

## Comments on 2023 RGGI Operating Plan Amendment

### Introduction

I am submitting these comments on the New York's Regional Greenhouse Gas Initiative (RGGI) [Operating Plan Amendment](#) ("Amendment") for 2023 document because I think Plan needs to re-focus its efforts and put more emphasis on programs that directly, indirectly, or potentially reduce carbon dioxide (CO<sub>2</sub>) from the electric generating units affected by RGGI. I think the proposed amendments put too much emphasis on the RGGI proceeds for Climate Leadership and Community Protection Act (Climate Act) support. My primary concern is that RGGI is an electric sector emissions reduction program and it is inappropriate to use the auction proceeds for any program that will not materially decrease emissions directly or indirectly through energy use reductions. There are multiple programs in the amendment that do not meet that criterion. Those funds should be re-allocated elsewhere.

I have been involved in the RGGI program process since it was first proposed prior to 2008. I follow and write about the [details of the RGGI program](#) because its implementation affects whether I will be able to continue to live in New York. I have extensive experience with air pollution control theory, implementation, and evaluation having worked on every cap-and-trade program affecting electric generating facilities in New York including the Acid Rain Program, Regional Greenhouse Gas Initiative (RGGI) and several Nitrogen Oxide programs. The opinions expressed in these comments do not reflect the position of any of my previous employers or any other company I have been associated with, these comments are mine alone.

### Summary

These comments are separated into two main parts. The first describes the observed New York State (NYS) emission reductions from the electric sector since 2000 and the lessons that should be learned. The second section offers my comments on the specific programs in the Amendment.

The historical emission trends of NYS electric generating units (EGU) provide valuable insight for future emission strategies. I found that between 2000 and 2021 New York EGU emissions have dropped from 57,114,438 tons to 28,546,529 tons, a decrease of 50%. NYS EGU CO<sub>2</sub> emissions were 39% lower in 2021 than the three-year baseline emissions before RGGI started. However, I showed that emissions have dropped primarily because coal and oil fueled generation has essentially gone to zero. Natural gas has increased to cover the generation from those fuels but because it has lower CO<sub>2</sub> emission rates New York emissions have gone down.

My evaluation discovered issues associated with the NYSERDA RGGI Funding Status reports related to the observed CO<sub>2</sub> reductions compared to estimates of direct CO<sub>2</sub> savings and projections using heat input (mmBtu) and generation (MWhr) projected savings. Consequently, the best estimate of observed emission reductions that can be attributed to RGGI are from the two programs that claim direct CO<sub>2</sub> reduction savings: NY-Sun Initiative and NYSERDA Solar Electric. Over the years 2013 to 2021, the total investment for those programs is \$565 million and the claimed savings are 1,684,616 MWh and 861,442 tons of CO<sub>2</sub>e with a calculated cost benefit of 565 \$/ton. The observed emissions decrease between 2013 and 2021 is 5,397,135 tons so the only CO<sub>2</sub> reductions that can conclusively be claimed from RGGI investments account for 16% of the observed emission reduction. Because observed coal CO<sub>2</sub> emissions went from 5,463,637 tons in 2013 to zero in 2021 and oil CO<sub>2</sub> emissions went from 3,871,162 tons to 313,115 tons, I conclude that the primary reason for the observed electric sector emission reductions in New York was due to fuel switching.

These observations are relevant for the future of EGU emission reductions required for RGGI and the Climate Act. Coal and oil emissions from the RGGI affected sources are as low as they are going to get without retirement of oil-fired sources. The average CO<sub>2</sub> emissions reduction per year from RGGI investments has been 95,716 tons since 2013. New York [Part 242](#) CO<sub>2</sub> Budget Trading Program specifies an annual reduction of RGGI allowances of 880,493 per year starting in 2022 and continuing to 2030. That reduction is nearly ten times more than the reductions from RGGI auction proceed investments. The Climate Act is going to require even more emission reductions. Electric generating unit owners and operators have no options available for additional emission reductions other than reducing their operating times. It is incumbent upon the state to incentivize and subsidize carbon-free generation so that the RGGI sources can reduce operations and not jeopardize system reliability. It is not clear where those reductions will come from given the poor record of RGGI-funded program investments and the lack of RGGI focus on direct emissions reduction programs.

I described program investments for six categories. The first three categories cover programs that directly, indirectly or could potentially decrease RGGI-affected source emissions. Those programs total 45% of the investments. I also included a category for programs that will add load that could potentially increase RGGI source emissions which totals 27% of the investments. Programs that do not affect emissions are funded with 21% of the proceeds and administrative costs total another 7%. I believe this represents an improper allocation of resources.

I evaluated potential emissions for five Integration Analysis and New York Independent System Operator (NYISO) scenario projections of load through 2030. They all agree that fossil generating resource loads will increase or remain nearly constant until 2026 when large amounts of renewable resources are expected to come on line. On the other hand, RGGI allowance allocations decrease so that NY emissions are projected to exceed the annual RGGI allocations. This problem peaks in 2025 but in that year NYISO Resource Outlook scenario 1 projects EGU emissions are 10% higher than the RGGI allocation.

In order to address the need for strategies that can displace RGGI-affected source generation the RGGI Operating Plan amendment needs to reevaluate priorities. NYSERDA must verify that other investments will provide the necessary reduction in RGGI-affected source emissions in order to justify spending more than half the RGGI proceeds on programs unrelated to RGGI emissions. My comments on specific amendments recommended that most of the unrelated programs not be funded.

I only have specific comments on one proposed program. The Climate Act is pushing the envelope of zero-emissions technology so the Scoping Plan Implementation Research program is certainly appropriate. I recommend that this program fund projects for [dispatchable emissions-free resource](#) (DEFR) requirements and the question of wind and solar resource availability during winter doldrums.

### Background

The draft Amendment explains that New York State invests RGGI proceeds to support comprehensive strategies that best achieve the RGGI greenhouse gas emissions reduction goals pursuant to 21 NYCRR Part 507. The programs in the portfolio of initiatives are designed to support the pursuit of the State's greenhouse gas emissions reduction goals by:

- Deploying commercially available energy efficiency and renewable energy technologies;
- Building the State's capacity for long-term carbon reduction;

- Empowering New York communities to reduce carbon pollution, and transition to cleaner energy;
- Stimulating entrepreneurship and growth of clean energy and carbon abatement companies in New York; and
- Creating innovative financing to increase adoption of clean energy and carbon abatement in the State.

The draft Amendment notes that the initiatives described represent program activity proposed for the 2023 Operating Plan. The funding levels for each program include previously approved and the amounts proposed for FY23-24 through FY25-26.

**New York State Emission Reductions**

I have written [multiple articles](#) that argue that RGGI advocates mislead the public when they imply that RGGI programs were the driving force behind the observed over 50% reduction in power sector CO<sub>2</sub> emissions since the start of the program. In my [latest evaluation](#) I found that since 2009 RGGI funded control programs have been responsible for 5.6% of the observed reductions. The [Investment of RGGI Proceeds in 2020](#) report does not directly provide the numbers necessary to calculate that estimate which I have come to believe is deliberate. When the sum of the RGGI investments is divided by the sum of the annual emission reductions the CO<sub>2</sub> emission reduction efficiency is \$818 per ton of CO<sub>2</sub> reduced. I concluded that RGGI is not an effective CO<sub>2</sub> emission reduction program.

The latest New York RGGI funding report prepared by the New York State Energy Research & Development Authority (NYSERDA) is the [Semi-Annual Status Report through June 30, 2022](#). It states that:

This report is prepared pursuant to the State’s RGGI Investment Plan (2020 Operating Plan) and provides an update on the progress of programs through the quarter ending June 30, 2022. It contains an accounting of program spending; an estimate of program benefits; and a summary description of program activities, implementation, and evaluation. An amendment providing updated program descriptions and funding levels for the 2021 version of the Operating Plan was approved by NYSERDA’s Board in January 2022.

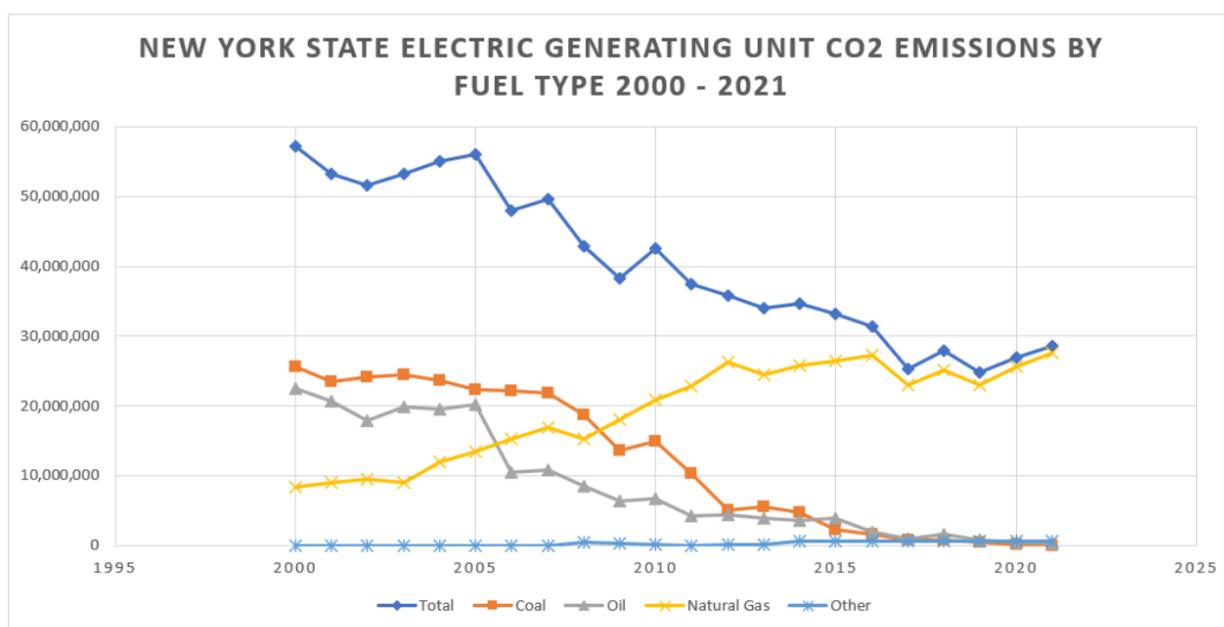
The State invests RGGI proceeds to support comprehensive strategies that best achieve the RGGI CO<sub>2</sub> emission reduction goals. These strategies aim to reduce global climate change and pollution through energy efficiency, renewable energy, and carbon abatement technology.

I used this document and previous iterations to evaluate the effectiveness of RGGI auction proceed investments to reduce NYS electric sector emissions.

**NYS Emissions Reductions – Observed Trend**

The first step in evaluating the effect of RGGI on CO<sub>2</sub> emissions is to determine the observed trend of New York electric utility emissions. My background is in the electric generating sector and I have been involved in the reporting process for electric generating unit (EGU) [continuous emissions monitoring system](#) (CEMS) data ever since the Environmental Protection Agency (EPA) mandated these systems for the [Acid Rain Program](#). EPA’s [Clean Air Markets Division maintains a data base](#) of all the emissions data collected by every power plant in the United States since the mid-1990’s. Those data are used for RGGI program compliance and are used in these comments.

The following graph from this [spreadsheet](#) shows New York State CO<sub>2</sub> emissions since 2000 based on data in spreadsheet [NY RGGI Funded Program Status Report Summary](#). These data are the sum of all New York units that are required to submit CEMS data to EPA for any air pollution control program. The EPA database includes supplemental information such as the primary fuel type of each generating unit and I have listed CO<sub>2</sub> emissions by fuel type. In 2000, New York EGU emissions were 57,114,438 tons and in 2021 they were 28,546,529 tons, a decrease of 50% (Table 1). In NYS 2021 CO<sub>2</sub> emissions are 39% lower than the three-year baseline emissions before RGGI started. The reason that emissions have dropped is because coal and oil fuels have essentially gone to zero as shown in the following graph. Natural gas has increased to cover the generation from those fuels but because it has lower CO<sub>2</sub> emission rates the New York emissions have gone down.



**Table 1: New York State EGU CO2 Emissions**

Year	CO2 Emissions (short tons)				
	Total	Coal	Oil	Natural Gas	Other
2000	57,114,439	25,546,641	22,488,241	8,411,265	0
2001	53,195,854	23,519,892	20,636,551	9,039,411	0
2002	51,546,524	24,073,494	17,924,260	9,548,770	0
2003	53,240,989	24,491,989	19,789,015	8,959,985	0
2004	55,125,941	23,673,988	19,574,349	11,877,605	0
2005	56,018,928	22,348,515	20,163,454	13,506,959	0
2006	47,912,219	22,183,541	10,487,480	15,241,197	0
2007	49,575,411	21,884,899	10,732,639	16,957,873	0
2008	42,844,448	18,679,355	8,515,621	15,205,001	444,472
2009	38,295,368	13,637,433	6,394,482	18,055,052	208,400
2010	42,534,713	14,950,792	6,701,372	20,793,883	88,666
2011	37,420,975	10,394,280	4,201,172	22,825,522	0
2012	35,762,481	5,030,164	4,349,728	26,195,974	186,615
2013	33,943,664	5,463,637	3,871,162	24,534,203	74,661
2014	34,666,067	4,667,127	3,575,144	25,765,912	657,883
2015	33,226,652	2,229,725	3,971,812	26,425,073	600,041
2016	31,384,868	1,588,950	1,920,260	27,259,941	615,717
2017	25,268,988	763,861	921,364	22,956,907	626,856
2018	27,973,346	703,377	1,552,645	25,081,091	636,234
2019	24,868,687	471,969	853,771	22,999,224	543,723
2020	26,868,364	174,360	461,209	25,638,260	594,535
2021	28,546,529	0	313,115	27,619,633	613,781

**NYS Emissions Reductions – RGGI Program Investment Reductions**

In the RGGI funding reports the Chapter Summary of Portfolio and Program Benefits describes the NYSERDA tracking process:

NYSERDA begins tracking program benefits once project installation is complete and provides estimated benefits for projects under contract that are not yet operational (pipeline benefits). Estimated benefits are based on the expected lifetime benefits from installed and pipeline savings. The metrics presented in this section are estimates and not evaluated unless otherwise noted. Future evaluation and status reports will present the results as they are available. NYSERDA expects verified net savings to be incorporated in the year-end 2022 report. Program benefits may be reported prior to the financial reporting of funds spent, as fund transfers may lag behind the installation date. At this time, the program benefits include some projects that are jointly supported by other non-RGGI funding sources administered by NYSERDA.

It is necessary to consider a couple of items. The NYSERDA RGGI funding report formats and material presented have changed over time. I found that only since 2013 were the reports consistent enough for my purposes. I do not understand the quote in the preceding paragraph: “metrics presented in this section are estimates and not evaluated unless otherwise noted.” I used the numbers as they were presented in the report.

The estimated cumulative annual net GHG emissions savings as of the end of the reporting period for each of the reports since 2013 are shown in Table 2. I did not use the “lifetime” savings data because I have always felt that was inappropriate. In this application I am trying to compare the RGGI program benefits reductions to the RGGI compliance metric of an annual emission cap. Lifetime reductions are clearly irrelevant. The document description “Estimated benefits are based on the expected lifetime benefits from installed and pipeline savings” suggests that the values shown are lifetime values but the table includes both power (MMBtu) and energy (MWhr) savings where lifetime values are more appropriate for energy efficiency program accounting.

**Table 2. Summary of Expected Cumulative Annual Program Benefits**

Report	Through Date	Net GHG Emission Savings (CO2e tons)			
		Installed	Pipeline	Total	Cumulative
Quarter 4	12/31/2013	100,934	45,904	146,838	146,838
Quarter 4	12/31/2014	178,048	83,118	261,165	408,003
Quarter 4	12/31/2015	277,276	74,526	351,802	759,805
Quarter 4	12/31/2016	610,750	65,517	676,266	1,436,071
Quarter 4	12/31/2017	838,995	51,373	890,368	2,326,439
Semi-annual	12/31/2018	1,053,081	63,506	1,116,587	3,443,026
Semi-annual	12/31/2019	910,707	66,715	977,422	4,420,448
Semi-annual	12/31/2021	1,359,213	87,724	1,446,937	5,867,385
Semi-annual	6/30/2022	1,477,039	115,999	1,593,038	7,460,423

Emission trends over short periods are unreliable as indicators of policy implementation because there are other factors affecting the operation of generating units. The biggest outside factor is weather. If the year was abnormally hot or cold then the emissions would go up because the units operated more. There also can be issues related other units going down to problems or retirements. For example, the recent CO<sub>2</sub> trend is New York is strongly affected by the closure of 2,000 MW of zero-emissions generating at Indian Point and I understand units on Long Island have run more the last couple of years due to issues with transmission cables under Long Island Sound. Keep this issue in mind when looking at Table 3 that compares New York CO<sub>2</sub> emissions with the cumulative RGGI net GHG emission savings. The emissions decrease between 2013 and 2021 is 5,397,135 tons but the RGGI investments claimed total 7,460,423 tons. NYSERDA is claiming that RGGI investments were responsible for all the emission reductions!

**Table 3: Cumulative RGGI Net GHG Emissions Savings (tons CO2)**

	Total New York CO2 Emissions (tons)	Cumulative RGGI Net GHG Emission Savings (tons CO2)		
		Annual	Cumulative	Percentage Savings of Total Emissions
2013	33,943,664	146,838	146,838	0.4%
2014	34,666,067	261,165	408,003	1.2%
2015	33,226,652	351,802	759,805	2.3%
2016	31,384,868	676,266	1,436,071	4.6%
2017	25,268,988	890,368	2,326,439	9.2%
2018	27,973,346	1,116,587	3,443,026	12.3%
2019	24,868,687	977,422	4,420,448	17.8%
2020	26,868,364	1,446,937	5,867,385	21.8%
2021	28,546,529	1,593,038	7,460,423	26.1%

I do not believe that the RGGI investments could be responsible for all the observed reductions. I think that fuel switching is more likely to be the cause of the emission reductions observed. Over this time period the last coal units shut down and the oil-fired units reduced their emissions about as low as I expect they can go and still provide capacity support. Another possible reason is that I assumed that the annual installed and pipeline emission savings represented an actual annual projection and not lifetime emission savings. That could account for the unrealistically high emission reduction claim.

There is another possible explanation. Appendix A, Section A.2 in [Semi-Annual Status Report through June 30, 2022](#) describes the CO<sub>2</sub> reduction savings methodology:

Emissions factors translate the energy savings data into annual GHG emission reduction values. The GHGs evaluated in the report include carbon dioxide, methane, and nitrous oxide. Because each of these gases has a different global warming potential, emissions for gases other than carbon dioxide are converted into carbon dioxide equivalent units (CO<sub>2</sub>e) through multiplication with their appropriate Intergovernmental Panel on Climate Change (IPCC) global warming potential value, shown in Table A-1.

Therefore, the other possibility for the discrepancy is that the cumulative RGGI net GHG emission savings in Table 2 of the status reports is not just CO<sub>2</sub> but also includes methane and nitrous oxide. If that is the case then it would explain some of the inconsistency. It also would be inappropriate. RGGI is supposed to be a CO<sub>2</sub> emissions reduction program. This document should report on the efficacy of RGGI-program investments and provide evidence how it will work in the future. In order to determine the value of the RGGI investments relative to the RGGI emission targets the only relevant GHG is CO<sub>2</sub>. Including methane and nitrous oxides misleads readers because it suggests higher emissions than what can be expected for investments needed to meet the RGGI emission reduction targets.

Appendix A goes on to say:

NYSERDA uses the emission factors shown in Table A-2 to calculate emissions from on-site fuel combustion derived from the U.S. Environmental Protection Agency (EPA) emission coefficients. The CO<sub>2</sub>e values represent aggregate CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions. If a program covers more than one sector, then the estimated reduction is based on a calculated average emission factor for the affected sectors.

Without more documentation I will admit to being flummoxed. This paragraph states that the emission factors used “represent aggregate CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O emissions” but the values in the following paragraph are close to the observed CO<sub>2</sub> only emission rates observed. This suggests that if the methane and nitrous oxide components of the aggregate emission rates are included that they are very small. It would be helpful if the documentation provided an example calculation showing how the aggregate factors were developed.

**Table A-2. Fuel Combustion Emission Factors by Sector**

	Transport (lbs: CO <sub>2</sub> e/MMBtu)	Residential (lbs: CO <sub>2</sub> e/MMBtu)	Commercial (lbs: CO <sub>2</sub> e/MMBtu)	Industrial (lbs: CO <sub>2</sub> e/MMBtu)
Coal	N/A	224.8	211.4	203.7
Natural Gas	117.2	117.2	117.2	114.5
#2 Oil/Distillate/Diesel	163.0	162.9	162.9	162.9
#6 Oil/Residual	N/A	N/A	166.0	166.0
Kerosene	N/A	161.2	161.2	161.2
Propane	136.1	136.1	136.1	136.1
Gasoline	158.0	N/A	N/A	N/A
Aviation Fuel	159.2	N/A	N/A	N/A
Wood	N/A	18.2	18.2	4.1
Steam	N/A	106.1	106.1	N/A

The final relevant section of Appendix A states:

For projects installed prior to 2016, a marginal emission factor of 1,160 pounds of CO<sub>2</sub>e/MWh estimates emission reductions associated with electricity use reductions for all sectors. When a project is installed and committed from 2016 onward, a marginal emission factor of 1,103 pounds of CO<sub>2</sub>e/MWh is applied to estimate emission reductions associated with electricity use reductions for all sectors. Although electricity savings may not lead to near-term emission reductions under the RGGI CO<sub>2</sub> cap, savings will potentially reduce imports of electricity to NYS; the demand for CO<sub>2</sub> allowances, leading to a possible future reduction in the cap; and the carbon footprint of end users, as they will be responsible for a smaller percent of the emissions associated with electricity production.

Even if the marginal emission factors represent aggregate rates for CO<sub>2</sub> that incorporate methane and nitrous oxides, this is an over-estimate of current CO<sub>2</sub> emission rates. The table opposite lists the calculated marginal emission rate for New York State electric generating units subject to RGGI. The fact is that current New York CO<sub>2</sub> emissions are almost exclusively due to natural gas emissions that are significantly lower than the marginal emission factors quoted. At a minimum, there should be another methodology adjustment to correct for this over-estimate of emission reductions that could be expected when RGGI investments reduce future energy use.

Year	CO2 Rate (lbs/MWh)
2013	1,155
2014	1,155
2015	1,122
2016	1,110
2017	1,092
2018	1,099
2019	1,065
2020	1,046
2021	1,036

#### NYS Emissions Reductions – Alternative RGGI Program Investment Reduction Methodologies

I calculated CO<sub>2</sub> annual emissions in two alternative ways. In the status report, Table 2: Summary of Expected Cumulative Annual Program Benefits lists the net energy savings (annual MMBtu) and net electricity savings or renewable energy generation (annual MWh). The EPA emissions data includes those parameters so that an annual New York emission rate based on both parameters can be calculated. Once the calculated emission rate is determined then it can be multiplied by the projected annual savings due to RGGI funded programs to get an annual total emissions estimate.

Table 4 uses the heat input (MMBtu) data to calculate annual CO<sub>2</sub> emission “savings”. Using this methodology, the cumulative total CO<sub>2</sub> emissions expected from the RGGI-funding programs is 2,040,461 tons or 7.1% of the 2021 annual emissions. Recall that the emissions decrease between 2013 and 2021 is 5,397,135 tons so at least this estimate is less than the observed emission reduction.

**Table 4: Alternative Calculation Methodology for CO2 Emission Savings**

	EPA CAMD Total New York CO2 Emissions (tons)	RGGI Funding Report Annual Benefits from Table 2 Total New York Electric Generation (mmBtu)	CO2 Emissions Savings (tons) Calculated as Rate (tons /mmBtu) Times Generation (mmBtu)			
			CO2 Rate (tons/MMBtu)	Calculated from Rate Annual	Cumulative	Percentage Savings of Total Emissions
2013	33,943,664	1,373,643	0.064	88,337	88,337	0.3%
2014	34,666,067	2,188,496	0.064	141,111	229,448	0.7%
2015	33,226,652	2,631,669	0.062	164,371	393,819	1.2%
2016	31,384,868	2,728,814	0.062	167,997	561,816	1.8%
2017	25,268,988	3,243,676	0.061	198,040	759,857	3.0%
2018	27,973,346	3,296,867	0.061	202,440	962,296	3.4%
2019	24,868,687	3,267,269	0.061	198,541	1,160,837	4.7%
2020	26,868,364	6,714,938	0.060	405,230	1,566,067	5.8%
2021	28,546,529	7,862,973	0.060	474,394	2,040,461	7.1%

Table 5 uses the load (MWhr) data to calculate annual CO<sub>2</sub> emissions. Using this methodology, the cumulative total CO<sub>2</sub> emissions expected from the RGGI-funding programs is 6,663,077 tons or 23.3% of the 2021 annual emissions. Recall that the emissions decrease between 2013 and 2021 is 5,397,135 tons so this estimate is greater than the observed emission reduction.

**Table 5: Alternative Calculation Methodology 2 for CO2 Emission Savings**

	EPA CAMD Total New York CO2 Emissions (tons)	Report Annual Benefits Net Electricity Savings or Renewable Energy Generation (MWh)	CO2 Emissions Savings (tons) Calculated as Rate (tons /MWhr)			
			CO2 Rate (tons/MWhr)	Calculated from Annual Rate	Cumulative	Percentage Savings of Total Emissions
2013	33,943,664	79,362	0.577	45,813	2,086,274	6.1%
2014	34,666,067	255,996	0.578	147,857	2,234,131	6.4%
2015	33,226,652	443,918	0.561	249,049	2,483,180	7.5%
2016	31,384,868	687,796	0.555	381,779	2,864,959	9.1%
2017	25,268,988	1,003,014	0.546	547,781	3,412,740	13.5%
2018	27,973,346	1,373,753	0.549	754,741	4,167,480	14.9%
2019	24,868,687	1,054,777	0.532	561,606	4,729,087	19.0%
2020	26,868,364	1,792,898	0.523	938,045	5,667,131	21.1%
2021	28,546,529	1,922,563	0.518	995,946	6,663,077	23.3%

#### NYS Emissions Reductions – RGGI-Funded Program Reductions

I believe that the underlying cause for the differences between the observed CO<sub>2</sub> reductions using CO<sub>2</sub> savings directly or the heat input (mmBtu) and generation (MWhr) data is that most of the RGGI-funded programs indirectly affect emissions. All the programs in the Green Jobs - Green New York, Energy Efficiency, Community Clean Energy, Clean Energy Communities, and Charge NY categories affect CO<sub>2</sub> emissions indirectly. In the Renewable Energy category only the NY-Sun Initiative and NYSERDA Solar Electric programs fund programs that subsidize renewable energy projects that directly offset generation from fossil-fired generating units affected by RGGI. All the other programs reduce energy use that indirectly reduces the need for RGGI-affected unit generation.

[Table 6](#) classifies the savings into two categories: direct and indirect effects on CO<sub>2</sub> emissions for the latest year. The only two programs (NY-Sun Initiative and NYSERDA Solar Electric) that directly affect emissions invested \$90 million through June 30, 2022 and are responsible for 272,964 MWh and 139,729 tons of CO<sub>2</sub>e savings with a calculated cost benefit of \$644/ton. All the other programs listed in the latest [NY RGGI Funding Status](#) report invested \$686 million through June 30, 2022 and are responsible for 1,663,357 MWh, 8,696,971 mmBtu and 1,516,469 tons of CO<sub>2</sub>e savings with a calculated cost benefit of \$452/ton. Note that the report does not report heat input (mmBtu) savings for the direct CO<sub>2</sub> reduction programs.

The key point of this section on NYS emission reductions is that the total CO<sub>2</sub> savings listed in the reports are not necessarily reductions that can be credited towards the observed emission reductions from the RGGI-affected sources. Energy efficiency programs reduce the fuel needed to heat homes and lead to direct emission reductions in the building sector if oil, gas, or propane are used for heating. Energy efficiency reductions reduce electric generating load for cooling and homes that use electric heat but trying to figure out just how much that affects RGGI emissions is not straight-forward. I have never seen a state report quantify that reduction.

If just the CO<sub>2</sub> reduction savings that are listed for the NY-Sun Initiative and NYSERDA Solar Electric programs are considered over the years 2013 to 2021, the total investment is \$565 million and the claimed savings are 1,684,616 MWh and 861,442 tons of CO<sub>2</sub>e with a calculated cost benefit of 565 \$/ton. Recall that the emissions decrease between 2013 and 2021 is 5,397,135 tons so the only CO<sub>2</sub>

reductions that can conclusively be claimed account for 16% of the observed emission reduction. Because observed coal CO<sub>2</sub> emissions went from 5,463,637 tons in 2013 to zero in 2021 and oil CO<sub>2</sub> emissions went from 3,871,162 tons to 313,115 tons, I conclude that the primary reason for the observed electric sector emission reductions in New York was due to fuel switching.

#### **NYS Emission Reduction Implications**

These observations are relevant for the future of EGU emission reductions required for RGGI and the Climate Act. Coal and oil emissions from the RGGI affected sources are as low as they are going to get without retirement of oil-fired sources. The average CO<sub>2</sub> emissions reduction per year has been 95,716 tons since 2013. New York [Part 242](#) CO<sub>2</sub> Budget Trading Program specifies an annual reduction of RGGI allowances of 880,493 per year starting in 2022 and continuing to 2030. That reduction is nearly ten times more than the reductions from RGGI auction proceed investments. The Climate Act is going to require even more emission reductions. Electric generating unit owners and operators have no options available for additional emission reductions other than reducing their operating times. It is incumbent upon the state to incentivize and subsidize carbon-free generation so that the RGGI sources do not have to operate. It is not clear where those reductions will come from given the poor record of RGGI-funded program investments and the lack of RGGI focus on direct emissions reduction programs.

Table 6: Summary of Expected Cumulative Annualized Program Benefits through 30 June 2022

Program	Programs that Could Directly Affect CO2 Emissions				Programs that Could Not Directly Affect CO2 Emissions			
	Costs (millions of dollars)	Net Energy Savings (Annualized MMBtu)	Net Electricity Savings or Renewable Energy Generation (Annualized MWh)	Net Greenhouse Gas Emission Savings (Annualized Tons CO2e)	Costs (millions of dollars)	Net Energy Savings (Annualized MMBtu)	Net Electricity Savings or Renewable Energy Generation (Annualized MWh)	Net Greenhouse Gas Emission Savings (Annualized Tons CO2e)
	Total Costs	Total Committed Savings	Total Committed Savings	Total Committed Savings	Total Costs	Total Committed Savings	Total Committed Savings	Total Committed Savings
<b>Green Jobs - Green New York</b>								
One- to Four-Family Residential Buildings Program Assessments					\$26.9	995,806	12,719	71,558
One-to Four-Family Residential Buildings Program Financing					\$158.2	833,281	183,173	146,448
Multifamily Performance Program Assessments					\$4.7	833,187	52,847	77,138
Small Commercial Energy Efficiency Program Financing					\$1.3	10,024	789	977
<b>Energy Efficiency</b>								
LIPA Energy Efficiency and Renewable Energy Initiative					\$269.6	35,035	1,194,657	616,897
Multifamily Performance Program					\$14.8	477,297	20,989	41,434
Multifamily Carbon Emissions Reduction Program					\$5.9			45,151
EmPower New York					\$30.0	205,388	416	13,979
Home Performance with ENERGY STAR					\$24.7	359,816	2,632	27,079
Green Residential Building Program					\$2.8	36,548	1,573	2,798
Solar Hot Water (Thermal) Program					\$4.2	14,217	22	959
Low-Rise Residential New Construction Program					\$0.6	8,914		550
<b>Renewable Energy</b>								
Renewable Heat New York					\$10.0	4,384	1,328	2,477
NY-Sun Initiative	\$84.7		270,924	137,622				
NYSERDA Solar Electric	\$5.3		2,040	2,107				
<b>Community Clean Energy</b>								
Regional Economic Development & GHG Reduction					\$9.9	(76,946)	3,688	34,018
Clean Energy Communities					\$2.1	17,762	8,319	5,256
Clean Energy Communities - LIPA					\$1.7	1,231,914	205,225	172,696
<b>Innovative GHG Abatement Strategies</b>								
Charge NY					\$60.7	2,880,322	(172,901)	119,922
<b>Clean Energy Fund</b>								
Clean Energy Fund					\$58.0	830,022	147,881	137,132
<b>TOTAL Annualized Cumulative</b>	\$90.0	0	272,964	139,729	\$686.1	8,696,971	1,663,357	1,516,469

### **2023 RGGI Operating Plan Amendment Comments**

Against the backdrop of observed and RGGI-affected emission reductions I evaluated the programs in the Operating Amendment relative to their value for future EGU emission reductions. In the following Amendment sections I list the descriptions of programs in the FY23-26 Amendment. I include indented and italicized comments on the text and classify each program relative to six categories of potential RGGI source emission reductions. Because RGGI is supposed to be a CO<sub>2</sub> emission reduction program the first category is direct RGGI emissions consistent with the “NYS Emissions Reductions – RGGI-Funded Program Reductions” section on observed emission reductions. Also consistent with that section are programs like energy efficiency that could indirectly reduce RGGI source emissions. Note that the previous section considered only the programs listed in the RGGI funding status reports. The Amendment includes other programs. There is a category for R&D programs that could lead to potential RGGI source emission reductions such as “Hydrogen Hubs.” I also included a category for programs that will add load such as support for Electric Vehicle charging which could potentially increase RGGI source emissions. The last category is administrative costs.

### **Amendment Comment: Environmental Justice Concerns**

Before addressing the programs, I want to comment on Environmental Justice concerns. The Operating Plan amendment for 2022 notes that:

RGGI programs have and will continue, alongside other state programs, to contribute to economy-wide greenhouse gas emissions reductions and provide benefits to New York’s historically overburdened and underserved communities. NYSERDA’s CO<sub>2</sub> Allowance Auction Program regulations reflect the provision of the Climate Leadership and Community Protection Act “that 40%, and no less than 35%, of the overall benefits from the investment of the [CO<sub>2</sub> Allowance Auctions] proceeds” will be realized in disadvantaged communities.

It is entirely appropriate that there should be an emphasis on environmental justice but I have concerns about the State’s approach.

The Climate Act and the draft Amendment emphasize support to disadvantaged communities. Given that all other jurisdictions that have attempted to reduce GHG emissions have increased the cost of energy, it is likely that will be the case in New York too. Therefore, I think there are two priorities to reduce the regressive impact on those who can least afford those increased costs. Overall, the funding emphasis should be on the most cost-effective GHG reduction programs to lower overall costs. The exception to that emphasis are programs that directly reduce costs for anyone, regardless of location, who is living in energy poverty or has a disproportionate energy burden. I worry that the emphasis on disadvantaged communities will hurt energy paupers living outside of dis-advantaged communities, particularly those in rural areas.

### **Amendment Comment: Residential PV Plus Storage**

The Amendment proposes \$9 million in FY23-26 to provide incentives to new and existing residential solar projects coupled with new energy storage. This program would allocate \$3 million to Long Island and \$6 million targeting the rest of the state. The program is expected to deliver 2,000 - 3,000 residential storage systems over more than two years, totaling around 10 megawatts (MW) of storage. Similar to the current offering on Long Island, the rest of state engagement is anticipated to leverage utilities by region. These storage projects will provide renewable resource integration, peak power support to the utility (e.g., virtual power plants, dynamic load management, other), with resiliency and clean power to homeowners.

*According to these numbers 3,000 residences will get a 3.33 kW energy storage system at \$3,000 per residence. A key point is that these homeowners will only have a resilient wintertime system if their energy storage system can continue to operate throughout a power outage and covers the electricity needs over the duration of the power outage when solar resources are low during the winter. It would be appropriate that this program size the energy storage systems based on solar availability and likely blackout durations. This program could lead to indirect RGGI emission reductions so it is appropriate for this to be funded by RGGI auction proceeds.*

### **Amendment Comment: Agrivoltaics**

This amendment proposes \$5 million to establish a new partnership between NYSERDA, New York State Department of Agriculture and Markets, as well as higher education institutions to further promote agrivoltaics. This is a practice of siting clean energy generation technologies on agricultural lands to maximize value of the two complementary uses of the land. The investment of RGGI proceeds will enable the development of guidance and education materials on the use of agrivoltaics in farming in New York State.

*This is an appropriate project for New York due to the tremendous expected buildout of solar resources required to meet Climate Act requirements. I submitted [comments](#) on the Draft Scoping Plan that recommended a moratorium on utility-scale solar development until responsible solar siting mandates that incorporate agrivoltaics are enacted. By the time the State gets around to promoting agrivoltaics massive swaths of prime farmland will be permanently lost to agriculture but at least this program will ultimately lead to a responsible utility-scale solar siting program. This program will not affect RGGI emissions so even though it is something that needs to be done it is inappropriate for this to be funded by RGGI auction proceeds.*

Table 7: 2023 Operating Plan Amendment Allocation of Funds by RGGI Reductions

Program	Total for FY23-FY26	Total for Amendment					
		Direct RGGI Reductions	Indirect RGGI Reductions	Potential RGGI Reductions	Increase Generation	No Emission Reductions	Administration Costs
Residential PV Plus Storage	\$9,000,000		\$9,000,000				
Agrivoltaics	\$5,000,000					\$5,000,000	
Multifamily Low Carbon Capital Planning / Pathway Projects	\$25,000,000				\$25,000,000		
New Construction and Challenges	\$35,000,000				\$35,000,000		
Climate Resiliency	\$15,000,000					\$15,000,000	
Support for 2 Million Homes Goal	\$15,000,000				\$15,000,000		
Hydrogen Hubs	\$5,000,000			\$5,000,000			
Scoping Plan Implementation Research	\$8,000,000					\$8,000,000	
Federal Program Match Opportunities	\$159,000,000			\$159,000,000			
Clean Energy Workforce Development	\$60,000,000					\$60,000,000	
Community Heat Pump Systems	\$10,700,000				\$10,700,000		
Natural Carbon Solutions	\$5,000,000					\$5,000,000	
Equity and Climate Transformation Research	\$1,800,000					\$1,800,000	
Healthy New Homes Design & Construction Challenge	\$6,000,000				\$6,000,000		
Clean Energy Hubs	\$6,000,000					\$6,000,000	
Climate Action Consumer Awareness & Education	\$15,500,000					\$15,500,000	
NY SUN NYPA Customer Incentives	\$54,820,000	\$54,820,000					
LIPA Efficiency and RE	\$60,000,000		\$60,000,000				
EmPower Plus	\$105,000,000		\$40,000,000		\$65,000,000		
Pilot Projects with Municipal Utilities	\$1,000,000					\$1,000,000	
Disadvantaged Communities Schools/Buildings	\$23,800,000		\$11,900,000		\$11,900,000		
Electric Vehicle/Charge NY	\$68,900,000				\$68,900,000		
Climate Mitigation and Resilience Research	\$500,000					\$500,000	
Clean Energy Communities	\$6,000,000					\$6,000,000	
Community Energy Engagement	\$0						
Renewable/NetZero Energy Demonstrations	\$0						
NYS Environmental Protection Fund	\$15,000,000					\$15,000,000	
Green JobsGreen NY Additional Funding	\$44,601,120					\$44,601,120	
Transfer to(from) Clean Energy Fund	\$63,773,196			\$63,773,196			
Program Evaluation	\$6,000,000						\$6,000,000
Program Administration	\$49,500,000						\$49,500,000
RGGI Inc prorata costs	\$2,475,000						\$2,475,000
State Cost Recovery	\$6,949,743						\$6,949,743
<b>Totals</b>	<b>\$889,319,059</b>	<b>\$54,820,000</b>	<b>\$120,900,000</b>	<b>\$227,773,196</b>	<b>\$237,500,000</b>	<b>\$183,401,120</b>	<b>\$64,924,743</b>
<b>Percentage of Total</b>		<b>6%</b>	<b>14%</b>	<b>26%</b>	<b>27%</b>	<b>21%</b>	<b>7%</b>

**Amendment Comment: Multifamily Low Carbon Capital Planning / Pathway Projects**

The proposed \$25 million will enable NYSERDA to support more projects participating in the Low Carbon Capital Planning (LCCP) and Low Carbon Pathways (Pathways) programs, which will enable more building electrification throughout the state. LCCP offers a 75% cost share for building and portfolio-level energy studies that include an assessment of electrification and electrification-ready measures informing building owners about the actionable steps they can take to prepare their buildings for electrification. Pathways program provides incentives for building owners that install a package of projects resulting in reduction of on-site carbon emissions. low carbon measure packages. The additional funding will prevent a disruption in service prior to 2025, due to the anticipated steady demand for the program and will support any ramp-up in demand anticipated from Local Law 97 (LL97). These investments will support electrification in both market-rate and affordable multifamily housing.

*Building electrification is a necessary component of the net-zero Climate Act target but it could increase RGGI source emissions so it is inappropriate for this to be funded by RGGI auction proceeds until NYSERDA verifies that other investments will provide the necessary emission reductions at sources affected by RGGI.*

**Amendment Comment: New Construction & Challenges**

This amendment proposes \$35 million to continue and build upon the success of key NYSERDA initiatives, such as Buildings of Excellence, the Carbon Challenge, and/or the Empire Building Challenge. These initiatives are competitive challenges pursuing exemplary design and high performance for new construction buildings. NYSERDA's investments provide funding to leverage design professionals and new technical solutions to create economically viable pathways for replicable approaches to removing emissions from existing commercial and industrial buildings and the design and construction of new buildings.

*Electrification of new buildings is a necessary component of the net-zero Climate Act target but it could increase RGGI source emissions. Therefore, it is inappropriate for this to be funded by RGGI auction proceeds until NYSERDA verifies that other investments will provide the necessary emission reductions at sources affected by RGGI.*

**Amendment Comment: Climate Resiliency**

A proposed \$15 million over FY24-26 will support research and analysis to perform a climate change risk assessment for clean energy and electrification assets and investments to help ensure they will remain durable solutions over time. It also includes the research and development of NYS Climate Resiliency Design Guidelines in conjunction with DEC and OGS. This work will ensure that New York State begins to develop a clear roadmap for integrating climate risks as per Executive Order 22 (signed September 20, 2022).

*This allocation will not reduce GHG emissions or energy use so it is inappropriate for this to be funded by RGGI auction proceeds until NYSERDA verifies that other investments will provide the necessary emission reductions at sources affected by RGGI.*

**Amendment Comment: Support for Two Million Climate Friendly Homes Initiative**

The amendment proposes to allocate \$20 million toward programs supporting the Two Million Climate Friendly Homes Initiative; aiming to achieve 1 million electrified and 1 million electrification-ready

homes by 2030 including clean energy upgrades for more than 800,000 low-to-moderate income households. The \$20 million will be allocated across the following activities.

#### Comfort Home

The proposed allocation of \$10 million in FY25-26 will allow for the Comfort Home Pilot to continue to offer services across New York State to approximately 7,700 additional homes beyond its current funding capacity. Comfort Home provides homeowners with an energy assessment focused on reducing heating and cooling energy load and provides incentives and financing for air sealing, insulation, and/or window upgrades. The program prepares homes for electrification and facilitated optimized heat pump equipment selection and design.

#### Climate Action Consumer Awareness & Education

The amendment proposes an additional \$5 million, which will focus on extending awareness and education efforts to increase demand for and acceptance of efficient electrification solutions, reinforcing the values and benefits of critical measures such as air sealing and insulation and heat pumps to accelerate adoption. Together, the \$17 million of total funding will sustain existing market rate efforts and expand to support efforts for low- and moderate-income audiences, and contractors whose growth and capacity will ensure consumer demand can be satisfied.

#### Financing Solutions

A proposed \$2.5 million will support research, analysis, piloting and market testing of a subset of high-impact financing interventions that mobilize private capital in support of outcomes from the 2 Million Climate Friendly Homes Initiative. These interventions will make financing more available for electrification projects as well as installing other measures preparing homes for electrification.

#### Supply Chain Support (Equipment & Installers)

This \$2.5 million allocation will bolster supply chain initiatives that address the specific challenges hindering expansion of supply side support for weatherization and heat pump adoption at all points along the supply chain and support the buildout of a contractor infrastructure capable of delivering residential weatherization and heat pump installations at the scale required to meet electrification goals. Two primary initiatives, Clean Heat Connect and Experience Clean Heat will be amplified to deliver the necessary tools and resources to increase confidence around electrification measures and the potential business opportunity for service providers, and to educate the technicians and contractors who touch homes every day. Support research and deployment on housing-sector wide market-focused interventions that substantially reduce the cost of solutions, result in an increase in private investment in supply chain capacity and capability, and drive innovation and the deployment of new business models.

*Electrification of homes is a necessary component of the net-zero Climate Act target but it could increase RGGI source emissions. Therefore, it is inappropriate for this to be funded by RGGI auction proceeds until NYSERDA verifies that other investments will provide the necessary emission reductions at sources affected by RGGI.*

**Amendment Comment: Hydrogen Hubs**

This amendment proposes \$5 million in funding to support the deployment of clean hydrogen infrastructure as part of this regional initiative. Of this funding, \$2 million will be allocated to support pre-engineering work for projects and the remaining \$3 million will be allocated for stakeholder engagement, administration, and project development.

*This program has the potential to reduce RGGI source emissions. It is also a potential solution for the [dispatchable emissions-free resource](#) requirement so I recommend this as a priority for RGGI funding.*

**Amendment Comment: Scoping Plan Implementation Research**

The Climate Leadership and Community Protection Act (Climate Act) was signed into law in 2019 as one of the most ambitious climate laws in the world, putting the State on a course to reduce greenhouse gas emissions and achieve net-zero emissions, increase renewable energy usage, and ensure climate justice. In anticipation of supporting work to realize recommendations included in the Climate Action Council's final Scoping Plan, this funding may include technical analysis to support activity requiring more detailed information, such as natural gas system planning for decarbonized future, planning an economy wide program, or support for a clean transportation standard. For the purpose of developing this proposed Operating Plan Amendment, NYSERDA assumes investment of \$5 million for these initiatives during FY23-24, and \$3 million during FY24-25, for a total of \$8 million throughout the planning period.

*From the standpoint of RGGI funding, it is inappropriate because this program will not affect RGGI affected sources. On the other hand, if this funding is used correctly, then it will serve a valuable need. The example projects included all address specific Climate Act Scoping Plan components. Because the net-zero transition control strategy is to electrify as much as possible using vast amounts of wind, solar, energy storage, and other new resources I think it would be more appropriate to use these funds to address two concerns. If this program addresses the [dispatchable emissions-free resource](#) requirements and the question of wind and solar resource availability during winter doldrums, then I support this program. I have provided more detail on this program as a separate section at the end of the document.*

**Amendment Comment: Federal Program Match Opportunities**

This amendment proposes that NYSERDA invest up to \$159 million of RGGI proceeds in federal grant programs that require a funding match, thus allowing RGGI funds to be leveraged to secure additional federal funding to deliver greater relative benefit in areas aligned with RGGI objectives. One such example is the U.S. Department of Energy's Funding Opportunity Announcement (FOA) for Grid Resilience and Innovation Partnerships. This FOA – a formula grant that is guaranteed if the funding match is provided – helps build New York State's capacity for long-term carbon reduction through greater adoption of monitoring and control devices that enhance distributed energy resources, allows for improved transmission and access to renewable energy resources across the state, and supports increasing the adaptive capacity of the electrical distribution system during disruptive events. NYSERDA will continue to monitor federal grant programs throughout the planning period, and where matched to RGGI objectives expects to utilize RGGI proceeds alongside other funds to fulfill matching contribution requirements.

*This program has the potential to reduce RGGI source emissions. However, the example "helping to build New York State's capacity for long-term carbon reduction through greater adoption of*

*monitoring and control devices that enhance distributed energy resources” could have significant unintended consequences. If distributed energy resources are not sized so that they will never need grid support, particularly during the periods of maximum load, then they could cause significant problems. If they need grid support it is likely that will need it at peak loads thereby exacerbating the challenge of sufficient power for the worst case. The wind and solar resource availability assessment mentioned in the previous sub-section could be used to ensure proper sizing for distributed energy resources.*

**Amendment Comment: Clean Energy Workforce Development**

*I think there is a typographical error in this text because the following two paragraphs are so similar. I have also assumed that this was called the Workforce Development Talent Pipeline Priority Population program in previous operating plan amendments.*

This amendment proposes investing an additional \$45 million over FY24-26 to support the just transition of fossil fuel workers to the clean energy workforce. This funding will be used to partner with labor unions to expand training programs offered to workers with fossil fuel jobs; namely, to develop training curriculum and equip training locations with technology to further enable the reskilling and upskilling of workers in these areas. Other activities from this investment will enable career literacy programs for K-12 schools covering clean energy jobs.

This amendment proposes investing an additional \$45 million over FY24-26 to support the just transition of fossil fuel workers to the clean energy jobs as well as supporting new workers that have not had adequate and equitable access to the economic benefits of the growing clean energy sector. This funding will be used to partner with labor unions and pre-apprenticeship training programs to 1) expand training offered to workers with fossil fuel jobs to prepare them for clean energy work; namely, to develop training curriculum and equip training locations with technology to further enable the reskilling and upskilling of workers and; 2) provide new training opportunities to people from priority populations or from disadvantaged communities, including pre-apprenticeship training, with pathways to apprenticeships. Other activities from this investment will enable career literacy programs for K-12 schools covering clean energy jobs.

*This is a transparent allocation to meet the Climate Act “Just Transition” mandates. Any connection to actual emission or energy reductions is tenuous at best. I do not support providing RGGI auction proceeds for this program.*

**Amendment Comment: Community Heat Pump Systems**

Heat pump technology has become a proven decarbonization solution, providing buildings with clean thermal energy for space heating, cooling, and domestic hot water. Existing heat pump programs to-date have targeted customers on an individual building-by-building basis, but community heat pump systems use a network of pipes to share heating water among a cluster of buildings. The Amendment proposes \$10.7 million in FY23-26 to implement community heat pump systems as part of a statewide program. This program will also provide support for systems in state and local government facilities, as well as Affordable Housing Developments. A community-based program will develop the infrastructure for larger-scale distribution and accelerate the deployment of heat pump systems across the state.

*I believe this is in response to concerns from the Climate Action Council regarding more widespread deployment of ground source heat pumps. It is not clear if this technology will work*

*as envisioned so the only way to find out is try it. The question is whether this is appropriate for RGGI funds. Electrification of new buildings is a necessary component of the net-zero Climate Act target but it could increase RGGI source emissions. Therefore, it is inappropriate for this to be funded by RGGI auction proceeds until NYSERDA verifies that other investments will provide the necessary emission reductions at sources affected by RGGI.*

**Amendment Comment: Natural Carbon Solutions**

Achieving a net-zero carbon economy will require reducing emissions across all sectors. The agriculture and forestry sectors are looked upon to contribute carbon sequestration (i.e., negative emissions) as well as emissions reductions. The amendment proposes \$5 million over FY23-26 to catalyze technology and business solutions and lay the foundation for an economically self-sustaining bio-economy in New York State. By establishing a marketplace of natural emissions-lowering solutions the program will demonstrate pathways to support disadvantaged rural communities, economic development, existing agriculture, and forestry industries, while increasing jobs and revenue.

*Although this program does not directly affect RGGI source emissions it is intended to reduce GHG emissions so funding this with RGGI auction proceeds is appropriate.*

**Amendment Comment: Equity and Climate Transformation Research**

The amendment proposes an allocation of \$1.8 million over FY23-26 to establish an Equity and Climate Transformation Research Program. While the techno-economic pathways for decarbonization have been mapped out in the literature and in analysis for the Climate Action Council, less is known about the social and institutional dimensions of this deep and rapid transformation. This program would establish an engaged, participatory research framework to study the social dimensions of an equitable and inclusive transition in a manner that centers the lived experiences of underserved and overburdened communities and prioritizes beneficial outcomes for disadvantaged communities. This initial funding would provide the investment necessary to develop both formal proposals for long-term funding as well as pilot initiatives. These pilot initiatives would aim to 1) test initial research hypotheses, 2) engage with a diverse set of NYS communities to understand how they would most benefit from this research and how they can be most effectively engaged in the process and 3) convene academics. The creation of an Equity and Climate Transformation Research Agenda would support scientifically rigorous inquiry that also advances transformative, inclusive solutions to climate action challenges in New York State. The work would inform strategies for effective climate awareness and consumer education initiatives.

*This is a transparent allocation to meet the Climate Act mandates for supporting disadvantaged communities. Any connection to actual emission or energy reductions is tenuous at best. I do not support providing RGGI auction proceeds for this program.*

**Amendment Comment: Healthy New Home Design & Construction Challenge**

The Amendment proposes a \$6 million investment to go towards creating a healthy home builder and developer network to get builders to design and offer carbon neutral homes. Funding will also be used to run a healthy Neighborhood Design Challenge to support all electric sub-divisions and planned communities, as well as promote the benefits of healthy homes. Through this program, we can accelerate the pivot to decarbonization of residential new construction and build market capability across (i.e., focus on Long Island area to complement existing activities already using Clean Energy Funds

elsewhere in the state), which will support requiring decarbonized new construction via code and regulations on an accelerated 5-year track.

*There appear to be overlapping programs. What is the difference between this, the “New Construction and Challenges”, and “Support for two million homes”? Moreover, while electrification of homes is a necessary component of the net-zero Climate Act target, this program could increase RGGI source emissions. Therefore, it is inappropriate for this to be funded by RGGI auction proceeds until NYSERDA verifies that other investments will provide the necessary emission reductions at sources affected by RGGI.*

#### **Amendment Comment: Clean Energy Hubs: Community and Stakeholder Engagement**

NYSERDA will continue building local capacity within disadvantaged communities and improve stakeholder engagement by adding \$6 million from FY23-24 through FY25-26 to increase engagement of residents and communities in New York City and Long Island, support the participation of community-based and advocacy organizations in stakeholder meetings, and support local projects. This will leverage the more than \$40 million for Clean Energy Hubs supported by the Clean Energy Fund. In 2022, NYSERDA launched this network of 12 Community Energy Hubs, one in each region of the state and three serving New York City. The Hubs build on the success of the Community Energy Engagement Program, wherein community and locally-based organizations across New York State provided outreach and education services to help low-income residents and small businesses make informed energy choices and access incentives and other resources to implement clean energy projects. The Hubs will enhance community-level engagement and capacity building by supporting clean energy concierge services and helping residents understand different clean energy solutions and apply for relevant programs. These services will be provided to residents, small businesses, nonprofits, and multifamily building owners in disadvantaged and underserved communities to increase awareness and adoption of clean energy programs and solutions, with the focus of creating a more inclusive clean energy economy.

In addition, NYSERDA will help to increase the potential of community-based organizations to advance clean energy projects in historically underserved communities by advancing a pilot effort to increase the capacity to plan for and develop community-scale clean energy projects with capacity development grants. Funds allocated in this operating plan will allow for statewide activities alongside efforts supported through the Clean Energy Fund.

*This is a transparent allocation to meet the Climate Act mandates for supporting disadvantaged communities. It is simply paying politically connected constituencies to provide indoctrination for the program. Any connection to actual emission or energy reductions is tenuous at best. I do not support providing RGGI auction proceeds for this program.*

#### **Amendment Comment: Climate Action Consumer Awareness & Education**

The amendment proposes a \$5.5 million increase over the last operating plan to \$15.5 million over three years to increase awareness and understanding of the critical need for and benefits of climate action in New York State. This investment will include an umbrella campaign to encourage broad engagement that is coordinated with a targeted marketing effort to impact the purchase decisions and actions that are needed to reach the State’s goals. The targeted effort will address specific barriers across critical sectors and encourage adoption of new technologies that will improve quality of life and help decarbonize our buildings and economy.

*There is no connection whatsoever for emissions and energy reductions for this program. Indoctrinating the public to meet the Climate Act goals is inappropriate for RGGI auction proceed funds.*

**Amendment Comment: NY-Sun Initiative**

According to the RGGI funding status reports the NY-Sun initiative is driving the growth of the solar industry and makes solar technology more affordable for all New Yorkers. The program provides declining incentives for the installation of systems and works to reduce solar electric balance-of-system costs through technology advancements, streamlined processes, and customer aggregation models. The goal is to achieve a sustainable solar industry that does not depend on incentives. Table 1 notes that the Amendment proposes an additional \$54.8 million to the already spent \$29 million.

*This program will directly reduce RGGI emissions by supporting renewable generating electricity that will directly displace electricity from RGGI affected sources. This program should be funded.*

**Amendment Comment: LIPA Energy Efficiency and Renewable Energy**

These funds enhance the portfolio of clean energy activities for energy consumers on Long Island, as approved by the Long Island Power Authority (LIPA) and administered by PSEG-Long Island. Funding and reporting requirements are established through a Memorandum of Understanding between NYSERDA and LIPA, which ensure that RGGI funds meet the requirements of the RGGI regulations that funds are used to support energy efficiency and clean energy activities, as well as advancing the goal of benefits of investments in disadvantaged communities. NYSERDA is working with LIPA to maintain the level of market activity designed with the previous RGGI allocations. With this funding re-allocation, as well as additional funds, the Operating Plan is proposed to maintain support for LIPA- implemented energy efficiency and clean energy activity in the amount of \$20 million each year for the calendar years 2023-2025. The LIPA Board of Trustees approves an annual energy efficiency program plan, which details the activities that these funds will support.

*This program could lead to indirect RGGI emission reductions so it is appropriate for this to be funded by RGGI auction proceeds.*

**Amendment Comment: EmPower Plus: Decarbonizing Buildings for Low- and Moderate-Income Households**

To maintain statewide access to fuel neutral, whole buildings energy efficiency opportunities, these funds will maintain support for low-to-moderate-income (LMI) customers of municipal utilities and/or customers using delivered fuel, which cannot be funded through the Clean Energy Fund, to access incentives through EmPower or Assisted Home Performance with ENERGY STAR, comprehensive energy efficiency services programs for income-qualified residents in existing one-to-four family homes. An additional \$65 million in proposed funding over FY23-26, totaling \$176 million, will fund high-efficiency electrification upgrades for low- and moderate- income municipal utility customers using electric resistance heating or delivered fuels.

*The comprehensive energy efficiency programs described could lead to indirect RGGI emission reductions so it is appropriate for this to be funded by RGGI auction proceeds. However, the \$65 for electrification upgrades could increase RGGI source emissions. Therefore, it is inappropriate for that to be funded by RGGI auction proceeds until NYSERDA verifies that other investments will provide the necessary emission reductions at sources affected by RGGI.*

**Amendment Comment: Pilot Projects with Municipal Utilities**

I could not find any description of this program and how the \$1 million is going to be allocated.

*In the absence of any information, I classified this as not having any RGGI emission potential. It is inappropriate for this to be funded by RGGI auction proceeds without any documentation.*

**Amendment Comment: Disadvantaged Communities Schools and Buildings**

The Amendment proposes an additional \$23.8 million for FY23-26 to fund high-performance energy efficiency and electrification in affordable housing. NYSERDA has partnerships in place with NYS Homes and Community Renewal (HCR), NYC Housing Preservation and Development (HPD) and the New York City Housing Authority (NYCHA) and seeks to continue supporting decarbonization projects with these agencies. In particular, this funding will allow HCR-regulated affordable housing located in non-SBC territories, including municipal electric territory or Long Island, to access building decarbonization grant funding as part of HCR's financing processes and 2) provide training, technical assistance, and strategic planning resources to support NYC HPD's development of a long-term portfolio-wide decarbonization strategy. Additionally, this initiative will support work with public housing authorities, like NYCHA, to decarbonize building with an emphasis on advancing packaged heat pump systems to develop clean heat for all.

*I assumed a 50-50 mix of funding in my allocation to Table 7. The energy efficiency programs described could lead to indirect RGGI emission reductions so it is appropriate for this to be funded by RGGI auction proceeds. However, the electrification upgrades could increase RGGI source emissions. Therefore, it is inappropriate for that to be funded by RGGI auction proceeds until NYSERDA verifies that other investments will provide the necessary emission reductions at sources affected by RGGI.*

**Amendment Comment: ChargeNY**

ChargeNY has been pursuing three strategies to promote plug-in electric vehicle (PEV) adoption by consumers across New York. First, NYSERDA implemented the Drive Clean rebate program for PEVs in March 2017, accelerating purchases of PEVs by reducing higher upfront costs. Second, NYSERDA will continue to invest in marketing and awareness-building activities to build interest in PEVs among the public. A focus on building greater public knowledge and awareness of the capabilities of PEVs is essential to spur more private investment in PEV purchases and PEV charging stations. This work may also include other market development activities, such as policy and business model development studies that support new ways for critical stakeholders, such as utilities, local governments, and car dealers, to get involved in the PEV market. Third, NYSERDA will also support the installation of PEV charging stations at workplaces, municipal lots, and multi-family buildings – location types that have been seen to be effective drivers for PEV adoption based on usage data reported from previous installations. Regions of the State that have seen faster PEV adoption will be identified for additional charging station support, which ensures investments in infrastructure support areas with the greatest potential for additional PEV drivers. This Operating Plan Amendment proposes to provide a total of \$69.9 million over the period to support continuation of current and additional ChargeNY strategies to ensure effective engagement with the market to build scale and ensure a focus on a just transition into future years.

*Promoting plug-in electric vehicle (PEV) adoption will increase electric energy use. It is inappropriate to use RGGI funds for this purpose.*

**Amendment Comment: Climate Mitigation and Resilience Research**

The proposed allocation of \$0.5 million over FY23-26 seeks to support additional work done by the Climate Action Council Integration Analysis team and leverage current research investment to expand on energy and environmental analyses. This would include additional sensitivity analyses on land-use and climate change impact scenarios. This research would map out the risks and vulnerabilities related to climate change impacts for both the business-as-usual energy system and the carbon neutral energy system.

*This allocation will not reduce GHG emissions or energy use so it is inappropriate for this to be funded by RGGI auction proceeds. Note that there is another similar program proposed called "Climate Resiliency."*

**Amendment Comment: Clean Energy Communities**

The Amendment proposes to provide \$6 million in RGGI funding for this program. The Clean Energy Communities program is operated statewide with funding from multiple sources, namely RGGI and CEF. The statewide Clean Energy Communities program, which is co-funded through the Clean Energy Fund (CEF), supports local governments with a common platform and the coaching, facilitation, technical assistance, and expertise for implementing the local-level policies and planning needed to drive future clean energy market activities. These local-level actions accumulate and help to deliver the regional sustainable growth strategies encouraged by the CGC program, consistent with the regional sustainability and economic development plans. The Clean Energy Communities program also complements the New York State Department of Environmental Conservation's (DEC) Climate Smart Communities Certification Program by assisting communities working toward certification.

*This allocation will not reduce GHG emissions or energy use so it is inappropriate for this to be funded by RGGI auction proceeds.*

**Amendment Comment: NYS Environmental Protection Fund**

The New York State Budget for FY22-23 directed NYSERDA to transfer \$5 million in RGGI funds to the Environmental Protection Fund (EPF). This operating plan assumes annual funding to support EPF programs that advance New York's leadership in reducing greenhouse gas emissions such as Climate Smart Communities, Smart Growth, and Greenhouse Gas Management. This proposed plan assumes NYSERDA will be similarly directed for the upcoming fiscal years.

*This is a perfect example of New York State's misuse of RGGI auction proceeds. This fund should be funded from the Budget. It is no less egregious a use of funds than the NYS Budget Transfer debacle when the State raided the RGGI proceeds to politically doctor the State's budget. This allocation will not reduce RGGI CO<sub>2</sub> emissions or energy use so it is inappropriate for this to be funded by RGGI auction proceeds.*

**Amendment Comment: Green Jobs Green NY Additional Funding**

The Green Jobs-Green New York (GJGNY) Program, created under the Green Jobs-Green New York Act of 2009, provides New Yorkers with access to energy assessments, installation services, low interest financing, and pathways to training for various green-collar careers. The GJGNY program was originally

funded with \$112 million of RGGI funds, and approximately \$93.4 million in additional RGGI funds approved by NYSERDA's Board, of which about \$112.2 million was allocated for a GJGNY Revolving Fund for residential loans to provide low interest financing for residential energy efficiency improvements, residential solar photovoltaic (PV) systems and other renewable technologies (effective April 2014). Interest rate changes reviewed with the GJGNY Advisory Council and effectuated in September 2016 resulted in a reduced level of RGGI funds required to support the financing of GJGNY loans.

In June of 2020, as part of our pandemic economic stimulus portfolio, NYSERDA launched a 0% financing loan initiative available for up to 12 months or until \$20 million in loans were approved. Demand far exceeded estimates after only 15 days. Most of these loans were issued in FY20-21 and funded from the revolving loan fund (resulting in an increase in the funding allocation required for the program for FY20-21). Loan participation sales partially reimbursed the funding in FY21-22. The Amendment proposes RGGI funding of \$16 million in FY25-26 for continuation of GJGNY residential financing, including making 15-year unsecured financing at market or below-market interest rates available to consumers living in federal census block groups where more than 50 percent of households have household income less than 120% of area median income (and allowing consumers living outside of these communities to qualify for this rate if they meet this income threshold), and also offering access to financing for consumers who may not qualify for traditional unsecured loan underwriting criteria and meet NYSERDA's "Tier 2" underwriting criteria. GJGNY is periodically updated within the parameters allowed by this program, such as to support heat pump installations as a clean energy complement to traditional energy efficiency measures.

*There is a very weak link between this program and potential RGGI emissions reductions. The \$645 cost per ton of CO<sub>2</sub> removed for all the programs listed under this category in the [Semi-Annual Status Report through June 30, 2022](#) is not cost-effective. The description does not explain whether the investments are for energy efficiency that could reduce the need for RGGI generation or electrification that could increase the need for RGGI generation. This allocation will not effectively reduce GHG emissions or energy use so it is inappropriate for this to be funded by RGGI auction proceeds.*

#### **Amendment Comment: Transfer to(from) Clean Energy Fund**

Through the Clean Energy Fund (CEF) and its portfolios, NYSERDA is advancing the goals of the Climate Act. As approved by the Commission, the CEF delivers on its primary goals to reduce greenhouse gas emissions, increase renewable energy generation, increase energy efficiency, and attract greater private investment in clean energy, with investment portfolios that are designed to achieve scale in clean energy markets. These key CEF objectives dovetail with the RGGI investment parameters, creating a unique opportunity to leverage CEF and RGGI funds to help achieve New York's broader Climate Act and clean energy objectives. In designing the CEF, NYSERDA planned to dedicate \$250 million in RGGI funds to the CEF portfolio over 10 years, supporting the \$3.42 billion Market Development and Innovation and Research activities.

In keeping with this plan, while accounting for new revenue and commitment projections, NYSERDA will allocate to the CEF approximately \$68 million throughout the planning period from FY23-24 through FY25-26, thus fulfilling the \$250 million commitment noted above.

*Because this program's primary goals are to reduce greenhouse gas emissions, increase renewable energy generation, and increase energy efficiency I classified this as having potential RGGI emission reductions. Note, however, the \$423 cost per ton of CO<sub>2</sub> removed for this program in the [Semi-Annual Status Report through June 30, 2022](#) is not cost-effective.*

#### **Amendment Comment: Program Evaluation**

This amendment proposes an allocation of \$2 million per year, starting in FY23-24 through FY25-26. This \$6 million in total will fund Market Impact and Evaluation studies, which assess how these RGGI-funded programs are having lasting impacts in the market and will assess technology performance. Studies assessing stand-alone RGGI programs will be undertaken, as well as studies that support programs funded through RGGI and other funding portfolios (e.g., Clean Energy Fund). RGGI Semi-annual Status Reports will summarize findings from these completed studies.

*This administrative cost program is appropriate but it will not affect emission reductions from RGGI-affected sources.*

#### **Amendment Comment: Anticipated Future Administrative Funding Allocations**

Table 1 in the Amendment presents the projected revenues and program funding allocations. Three program administration and evaluation cost programs are included: ongoing RGGI, Inc. costs, State Cost Recovery Fees, and program administration. The Amendment states that there is an increase in program administration funding, which reflect the projected increased need to support additional activities anticipated due to new program activity.

*These administrative cost programs are necessary but they will not affect emission reductions from RGGI-affected sources.*

#### **Discussion of Amendment Comments**

The discussion of the historical emissions trends explained that emission reductions directly attributable to RGGI program investments fall far short of the reductions necessary for New York sources to meet the state allocations in the [Part 242](#) CO<sub>2</sub> Budget Trading Program. The Climate Act is going to require even more emission reductions. Future emission reductions are only possible from reduced operations at RGGI-affected sources from State programs that incentivize and subsidize carbon-free generation so that the RGGI sources can reduce their operating time.

Table 7 summarizes the program investments for six categories. The first three categories cover programs that directly, indirectly or could potentially decrease RGGI-affected source emissions. Those programs total 45% of the investments. I also included a category for programs that will add load that could potentially increase RGGI source emissions which totals 27% of the investments. Programs that do not affect emissions are funded with 21% of the proceeds and administrative costs total another 7%.

Table 8 summarizes a comparison of projected RGGI allocations and projected emissions through 2030 for projected loads for NYISO and NYSERDA projected loads for the Climate Act Scoping Plan. The first two columns list the year and the Part 242 CO<sub>2</sub> Budget Trading Program RGGI allowance allocations for New York. The next three columns list the observed CO<sub>2</sub> emissions, gross load, and a calculated emission rate. I assume that the fossil-fired EGU emission rate will stay the same as the observed 2021 emission rate because of the fuel switching discussed in the first section of this document. There are

**Table 8: Projected RGGI Allocations and Projected Emissions Through 2030 for Climate Act Scoping Plan Projected Loads**

RGGI Allocation		Observed NYS EGU			NYISO Resource 2021-2040 Outlook					
		CO2	Gross Load	CO2 Rate	Scenario 1			Scenario 2		
Year	Allocation	(Tons)	(MWh)	(tons/MWh)	Load	Emissions	RGGI Margin	Load	Emissions	RGGI Margin
2019	35,228,822	24,868,687	46,706,946	0.532	46,706,946	24,648,770	10,580,052	46,706,946	24,648,770	10,580,052
2020	30,435,778	26,868,364	51,353,884	0.523	51,353,884	26,718,997	3,716,781	51,353,884	26,718,997	3,716,781
2021	29,056,270	28,546,529	55,105,911	0.518	55,105,911	28,361,712	694,558	55,105,911	28,361,712	694,558
2022	28,175,777			0.518	54,872,860	28,425,802	-250,025	54,438,558	28,200,820	-25,043
2023	27,295,284			0.518	54,639,810	28,305,075	-1,009,791	53,771,205	27,855,111	-559,827
2024	26,414,791			0.518	54,406,760	28,184,348	-1,769,557	53,103,853	27,509,403	-1,094,612
2025	25,534,298			0.518	54,173,710	28,063,621	-2,529,323	52,436,500	27,163,694	-1,629,396
2026	24,653,805			0.518	47,336,432	24,521,704	132,101	45,962,468	23,809,949	843,856
2027	23,773,312			0.518	40,499,154	20,979,787	2,793,525	39,488,436	20,456,205	3,317,107
2028	22,892,819			0.518	33,661,876	17,437,870	5,454,949	33,014,404	17,102,460	5,790,359
2029	22,012,326			0.518	26,824,598	13,895,953	8,116,373	26,540,372	13,748,716	8,263,610
2030	21,131,833			0.518	19,987,320	10,354,037	10,777,796	20,066,340	10,394,971	10,736,862

RGGI Allocation		Observed NYS EGU			Final Scoping Plan IA-Tech-Supplement-Annex-2-Key-Drivers-Outputs-2022 Spreadsheet								
		CO2	Gross Load	CO2 Rate	Strategic Use of Low-Carbon Fuels			Faster Transition from Combustion			Beyond 85% Reductions		
Year	Allocation	(Tons)	(MWh)	(tons/MWh)	Load	Emissions	RGGI Margin	Load	Emissions	RGGI Margin	Load	Emissions	RGGI Margin
2019	35,228,822	24,868,687	46,706,946	0.532	46,706,946	24,648,770	10,580,052	46,706,946	24,648,770	10,580,052	46,706,946	24,648,770	10,580,052
2020	30,435,778	26,868,364	51,353,884	0.523	51,353,884	26,718,997	3,716,781	51,353,884	26,718,997	3,716,781	51,353,884	26,718,997	3,716,781
2021	29,056,270	28,546,529	55,105,911	0.518	55,105,911	28,361,712	694,558	55,105,911	28,361,712	694,558	55,105,911	28,361,712	694,558
2022	28,175,777			0.518	65,118,400	33,733,302	-5,557,525	64,937,800	33,639,745	-5,463,968	65,034,400	33,689,787	-5,514,010
2023	27,295,284			0.518	61,505,600	31,861,762	-4,566,478	61,230,200	31,719,096	-4,423,812	61,375,600	31,794,418	-4,499,134
2024	26,414,791			0.518	57,892,800	29,990,222	-3,575,431	57,522,600	29,798,447	-3,383,656	57,716,800	29,899,049	-3,484,258
2025	25,534,298			0.518	54,280,000	28,118,683	-2,584,385	53,815,000	27,877,798	-2,343,500	54,058,000	28,003,680	-2,469,382
2026	24,653,805			0.518	47,953,200	24,841,209	-187,404	47,999,400	24,865,142	-211,337	48,183,000	24,960,252	-306,447
2027	23,773,312			0.518	41,626,400	21,563,735	2,209,577	42,183,800	21,852,485	1,920,827	42,308,000	21,916,824	1,856,488
2028	22,892,819			0.518	35,299,600	18,286,261	4,606,558	36,368,200	18,839,828	4,052,991	36,433,000	18,873,396	4,019,423
2029	22,012,326			0.518	28,972,800	15,008,787	7,003,539	30,552,600	15,827,171	6,185,155	30,558,000	15,829,969	6,182,357
2030	21,131,833			0.518	22,646,000	11,731,313	9,400,520	24,737,000	12,814,515	8,317,318	24,683,000	12,786,541	8,345,292

two sets of projections. The first uses the projected fossil generating unit loads from the NYISO [2021-2040 System & Resource Outlook](#) and the second uses projected fossil generation unit loads from Final Scoping Plan [Tech-Supplement-Annex-2-Key-Drivers-Outputs](#) spreadsheet. For each of the load projections the load, calculated emissions using the 2021 emission rates, and margin (difference between NYS RGGI allocations and projected emissions) are listed.

The results shown in Table 8 suggest that there may be a potential problem in the next several years. NYISO ran two policy scenarios: Scenario 1 -Utilizes industry data and NYISO load forecasts and Scenario 2 - Utilizes various assumptions consistent with the Climate Action Council Integration Analysis. The NYSERDA Scoping Plan analysis considered three policy scenarios: Scenario 2: Strategic Use of Low-Carbon Fuels, Scenario 3: Accelerated Transition Away from Combustion, and Scenario 4: Beyond 85% Reduction. All five scenarios project increased or nearly constant loads from fossil resources until 2026 when large amounts of renewable resources are expected to come on line. Over the same time RGGI allowance allocations decrease. As a result, the NY emissions are projected to exceed the annual RGGI allocations. This problem peaks in 2025. Note that NYISO Resource Outlook scenario 1 projects that EGU emissions will be 10% higher than the RGGI allocation.

The future RGGI allowance market is in turmoil because of the uncertainty related to New Jersey, Virginia, and Pennsylvania participation and their allowance additions. Without those additional allowances New York would not be able to find sufficient allowances from the other RGGI states to cover the projected margin deficit. That would mean that facilities would not be able to operate when required.

Table 8 highlights the importance of the need for strategies that can directly displace RGGI-affected source generation in the short-term. The RGGI Operating Plan amendment needs to reevaluate priorities until the projected wave of renewable development kicks in. NYSERDA must verify that other investments will provide the necessary reduction in RGGI-affected source emissions in order to justify spending more than half the RGGI proceeds on programs unrelated to RGGI emissions. My comments on specific amendments recommend that most of the unrelated programs not be funded until this is resolved.

#### **Amendment Comment: Scoping Plan Implementation Research**

The Climate Act is pushing the envelope of zero-emissions technology so research is certainly appropriate. Unfortunately, the program description describes three programs that support recommendations included in the Climate Action Council's final Scoping Plan rather than addressing the fundamental feasibility of a zero-emissions electric system by 2040. The natural gas system planning for decarbonized future, planning an economy wide program, or support for a clean transportation standard program examples are much less of a priority than programs that meet the [dispatchable emissions-free resource](#) (DEFER) requirements and the question of wind and solar resource availability during winter doldrums.

The Final Scoping Plan Appendix G: Integration Analysis Technical Supplement (uses the term zero-carbon firm resource to describe DEFER) explains how DEFER was treated in the Integration Analysis:

In Scenarios 1, 2, and 4, the "zero-carbon firm resource" represents a combination of existing and new combustion-based resources (i.e. combustion turbines and combined cycle gas turbines) that convert to utilizing hydrogen as a zero-carbon fuel. In Scenario 3, firm zero-carbon capacity represents a combustion-free resource, modeled as hydrogen fuel cells.

The NYISO [2021-2040 System Resource Outlook](#) states:

DEFERs that provide sustained on-demand power and system stability will be essential to meeting policy objectives while maintaining a reliable electric grid. While essential to the grid of the future, such DEFER technologies are not commercially viable today. DEFERs will require committed public and private investment in research and development efforts to identify the most efficient and cost-effective technologies with a view towards the development and eventual adoption of commercially viable resources. The development and construction lead times necessary for these technologies may extend beyond policy target dates.

The important point is that these resources need to be developed. If a viable DEFER technology is not available when needed, the schedule of the Climate Act transition cannot be met without risking catastrophic blackouts. This technology is therefore a higher priority than the Scoping Plan supporting examples.

The net-zero transition plan described in the Scoping Plan depends on massive amounts of solar, wind, and energy storage resources. In [my comments on the Draft Scoping Plan](#) I explained why an accurate and detailed evaluation of renewable energy resource availability is crucial to determine the generation and energy storage requirements of the future New York electrical system. I explained that in order to ensure electric system reliability for an energy system that depends on renewable generators and energy storage, the resources available during worst-case periods of low wind and solar energy production must be known. To date, many studies do not consider the importance of worst-case conditions on reliability planning and I believe that the Integration Analysis also fails to address this issue adequately. My comments showed that there is a viable approach that could robustly quantify the worst-case renewable energy resources and provide the information necessary for adequate planning. I recommend that such a study be considered as part of the Scoping Plan Implementation Research Program.

#### **Conclusion**

My primary concern is that RGGI is an electric sector emissions reduction program and it is inappropriate to use the auction proceeds for any program that will not materially decrease emissions directly or indirectly through energy use reductions. There are multiple programs in the amendment that do not meet that criterion. Those funds should be re-allocated elsewhere.

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