act targets is inconsistent with technological reality of the Climate Act schedule. Because GHG emissions are equivalent to energy use, limiting GHG emissions before there are technological solutions that provide zero-emissions energy means that compliance will only be possible by restricting energy use. It is essential that compliance enforcement consider this problem. The second issue that NYCI implementation must address is a feasibility analysis whether there will be sufficient allowances to avoid limits on power plant operations, gasoline availability, and natural gas for residential use for the 2030 Climate Act 40% GHG emission reduction target. Because of the importance of the electric system, I recommend that DEC and NYSERDA convene a panel to review electric grid reliability that includes the New York State Independent System Operator, New York State Reliability Council, Public Service Commission, and representatives from the generation and transmission companies.

There is no excuse to not consider changes to the schedule. While the NYCI webinars have not acknowledged that there are conditions relative to meeting the Climate Act targets, New York Public Service Law § 66-p. "Establishment of a renewable energy program" has safety valve conditions for affordability and reliability that are directly related to the two issues described above. § 66-p (4) states: "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".

The allure of a source of revenues and compliance certainty using climate policies that apparently have worked in the past led the Council and Governor to put the cart before the horse. The Cap-and-Invest Program recommended by the Climate Action Council's final Scoping Plan and proposed in Governor Kathy Hochul's 2023 State of the State Address and Executive Budget has not paid adequate attention to what made previous policies work and whether there are significant differences between the Climate Act requirements and previous policy goals in those other programs that might impact NYCI.

The remainder of these comments address specific design elements questions raised in the webinars.

Applicability and Thresholds

- What should be considered when establishing which source categories should be obligated?
    - Obligated sources should have a potential for realistic emission reductions beyond shutting down the source sector. For example, there is no realistic opportunity to replace aviation fuel for long-distance flights so the only control option is restricting flights. The whole-economy target mandate of the Climate Act is inconsistent with the reality that there are limited financial resources such that it might be appropriate to phase in allowance obligations for sources based on the relative magnitude of emissions and the cost per ton reduced. In my opinion, electric transmission system emissions from SF_6 leaks is a prime candidate for obligated source exclusion because 2019 emissions were 0.011 million metric

tons of CO_2e using GWP-20 compared to the state total GHG emissions of 376.18 MMT. That is only 0.029% of the state total. I suspect but do not know that the cost per ton reduced would be very high.

- What should be considered when establishing emission factors for upstream out of state fossil fuel emissions?
    - The overarching issue associated with upstream out-of-state emissions is that including upstream emissions is inconsistent with the professed desire to "Catalyze other states to join New York, and allow linkage to other jurisdictions." Other jurisdictions are upstream so how can NYCI account for that? On an implementation level the emissions factors must be transparently available and verified relative to alternative measurements.
- What, if any, special considerations should be given for assigning upstream out of state emissions to obligated sources? Are there any sources of data that New York State should consider in determining obligated sources?
    - In my three decades of experience with cap-and-trade emission accounting, reporting, and analysis I have no experience with upstream out-of-state emissions so I have no recommendations.

Non-Obligated Sources

- What considerations should be applied to establishing which sectors are non-obligated?

  Given the magnitude of the challenge and limits on money and resources there should be a focus on effectiveness. Non-obligated sources should include sectors that do not have realistic emission reduction control options, have inconsequential emissions, or have excess cost per ton reduced control options.

  If the modeling analyses use a reference case that includes "already implemented" programs, then all the sectors associated with those programs should be non-obligated sources. The NYCI auction proceeds should only be used for sources that have NYCI compliance options. Eventual implementation should be consistent with the modeling proposed on June 20, 2023.

- How might the regulation clearly represent emissions from non-obligated sources that are difficult to monitor? (e.g., non-fossil fuel agricultural emissions)

Compliance thresholds

- What should be considered when establishing thresholds for obligated emission sources?
    - There are trade-offs between implementation logistics and some of the NYCI goals. In general, I believe it is appropriate to minimize the number of obligated sources. I have extensive experience reporting emissions data from electric generating units and all the infrastructure necessary to provide that data is already in place. However, it is not clear to me that the EPA monitoring data will be used for the electric generating units. Instead, it is possible that the state will use fuel use data for the electric generators. If that is the case then the obligated sources should be the fuel suppliers. Given that it would be inappropriate to make every home that uses natural gas an obligated source, the logical obligated source for the sector would be fuel suppliers. This would provide consistency. It

would also simplify upstream reporting because the fuel suppliers know where the fuels originated.

- How significant is consistency of the threshold between emission source categories?
    - This is another instance where the quantity of emissions, the availability of control strategies, and cost effectiveness of control options should be considered. Instead of a mass threshold, a consistent metric that also includes potential effectiveness would be appropriate for all thresholds.

Allowance Allocation

- How should allowances be allocated, including considerations for no-cost or fixed price allowances?
    - The Regional Greenhouse Gas Initiative (RGGI) provided most of the allowances through an auction system. Set-asides for non-obligated sources are appropriate. Because this aspect of RGGI works and the NYCI proposal is consistent with this aspect any variations or exceptions to the RGGI allocation process should be avoided.

Auction Rules –

- Do you have recommendations for the structure and mechanics of allowance auctions.

  The Regional Greenhouse Gas Initiative (RGGI) developed an approach to allocate allowances through an auction system that works and any variations or exceptions to the NYCI allocation process should be avoided. I recommend using the same type of auction and schedule of quarterly auctions. A market monitoring system must be included like RGGI. In one departure from RGGI practice and in the interest of full transparency, I recommend that the EPA allowance holding documentation format that includes the ownership of the allowances be followed rather than the RGGI practice of anonymous ownership documentation.

Market Rules –

- Do you have recommendations for rules for participation in market and trading of allowances.

  The Regional Greenhouse Gas Initiative (RGGI) developed market rules that proved successful so any variations or exceptions to those rules should be avoided. This economy-wide strategy is supposed to be a market-based program but the suggestions that limitations on trading and site-specific constraints in the Climate Action Council recommendations are incompatible with a market program. To on one hand claim the benefits of existing programs but on the other hand to destroy the components that provided those benefits is a mistake.

  The first fundamental is trading. The ability for market participants to buy, sell, or trade allowances is a prerequisite. The RGGI Secondary Market Reports (e.g., Q1 2023) explain how the trading of physical allowances and financial derivatives, such as futures, forward, and option contracts, enable affected sources to manage risks and reduce costs to their customers. If there is no trading then this is not an emissions market program, it is simply a tax.

  The second fundamental is no site-specific constraints. A prerequisite for a trading program is that it is designed to control pollutants that have regional or global impacts not local impacts.

The Climate Action Council and Climate Act emphasis on environmental justice in disadvantaged communities has raised the idea that NYCI can also be used to address local impacts. In the first place there is no obvious way limit allowance use for a particular area. Allowances are not labelled for specific areas. Excess allowance surrender requirements ignore the fact that air quality impacts are not solely based on emissions but also local transport and diffusion. The poster child for this particular problem is a peaker power plant, but I have shown that the alleged peaker power plant problems are based on selective choice of metrics, poor understanding of air quality health impacts, and ignorance of air quality trends. Power plants are not the only sources in dis-advantaged communities and it is not clear how, for example, transportation sector allowance requirements could be traced to any particular location. There should be no site-specific constraints on allowances in NYCI.

The benefits of trading are only fully realized if the market is open to unrestricted participation. I personally participated in a RGGI auction and recommend the same participation criteria be used for NYCI. Nonetheless, I do think that the allowances held by all participants should be completely transparent so that all participants can decide for themselves if there are market manipulation issues. There must be rules in place that enable the State to modify or restrict trading if market manipulation is detected.

Program Ambition

- How should the starting point for the cap be set? For example, based on current emissions, or surrogate?
    - I recommend a three-year compliance period. For consistency the starting cap should use the same number of years for a representative period. The 2020 emissions are acknowledged outliers and should not be included in the starting cap.
- How should the cap decline? Should the cap decline at a fixed rate or take steps?
    - The cap should decline at the rate set by a feasibility analysis. As noted in my introductory comments I believe that New York Public Service Law § 66-p. "Establishment of a renewable energy program justifies a different emission reduction schedule if NYISO, DEC, and NYSERDA analysis shows that the Climate Act schedule is unrealistic. In my opinion, the State has not considered that there will be significant consequences related to the use of NYCI as a compliance mechanism if the deployment of zero-emissions resources necessary to make the reductions is delayed. The Hochul Administration has not acknowledged or figured out that the emission reduction ambition of their Climate Act targets is inconsistent with technology reality. Because GHG emissions are equivalent to energy use, limiting GHG emissions before there are technological solutions that provide zero-emissions energy means that compliance will only be possible by restricting energy use.

      The California Air Resources Board (CARB) has a GHG emissions cap-and-trade program that has been in place since 2019. Even though the Climate Act differs from the California plan because the Climate Act requires that all GHG emissions must be accounted for rather

offering some exemptions, I am disappointed that there does not seem to be much sign that New York is considering using the methodological approaches used by California.

Of particular interest is the CARB 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) that "lays out a path to achieve targets for carbon neutrality and reduce anthropogenic greenhouse gas (GHG) emissions by 85 percent below 1990 levels no later than 2045, as directed by Assembly Bill 1279." This is one example where New York's efforts could be informed by the California process and it addresses my feasibility concern. The California Air Resources Board 2022 Scoping Plan issued in November 2022 included a 2030 Uncertainty Analysis. The report explains that the implementation effort requires additional efforts beyond those already in place but notes:

> There is also uncertainty that the current mix of policies (regulations, incentives, and carbon pricing) will be sufficient to achieve California's 2030 target, at least 40% below 1990 greenhouse gas (GHG) emissions. Uncertainty is an inherent part of emissions forecasting and modeling – there is no model capable of predicting the future with perfect accuracy. As the on-going global COVID-19 pandemic and recovery has demonstrated, unexpected events can dramatically impact human welfare, economic activity, and GHG emissions.
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> In this analysis, we identify the drivers of uncertainty and analyze the potential impact of implementation delays on GHG emissions in 2030. That is, what if delayed implementation of actions as defined in the Scoping Plan Reference Scenario fail to achieve anticipated GHG reductions by 2030? This uncertainty analysis focuses on progress in achieving the 2030 target of at least 40% below 1990 levels by 2030 and does not include an assessment of the uncertainty faced in implementing the Scoping Plan scenario for achieving carbon neutrality by 2045.
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> We construct two scenarios that capture the largest emissions impact in 2030 from delays in implementation under the Scoping Plan Reference Scenario: delayed renewable capacity and delayed transportation electrification. We quantify the magnitude of the emissions impact under these two scenarios, highlighting the importance of these two actions in achieving the reductions outlined in the Scoping Plan Reference Scenario to hit California's 2030 climate target.

This is exactly what I believe is necessary for NYCI. The report notes that:

> The main drivers of future GHG emissions – technology costs, energy prices, macroeconomic conditions, and policy implementation – are not known with perfect certainty. Modelers make informed assumptions about these drivers and estimate a range of GHG emissions based on historic, current, and potential future

trends.

> Unanticipated changes in these variables impact GHG emissions, however they are largely outside the control of policy makers. In just the past few years, we have seen global geopolitical and macroeconomic events dramatically alter energy prices, technology costs, and GHG emissions in California. The impacts of these events are still being felt and will continue to impact California's economy and emissions – but are largely outside the control of the State.

The uncertainty analysis considered two scenarios: one for delayed renewable development and another for delayed transportation electrification. The delayed renewable capacity scenario description notes:

> In the Scoping Plan Reference Scenario, California has a 38 MMT GHG constraint in the power sector and achieves a 60% Renewable Portfolio Standard (RPS) by 2030 as required in SB 100. Under the delayed renewable capacity scenario, we construct an emissions trajectory from 2022 to 2030 under a 5-year delay in renewable capacity including infrastructure for existing renewable facilities as well as delays in permitting and construction for new renewable generation and transmission.

The delayed transportation electrification scenario description explains:

> In the transportation sector, there are two assumptions driving emissions in 2030 in the Scoping Plan Reference Scenario- per-capita vehicle miles travelled (VMT) are reduced 4% below 2019 levels by 2045 and 40% of light-duty vehicle (LDV) sales are zero emission vehicles (ZEV) by 2030 (with minimal medium-duty and heavy-duty vehicle decarbonization) aligned with California Institute for Transportation Studies (ITS) BAU scenario. In California, per-capita VMT increased from 2017 to 2019. Therefore, the assumption that VMT decreases, even marginally, without additional action is a risk to achieving the 2030 emissions under the Scoping Plan Reference Scenario. However, the overall emissions impact in 2030 of failing to achieve the 4% per capita VMT reduction is relatively small under the Scoping Plan Reference Scenario as compared to the emissions impact of near-term transportation electrification.

The analysis concludes:

> California's path to carbon neutrality by 2045 is predicated on achieving the emission reductions outlined in the Scoping Plan Reference Scenario. We find that delaying renewable capacity by 5 years will increase California emissions by 8% in 2030 while delaying vehicle electrification will increase emissions by 6% in 2030. While the magnitude of these values may seem small, the risks are high. 2030 is just over seven years away and the gap to achieving the sector targets in the Scoping Plan Reference Scenario are large.

These emission reductions outlined in the Scoping Plan Reference Scenario are not guaranteed and while some of the risk and uncertainty is global and largely exogenous, there are risks associated with implementation. These risks can potentially be reduced or eliminated with targeted policy interventions. While in this analysis we have highlighted the impact of delayed renewable capacity and transportation electrification, there are uncertainties in each implementation assumption across California's economic sectors. The magnitude of the emissions impact will vary as will any potential policy or regulatory intervention.

This analysis has focused on the risks associated with California achieving the GHG emissions outlined in the Scoping Plan Reference Scenario. Any increase in emissions on the pathway to 2030 will impact California's ability to achieve carbon neutrality by 2045. In addition, the technologies and fuels needed to achieve carbon neutrality will also face significant uncertainties in the future. While outside the scope of this analysis, the same implementation risks discussed in relation to renewable capacity may be relevant to emerging technologies like carbon dioxide removal or carbon capture and renewable hydrogen production.

I believe that there is regulatory justification for changes to the implementation schedule. Given the recent financing issues associated with off-shore wind projects, supply chain problems, and lack of sufficient trained personnel there is a real possibility that the Climate Act schedule is too ambitious. The only way to address this concern and prepare a realistic schedule is to do a study similar to the CARB 2030 Uncertainty Analysis. Any other cap decline options are inappropriate at this time.

- Allowance budget - The budget is allowances available for obligated sources. A set-aside account will hold allowances to be retired to account for GHG emissions from non-obligated sources.

  One question that was asked was what should be considered when designing the set-aside account and budget so that the program is consistent with the NYS GHG annual inventory? I recommend that consistency and transparency of the data should be a primary consideration.

  I do not have any opinions regarding specific considerations which would allow flexibility in covering the not-obligated emissions and establishing the allowance budget because those considerations should be a function of the sectors included in the non-obligated source category.

  I see no reason to depart from the RGGI allowance allocation procedures.

Program Stability Mechanisms

The Regional Greenhouse Gas Initiative (RGGI) developed the CCR and ECR approaches to moderate costs and sustain program ambition if emissions are higher or lower than anticipated

that works and any variations or exceptions to the NYCI allocation process should be avoided.

I recommend that the Cost Containment Reserve be set at 10% of the auction total in the same way that RGGI uses the mechanism. The allowances should be added to the original allotment and not taken from subsequent auctions. It is only in 2030 that there is a legal requirement for a fixed emissions limit. In that compliance period the CCR cannot be used.

I recommend that the Emissions Containment Reserve follow the same methodology as RGGI. I do not see any chance that there will be opportunities for reducing emissions further due to lower costs than anticipated but it should be in place in case a miracle occurs.

In order to set an auction reserve price, it is necessary to determine the revenue goals of NYCI. DEC and NYSERDA must determine how much money is needed to fund the necessary control strategies. Using that information and the expected revenues from other sources, then the auction revenue target can be set and the auction reserve price derived.

For example, the following table uses the range of 2022 emission estimates (384.92 and 345 million metric tons of CO_2e) and the range of cost per ton reduced ($533.79 and $487.75) from my analysis of RGGI control effectiveness to place bounds on the required reduction costs. If the assumption is made that all the reduction costs will be financed by auction proceed investments, then the annual revenue needed for the high bound is $9.278 billion and the low bound is $6.044 billion. That assumes that all the money collected is invested. However, this year's legislation includes a Climate Action Rebate of 30%. In order to maintain the revenue needed to meet the emission targets that means that the total collected must increase from $9.278 billion to $12.254 billion increasing the cost per ton reduced to $763. The legislation includd another 3% for small businesses and, this being New York, I assume that the administrative costs will be the same as the 7% as in RGGI. Incorporating those costs raises the total needed to between $15.463 billion and $10.073 billion. That assumes that all the environmental justice targeted money can be invested in reductions that benefit environmental justice communities. If the interpretation of the 40% for environmental justice communities is in addition to the investments needed to meet the reduction targets, then the annual totals increase between $46.390 billion and $30.219 billion.

Annual Projected Funding Range Needed to Meet Emission Reduction Targets

Costs for all Cap and Invest % Set-Asides	High	Low	High	Low
2022 emissions million metric tons	384.92	345.00	384.92	345.00
Annual tonnage reduction to get to 2030 target	17.38	12.39	17.38	12.39
Range RGGI Investment average $ per ton	$ 533.79	$ 533.79	$487.75	$487.75
Annual revenues needed to meet the trajectory	$ 9,277.99	$ 6,614.34	$ 8,477.69	$ 6,043.80
RRGI experience with adminstration costs (7%)	$ 3,247.30	$ 2,315.02	$ 2,967.19	$ 2,115.33
3% needed for small business set-aside	$ 1,391.70	$ 992.15	$ 1,271.65	$ 906.57
30% needed for Climate Action Rebate	$13,916.99	$ 9,921.51	$12,716.53	$ 9,065.70
40% needed for environmental justice target	$18,555.98	$13,228.68	$16,955.38	$12,087.60
Annual Proceeds Necessary to Make Reductions	$46,389.96	$33,071.69	$42,388.45	$30,218.99
Required Allowance Price $/ton	$ 2,668.96	$ 2,668.96	$ 2,438.74	$ 2,438.74

Costs Assuming All EJ Set-aside Reduces Emissions	High	Low	High	Low
2022 emissions million metric tons	384.92	345.00	384.92	345.00
Annual tonnage reduction to get to 2030 target	17.38	12.39	17.38	12.39
Range RGGI Investment average $ per ton	$ 533.79	$ 533.79	$487.75	$487.75
Annual revenues needed to meet the trajectory	$ 9,277.99	$ 6,614.34	$ 8,477.69	$ 6,043.80
RRGI experience with adminstration costs (7%)	$ 1,082.43	$ 771.67	$ 989.06	$ 705.11
3% needed for small business set-aside	$ 463.90	$ 330.72	$ 423.88	$ 302.19
30% needed for Climate Action Rebate	$ 4,639.00	$ 3,307.17	$ 4,238.84	$ 3,021.90
40% needed for environmental justice target	$ -	$ -	$ -	$ -
Annual Proceeds Necessary to Make Reductions	$15,463.32	$11,023.90	$14,129.48	$10,073.00
Required Allowance Price $/ton	$ 889.65	$ 889.65	$ 812.91	$ 812.91

DEC and NYSERDA should do a similar sort of analysis and determine the revenue targets so the allowance price reserve can be calculated. Now that the impacts of the Inflation Reduction Act are known, those revenues can be used to offset some of the NYCI revenue needed. Presumably ratepayers will also have to fund some of the strategies and that information should be considered.

Given the uncertainties with this program there should be no limitations on banking or any consideration of bank adjustments until after the 2030 compliance period. Banking is a necessary component of any cap-and-trade program. Not including banking turns NYCI into a tax.

NYCI categorically rejects the use of offsets despite their use in every other GHG emission reduction program. The loss of this flexibility mechanism complicates compliance alternatives and makes the program incompatible with trading programs in other jurisdictions. I strongly recommend that this option be considered.

Compliance, Enforcement and Penalties – Defines compliance periods and types of enforcement mechanisms.

- How often should obligated sources surrender allowances? If multi-year compliance periods are used, what percentage of allowances should be surrendered in an interim year?

  The RGGI allowance surrender methodology approach works and should be used for NYCI.
- How many years should a compliance period cover?

  I believe the RGGI three-year compliance period is appropriate for NYCI because it addresses inter-annual variability.
- What amount of time should be given between reporting of emissions and surrender of allowances?

  This question cannot be answered until the reporting methodology is determined. Clearly, the current statewide GHG reporting process which takes two years is inappropriate. Given the fuel reporting methodologies in place I suspect that reporting, truing up and surrender will take at least six months. It would be appropriate to setup a working group of affected source staff and DEC staff to discuss reporting issues.
- What approaches to enforcement and what types of compliance should be considered? How could assignment of multiple types of compliance mechanisms (e.g., surrender additional allowances and monetary penalties) be structured?

  My analysis of the current state of emissions relative to the 2030 Climate Act goals leads me to believe that compliance with the arbitrary schedule is impossible. The ultimate compliance strategy for any GHG emission limitation program is stop using fossil fuels. If there is no replacement energy available that means that compliance will lead to an artificial energy shortage unless there is a safety valve or affected sources pay a penalty.

  I believe that there is an appropriate safety valve mechanism. New York Public Service Law § 66-p. "Establishment of a renewable energy program" § 66-p (4) states: "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". If the modeling analysis finds that reliability or affordability issues are likely due to implementation issues, then this could be used to modify the schedule.

  In order to prevent artificial energy shortages, the other option is for affected sources to pay penalties. If the penalty is two times the average cost of allowances over the compliance period, then there will be an incentive to meet the Climate Act target as opposed to creating an artificial energy shortage. Any allowance surrender options will only exacerbate the allowance shortage so I recommend that they not be included.
- How should the potential for market manipulation be addressed?

  The market monitoring system used in RGGI should be included in NYCI. In one departure from RGGI practice and in the interest of full transparency, I recommend that the EPA allowance holding documentation format that includes the ownership of the allowances be followed rather than the RGGI practice of anonymous ownership documentation.

Reporting and Verification

- What sources must report?

  The pragmatic approach to reporting and verification would recognize that there are reporting limitations and limited resources. The distinction between obligated and non-obligated resources is an appropriate approach and should be included. I believe obligated sources should include those sources that have clearly defined emission calculation parameters (e.g., fuel use reporting obligations) and also represent a significant portion of total emissions, i.e., the source sector represents at least 5% of total emissions.

  I have been dealing with emissions reporting for cap-and-trade programs for three decades starting with the Acid Rain Program in the early 1990's. The Environmental Protection Agency standard of the accountability for tracking and reporting emissions is very high. Developing the infrastructure to record, report, and comply with their standards took enormous effort but the data are completely transparent and verifiable to national standards. Note, however, that this high level is only possible because the emissions are measured directly. That approach is not possible for many sectors covered by the Climate Act including all the non-obligated sources. However, that does not mean that there should not be accountability for non-obligated source emissions.

  There is another important difference between the emissions reported based on direct measurements at the source and emissions derived from emission factors. The measured values cannot change but if there are refinements to the emission factors or activity rate measurements then emission estimates can change. Note that the 2022 Sectoral Report 1: Energy report has a chapter entitled Planned Improvements that lists known issues where improved estimates are desired. There are numerous examples where the DEC emission factors used are questionable and I expect that affected sources will make investments to improve the emission factors for more realistic emission estimates. There have already been changes such that the Part 496 1990 baseline value of 410 MMT is different than the 2022 GHG emission inventory estimated 1990 emissions of 404.26 MMT. DEC and NYSERDA must consider how to manage inconsistencies in the databases resulting from emission factor refinements and whether changes to the Part 496 baseline are appropriate.

  There is another aspect of who should report. In order to minimize reporting and compliance infrastructure and resource requirements, I recommend that the affected sources be defined as close to the origination source as possible. In other words, instead of making gasoline stations the affected source with reporting obligations, the gasoline suppliers should be the affected sources. This would greatly simplify the reporting and compliance burden.

  My background is in the electric generating sector. This sector already has GHG reporting obligations but the statewide GHG emissions report uses fuel use rather than the emissions reporting system used for RGGI. That being the case then I recommend that their fuel suppliers

be the obligated source. The suppliers are also in the best position to estimate upstream emissions anyway.

- When should reporting begin and how often?

  Data availability timing is the final relevant difference between the EPA monitoring reporting methodology and the NYCI emission factor methodology. The EPA monitoring methodology can provide real-time updates of estimated emissions data. However, before the data can be submitted to EPA there are some retrospective data quality verification processing steps that must be completed. The EPA monitoring data are available to the agency 30 days after the end of the reporting period and reconciliation between emissions and allowances occurs 30 days after that. On the other hand, the emission factor activity rate data are not readily available and that accounts for most of the reason that the DEC GHG emission report has a two-year lag. Another consideration is that once these data are available, they should be verified by a third party.

- How reporting should be verified?

  There are some source sectors that will never have clearly represented emissions that can be easily verified. I believe that includes all the non-obligated sources. In order to have an acceptable level of accountability, the NYCI emissions reporting system must be much more open and transparent than the annual report for statewide greenhouse gas emissions, pursuant to Section 75-0105 of the Environmental Conservation Law has been to date. Instead of directly measuring the pollution emissions at the source, most NYCI emission estimates must rely on emission factors. EPA describes emissions factors as follows:

  > An **emissions factor** is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (e.g., kilograms of particulate emitted per megagram of coal burned). Such factors facilitate estimation of emissions from various sources of air pollution. In most cases, these factors are simply averages of all available data of acceptable quality and are assumed to be representative of long-term averages for all facilities in the source category (i.e., a population average).
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  > To calculate emissions using an emission factor the following equation is used:
  > E = A x EF x (1-ER/100)
  > where:
  > E = emissions;
  > A = activity rate;
  > EF = emission factor, and
  > ER =overall emission reduction efficiency, %

For the NYCI emissions to be accountable, all four of those values should be documented and available to the public. At this time this information has not been provided for all the emissions reported in the DEC annual report for statewide greenhouse gas emissions.

I have not reviewed the data verification program in the California program but believe that it would be appropriate to follow their lead.

- How should existing reporting programs be incorporated?

  Other GHG emissions programs like the California program have addressed these concerns. In the time available for these comments, I did not have the opportunity to review their reporting requirements. However, I suggest that DEC and NYSERDA appropriate as much of their methodology as possible because the effort to develop an accountable system is immense. There is no need to reinvent the process if the systems in other jurisdictions can be adapted for use in New York.

Use of Proceeds

I am concerned about the recently passed use of proceeds legislation because of conflicting goals of the principles of NYCI. DEC and NYSERDA have developed an official website for cap and invest that states:

> An economywide Cap-and-Invest Program will establish a declining cap on greenhouse gas emissions, limit potential costs to New Yorkers, invest proceeds in programs that drive emission reductions in an equitable manner, and maintain the competitiveness of New York businesses and industries. Cap-and-Invest will ensure the state meets the greenhouse gas emission reduction requirements set forth in the Climate Leadership and Community Protection Act (Climate Act).

There is an unrecognized dynamic between the stated goals of these principles. The New York Independent System Operator has stated that the CLCPA net-zero transition is "driving the need for unprecedented levels of investment in new generation to achieve decarbonization and maintain system reliability". The first step for determining the use of the auction proceeds should be to provide an estimate of how much these investments will cost in order determine how much money must be raised by the Cap-and-Invest program. If the investments are insufficient then the energy system will fail to meet the cap limits.

Dedicating auction proceeds to the limiting potential costs to New Yorkers is a politically expedient goal. However not only does it divert funding needed to reduce GHG emissions it also perversely discourages emissions reductions. Higher energy costs are supposed to make changes to behavior that reduce emissions but rebates do not encourage those changes.

The Climate Act focus on environmental justice in disadvantaged communities' mandates at least 35% of the proceeds be dedicated to those areas. While this is entirely appropriate because the inevitable increased costs of the energy transition will have regressive impacts, it is also

necessary to prioritize the investments to provide emission reductions. Energy conservation and energy efficiency investments that reduce energy burdens for low- and middle- income citizens should be the priority for the disadvantage community revenues.

Emission reductions must be a priority or the oft-touted compliance certainty feature could cause artificial energy shortages

Analysis – Modeling methods to assess potential market outcomes and impacts from the proposed Cap and Invest program.

Introduction

I want to make two points in these preliminary analytical modeling comments. There is insufficient information available for meaningful comments on the modeling inputs and techniques and the analyses must address trade-offs between the five guiding principles of the Hochul NYCI plan.

I have personal experience with the Integrated Planning Model (IPM) that has been proposed for use in this process. IPM was used by EPA for its electric system projections associated with all the iterations of NOx cap and trade programs over the years and I evaluated the results and impacts for all those programs. IPM has also been used for RGGI and I participated in the original model rule development and subsequent program design review modeling efforts. Based on my experience with RGGI it is impossible to provide meaningful comments without more detailed information from the developers. I also believe that reconciliation of issues is best addressed with technical meetings that allow for real-time questions and answers. The webinar format used for NYCI is inappropriate for technical issue resolution.

The NYCI webinars have emphasized that NYCI will incorporate the following guiding principles:

- *Affordability*: Craft a program to deliver money back to New Yorkers to ensure energy affordability
- *Climate Leadership*: Catalyze other states to join New York, and allows linkage to other jurisdictions
- *Creating Jobs and Preserving Competitiveness*: Protect existing jobs and support new and existing industries
- *Investing in Disadvantaged Communities*: Ensure 35%+ of investments benefit DACs
- *Funding a Sustainable Future*: Support ambitious clean energy investment

From the standpoint of emission reductions, it is telling that funding clean energy investments is listed last. The oft-cited compliance certainty feature of NYCI requires significant investments. The New York Independent System Operator has stated that the Climate Leadership & Community Protection Act (Climate Act) net-zero transition is “driving the need for unprecedented levels of investment in new generation to achieve decarbonization and maintain system reliability”. The analytical modeling must consider the balance between the “affordability” and “investing in Disadvantaged Communities” principles against the investments needed. If the investments are insufficient then the energy system

will fail to meet the cap limits. The modeling also must address the feasibility of the transition schedule that considers delays due to permitting delays, supply chain issues and trained labor constraints. Even if the money is available, it may not be possible to build it fast enough to meet the arbitrary Climate Act schedule and a modeling scenario must reflect that possibility.

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Program Ambition Modeling

The modeling analyses can be used to inform program ambition. In fact, further analysis in this regard should be a prerequisite to defining the cap and the cap trajectory. However, before meaningful stakeholder comment is possible the following questions should be addressed.

All previous NY regulatory proceedings that used IPM included stakeholder technical meetings. Given the number and depth of technical issues a stakeholder meeting/webinar that allows direct questions and answers, clarifying questions and responses, and a background rationale for the questions and answers would be appropriate. Are there any plans for this kind of meeting in this proceeding?

Examples of the technical questions that need to be addressed before NYCI program ambition issues related to program ambition are resolved include the following:

Will the technoeconomic inputs for the electric sector be provided in sufficient detail to provide meaningful comment? For the record the Integration Analysis documentation was inadequate in this regard. In order to evaluate the model output, the capacity factors and costs for all the electric sector control options should be provided. Recently the offshore wind developers asked for revisions to their contracts due to higher expected costs. Will those estimates be incorporated into this analysis?

How will IPM address resource adequacy for a system dominated by intermittent and diffuse wind and solar? Has the model been modified to address the balance between wind and solar availability and storage requirements? Does the model go beyond using annual averages to estimate what is needed to meet reliability standards that incorporate one in ten-year wind and solar resource availability? How will the model determine what transmission upgrades are necessary to supply Upstate wind and solar energy to New York City?

How will IPM address the dispatchable emissions-free resource requirement identified by the Integration Analysis, NYISO Resource Outlook, New York State Reliability Council Draft Scoping Plan Comments, and the recent Public Service Commission proceeding be addressed. What is the placeholder resource?

I do not believe that the Integration Analysis future resource projections have been reconciled against the NYISO Resource Outlook projections. How will lPM modeling be reconciled with the Integration Analysis and NYISO Resource Outlook? When will differences in the Integration Analysis and NYISO Resource Outlook projections for future electricity resource requirements be resolved?

Program Ambition - Policy Options

Another aspect of program ambition is the regulatory framework driving the required policy options for emission reductions. In order to evaluate the effects of different policy options, this kind of proposed modeling analysis projects future conditions for a baseline or "business-as-usual" case. The evaluation analysis makes projections for different policy options, and then the results are compared relative to the business-as-usual case. The webinar presentation indicated that the modeling plans to update the Scoping Plan's Reference case. The Integration Analysis comparison scenario Reference Case included "already implemented" programs. This definition of the Reference Case instead of a Business-As-Usual case is different practice and inappropriate for use with NYC as shown below.

The Scoping Plan Integration Analysis Reference Case, described as "Business as usual plus implemented policies", included the following policies:

- Growth in housing units, population, commercial square footage, and GDP
- Federal appliance standards
- Economic fuel switching
- New York State bioheat mandate
- Estimate of New Efficiency, New York Energy Efficiency achieved by funded programs: HCR+NYPA, DPS (IOUs), LIPA, NYSERDA CEF (assumes market transformation maintains level of efficiency and electrification post-2025)
- Funded building electrification (4% HP stock share by 2030)
- Corporate Average Fuel Economy (CAFE) standards
- Zero-emission vehicle mandate (8% LDV ZEV stock share by 2030)
- Clean Energy Standard (70x30), including technology carveouts: (6 GW of behind-the-meter solar by 2025, 3 GW of battery storage by 2030, 9 GW of offshore wind by 2035, 1.25 GW of Tier 4 renewables by 2030)

Webinar 6 stated that the Scoping Plan's Reference Case will be updated with policies adopted since the original case was designed. The webinar asks for input on which policies to include, such as:

Buildings

- NYC Local Laws
- Statewide new construction codes
- IRA Incentives

Transportation

- Advanced Clean Cars II/Advanced Clean Trucks
- 100% sales MHDVs by 2045
- 100% ZEV school buses by 2035, 100% transit buses by 2040

Natural Gas

- IRA Methane Charge
- EPA Supplemental Rule

- NYS Part 203

Refrigerants

- AIM Act (EPA Technology Transitions)

The inadequate Integration Analysis documentation precludes estimates of the relative magnitudes of the costs and ambitions of the total costs to reach net zero in the reference case as opposed to a true business-as-usual base case. A true base case should not consider any programs that are promulgated primarily to reduce GHG emissions. For example, the "Peaker Rule" was implemented to reduce NOx emissions as an ozone control strategy so it is an appropriate Base Case business-as-usual comparison scenario. On the other hand, the Clean Energy Standard (70x30), including technology carveouts: (6 GW of behind-the-meter solar by 2025, 3 GW of battery storage by 2030, 9 GW of offshore wind by 2035, and 1.25 GW of Tier 4 renewables by 2030) only exists to reduce GHG emissions.

In this context excluding things like the Clean Energy Standard is clearly inappropriate if NYCI is to fund the transition to net-zero. The intent of NYCI should be to provide revenues to get to the Climate Act net-zero targets not some arbitrary sub-set of programs that cannot be held accountable to the Climate Act. If the proposed Reference Case approach is used, that means that none of the NYCI auction revenues should be used to fund any of the programs listed. Given the magnitude of resources needed this is clearly not viable. The only rationale for this approach is to hide the true costs to reach net-zero. I strongly recommend that the modeling analyses use the standard business-as-usual base case.

Applicability and Thresholds

The use of the Reference Case as opposed to the Base Case also has ramifications relative to obligated vs. non-obligated sources. Obligated sources are required to surrender allowances necessary to meet the NYCI cap. Modeling this obligation with the Reference Case approach requires all the allowances associated with all the programs listed to be considered non-obligated sources. One question that needs to be addressed Is whether the reference case distinction is being considered a factor for non-obligated sources.

The proposed use of a reference case rather than a base case is unprecedented in the use of IPM for NY regulatory proceedings. How can the use of a reference case cover all the costs of the net-zero transition? Comparing the modeling scenarios against a true base case provides the total cost to meet the net-zero GHG emission target in the Climate Act. The Reference Case that excludes "already implemented" policies using the Scoping Plan terminology does not include all the costs to get to net-zero. Another question to resolve is: whether excluding the "already implemented" programs will underestimate the costs and policies needed.

One final point in this context is that in the electric sector, RGGI is an "already implemented" program so it should be a non-obligated sector.

Reporting and Verification

Although questions have been asked about reporting emissions data from affected sources, it is no less important to consider the State's reporting on GHG emissions. I will address the need for estimates of the current status of GHG emissions elsewhere. In short there are no official sector emissions so I had to rely on the Data NY and the Statewide GHG Emissions dataset available there to breakdown the differences between the 1990 baseline and the 2019 and 2020 emissions for various sub-sectors and fuels to estimate where the State stands. These are only estimates and not the official sub-sector emissions.

The following table summarizes the emissions using the New York State global warming potential accounting approach for 20 years and the Intergovernmental Panel on Climate Change accounting for 100 years for each of the sectors and the overall totals. It is not clear exactly which components of each sector will be subject to NYCI obligations but the totals suggest that the aspirational goals will be a challenge to meet. The agriculture, buildings, transportation, and waste sectors all need to reduce emissions over 40% between 2019 and 2030. While the electricity sector seems to be in good shape relative to the target the 2019 data does not reflect the shutdown of 2,000 MW of zero-emissions nuclear generation at Indian Point which raised the sector emissions by over 20%.

Statewide Greenhouse Gas Emissions (MMT) by Sector Relative to 2030 Target

		Baseline	Target		1990 - 2019		2019 - 2030	
	Year	1990	2030	2019	Delta	%	Delta	%
Agriculture	GWP20	15.28	9.17	21.25	12.1	132%	-12.1	-57%
	GWP100	5.91	3.55	7.75	4.2	118%	-4.2	-54%
Buildings	GWP20	103.52	62.11	119.82	57.7	93%	-57.7	-48%
	GWP100	84.97	50.98	90.96	40.0	78%	-40.0	-44%
Electricity	GWP20	94.51	56.70	50.66	-6.0	-11%	6.0	12%
	GWP100	82.90	49.74	40.30	-9.4	-19%	9.4	23%
Industry	GWP20	52.65	31.59	35.27	3.7	12%	-3.7	-10%
	GWP100	35.76	21.46	21.98	0.5	2%	-0.5	-2%
Transportation	GWP20	97.49	58.50	107.57	49.1	84%	-49.1	-46%
	GWP100	89.54	53.73	97.83	44.1	82%	-44.1	-45%
Waste	GWP20	40.81	24.49	41.62	17.1	70%	-17.1	-41%
	GWP100	15.30	9.18	15.36	6.2	67%	-6.2	-40%
Total	GWP20	404.26	242.56	376.18	133.6	55%	-133.6	-36%
	GWP100	314.40	188.64	274.18	85.5	45%	-85.5	-31%

Compliance, Enforcement and Penalties

I broke the emissions data down within these sectors in a blog post. The reason I include this information in these comments is because I don't think there is any doubt that meeting the 2030 40% reduction in emissions relative to 1990 is not going to be possible. The ultimate compliance strategy for

any GHG emission limitation program is stop using fossil fuels. If there is no replacement energy available that means that compliance will lead to an artificial energy shortage unless there is a safety valve or affected sources pay a penalty.

New York Public Service Law § 66-p. "Establishment of a renewable energy program" § 66-p (4) states: "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". If the modeling analysis finds that reliability or affordability issues are likely due to implementation issues, then this could be used to modify the schedule.

The other option is for affected sources to pay penalties. If the penalty is two times the average cost of allowances over the compliance period, then there will be an incentive to meet the Climate Act target as opposed to creating an artificial energy shortage. Any allowance surrender options will only exacerbate the allowance shortage so I recommend that they not be included.

I have been following this process since the idea for a cap-and-invest program was first proposed at Pragmatic Environmentalist of New York. I recently posted a Commentary overview for the New York Cap & Invest (NYCI) program that was written for a non-technical audience. In late March I summarized my previous articles on the New York cap and invest proposal in a post designed to brief politicians about the proposal if you want more technical information. There also is a page that describes all my carbon pricing initiatives articles that includes a section listing articles about the New York Cap and Invest (NYCI) proceeding.

I have extensive experience with air pollution control theory, implementation, and evaluation having worked on every cap-and-trade program affecting electric generating facilities in New York including the Acid Rain Program, RGGI, and several Nitrogen Oxide programs since the inception of those programs. I follow and write about the RGGI cap and invest CO2 pollution control program so my background is particularly suited for this proposal. The opinions expressed in this post do not reflect the position of any of my previous employers or any other company I have been associated with, these comments are mine alone.

Roger Caiazza
Pragmatic Environmentalist of New York
NYpragmaticenvironmentalist@gmail.com
Liverpool, NY