

The Advisory Panel has done a commendable job of at least touching on the majority of the issues surrounding this important issue. I have concerns with a few aspects of the plan that I appreciate having the opportunity to share. I am a Chemical Engineer with close to 50 years of experience in various processing industries including renewable like ethanol, bioplastics, animal manure processing, and trash processing as well as some of the more traditional processing including work at small refineries and manufacturing of fine chemicals. I have worked for the big guys both directly and contractually as well as having to manage startups and small scale operations including design firms. I think my diverse background offers a unique perspective and hope the panel takes my thoughts into consideration. I have taken the time to read the entire Draft Scoping Plan as well as Appendix G with many pages of notes from those reads.

INTRODUCTION

I am negative on the attempts to meet 2050 goals that were set based on the pretense that these are a must. Review and use of scenario 1 projections (original AP recommendations) would seem to be more prudent. Acceleration of this plan takes on a certain level of risk (technical and social) as well as additional funding to support those plans. Trying to manufacture, install, and maintain such a large number of vehicles and heat pumps will be a task in itself and then the uncertain reliability of these systems creates a level of risk. Access to timely repairs will be a very significant requirement in making these changes in a short time. Hardware and software issues are likely to become issues as well as other types of problems not yet foreseen nor solved. I favor a hybrid approach that promotes hybrid vehicles and heat pump technologies that still have a non-electrical backup source (natural gas) during extreme cold weather periods. Retirement of large quantities of vehicles and older heating systems is a concern within itself and needs a well thought plan to minimize additional negative impacts. Finally, we shouldn't be in too big of a hurry to meet zero net goals while other countries are continuing to increase CO₂ (China through 2030). I want to significantly cut our emissions (the sooner we take a good bite the better) but the risk and added cost we take in an effort to be perfect comes with added risk and cost.

ELECTRICITY (CHAPTER 13)

Electrical power generation using such a large percentage of solar will impose a much higher peak load on transmission and will require significant storage either in the form of batteries or conversion to H₂ (included are concerns of water purity to apply H₂ technology) for alternative use. Solar Farms should not take away from farms or forests that provide income, food, recreation, and habitat. Electrification using solar will require a number of resources as well as technology. Included in the resources are Cu, Li, Co, Ni, and Zn with total estimates indicating the production of these minerals at 500% (world-wide) of the current production levels. We are also still in the early stages (relative to other power generating alternatives) in development and the longer term durability, maintainability, and recovery of the original materials as these panels age (15 to 25 years of operation).

One issue I have not been able to find good data on is the added amount of energy solar panels will add to the earth. A portion of the sun's light is naturally reflected (in winter, with snow cover as much as 90%; consider how blacktop heats up) so never adds to the energy. In contrast, solar panels are

designed to be efficient energy absorbers and as we continue to add more and more surface area the impact will be greater and greater. I realize the main benefit is no CO2 being generated but if more energy is brought into the planet it will still continue to warm. This thought may get a chuckle from some but I think the overall energy balance needs to be performed before we expand solar to such a large area.

Other low climate impact types of power generation are available and tested including nuclear (including technology improvements to significantly reduce waste along with safety improvements), wind, and natural gas (or its bio replacement). I intentionally have left hydro power out since I don't think we should be damming up any more rivers. I would ask the panel to seriously consider removing the no new natural gas after 2024 from the plan (Chapter 18 Gas System Transition) so that we continue to have a backup to electrical power during unexpected events. This also minimizes "Stranded Assets" at a time they may likely be called back into service.

MAINTENANCE, REPAIRS, AND CONTROL OF SERVICES

One issue with current and developing technology is that the manufacturers have built in code to prevent outside service organizations from working on their products. This has been a deterrent for farmers to purchase newer equipment since they want to be able to repair to keep running and provides plenty of frustration for home owners trying to get service on their appliances. This is a "Right to Repair" issue that should be insisted upon to be NYS Climate Act approved – don't allow manufacturers to control these services. It is hard enough to get someone out for timely repairs without being restricted by a software control mechanism.

A similar but different subject is allowing folks that like to take care of their heating bills by burning wood. I understand the PM issues and there should be technology that could be installed to reduce that from wood burning stoves (with annual inspections by the local communities or home owner's insurance). Wood is at least partially a circular material and certainly renewable as long as the forests it is taken from is managed properly.

BUILDINGS (CHAPTER 12)

Heat Pumps can provide a great benefit to both the environment and the owner but applying heat pump technology to extreme cold weather is not an efficient use of the technology. Additionally, using electrical resistance as the auxiliary fuel will only add to the peak requirements of the grid (as noted but can be avoided). Allowing use of natural gas or a bio alternative for these extremes (and to continue to provide heat should the heat pump fail for any reason) would seem most appropriate. The thermostats that control these units are much more complicated than the old Hg switches used in the last century and subject to glitches like most computer technology these days. I am a heat pump owner.

It should go without saying that tightening up the building structures will greatly reduce energy losses. Continued education of building occupants on the benefits of maintaining these improvements as well as temperature controls settings impact on energy use should be emphasized.

TRANSPORTATION (CHAPTER 11)

Electric Vehicles are certainly in our future but I would take a hybrid approach. We don't have the number of vehicles nor the extended time experience yet to know what we may be setting ourselves up for. New types of maintenance will be required that we don't truly understand from a frequency of occurrence or cost perspective. We also will need to keep in mind that many travelers come into NYS who may not be coming from a state that requires EVs and will need traditional fuel. NYS travelers taking trips outside of NYS where recharging stations are more difficult to find may have similar issues. The EVs use battery power to heat and cool and in the event of a large traffic jam (winter 2022 on I-95) there would potentially be a large quantity of vehicles waiting for a charge to get their vehicles off the road. Eliminating gasoline driven engines alone will not shut down refineries since we still need those products for making other materials including asphalt for the roads we'll still be using.

JUSTICE, HEALTH, ANALYSIS, AND BENEFITS

Items related to but not functionally changing the climate in the report have an impact on how the community will respond. We need to be careful with things like Carbon Tracking which must make certain that ownership is a sole business or individual so as not to double count. The health benefits of this plan that are based on PM appear to be largely based on banning wood as a fuel source but this is actually a small percentage of the total from a greenhouse gas perspective thus the real health benefits of the plan are relatively minor (until we're joined by the rest of the world). The PM issue is one of the major components of Climate Justice as well but moving on from wood burning we would need to look at auto and truck emissions in urban areas which could be served by limiting access to these areas to certain times of day unless by an EV type vehicle. A significant concern of mine in any government funded expenditure is the creation of reliance on that funding by businesses or the general public. The "job building" described seems to be focused on construction projects which will be reduced considerably once all of this is implemented; how many of the jobs are sustained? Finally, I hope zoning boards will be forced to use the projected flood maps and any fire risks in approving / rejecting projects in these higher risk areas. I hope that owners that then build in these higher risk areas, take on these risks without any governmental support up front or in the event there is an environment situation that does damage.

CONCLUSIONS

- Avoid extending resources to an accelerated plan of action to achieve an unreasonable goal in such a short period of time. Make substantial change at a pace that reveals the impacts of these changes (both positive and negative) and allows for continuous improvement.
- Promote Nuclear and limit Solar; not only sustain existing but add nuclear power generating facilities to avoid peak transmission and storage requirements of such a high portion transitioning to solar.
- Maintain some gas fired power generation for supplemental and emergency requirements including gas to homes and businesses unless an area has a community based backup.
- HFC inspections (heat pumps and auto A/C) required similar to annual automobile inspections.

- Backup heat source using LP or other gas source. Heat pump efficiencies (air to air systems) drop significantly as air temperatures get lower adding to peak load requirements.
- Minimize use of atmospheric capturing of CO2 but emphasize the capture of CO2 from stationary sources (technology such as Amine Capture).
- Business and Community work schedule management and peak power load management plans. No real capital investment required. Also, community scale storage of energy and microgrids.
- Municipal solid waste collection and recycling improvements. Promote food scrap recovery programs. Emphasize plastics collection and recycling. Note: Plastic does not release CO2 if not incinerated. Implement Extended Producer Responsibility and include sustainable product designs.
- Sewage waste treatment and CH4 capture in all industries.
- We don't need to attract future population growth but rather an improvement for those within the state. Let's improve quality of life including reducing the cost to live in NYS. Land use modifications should be a return to a more natural environment.
- Emphasize agricultural and forest preservation even if it means limiting economic growth. Let's improve our forests, urban tree planting, and sharing our resources with the rest of nature.

Sincerely,

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