

June 19, 2017

The Honorable Senator Tony Avella
Room 902, Legislative Office Building
Albany, NY 12247

RE: Climate and Community Protection Act

Dear Senator Avella,

We appreciate that you have sponsored legislation on climate change.

As you know, addressing the climate crisis requires not only a desire to act, but a strategy for action that can succeed. Effective climate legislation must be rooted in science, setting forth goals that are clear, measurable, and realistic, identifying key actions that must occur, and providing the statutory framework through which those actions will be implemented. It must also be informed by a technical understanding of the challenges involved and the set of solutions capable of achieving success.

Serious concerns have been raised about the Climate and Community Protection Act (CCPA), which was introduced during the last few days of the 2016 legislative session. The three of us have carefully reviewed the 2016 bill, another version recently introduced this year, and an Assembly amendment filed late Friday afternoon. While we support the bill's legislative intent, in our view the CCPA is not equipped with content necessary to achieve its professed greenhouse gas reduction goal. We also respect that the Governor has an executive responsibility of ensuring that any bill he signs into law makes sense and can be effectively implemented. In our view the CCPA as presently written is not ready for his signature.

We are sure you agree that there is no benefit to legislation that sounds wonderful, but cannot deliver on its promises. Although a few changes have been made to the CCPA since last year, significant technical problems and programmatic issues remain that we believe must be addressed to produce credible climate legislation. The following describes several of our concerns. We hope you agree that it is prudent to take the time necessary to fully evaluate these issues and make necessary changes before seeking passage of the CCPA or other climate legislation next year.

Sincerely,



Anthony Ingraffea, Ph.D., P.E.



Jannette M. Barth, Ph.D.



Keith Schue

PROBLEMS WITH THE CLIMATE AND COMMUNITY PROTECTION ACT

1. Planning for the scale of complex synchronous actions that must occur

As presently written, the CCPA lacks critical content necessary to succeed. Approaching the bill's professed goal of eliminating anthropogenic greenhouse gas emissions is a complex and difficult task.¹ (Completely eliminating them is not realistic, as discussed in the next section.)

Making deep cuts in emissions will require the careful **synchronization** of two processes: (1) Reducing the supply and demand for sources of energy which produce carbon emissions, especially fossil fuels, and (2) increasing the supply and demand for sources of energy that do not. This requires a fundamental change in how we produce and consume energy. It will require the phasing out of fossil fuels from both power plants and end-user systems (such as vehicles, home furnaces, and industrial equipment); simultaneously with the widespread deployment of renewables, energy storage, efficiency improvements, and zero emission technology (such as electric cars and heat pumps). A stark reality is that the widespread replacement of vehicles, appliances, and equipment that burn fossil fuels will also require significantly more electricity than New York uses today, perhaps twice as much or more. Furthermore, if greenhouse gas reduction goals are to be met, that **additional** electricity must also be emissions free. Importantly, all of these activities must happen **at-scale** and **on-time** to meet climate goals while ensuring that the lights stay on, people don't freeze in their homes, and commuters can still get to work.

Accomplishing this daunting task will require the coordinated development of robust programs to ensure that these widespread changes affecting almost every home and business in the state occur. However, the CCPA merely requires that DEC adopt a "scoping" plan with recommendations, and it fails to require any proactive work by other agencies. The bill grants agencies "authorization" to take action, but it does not require that they actually do anything, nor does it provide any guidance as to what they should do. This is not a recipe for success. Unless a robust **implementation plan** is required to address key actions that must take place over time, any climate legislation that seeks to make deep cuts in greenhouse gas emissions will fail.²

As written, the CCPA puts virtually all responsibility for implementation on the DEC, calling on the agency to adopt rules and regulations pertaining to emission limits identified in the bill for specific years. This naively suggests that the government can simply mandate that every power plant, automobile, airplane and furnace in New York magically burn less fuel than it did the year before until fuel is no longer needed. The bill says almost nothing about the systemic and technological changes required—meaning what must be built, installed, switched out, or shut off.

¹ An amendment proposed by the Assembly on June 16 would exclude livestock emissions. However, as written, this does not sufficiently address the issue and creates additional problems with respect the state greenhouse gas inventory. See next section.

² We note that Governor Cuomo recently issued an Executive Order to administratively require that state agencies individually prepare implementation plans to meet the state's adopted greenhouse gas reduction goals. Although we believe that a coordinated effort is important, as such the Governor's order provides for more substantive action than the CCPA.

Success will require active and coordinated participation by all state agencies and levels of government to develop **actionable programs** that result in the timely development and replacement of physical systems, as well as the widespread installation of efficiency measures. The Governor's Clean Energy Standard is an example of one such program. However, many other programs, focused on different portions of our carbon footprint and lasting through the bill's end date of 2050, will be just as important. Planning is also needed to provide for the significant expansion of renewables and zero-emission technology which will be needed to satisfy an increased demand for electricity caused by the electrification of end-user systems. Critically important, the bill must contain quantifiable metrics by which to measure progress and actionable elements to ensure that these simultaneous activities remain in synch.

Instead of just a "scoping" plan, the bill should require that a comprehensive greenhouse gas reduction plan—an implementation plan—be developed. We recommend that the role of the Climate Action Council be strengthened so that its members are empowered to prepare this plan and work together across agency boundaries to collectively develop the cohesive set of new programs, policies, rules, and regulations that will be needed. Meaningful climate legislation should also enumerate "key actions" for which plans and schedules of implementation will be developed. A paragraph like this would be helpful:

To ensure that greenhouse gas emission limits are achievable, the [council/plan] shall quantitatively analyze and propose schedules for key actions that must take place at scale and on time to substantially reduce greenhouse gas emissions from the largest contributing sectors. The [council/plan] shall analyze and propose schedules for the following key actions:

- a. The widespread conversion of end-user systems that rely on fossil fuels to zero-emission technology, including but not limited to transportation and heating. Examples of zero-emission technology are electric vehicles, high-efficiency electric heat pumps, and machinery powered by electricity rather than fossil fuels;*
- b. The deployment of additional electricity from carbon-free sources necessary to support the widespread conversion of end-user systems that burn fossil fuels to zero-emission technology and eliminate fossil fuels as a source of electricity generation. Specifically, this shall include an analysis of additional electricity measured in gigawatt-hours annually that will be required, with attention to the necessary distribution and diversification of generators. Taking the need for additional electricity into account, this shall also include an analysis of improvements needed to the New York State Clean Energy Standard to ensure that statewide greenhouse gas emission limits can be met;*
- c. The widespread incorporation of expanded efficiency measures in new construction, existing buildings, and industrial processes;*
- d. Necessary improvements to the electrical grid and related infrastructure, including energy storage, to support the widespread deployment of renewables and increased demand for electricity;*
- e. The phase-out of existing power plants and other facilities that produce greenhouse gas emissions, synchronously with other key actions.*

In addition, we recommend that the bill identify various concepts and approaches that the council and member agencies should consider in developing the comprehensive set of rules, regulations, programs, and policies necessary. Such actions may include, for example, rules requiring heat pumps instead of furnaces for new construction, programs and incentives affecting the sale of zero-emission vehicles, and policies to curtail the construction of new power plants that burn fossil fuels. Existing policies that inappropriately encourage the expansion of gas infrastructure ought to be scrutinized as well. We encourage drafters of the CCPA to

review another bill that presently exists, **the Climate Responsibility Act (S5557/A8299)** sponsored by Senator Latimer and Assemblywoman Rosenthal, which contains useful content regarding various issues and actions that should be considered in the development of an effective implementation plan.

Finally, in addition to providing appropriate guidance in the development of an implementation plan, the bill should direct state agencies to actually adopt and implement rules, regulations, programs, and policies that will be needed. Coupled with this, an ongoing and iterative process is needed for measuring progress and making changes in a timely matter to ensure that the programs which are developed remain on track. As currently written, the CCPA lacks any of these necessary provisions.

2. Reality Problems and Setting of Benchmarks

Climate legislation cannot be effective unless the goal is understood. Today the state of New York has a clearly articulated goal for greenhouse gas reduction, first expressed in Executive Order 24 by Governor Paterson in 2009 and later reaffirmed by Governor Cuomo. Section 1 of 2009 Executive Order 24 states:

It shall be a goal of the State of New York to reduce current greenhouse gas emissions from all sources within the State eighty percent (80%) below levels emitted in the year nineteen hundred ninety (1990) by the year two-thousand fifty (2050).

Instead of introducing legislation to ensure that New York meets this goal, authors of the 2016 CCPA have put forth a bill to require the 100% elimination of greenhouse gas emissions by 2050. However, through various iterations of the bill and an amendment introduced last week, the meaning of 100% has changed. It changed through the inclusion of inconsistent language qualifying various types of emission sources as "major", by changes to the definition of "greenhouse gas emission source", and by changes to the definition of "statewide greenhouse gas emissions". However, in each iteration, including the latest one, that meaning remains unclear.

The fact is that eliminating 100% of all anthropogenic greenhouse gas emissions is not realistic. Livestock emissions (exempted from consideration in the latest Assembly amendment) is one example of the problem created by attempting to establish a 100% mandate, but it is not the only one. Our comments have focused on emissions from the energy sector (electricity production, transportation, heating, and the powering of machinery). However, greenhouse gases are the product of other activities too: for example the operation of sewage treatment plants, landfills, and crematoriums, or as a byproduct of certain chemical processes like the production of cement and semiconductors. Greenhouse gas emissions are also produced when fossil fuels are used as a raw material, like in the production of plastics and fertilizers. Through better management practices or processes, it may be possible to reduce many of these emission sources. (For example, livestock emissions can be reduced by changing the diet of cattle.) However, completely eliminating some of these emissions is not realistic. Even within the energy sector, the complete elimination of greenhouse gas emissions from each and every source (like aircraft and fireplaces) may not be feasible.

Although we understand that it may be politically attractive to advertise a goal of 100% greenhouse gas reduction, doing so is not intellectually honest. We also respect that the Governor cannot be expected to put his name on legislation that cannot be implemented in the real world.

Equally problematic is the notion of retaining a 100% greenhouse gas reduction goal that exempts certain emission categories or inserts ambiguity about what qualifies as an emission source. Excluding a category

means that no value is placed on reducing emissions from that category whatsoever. Those emissions are simply ignored. For example, the recent Assembly amendment (A8270-A) exempts livestock, despite the fact that meaningful action can be taken to at least partially reduce emissions from that sector. The same problem would manifest itself if other types of emissions, which cannot be *completely* eliminated, are excluded in order to continue advertising a misleading claim of 100%. Various permutations of the bill have also used biased criteria to create ambiguity about what qualifies as an emission source. Although the latest amendment removes those, it retains ambiguity with a definition of "**greenhouse gas emission sources**" that allows the DEC to qualify a source or category of sources based on whether "its participation in the program enables the department to effectively reduce greenhouse gas emissions." Although seemingly innocuous, this provision would conceivably let DEC ignore a source that it feels cannot effectively be reduced or that interferes with a determination that reductions have occurred.

The CCPA also improperly excludes emission sources from the state's **greenhouse gas inventory report**. The bill amended by the Assembly would exclude agricultural emissions and any other emission source that the DEC decides should not "participate." As such, the inventory would be an incomplete representation of New York's greenhouse gas footprint. Regardless of its name, it would not be a "statewide greenhouse gas inventory." This is a significant problem. New York's current greenhouse gas inventory prepared by NYSERDA does not contain blanket exceptions for certain emission categories, so the CCPA should not either.³

In our opinion, authors of the CCPA have gone to great lengths to create an illusion. **Instead of establishing a 100% greenhouse gas reduction mandate that cannot be met or that requires a complex assortment of loopholes or ambiguities to create an appearance of 100%, we recommend setting a bold but realistic target that is achievable and readily understood.**⁴ One option would be to uphold the state's adopted goal of 80% reduction in statewide greenhouse gas emissions from 1990 levels by 2050, but establish a parallel requirement that New York reduce greenhouse gas emissions from the energy sector (electricity, transportation, heating, and powering of machinery) by as close to 100% as possible.⁵ Another may be to seek a target in excess of 80% or a more aggressive timeframe. However, those inquiries should be informed by sound science and an understanding of the challenges involved.

It is critical that the greenhouse gas inventory described in Section 75-0105 of the bill be a comprehensive account of all statewide greenhouse gas emissions, using best available data and methods of analysis. Although we recognize that not all sources can be directly measured, **the inventory report should provide the most accurate estimate of emissions possible from all sources, large and small, and without exceptions.** Needless to say, all greenhouse gas emissions matter to the planet and contribute to climate change. Having an up-to-date, complete and credible account of total statewide greenhouse gas emissions is also essential to measuring progress.

³ This does not mean that the state's current greenhouse gas inventory is without flaws. We believe that NYSERDA's inventory seriously underestimates statewide emissions, relies on questionable data, and makes invalid assumptions about sources that are not negligible. Having said this, it is still an estimate of total statewide emissions. The statewide greenhouse gas inventory prescribed in the amended CCPA would not be.

⁴ Significantly, other proposed legislation that we have reviewed involving a 100% mandate refer to 100% clean energy or generating 100% of electricity from renewables. Examples of this are the Merkley/Markey/Sanders bill in Congress and Senate Bill 100 in the California legislature. Neither of these bills claim to achieve 100% reduction in greenhouse gas emissions.

⁵ Such an approach would also be more consistent with the 2013 Jacobson Plan, which specifically focused on elimination of fossil fuels from all energy infrastructure, but not other sources.

Relating to this, we notice that the recent Assembly amendment modifies the definition of "statewide greenhouse gas emissions" to include emissions associated with the extraction and transmission of fossil fuels imported into the state. This is useful from the standpoint of accounting for "upstream" lifecycle emissions of methane. However, it is important to recognize that this is not how New York inventories emissions today. Currently NYSERDA only attempts to account for greenhouse gas emissions that are produced within the physical boundaries of New York (in addition to emissions from imported electricity). Since the fugitive lifecycle emissions of methane that relate to unconventional drilling (HVHF) occurs at the well-head or mid-stream, and since those emissions are much higher than for conventional production, this will increase the amount of methane attributed to statewide greenhouse gas emissions relative to 1990.

It is also important to recognize that the greenhouse gas impact of methane is dependent on leakage rate. Depending on what research paper is cited, those emissions range from less than 2% to more than 12%. This in turn has the effect of multiplying the 20-year carbon dioxide equivalent (CO₂e) emissions associated with natural gas used in New York by a factor of two or more—perhaps a lot more. This introduces significant uncertainty in statewide estimates, which will probably require a sensitivity analysis to interpret.

Moreover, **it renders the specific emission limits set forth in Section 75-0107 of the bill useless, since those numbers do not include out-of-state upstream emissions.** For example the bill prescribes a 15% reduction for 2020 because the state has estimated that emissions have already fallen 12% since 1990.⁶ However, that does not take into account upstream methane. Accounting for this would yield a different number that is not 12%. Therefore the limits established for future years would have to be different too. Again, since estimates of leakage vary widely, those numbers also depend on what leakage rate is assumed. Adding to this is the uncertainty involved in attempting to estimate out-of-state upstream methane emissions from 1990.

We support including an estimate of emissions (or a range emissions) associated with the extraction and transmission of imported fossil fuels within the statewide greenhouse gas emissions report. However, we recommend that this occur as part of a dedicated analysis within the document and not be confused with other data sets. Furthermore, since the Assembly's amended bill mistakenly includes an "apples to oranges" comparison of emissions, the limits provided for in Section 75-0107 are invalid. A different approach is needed.

We have significant doubts about the accuracy of New York's current greenhouse gas inventory. This, in addition to changes associated with the bill's redefinition of "statewide greenhouse gas emissions," causes the inclusion of any specific emission limits in statute to be pure speculation. Instead of codifying guesses in statute, we recommend that limits for individual years be adopted only after DEC has evaluated current and past emissions, reconciled difference in definitions and methodology, and determined the most appropriate reduction profile. This could be accomplished by requiring that DEC adopt specific emission limits within a time certain following the passage of legislation, for example within one year.

⁶ As discussed in footnote 3, we question the legitimacy of New York's current greenhouse gas inventory. We therefore suspect that the claim of 12% reduction from 1990 levels (excluding out-of-state emissions) is probably inaccurate as well.

3. Outdated Action

The CCPA requires that the Public Service Commission (PSC) develop a program by 2018 to ensure that 50% of the state's electricity comes from renewable sources in 2030. However, such a program already exists with the Governor's Clean Energy Standard (CES) that went into effect this year. Ironically the bill is silent on what should happen with electricity after 2030. The CCPA does not require any additional expansion of renewables beyond 50%. In fact, the bill could even let them decline after that time. Including an entire section in the bill dedicated to electricity generation may not be necessary; but if one is included, we believe it should be of value. Rather than simply calling for a program which already exists, "value-added" legislation would address **actions needed through 2050** to eliminate New York's dependence on fossil fuels for electricity. Clearly, if such action does not occur, New York will not meet its adopted goals, nor will the CCPA meet goals that it professes to achieve.

Aside from this obvious point, there are several reasons why attention to electricity generation beyond 2030 is extremely important. The incremental technical challenges and associated costs of creating a reliable electricity network become significantly more complex as intermittent sources of renewable energy (wind and solar) assume a greater proportion of total generation. New York is fortunate to have already developed significant hydropower resources, which in this state are highly reliable throughout the year. Today this represents about 22.5% of total electricity used in the state. (Wind and solar combined are only about 3%.) However, as intermittent sources of renewable energy like wind and solar grow, the need for storage, demand management, and other grid improvements become a larger barrier to deployment. This makes the second 50% far more difficult than the first. Unless the state has a robust plan in place to continue the expansion of renewables beyond 2030, it is likely to falter.

As previously discussed, the electrification of various end-user systems will also create greater demand for electricity (which has not been factored into plans by NYSERDA or the PSC in development of the CES). In order to bring greenhouse gas emissions down from all sectors, the widespread conversion of those systems will have to be well underway by 2030, with full replacement by 2050. The impact of this on New York's electricity grid must be considered in advance and sufficient carbon-free sources of energy procured to meet that demand. Furthermore, New York's remaining nuclear facilities (which currently provide 31% of the state's electricity) are likely to retire in the 2030 timeframe. The amount of electricity expected from renewables in 2030 is actually less than would be lost from nuclear. So unless additional carbon-free sources of electricity are procured in excess of 50%, New York's progress in greenhouse gas reduction could be effectively reset or actually move backwards after 2030. Again, what occurs after 2030 is extremely important.

Finally, we notice that the definition of "renewable energy systems" in Section 4 of the bill excludes some forms of renewable energy, such as biomass. The over-use of biomass within a renewable energy portfolio can be problematic due to pollutants associated with combustion, impacts on ecosystems, competing agricultural land uses, and greenhouse gas emissions if not part of a long-term sustainable harvest/regrowth program. However, the exclusion of biomass from the definition could preclude its use entirely and conflict with the CES now in effect.

4. Addressing Environmental Justice and Labor Issues

The CCPA seeks to assign 40% of all funds associated with any type of climate-related program to disadvantaged communities. Although we strongly support the need to address environmental justice issues and ensure that all New Yorkers benefit from a transition to renewable energy and efficiency, we do not believe that mandating the allocation of a fixed percentage of funds in this manner is a scientifically or economically justified approach.

The purpose and operation of programs vary widely. For example, the recently adopted CES, which affects the purchase of renewable energy credits by utilities, is very different from what may be an existing or future program to provide assistance for the installation of energy efficiency measures by consumers. The problem with a one-size-fits-all approach is that it fails to recognize those differences and the unique equity issues associated with each. In some circumstances a 40% allocation may be too low, and in other cases it may be too high. Over time, as the energy transition occurs and equity issues are addressed, it should also be expected that the size of communities disadvantaged by our existing dependence on fossil fuels will decline. Thus, a fixed 40% allocation into the future constitutes a tacit presumption of failure. We maintain that to accomplish an energy transition that is truly protective of all people and communities, the allocation of funds should be based on a careful analysis of what makes the most sense for each type of program.

This careful analysis is also essential for climate legislation to succeed. It would be irresponsible to place constraints on funds needed to maximize greenhouse gas reduction and bolster renewables without first examining how those objectives could be jeopardized. For example, the effective deployment of wind and solar projects will depend on site conditions that do not necessarily correspond to a particular income level or group. The consequence of establishing arbitrary mandates is that funds may not be spent efficiently and effectively.

Advocates of a funding mandate have argued that 40% is not arbitrary because this number roughly corresponds to a percentage of people within a particular income and racial demographic. Yet this statistic does not translate to a knowable cost of actions necessary to mitigate the adverse impacts of fossil fuels or achieve the bill's ambitious greenhouse gas reduction goals. An in-depth analysis of all existing and potential climate-related programs and strategies for their implementation is needed to make such a determination. The 40% mandate has also been improperly compared to a particular program in California. What may be appropriate for a particular circumstance in one state does not necessarily correspond to measures applicable to a different set of programs and circumstances in New York intended to exist for decades into the future. Actions contemplated by the CCPA will also require far more funding than applied in the California example (which was only a \$912 Million program). All of the state's current efforts to date are insignificant compared to the amount of money that will have to be invested in renewables, storage, energy efficiency, and the widespread conversion of end-user systems to meet greenhouse gas reduction goals of the CCPA. Those funds, amounting to many billions of dollars, not only need to be found; they also need to be spent in the most effective way possible.

Finally, the particular process described in the CCPA for determining where 40% of climate funds would be spent is problematic. The bill states that communities defined as "disadvantaged" would be selected according to criteria determined by a Climate Justice Working Group, and from this, a list of draft communities would be prepared by the DEC. The group would then review and change the list as it deems appropriate. We are concerned that such a process could lead to political machination, causing communities to compete with one another as they lobby for the dubious distinction of being declared most "disadvantaged." This runs the risk of politicizing and unnecessarily complicating what ought to be a serious,

scientific, and technical task of directed appropriate action and resources into communities where the exposure to fossil fuel pollutants is most prevalent, while also ensuring that statewide greenhouse gas reduction goals of the bill can be achieved.

Instead of applying a flawed 40% mandate that labels communities as disadvantaged, we recommend that the CCPA clearly establish funding objectives to maximize greenhouse gas reduction and **prioritize efforts to reduce pollutants in communities with greatest exposure.** This would ensure that funds are spent where they are needed to prevent impacted communities from being left out due to a less than scientific process. By definition, this would benefit Environmental Justice communities, which are communities that suffer disproportionately from environmental pollution. Such an approach would also ensure that no community or group of people slips through the cracks. Many urban areas would be prioritized by such an approach since air quality is worst in cities (largely due to transportation emissions). However, rural or suburban communities that suffer higher levels of exposure (for example from a nearby compressor station or power plant) would receive protection as well. It is worth mentioning that many forms of fossil fuel use are actually "equal-opportunity polluters." For example, all city dwellers, regardless of their particular race or economic status, are at greater risk of having medical problems due to poor air quality.

In addition to the above, efforts should be taken to ensure that economically disadvantaged communities and individuals can access and afford renewable energy and efficiency measures. Section 8 of the CCPA contains provisions for a report on such measures. However, this could be improved with the requirement for specific action. Furthermore, since the replacement of end-user equipment (home furnaces, heating systems, etc) with zero-emission technology will be a greater financial burden on low-income or fixed-income families, the bill could be improved with provisions or programs to subsidize those conversions.

We maintain that the best way of helping environmental justice communities is with a bill that is equipped to actually achieve its greenhouse gas reduction goals. If that happens, fossil fuels will no longer be burned and nobody—regardless of race or socio-economic status—will be exposed to their pollutants. Moreover, by embracing renewables and efficiency solutions, the economies of scale associated with producing renewable energy and zero-emission products, along with a lower demand for energy, can help to bring down the costs of transitioning away from a carbon-based economy.

Regarding labor, several sections of the CCPA imposed prevailing wage requirements upon businesses that are associated with renewable energy and efficiency solutions. While we understand the motivation for this, it should be clear that such measures may actually *increase* the cost of such solutions to both the state and consumers, which in turn could limit the extent of their deployment. As with environmental justice, the greatest way of benefitting labor is with a bill that can deliver on its promises of greenhouse gas reduction. If that occurs, a tremendous number of jobs in renewable energy and efficiency will emerge; and as the demand for those jobs grows, wages will rise. It has been estimated that three times as many jobs are created per dollar invested in renewables compared to fossil fuels. We support other aspects of the CCPA that benefit labor, such as worker training. However, those also could be improved with greater incentives for research and development.

In addition, we recommend considering a provision to require that **at least 80% of New York's electricity be generated in New York.** This is consistent with conditions today and would ensure that greenhouse gas reduction occurs predominantly through the use of renewable energy produced and installed in state, rather than imported from elsewhere. Such a policy would provide jobs for New Yorkers and also ensure more efficient generation of power locally.