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**Comment on Draft Scoping Plan relating to New York's
Climate Leadership and Community Protection Act**

To whom it may concern:

My name is Francis Menton. I live in Manhattan. I submit this comment as a private citizen. I have no affiliation with, nor do I receive compensation from, any person or company in the energy business.

100% carbon free electricity or energy for New York – other than with vast expansion of nuclear power, which you have ruled out for some unknown reason -- is a ridiculous and dangerous fantasy. It will not and cannot happen. It will shortly run into the wall of physical reality. Meanwhile, any reductions in carbon emissions that NYS may be able to achieve are completely meaningless in the global context. The treatment of these subjects in the Scoping Plan is inadequate and incompetent.

I will briefly address three topics:

1. Energy storage
2. Hydrogen
3. The global context

Energy storage.

Supposedly, we are replacing our fossil fuel generation (mostly natural gas) with wind and sun. Sun does not work at night, and there is little in the winter. Wind does not work when it is calm. Neither works at all on a calm night.

How do you plan to back up a predominantly wind/solar electricity generation system when we have no more coal or natural gas? The treatment of this subject in the Scoping Plan is breathtakingly incompetent. Where is the calculation of how much storage you will need to get through a full year? The SP doesn't even make that calculation in the correct units, which are GWH.

We're going to need at least 10,000 GWH of storage to back up just current usage if you replace all FF generation with W&S. At the price of Tesla batteries, that will run you about \$1.5 trillion, which is approximately equal to the entire GDP of NYS. If you triple electricity consumption by

electrifying vehicles and home heat, it will cost at least three times GDP. And in addition, you need a battery that can store electricity all the way from summer to winter without all the energy dissipating, and then discharge that energy over the course of months rather than mere hours or days. No existing battery can do that, nor can any hypothetical new battery technology currently under development. The chance that the storage problem can be solved in the time frame ordered by the Climate Act is zero.

It is completely irresponsible to commit New Yorkers to the goals of the Climate Act without at the minimum a fully-working demonstration project showing how the plan will work and demonstrating its costs. You not only don't have that, you don't even have any detailed feasibility study or cost workup. Do you understand that when everything is electrified and the power goes out for an extended period in winter, people could die by the thousands?

Hydrogen.

Hydrogen is not the answer to this. To generate hydrogen from water is enormously costly. You lose about $\frac{3}{4}$ of the input energy in the round-trip between electrolysis and then combustion of the hydrogen. And after you create hydrogen by very costly electrolysis, you have a gas that is inferior in every way to natural gas.

- H2 is only about $\frac{1}{4}$ as energy dense by volume as NG. Thus pipeline capacity would need to be quadrupled for a hydrogen system.
- H2 is explosive and dangerous to handle, much more so than NG.
- H2 is a tiny molecule and very corrosive to metal pipes. It leaks very easily and is very dangerous. Do all homeowners need to replace their internal pipes?
- How much more will H2 cost than NG by the time you make the stuff and replace all the infrastructure? 5x? 10x? Where is your detailed cost study of this? Where is your demonstration project to show that it can work at reasonable cost at this kind of scale?

The Global Context

New York's average electricity usage is around 20 GW. Its carbon emissions are less than one-half of one percent of world emissions, a percent that is rapidly declining as third-world emissions increase.

The Scoping Plan talks about building a "massive" 9 GW of new offshore wind turbines in the effort to go carbon free. Meanwhile do you know what China is doing? Just this year, they are building 47 GW of new coal power plants. Those plants produce all the time, while our 9 GW of wind will produce only 1/3 of the time, so China is building just this year some 15 times the capacity of what we're doing, in coal.

And they have another 100+ GW more coal plants in the works just for the next couple of years.

And then there's India. They have about the same population as China (1.4 billion). Each of those countries is 70 times the population of NY. India is way behind China on electrification. Most Indians today have no air conditioning, even though temperatures are regularly above 90

degrees, and often above 100. India explicitly says that it plans to provide its people with electricity using coal. That will be well over 1000 GW of coal capacity by the time they are done.

And then there's Africa. They about 1 billion people – and 2 billion projected by 2100. And they have very little electricity currently. They're also going to provide all those people with electricity using coal.

Who are we trying to kid here? To the extent that NY is able to reduce emissions somewhat, or even if we could eliminate our emissions entirely, it will be completely insignificant in the global context. We are barely a rounding error.

This whole project for New York is completely unworkable, wildly expensive, and utterly meaningless in the global context.

The entire Scoping Plan should be scrapped, and the people who generated it need to be fired and replaced with others who have at least a small amount of competence.

Thank you for allowing me the chance to comment.

Respectfully submitted,



Francis J. Menton

