May 17, 2018

Comments of the Council on Intelligent Energy & Conservation Policy (CIECP) and Promoting Health and Sustainable Energy (PHASE)

TO: New York Independent System Operator (NYISO) and New York State Department of Public Service (DPS)

RE: Matter 17-01821 – In the Matter of Carbon Pricing in New York Wholesale Markets Notice on Process – Carbon Pricing Straw Proposal Report Prepared for the Integrating Public Policy Task Force

Filed electronically to: IPP_feedback@nyiso.com and secretary@dps.ny.gov

The Council on Intelligent Energy & Conservation Policy (CIECP) and Promoting Health and Sustainable Energy (PHASE) applauds New York's pursuit of decarbonization and agrees that energy policy should provide the greatest benefits at the least cost to consumers, with appropriate price signals to incentivize investment and maintain grid reliability. We also support imposition of a charge upon fossil fuel generation.

The referenced Carbon Pricing Straw Proposal, however, is ill-suited to the task of achieving its stated goals of economic efficiency; avoidance of major cost shifts among New York customers; transparency; and market/regulatory stability. More problematically the Straw Proposal is a poor option if the ultimate objective is to truly fight climate change. A meaningful effort would involve rapid dramatic transformation of the State's energy system in a way which spurs national and global transformation. New York is actually uniquely positioned to engage in such a meaningful effort by virtue of its status as a global leader and a major capital markets power. Unfortunately, a major transformative vision is evident in neither the Straw Proposal, nor other current State initiatives, which are modest, piecemeal, and perpetuate a business-as-usual approach over the coming decade.

The three core problems with the Straw Proposal involve (1) a lack of realism, (2) an overly narrow policy focus, and (3) reliance upon completely false assumptions. Each of these criticisms is briefly stated below.

(1) Lack of Realism

The Straw Proposal lacks coherence and logic, given current federal policies and the actions of many other states. One point of obvious disconnect, is the federal proposal to repeal the U.S. Environmental Protection Agency (EPA) Clean Power Plan. Another is the federal decision to disregard the Social Cost of Carbon (SCC). Pertinent, also, are current efforts on the part of large coal and nuclear power operators to obtain large federal subsidies for coal and nuclear plants, and recent proposals on the part of the White House and U.S. Department of Energy (DOE) to create a subsidization scheme which would benefit aging uncompetitive coal and nuclear power plants. A New York scheme based on a unified SCC or unified social cost of greenhouse gas (GHG) emissions, might have merit at some point in the future. At this point in time, such is not the case.

(2) Overly Narrow Focus

The Straw Proposal represents a dangerously myopic and reductive view of real world climate dynamics, environmental conditions, and risks. Here, it should be noted, that the SCC metric (as previously promulgated by the EPA), was meant to be a mathematical evaluation of how much the emission of a ton of carbon dioxide (CO2) into the atmosphere is likely to cost society at large – in terms of certain environmental, agricultural, human health, and land use damages – through future climate change. It was intended to be used as one specific value incorporated into cost-benefit analyses of regulations aimed at achieving GHG emissions reduction. It was never intended to be the sole metric considered in energy policy. Most certainly, SCC and other carbon pricing initiatives should not promote active *disregard* on the part of state policymakers of environmental, agricultural, human health and land use costs and risks. Such risks, as well as the environmental justice implications and the extreme public safety and security risks of incentivizing – much less continued reliance upon – energy from hydraulic fracturing (fracking) and nuclear power must be fully assessed by independent experts.

We appreciate the body of traditional energy technology knowledge, engineering acumen and economic expertise which has been brought to bear in the State's decarbonization effort to date. However there has been a glaring absence of involvement and deference given to public interest advocates and experts in the multiple diverse disciplines implicated in transforming New York's energy policy. Among the absent disciplines whose informative expertise is crucial and must be sought by the NYISO and DPS are experts from the fields of: agriculture; biology; cybersecurity; disaster science; environmental science; human rights (*e.g.*, social scientists focused on environmental justice); limnology; medicine (especially pediatrics); and seismology. All of these fields are highly relevant to proper evaluation of policy implicating fracking and nuclear power.

We also strongly advocate the NYISO and DPS seek input from independent experts.

The recent history of New York State's heavy reliance upon reports and analyses conducted by individuals affiliated with institutions that receive substantial funding from gas and nuclear industry actors is a serious abrogation of the State's duty to the public.

(3) Reliance Upon False Assumptions

A crucial false assumption within the Straw Proposal is that that suppliers would accurately "self-report" their carbon emissions to the NYISO. Even accepting the presumption that suppliers would never be less that wholly candid in their estimates, the simple fact of the matter is that the suppliers cannot possibly have accurate knowledge of their GHG emissions, as such emissions are not comprehensively monitored.

Fossil fuel generation produces sizable quantities of GHG emissions at every phase of its full life cycle course. On this there is no longer reasonable scientific dispute. While there continues to be debate regarding the precise level of GHG emissions and the degree of environmental, public health, national and global security, human rights, and socioeconomic costs imposed upon society from various forms of fossil fuel generation/use, we submit that the rationale for some level of charge on all forms of fossil is beyond cavil. However the externality costs of fossil are grossly understated. An implicit false assumption embodied in the Straw Proposal is that the externalized GHG costs of modern gas render it a "lower" GHG emission enterprise. This

ignores the GHG and toxic emission costs of fracking activities such as methane gas leaks. It also ignores the GHG emission costs of infrastructure buildup linked to the use of fracked gas.

The Straw Proposal also improperly ignores the sizable toxic load (including radioactivity) imposed by fracked gas upon waters as well as the potential health costs of that load.

Nuclear power also results in the release of sizable quantities of GHG emissions, with GHGs implicated at every phase of its full life cycle course. The explicit reference in the Straw Proposal to nuclear as "low-emitting" and characterization of nuclear as "carbon-free" in the consultancy report solicited by the NYISO to inform State decarbonization policy warrant critique. It is profoundly disappointing that New York has placed such heavy reliance upon the analyses of a consultancy which also provides a volume of consultancy and litigation support services to the nuclear industry. If nothing else, the *appearance* of conflict of interest is quite apparent.

Nuclear power is a highly-polluting form of power, producing prodigious amounts of long-lived highly toxic radioactive waste, thermal emissions, and GHGs throughout its entire full fuel cycle.

The fallacy of characterizing nuclear as "zero" or "low" emissions becomes evident upon consideration of one simple, undisputed, fact. GHGs affect global warming through their global action, not their local action. Other kinds of pollution (like chemical spills) stay more or less within a geographic region. GHSs, in contrast, pollute not because of where they sit, but because they rise into the atmosphere and alter atmospheric conditions. From a climate change perspective, it is entirely irrelevant where an emitter is located.

Therefore climate change analysis of every form of energy generation – even renewable – must take into consideration emissions generated throughout the *entire* fuel cycle. If one stage of a particular cycle produces minimal carbon, but every other stage produces prodigious amounts, that industry is a climate change polluter.

The full fuel cycle shows why nuclear is a poor choice for the planet. Nuclear power is actually a chain of highly energy-intensive industrial processes which – combined – consume large amounts of fossil fuels and generate potent warming gases. These include: uranium mining; milling; enrichment; fuel fabrication; heavy materials transport; construction and maintenance of the heavy industrial structures (including storage systems); emissions of newly created carbon atoms, released into atmosphere as radioactive carbon and methane; environmental remediation of closed nuclear facilities; disposal and burial of voluminous amounts of so-called "low-level" nuclear waste (all the structures and components and materials which are contaminated, but not themselves spent fuel); long-term on-site containment of high-level nuclear waste (spent fuel); permanent disposal of high-level nuclear waste, including the construction and maintenance of all waste depositories.

With regard to the mining component of the fuel cycle, it is noteworthy that the fissile form of uranium – U-235 – is found in less than 1% of natural ore. Uranium ore is a finite resource which is expected to become increasingly energy intensive to obtain because most of the globe's easy to access high quality uranium reserves have already been excavated.

The creation of new carbon during normal plant operation has been effectively ignored in regulation. This point must be emphasized: While burning of fossil fuels releases sequestered carbon, **nuclear fission creates new carbon** – carbon that never existed in nature. Nuclear plant carbon generation is described in a 2010 Electric Power Research Institute (EPRI)

technical report titled “Estimation of Carbon-14 (C-14) in Nuclear Power Plant Gaseous Effluents.” http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000000001021106. In Boiling Water Reactors (BWRs) radioactive carbon is released from the core in volatile form such as CO-14, CO^2-14. In Pressurized Water Reactors (PWRs), EPRI states: “Carbon-14 is produced in the reactor coolant during power operation, and its production rate increases during the fuel cycle due to increasing neutron flux and ingress of nitrogen. … Analyses of pressurized PWR reactor coolant samples shows that the ^{14}C species are essentially 100% organic, and ~50% of the coolant activity is a volatile species (most likely methane).” (Chapter 4, p 1.) Most of the C-14 – or methane – is released to the atmosphere via plant venting. What the EPRI does not address is something which – to our knowledge – is utterly unanalyzed by anyone, and that is the additional gas effluent composition created by recent (and increasing) use of high burnup nuclear fuel. Such fuel is hotter and far more radioactive than traditional fuel.

Notably C-14 has a half-life of 5,700±30 years. Also relevant to the climate analysis is the fact that methane is 86 times more powerful a heat-trapper than CO-2 over a 20 year timeframe. (Not germane to climate, but highly pertinent to human health, is the fact C-14 is prevalent in tritium and readily incorporated into human tissue where its beta decay can destructively target cells.)

Nuclear power also continuously release other radioactive emissions into the environment as part of routine operation. Leaks, spills and accidental releases have occurred repeatedly at nuclear sites, including sites in New York. In fact, the Nuclear Regulatory Commission (NRC) concedes that virtually every nuclear plant site in the U.S. has had accidental radiation leaks. Many continued for years prior to discovery; over a dozen leaks have seeped from spent fuel pools. Such leaks can only be expected to increase as New York’s already well worn nuclear plants continue to age. Higher levels of contamination will mandate greater and more costly clean-up activities. (Contaminations at Indian Point and the West Valley site are well known to New York officials.) Cleanup of contaminated sites involves and will increasingly require extensive use of GHG emitting heavy equipment, transportation fuel and electrical energy. These externalities need to be considered in any cost-benefit evaluation.

Moreover, the longer nuclear plants operate, the more hazardous nuclear waste they produce. The vast energy resources which will be needed to safeguard and store rising inventories of high level nuclear waste for generations to come are, in fact, incalculable.

It must be understood, the damage done by New York nuclear plants is not limited to New York. A plan which incentivizes nuclear power in New York increases the externalized costs of nuclear both within and beyond State boundaries. Leaks are despoiling waterways throughout the nation and the front end state of the full fuel cycle (uranium mining, milling and enrichment activities) have despoiled and devastated Environmental Justice communities – particularly Native American reservation areas – for decades. (See, *e.g.*, *Millet, Lydia, Selling Off the Holy Land, New York Times Op-Ed, May 29, 2015.* http://www.nytimes.com/2015/05/29/opinion/selling-off-apache-holy-land.html. *Moore-Nall, A, The Legacy of Uranium Development on or Near Indian Reservations and Health Implications Rekindling Public Awareness, Geosciences (2015); 5 (1): 15-29.* http://www.mdpi.com/2076-3263/5/1/15/htm. *Santos, Fernanda, On Parched Navajo Reservation, ‘Water Lady’ Brings Liquid Gold, New York Times, Jul 14, 2015.* http://www.nytimes.com/2015/07/14/us/on-parched-navajo-reservation-water-lady-brings-liquid-gold.html.) For the populations affected by accidents and environmental poisonings, the disaster never ends – and, as with Flint, Sandy, Katrina, Fukushima, BP (Deepwater Horizon), Church

Rock, and innumerable other disasters – impact is ruinous for those who were struggling before the calamity. With nuclear, uniquely, the sheer longevity of radioactivity in the environment projects health impairment and economic devastation upon untold future generations. Continuing to look the other way and promote exploitation of public waterways and lands is simply unconscionable, especially as water systems become increasingly stressed under climate change conditions.

Water resources are a serious and growing concern. And nuclear power plants impose a heavy burden on river, lake and marine systems. This is *aside from* their radioactive discharges into rivers, lakes, oceans and groundwater. As the New York State Department of State notes in its November 6, 2015 determination not to grant Entergy's request for a Coastal Consistency Determination for Indian Point, that one single site's intake structures withdraw up to 2.5 billion gallons of water per day for cooling, heating the Hudson River water and killing at least a billion fish, fish eggs and other organisms each year. We emphatically urge the NYISO and DPS to extrapolate the State's own findings with respect to the Hudson, and apply the results to Lake Ontario.

Thermal pollution represents an especially negative impact in a warming world. Indian Point, for example, dumps **billions of BTUs of heat** into the Hudson River each day – approximately equivalent to detonation of multiple Hiroshima-sized bombs. But the thermal impacts of New York's upstate nuclear plants may be even more serious. Evolving understanding of climate change conditions points to warming of the Great Lakes being of especially grave concern for a number of reasons. One reason is the increasing prevalence of algal blooms. Algae inundation can cause fish die-offs, harm other aquatic life, sicken people and devastate local economies by curbing tourism and recreational activities, especially during summer months when blooms often reach their peak. The increase in blooms is attributed primarily to runoff into waterways from fertilizer and manure, which are high in phosphorus. Changing weather patterns associated with climate change and warming waters exacerbate the problem. (*See, e.g., Across U.S., Toxic Blooms Pollute Lakes, Environmental Working Group Analysis, May 15, 2018.* *https://www.ewg.org/toxicalgalblooms/*.)

Crucially, warming waters are now believed intricately linked to climate change feedback loops, with warming promoting algae, and algae releasing methane and CO2. (*See, e.g., Gustin, Georgina, Toxic Algae Blooms Occurring More Often, May Be Caught in Climate Change Feedback Loop, Inside Climate News, May 15, 2018.* *https://insideclimatenews.org/news/15052018/algae-blooms-climate-change-methane-emissions-data-agriculture-nutrient-runoff-fertilizer-sewage-pollution-lake-erie**.** *Woolway RL, Merchant CJ, Amplified surface temperature response of cold, deep lakes to inter-annual air temperature variability, Sceientific Reports (2017); 7 (4130).* *https://www.nature.com/articles/s41598-017-04058-0*.)

Indeed some experts have assessed the Great Lakes as "among the most thermally impacted watersheds globally receiving heat emissions from predominantly coal-fuelled and nuclear power plants." (*Raptis CE, Boucher JM, and Pfister S, Assessing the environmental impacts of freshwater thermal pollution from global power generation in LCA, Science of The Total Environment (2017); 580: 1014-1026.* *http://www.sciencedirect.com/science/article/pii/S0048969716327425*.)

The key point here is that energy policy needs to take into consideration significant ways energy technologies may exacerbate and interact with climate change-related challenges. A simplistic GHG calculus (even one which takes into consideration the full life cycle GHG emissions) fails to capture the complex ways which energy systems impact climate conditions. Heat especially, can drive critical source water systems towards ecological tipping points.

Choices should also be made with rigorous consideration of the changing weather patterns and strains on the environment climate scientists say nature will increasingly present. Prime among these is water stress. Energy production, land use, agriculture, the ecosystem, and water resources are linked in extraordinarily complex ways. And problems in one area will ripple across multiple sectors. Water resources are a particular area of concern. Droughts – expected to increase even in the Northeast – lead to low-flowing water in lakes and rivers. This reduces both water quality (less dilution for pollution) and quantity.

Another factor which makes nuclear reactors poorly suited for operation in a warming planet is the fact that they become less reliant and efficient from an energy generation standpoint. Nuclear plants can also be been forced to go offline during heat waves due to overly hot or lowered waterways.

Climate change also exacerbates safety vulnerabilities. Heavy precipitation and wide temperature swings in the region will likely take a further toll on all of the states aging plants, accelerating corrosion and rusting in buried pipes and cables. Degraded systems could then operate seemingly fine for years, but then fail if stressed by storm or accident conditions. Drought and too warm cooling supply waters increase the risks associated with the cooling systems of reactors and spent fuel pools. Paradoxically, extreme weather, intense precipitation and flooding events put nuclear cooling systems at even more risk. This is because such events portend station blackout from the potential loss of offsite power. Fukushima, it bears mention, was caused by the loss of off-site electric power followed by rundown of emergency on-site backup power. These conditions are precisely those that elevate the risk of all reactors during severe storms or other conditions – like wildfires, hurricanes, snowstorms, droughts, landslides, and floods – which are anticipated to increase in quantity and severity.

The combination of aging and climate conditions challenge buried site electrical wiring, cables and other systems, some of which are inaccessible to full inspection. In addition, storms and floods send debris flowing. In February 2007, for example, an “Unusual Event” was declared at Indian Point. The combination of low Hudson River water level, icing conditions, and rushing debris clogged rotating screens used to prevent material from entering a water intake structure.

The elevated danger engendered by severe storm conditions was evident during Superstorm Sandy when Indian Point and other plants were forced into emergency scrams.

A significant distinction between Fukushima and New York’s nuclear plants is also highly relevant. Japan was saved by the luck of winds known as Westerlies which blew 80% of the radioactivity released during the crisis phase of the accident out over the Pacific Ocean. High mountain ranges also blocked plumes. Thus the geographic scale of land heavily contaminated was much smaller than the mass contaminated by the Chernobyl accident, which left 1,000 square miles uninhabitable. Like Chernobyl, New York’s reactors are all inland. They are not proximate to an ocean, thus there are no major release accident scenarios with “lucky” winds.

Do we really want to keep rolling the dice?

The odds are only getting worse as New York's old reactors continue to age.

Other Externalities Ignored in the Straw Proposal With Respect to Both Gas and Nuclear

Finally, the Straw Proposal recklessly disregards the voluminous body of evidence on the agricultural, environmental, cyberterrorism, safety, and public health risks of reliance upon both fracked gas and nuclear.

Such risks are precisely those about which economists would reasonably not have a full understanding. This is exactly why, as noted earlier in these Comments, it is imperative for the NYISO and DPS to solicit and actively incorporate the perspectives of truly independent experts from other disciplines into the energy public policy process.

Conclusion

If the objective of the NYIOSO and DPS is to mitigate the effects of climate change, the full degree to which fracked gas and nuclear power may exacerbate and interact with climate change must be taken into consideration. A proper analysis necessarily includes the totality of the greenhouse gases they have, do, and will contribute to the atmosphere from their full fuel cycle. A proper analysis necessarily includes the totality of fracking and nuclear's deleterious effects on water and the threat posed to water security throughout the nation. A proper analysis must account for fossil and nuclear BTU contributions. And a proper, honest analysis must reasonably consider the interactive and synergistic effects their toxic emissions pose to human health and ecosystems increasingly vulnerable due to other pollutants and the climate.

Government has long used its money and power to promote nuclear power, coal, and other dirty forms of power. This has been done through massive subsidies and tax incentives, building codes and infrastructure, municipal and education expenditure, regulatory schemes and energy market design.

There is no longer any defensible argument for continuing to prop up extractive forms of power. The burden they impose – upon the environment, human health, and the climate – is increasingly intolerable.

And as for New York and the nation as a whole: How many more toxic leaks do we want streaming into our water supplies? How much more chemical and fission products do we want our children to draw into their lungs and bloodstreams? How many more nuclear waste dumps, Superfund sites, brownfields and hazard zones do we need? How many more cancers and neurological problems and immune disorders are enough?

New York must cease all manner of support for highly-polluting forms of power.

Make the decisions needed and marshal the resources available to accelerate the development of clean energy, distributed generation, and smart end use.

Fracked gas and nuclear now stand as major obstacles blocking transformation to a sustainable way of living. This opportunity cost is untenable. The NYISO and DPS should redirect the course of energy policy in a way that will invigorate our economy today and keep New York safe, clean and prosperous for generations to come.

As citizens, we yearn for our leaders to be bold and visionary and, most of all, determined. We want a declaration that New York will commit itself to achieving the goal, before this decade is out, of transformation to a *truly* clean energy economy.

The allusion here, of course, is to the challenge President John F. Kennedy made to the imagination of all Americans some 50 years ago:

"We choose to go to the moon. We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too." (*President John F. Kennedy, Sep 12, 1962, Rice University, Houston.)*

New York has an abundance of sun, winds, biogases, waters, and tides to harness. Our State infrastructure can be made vastly more efficient and resilient. We have a plethora of great universities, and colleges, and schools filled with new ideas and vitality. We have a workforce that is educated, skilled, and ready for activation.

Please lead us to the future.

Respectfully submitted

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On behalf of the Council on Intelligent Energy & Conservation Policy and Promoting Health and Sustainable Energy