

COMMENTS ON DRAFT SCOPING PLAN CHAPTER 9 - 2022 JULY 1

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Chapter 9 - Analysis/Scenarios

I welcome the general approach of the draft plan, economy-wide "deep decarbonization", including all sectors, with due attention to a just transition for overpolluted, underpaid, and disrespected communities, as well as deindustrialized, abandoned and demoralized "rust belt" communities, and workers displaced from fossil-dependent jobs. It is a serious step forward, with many good ideas. Developing a practical plan to transform our entire economy in decades is a huge challenge, but it is absolutely necessary. I appreciate all the work that went into developing the Plan, and the opportunity to comment.

The climate crisis is the ultimate instance of market failure. Corporations that dominate the economy make decisions based on costs and benefits to the private firm; external costs are systematically imposed on everyone downstream, and on the living world which gives us life. So governments at all levels, in principle democratically accountable to the people who suffer those external costs, must take the lead.

Scenarios

The CLCPA and its time frame were drafted before two major 2018 reports - IPCC SR15 and PNAS Hothouse Earth Highlights of Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C <https://www.ipcc.ch/sr15/> "Hothouse Earth" study **Trajectories of the Earth System in the Anthropocene** <https://www.pnas.org/content/115/33/8252> made clear that reaching zero net **global** emissions later than 2050 would pose an unacceptable risk of global catastrophe that would threaten the survival of civilization. We must stop short of the unknown point at which accelerating feedbacks take off, cascade, and run away to a hothouse earth equilibrium that would make much of the planet uninhabitable. As John Holdren, President Obama's Science Advisor, put it - when you are driving in a fog toward a cliff you can't see but know is there, the prudent course is to stop as soon as safely possible.

But the IPCC's target of net zero by 2050 is for the whole planet. Rich countries, especially the US, responsible for the lion's share of GHGs, must get to zero faster than low and moderate income peoples of the global South, eg India and Africa, and Puerto Rico closer to home - least responsible for GHG emissions but most gravely threatened by destructive floods, killer heat waves, firestorms, and drought-induced famine. Dr. Robert Bullard, founding leader of the Environmental Justice Movement, said that "climate is the number one EJ issue of the 21st Century."

New York as a progressive state must lead the US, especially since the Rogue Court has just sabotaged the capacity of the federal government to act at scale in the near term at least. In view of the gravity of the climate emergency, the fastest net reductions would have the greatest net benefit in avoided health, ecological, and economic costs, so Scenario 4 should be the minimum backup plan. CAC should develop a scenario commensurate with the time scale of the emergency - zero net emissions economywide no later than 2040, preferably sooner.

When JFK set the national goal to put a man on the moon in a decade, we didn't have all the technology, but it was a top national priority, and we invented the means. As we launch the ship of state toward a safe harbor, we can accelerate as we gain experience. This is a mission to Planet Earth, a **rescue mission**. As they say at NASA, FAILURE IS NOT AN OPTION.

9.3 Key Findings

1 - Deep decarbonization by mid-century. *2050 or 2040 are beyond the practical reach of current policy, so the emphasis of the climate plan should be to reduce greenhouse emissions as much as feasible by 2030. According to the federal EIA, New York has been spending some \$39 Billion annually on fossil energy, almost all from out of state. The faster we ramp that down as we bring clean renewable energy online (along with energy efficiency and storage) the sooner the avoided fuel costs will pay for the transition. Of course the avoided health and economic costs of climate chaos would be even greater. According to a study published by the American Meteorological Society, under a business as usual scenario superstorms like Sandy would hit the New York metro area frequently by midcentury, and perhaps annually by the end of the century.*

2 Efficiency and end use electrification - *yes: efficiency first is the fastest, cleanest way to reduce emissions, and most cost effective especially as it reduces the scale of required clean energy supply. Likewise electrifying end uses can both optimize whole system efficiency and reduce local pollution where people use it. But energy storage is likewise vital, since solar and wind energy are intermittent.*

3 Refrigerants - super-pollutant HFCs should be phased out ASAP, and very strictly regulated as long as they are used. Recapture at the end of product life is crucial. There should be large "cash for clunker" style rebates for proper return of appliances that use refrigerants. Perhaps utilities which have ongoing relations with electricity customers should be responsible for collection and reprocessing of refrigerators, air conditioners etc. The state should fund the rebates, since the benefits are to the public at large.

4 Community decisionmaking - the building sector is the largest source of emissions in NYS, and buildings that already exist will continue to dominate the sector through mid century and beyond. Heat pumps combined with thermal energy networks (district heating) may be the best way to meet heating and cooling needs on the scale of neighborhoods, subdivisions etc and can take advantage of economies of scale. Combined with efficiency retrofits, they can reduce total utility costs to end users. If full financing and technical support are made available to communities, they would welcome the upgrade.

5 Wind water and sunlight - Yes, especially converted to electricity, but geothermal can also make a major contribution especially for heating and cooling buildings- see #4 above. Also solar thermal can contribute, especially passive solar design for new buildings.

6 Increasing access to public transportation - public transit is both more energy efficient and much safer than travel by private automobile. The most important impact of cars is the impact of metal on flesh. Transit fleets should be electrified rapidly, expanded, and made as convenient, comfortable, reliable, and user friendly as possible, which will encourage ridership, as would fare free systems. Special attention to minimize transfer times would help. 21st century commuter rail can be more efficient in high density corridors. Dedicated bus lanes can reduce congestion. Express bus systems such as pioneered by Curitiba Brazil should be deployed throughout New York. Transit oriented development can reduce trip lengths and congestion, save people time, and help build a sense of community while reducing emissions.

7 Low carbon fuels - Continuing innovation in battery technology, including solid state using abundant materials, may make "low carbon fuels" appropriate only for niche uses. Biofuels should be used mainly on site where they are produced, ie farms and composting facilities. Only hydrogen from hydrolysis of water powered by renewable energy qualifies as green. Hydrogen should not be blended with fossil gas to greenwash continuing use of the latter. Hydrogen should not be combusted except for hard to electrify purposes such as making steel and cement, and used otherwise mainly in fuel cells which don't release air pollutants such as NOx.

8 Carbon sequestration - Carbon capture, reversing combustion, is endothermic - ie it consumes more energy than was produced by combustion, per the 2d Law of Thermodynamics. This fundamental physical limit makes it highly unlikely for industrial CCS to ever be cost effective compared to just about any feasible emission reduction technology, and very unwise to rely on. That logic rules out scenarios 1-3.

Biological carbon capture eg by net afforestation and sequestering biochar in soil can reduce net emissions somewhat, but their contribution is unlikely to be major. Reducing emissions -- "ounce of prevention" tends to be more cost effective.

9 Methane emission mitigation in waste and agriculture: Because NY is a major dairy state, we must use the best available feed mix for cattle to digest efficiently and minimize CH4 emissions. Some species of seaweed used as cattle feed supplements, according to early studies, improve digestion efficiency and dramatically reduce CH4 emissions.

<https://www.soci.org/news/2021/3/seaweed-reduces-methane-output-of-cattle>

Likewise best technologies such as well managed composting and perhaps anaerobic digesters are needed to minimize methane emissions from the waste stream.

10 Continued RD&D - Yes, clean energy technologies which are still new continue to improve in cost effectiveness and efficiency - solar, wind, and battery costs continue to decline more or less exponentially. New innovations, for example solid state batteries could improve price performance even more. **New York should help our universities take the lead in the clean energy revolution.**

11 Large remaining sources -

Landfill emissions can be reduced by minimizing food waste and providing subsidies and technical support for composting. Seaweed can reduce emissions from cattle feeding. Non coercive subsidies and promotion could encourage people to eat more veggies and reduce meat consumption.

Electric powered high speed or very high speed passenger rail can provide a renewably powered alternative to airplanes for travel up to a few hundred miles. Getting to and from well sited train stations, and omitting TSA lines, saves time comparable to what airplanes save intercity. New York should study HSR/VHSR for a route from Buffalo to NYC, (with branches Montauk and Montreal). VHSR is much faster but more expensive, requiring new tracks. New York should do a major study comparing costs and benefits, pick whichever is more practical, and build it by 2030.