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Submitted via email to: air.regs@dec.ny.gov

Re: Proposed Policy DAR-21: The Climate Leadership and Community Protection Act and Air Permit Applications

Dear Mr. Lanzafame,

I am submitting comments on the New York State Department of Environmental Conservation (DEC) Proposed Policy DAR-21: The Climate Leadership and Community Protection Act and Air Permit Applications. These comments are submitted as a private mostly retired citizen. They do not reflect the position of any of my previous employers or any other organization I have been associated with, these comments are mine alone.

This policy document outlines the requirements for analyses developed "pursuant to Section 7(2) of the Climate Leadership and Community Protection Act (CLCPA) in support of air pollution control permit applications". The document notes that the CLCPA went into effect January 1, 2020 (Chapter 106 of the Laws of 2019). It also notes that the CLCPA also establishes a Climate Action Council that is given three years (by January 1, 2023) to finalize a Scoping Plan providing recommendations for meeting those limits, and requires the DEC to promulgate regulations on GHG emissionsources within four years (by January 1, 2024) that will ensure those limits are met. I submit that this policy is putting the cart before the horse. It is inappropriate to require analysis before regulations are promulgated simply because no standards have been established.

Ultimately the problem with this guidance document can be traced back to the CLCPA presumption that a transition to net-zero can be accomplished by 2050 if only there is political will. The reality is that there are enormous technological challenges particularly for the mandated schedule. As a result, there is a gaping hole in the Scoping Plan because it does not include a feasibility plan for the specific technology and schedule that the Climate Action Council proposes. It is not clear to me when and how the organizations responsible for electric system reliability will review and sign off on an implementation plan. Until that happens it is inappropriate for DEC to put any limitations on fossil-fired generation.

It is obvious that there are serious limitations with existing technology and the aggressive schedule. The New York Independent System Operator (NYISO) 2021-2030 Comprehensive Reliability Plan is the most recent reliability study in New York. It states:

> Moving to 2040, the CLCPA requires generation to be emission-free. The Climate Change Study looked at 100 x 40 (emission-free electric grid by 2040). It noted the significant amount of dispatchable resources that would be needed to meet that goal but did not describe the technology that would be able to provide a dispatchable resource, instead choosing to refer to generic dispatchable, emission-free resources. Not surprisingly, the Climate Change report found that a similar amount of dispatchable resources as the RNA case would be needed to maintain reliability under baseline assumptions. **However, under CLCPA assumptions, the amount of dispatchable emission-free resources needed increases to over 32,000 MW in 2040, approximately 6,000 MW more than the total fossil-fueled generation fleet on the grid in 2021**. The Climate Change Study noted that the current system is heavily dependent on existing fossil-fueled resources to maintain reliability and eliminating these resources from the mix "will require an *unprecedented level of investment in new* and replacement infrastructure, and/or the emergence of a zero-carbon fuel source for thermal generating resources" (emphasis added)[25]. The Climate Change Study did note that while the amount of installed capacity (MW) of dispatchable resources is significant, the amount of energy generated (MWh) required from such resources would likely not be significant, with the percent of total energy being in the range of 10% — 20% range depending on the penetration level of intermittent resources.

This guidance and the Draft Scoping Plan don't consider one component of the CLCPA. The Public Service Commission mandate Public Service (PBS) CHAPTER 48, ARTICLE 4, § 66-p. Establishment of a renewable energy program (4) states:

> The commission may temporarily suspend or modify the obligations under such program provided that the commission, after conducting a hearing as provided in section twenty of this chapter, makes a finding that the program impedes the provision of safe and adequate electric service; the program is likely to impair existing obligations and agreements; and/or that there is a significant increase in arrears or service disconnections that the commission determines is related to the program.

Given that the Energy Plan has to consider the provision for safe and adequate electric service, and it will not be prepared until 2023, it is premature for DEC to pick any winning or losing technologies in this guidance or any other permitting decisions for that matter. I recommend that the effective data be made contingent upon the completion of an Energy Plan that meets PBS Chapter 48, Article 4, § 66-p. Establishment of a renewable energy program requirement for safe and adequate electric service. Because reducing emissions is so dependent upon electrification the electric service criterion is a good surrogate for all permitting activities covered by the guidance.

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[25] Page 13 of the *Climate Change Impact and Resilience Study – Phase II*
https://www.nyiso.com/documents/20142/10773574/NYISO-Climate-Impact-Study-Phase-2-Report.pdf

As an aside to this proceeding but relevant nonetheless I note that the in the DEC's "Notice of Denial of Title V Air Permit" for the Danskammer Energy Center (DEC ID: 3-3346-00011/00017) and in its "Notice of Denial of Title V Air Permit" for the Astoria Gas Turbine Power Project (DEC ID: 2-6301-00191/00014) the DEC rejected the use of both hydrogen and renewable natural gas (RNG) as a 2040 compliance mechanism because the DEC labeled them "speculative" and "aspirational". However, the Scoping Plan's placeholder for a dispatchable, emission-free resource is hydrogen. Governor Hochul's recent State of the State address proposes that New York position itself to compete for nearly $10 billion in federal funding for green hydrogen R&D under the federal infrastructure bill. Obviously, it is in the state's best interest to preserve the option to use hydrogen in the future. In the meantime, the options to supplant the dispatchable energy from those facilities with energy storage and renewable energy alternatives are no less "speculative" and "aspirational". DEC's decision to reject those permits is a serious threat to reliability.

The guidance includes a requirement for an analysis to determine consistency with the CLCPA. I am particularly concerned with section 3: Calculations describing any upstream GHG emissions attributable to the project resulting from the extraction, transmission, and use of fossil fuels or electricity imported into the State. The following paragraph has problems:

> These calculations should be performed using the emission factors in the most recent version of the Preliminary Interim Draft Emission Factors for Use by State Agencies and Project Proponents document developed by DEC, or a facility- specific factor developed by the applicant. If a facility-specific factor is used, the applicant must include a justification explaining the source of the factor and why the applicant believes it is reasonable.

In the first place, reliance on a document with preliminary, interim and draft in the title is a warning flag that the numbers may be poorly supported, speculative, and out-of-line with other similar estimates. The Preliminary Interim Draft Emission Factors for Use by State Agencies and Project Proponents document fits all those descriptions. The document itself was not offered for public review and comment. If it had been I would have re-submitted the attached summary of methane references that I prepared for Part 496. The DEC response to my comments in the final regulatory documents for Part 496 did not address the main point of my comments that the references and numbers chosen only reflect one side of a controversial topic. The Preliminary Interim Draft report numbers poorly support the belief that upstream fugitive methane is a large source. My Part 496 comments referenced work that stated that these perspectives and calculations are invalid. More importantly the fact that there a high quality, long-term methane monitoring network does not show a trend consistent with this presumption unequivocally debunks this belief.

There also is a troubling difference between the estimate of upstream natural gas emission factors in the National Renewable Energy Laboratory document Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update and the DEC Preliminary Interim Draft report. The NREL document Table 1 lists the one-time upstream median published life cycle emissions factor for natural gas as 0.8 g/ kWh expressed in CO_2e (100 yr GWP). In DEC Draft Factors Table 1, the natural gas current upstream and out-of-state emission factor is 44,205 g/mmBtu expressed in CO_2e (20 yr GWP). To convert the NREL g/ kWh to g/mmBtu I used the conversion factor 293.071 kWh per mmBtu which gives 234.45 g/mmBtu expressed as CO_2e (100 yr GWP). The Draft Factors lists the CO2, CH4 and N2O emission factors so that

the CO_2e (100 yr GWP) can be calculated: 22,701 g/mmBtu expressed as CO_2e (100 yr GWP). The Draft Factors upstream natural gas emission factor is 97 times higher than the NREL upstream factor.

NREL document Figure 2 lists the range of estimates for total life cycle greenhouse gas emission estimates for selected electricity generation technologies. The median total life cycle emissions for natural gas is 486 g/ kWh expressed in CO_2e (100 yr GWP). The maximum estimate is just under 1,000 and the minimum is around 250 g/ kWh. The Draft Factors upstream natural gas emission factor is over 40 times higher than NREL maximum estimate.

NREL Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update

Table 1. Median Published Life Cycle Emissions Factors for Electricity Generation Technologies, by Life Cycle Phase

	Generation Technology	One-Time Upstream	Ongoing Combustion	Ongoing Non Combustion	One-Time Downstream	Total Life Cycle	Sources
Renewable	Biomass	NR	—	NR	NR	52	EPRI 2013 Renewable Electricity Futures Study 2012
	Photovoltaic[a]	~28	—	~10	~5	43	Kim et al. 2012 Hsu et al. 2012 NREL 2012
	Concentrating Solar Power[b]	20	—	10	0.53	28	Burkhardt et al. 2012
	Geothermal	15	—	6.9	0.12	37	Eberle et al. 2017
	Hydropower	6.2	—	1.9	0.004	21	DOE 2016
	Ocean	NR	—	NR	NR	8	IPCC 2011
	Wind[c]	12	—	0.74	0.34	13	DOE 2015
Storage	Pumped-storage hydropower	3.0	—	1.8	0.07	7.4	DOE 2016
	Lithium-ion battery	32	—	NR	3.4	33	Nicholson et al. 2021
	Hydrogen fuel cell	27	—	2.5	1.9	38	Khan et al. 2005
Nonrenewable	Nuclear[d]	2.0	—	12	0.7	13	Warner and Heath 2012
	Natural gas	0.8	389	71	0.02	486	O'Donoughue et al. 2013
	Oil	NR	NR	NR	NR	840	IPCC 2011
	Coal	<5	1010	10	<5	1001	Whitaker et al. 2012

Notes for Table 1

All values are in grams of carbon dioxide equivalent per kilowatt-hour (g CO_2e/kWh)

[a] Thin film and crystalline silicon

[b] Tower and trough

[c] Land-based and offshore

[d] Light-water reactor (including pressurized water and boiling water) only

NR = Not Reported.

Funding for this fact sheet was provided by the Joint Institute for Strategic Energy Analysis in support of its Energy and Atmospheric Systems Catalyzer, a collaborative effort that explores the multidirectional relationships across climate, air quality, and energy systems.

See Also

General information about life cycle assessments: "Life Cycle Assessment Harmonization," NREL, https://www.nrel.gov/analysis/life-cycle-assessment.html

Data visualization and data downloads: "LCA Harmonization," OpenEI, https://openei.org/apps/LCA/

Additional distributional statistics and subtechnology emissions factors augmenting Table 1:

DEC “Preliminary Interim Draft Emission Factors for Use by State Agencies and Project Proponents” 2/21

Table 1. Current Upstream and Out-of-State Emission Factors for Imported Fossil Fuels

These factors reflect greenhouse gas emissions associated with the extraction, production, and transmission of fossil fuels imported into New York State for the most recent year available, or 2018.[3] This does not include extraction, production, or transmission of fuels within New York State.

	Greenhouse gas emission rate (g/mmbtu)*			
Fuel Type**	**CO_2**	**CH_4**	**N_2O**	**CO_2e (20 yr GWP)+**
Natural Gas	11,913	384	0.136	44,205
Diesel/ Distillate Fuel	15,164	121	0.258	25,375
Coal	3,279	397	0.103	36,650
Kerosene/Jet Fuel	10,071	109	0.170	19,270
Gasoline (E85)	5,097	33	0.085	7,905
Gasoline***	18,349	119	0.306	28,459
LPG	17,295	121	0.270	27,553
Petroleum Coke	11,612	112	0.204	21,096
Residual Fuel	11,799	111	0.194	21,184
Asphalt and Road Oil	8,487	105	0.128	17,325

*Sums or products may not match due to independent rounding. Units in grams(g) can be converted to pounds by dividing by 453.6.

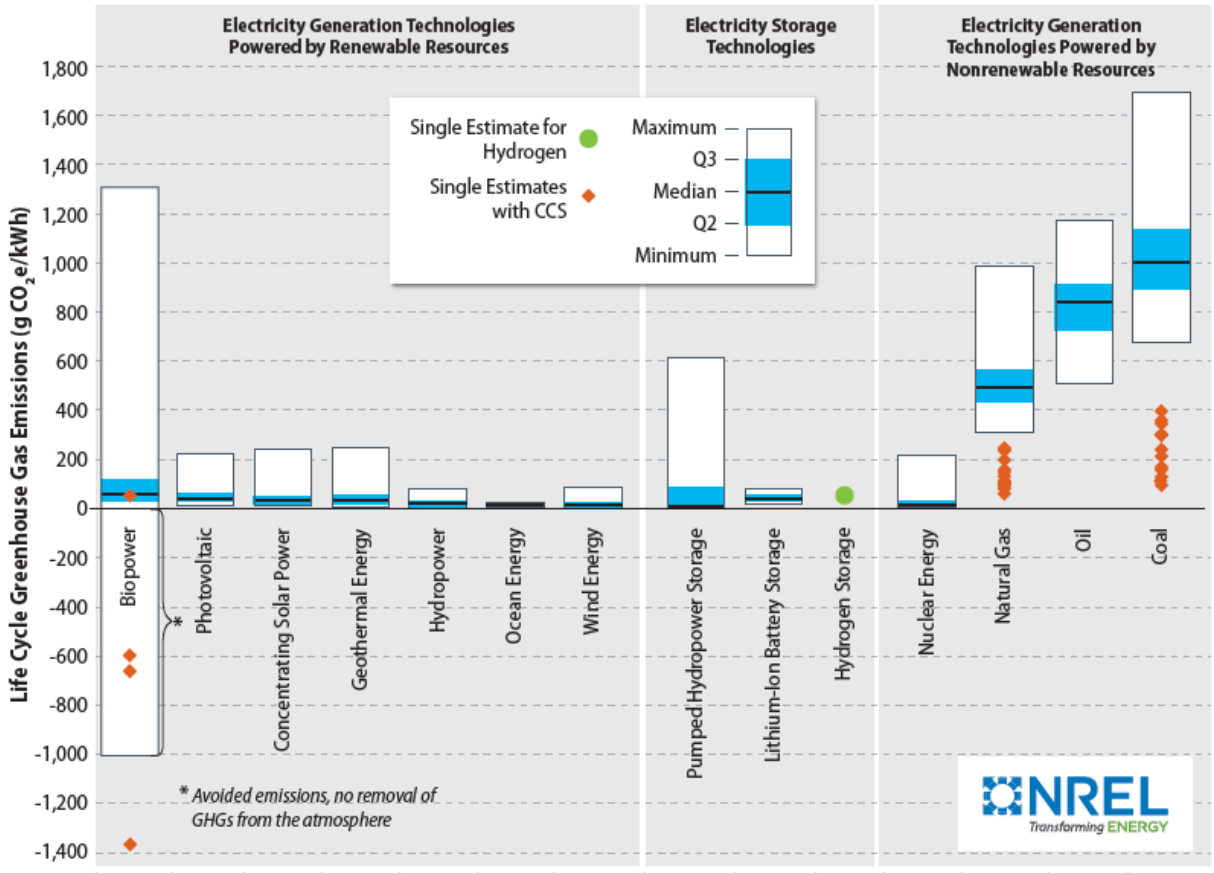
** Users may wish to adjust the specified emission factors for blended fuels

*** The gasoline emission factors represent 100% fossil fuel content gasoline, equivalent to gasoline blend stock, if evaluating blends with oxygenates (e.g., ethanol) these blends can be apportioned to the fraction of emissions associated with the energy fraction of the blend that is from fossil fuels (e.g. E85 is a blend of ethanol and gasoline estimated here to have the energy content of approximately 28% gasoline and 72% ethanol).

+ CO_2e is calculated by multiplying the mass of each gas by its global warming potential(GWP) and adding the products together(CO_2 GWP is 1, CH_4 GWP is 84, N_2O GWP is 264).

NREL [Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update]

Figure 2. Life cycle greenhouse gas emission estimates for selected electricity generation and storage technologies, and some technologies integrated with carbon capture and storage (CCS).



	Biopower	Photovoltaic	Concentrating Solar Power	Geothermal Energy	Hydropower	Ocean Energy	Wind Energy	Pumped Hydropower Storage	Lithium-Ion Battery Storage	Hydrogen Storage	Nuclear Energy	Natural Gas	Oil	Coal
Estimates	276 (+4)	46	36	35	149	10	186	16	29	1	99	80 (+13)	24	164 (+11)
References	57 (+2)	17	10	15	22	5	69	4	3	1	27	47 (+11)	10	53 (+9)

Notes for Figure 2: The number of estimates is greater than the number of references because many studies considered multiple scenarios. Numbers reported in parentheses pertain to additional references and estimates that evaluated technologies with CCS.

Section 7 in the guidance for an analysis to determine consistency with the CLCPA states:

> For facilities in the electric generation sector, the analysis should discuss how the facility intends to comply with the requirement that the electric generation sector be zero emissions by 2040. This discussion should cover the feasibility and impacts from any alternative fuels or technologies that will be used by the facility to comply, and any alternatives or mitigation measures that will be implemented.

In my opinion this request for a feasibility analysis when the Climate Action Council has not provided one in the Draft Scoping Plan is hypocritical at best. Until such time that the State has amended the Energy Plan based on a feasibility analysis this requirement in DAR-21 should be delayed.

Conclusions

As shown by my comments above, I recommend that this guidance be implemented only after the Energy Plan is acceptable with all New York State organizations responsible for electric system reliability. Clearly there is concern by the NYISO that the technology for a dispatchable, emission-free resource does not currently exist so meeting the schedule for implementing the amount of this new resource needed to meet the CLCPA target is unlikely. In that light, this guidance should not be implemented until the Energy Plan update consistent with the CLCPA is finalized.

The risk that some technology will be prohibited that might be needed in the future is so great that the emphasis must be on maintaining existing resources and allowing upgrades such that they will be available until at least 2040, if not longer. It is obvious that a permit condition can be incorporated that simply states that when all the CLCPA reliability conditions are met then the facility must shut down. If an owner thinks that they can make money with that constraint then they should not be discouraged.

The guidance should be revised to directly address the NYISO concerns. The model of the peaker rule process between DEC and NYISO should be used in this instance. DEC must incorporate a process similar to that used for the Peaker Rule (6NYCRR Part 227-3) whereby the NYISO works with DEC to ensure reliability issues are addressed for any permit application affecting electric generation viability.

Thank you for the opportunity to comment.

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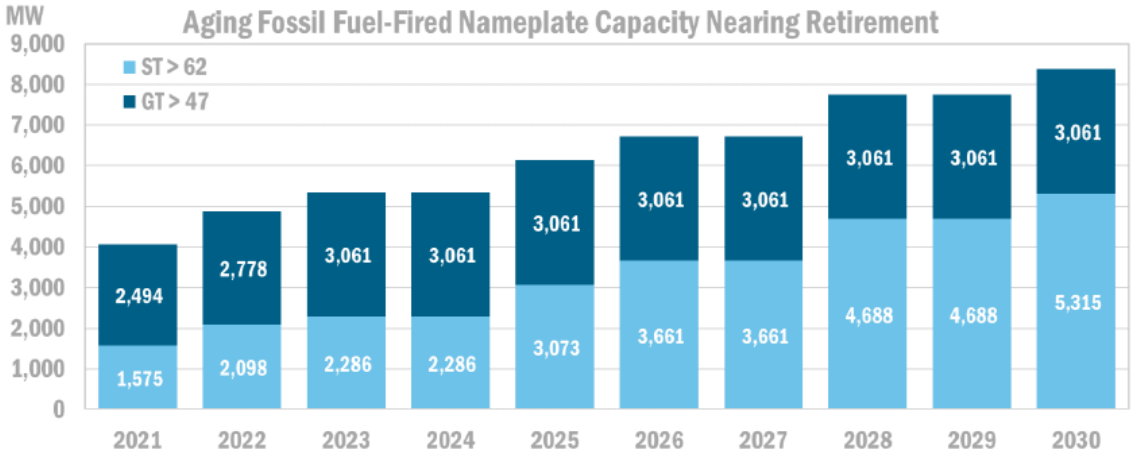
In my previous submittal on February 2, 2022, I pointed out that Proposed Policy DAR-21 guidance and the Draft Scoping Plan don't consider one component of the Climate Leadership & Community Protection Act (CLCPA). The Public Service Commission mandate Public Service (PBS) CHAPTER 48, ARTICLE 4, § 66-p. Establishment of a renewable energy program (4) states:

> The commission may temporarily suspend or modify the obligations under such program provided that the commission, after conducting a hearing as provided in section twenty of this chapter, makes a finding that the program impedes the provision of safe and adequate electric service; the program is likely to impair existing obligations and agreements; and/or that there is a significant increase in arrears or service disconnections that the commission determines is related to the program.

This comment was submitted to highlight a relevant finding in the New York Independent System Operator (NYISO) 2021-2030 Comprehensive Reliability Plan (CRP) report. The report highlights some risk factors that threaten electric system reliability. The CRP states:

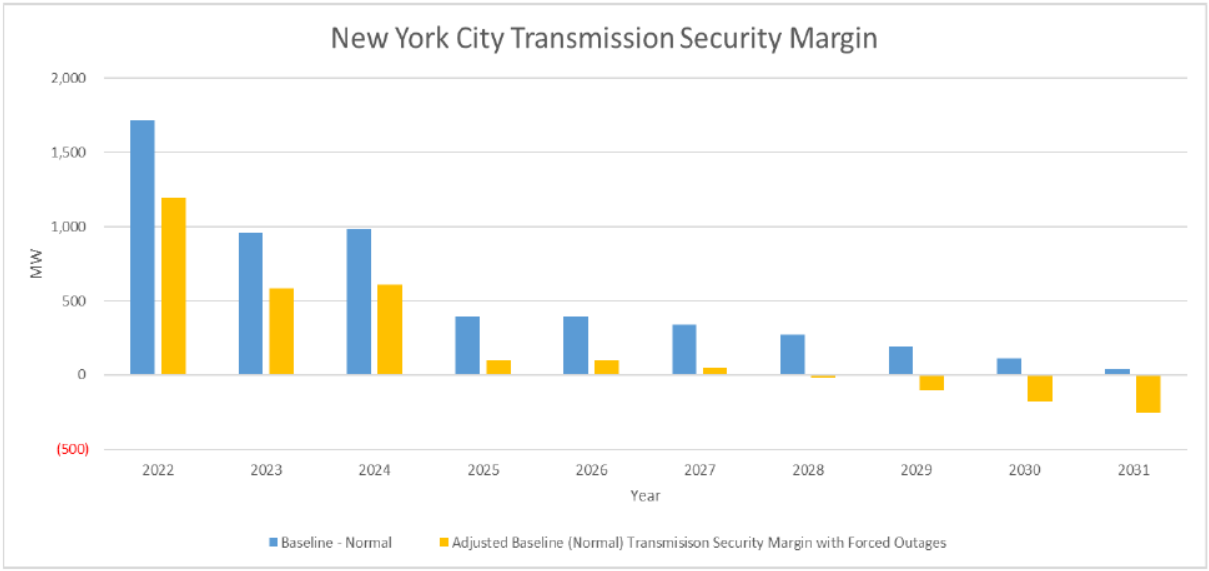
> As generators age and experience more frequent and longer duration outages, the costs to maintain the assets increase. These costs may drive aging generation into retirement. A growing amount of New York's gas-turbine and fossil fuel-fired steam-turbine capacity is reaching an age at which, nationally, a vast majority of similar capacity has been deactivated. As shown in Figure 11, by 2028 more than 8,300 MW of gas-turbine and steam-turbine based capacity in New York will reach an age beyond which 95% of these types of generators have deactivated.

Figure 11: Cumulative NYCA Nameplate Capacity MW Past the Age When 95% of Similar Units Have Retired



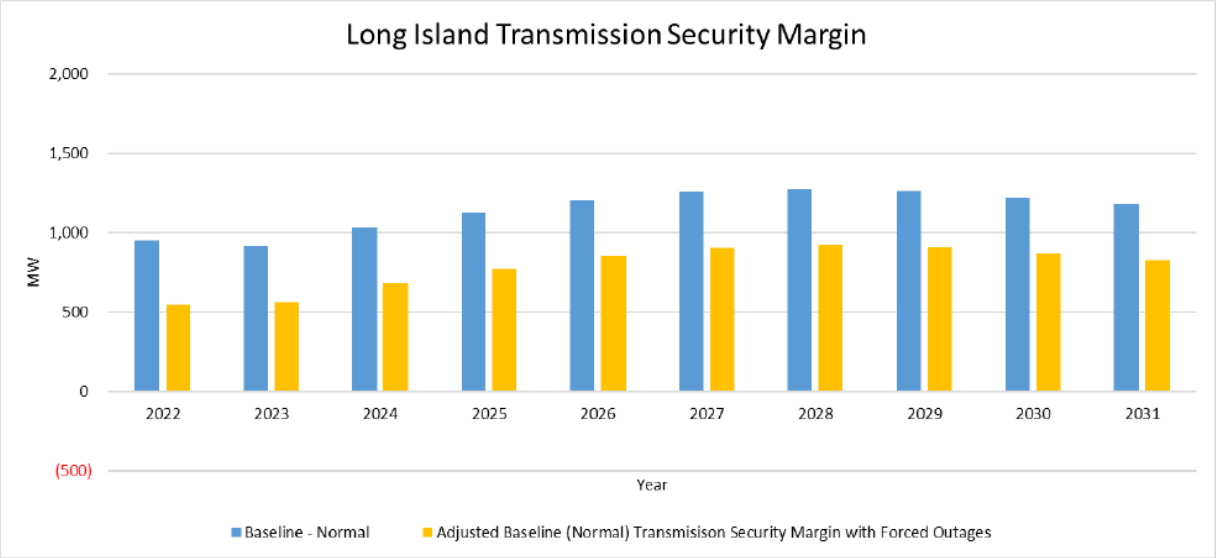
The impact of the unavailability of system resources can readily be seen through tipping point evaluations. **While transmission security within New York City (Zone J) is maintained through the ten-year period in accordance with design criteria, the margin would be very tight starting in 2025 and would be deficient beginning in 2028 if forced outages are experienced at the historical rate**, as shown in Figure 12[26]. Transmission security within Long Island (Zone K) is also maintained through the ten-year period, with the slimmest margin in the first few years as shown in Figure 13. If forced outages are experienced at the historical rate the Long Island margin would be sufficient through the study period.

Figure 12: New York City Transmission Security Margin (Summer Baseline Peak Forecast – Normal Operations)



[26] Additional transmission, resources, or demand reduction within New York City may increase the margin and reduce the likelihood of future reliability needs.

Figure 13: Long Island Transmission Security Margin (Summer Baseline Peak Forecast – Normal Operations)



Obliviously, DEC has rejected permits for new replacement generating facilities that addresses this risk factor. For example, the Danskhammer Energy Center proposed a replacement gas-fired combustion turbine but DEC denied the permit "The proposed project would be inconsistent with or would interfere with the statewide greenhouse gas emissions limits established in the Climate Act." This proposed guidance must incorporate a process similar to that used for the Peaker Rule (6NYCRR Part 227-3) whereby the NYISO works with DEC to ensure reliability issues are addressed for any permit application affecting electric generation viability.

The DAR-21 Guidance must be revised to incorporate electric system reliability considerations. Firstly, as shown above there are reliability concerns related to existing electrical generators. The guidance must not preclude continued operation of existing units. Secondly, DEC should not prevent operators from providing modern generating units that are more reliable than the existing aging units. Finally, the Energy Plan has to consider the provision for safe and adequate electric service at the same time that the Draft Scoping Plan is proposing the use of currently unavailable technology. For all three reasons it is premature for any DEC to limit, shut down or prevent upgrades at existing electrical generation facilities.

Conclusions

The risk that some technology will be prohibited that might be needed in the future is so great that the emphasis must be on maintaining existing resources and allowing upgrades such that they will be available until at least 2040, if not longer. It is obvious that a permit condition can be incorporated that simply states that when all the CLCPA reliability conditions are met then the facility must shut down. If an owner thinks that they can make money with that constraint then they should not be discouraged.

The guidance should be revised to directly address the NYISO concerns. The model of the peaker rule process between DEC and NYISO should be used in this instance. DEC must incorporate a process similar

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