To: Jared Snyder, New York State Department of Environmental Conservation
Basil Seggos, New York State Department of Environmental Conservation
Gavin Donohue, Independent Power Producers of New York
Justin Driscoll, New York Power Authority
Peter Iwanowicz, Environmental Advocates NY
Hope Knight, Empire State Development
Anne Reynolds, Alliance for Clean Energy New York
Carolyn Ryan, New York State Department of Transportation

From: Roger Caiazza, Pragmatic Environmentalist of New York July 14, 2022

Re: Economywide Strategies Subgroup Draft Workplan Comments

I am writing to the Economywide Strategies Subgroup relative to the draft workplan overview schedule and the NYSERDA - Resources for the Future Carbon Pricing Project presentation. According to the schedule you won't consider public comment until August 22 and I think you should be aware of my submitted comments on the Economywide Strategies chapter before that point because I discuss issues not raised in the Draft Scoping Plan. This email also points out some short-comings of the NYSERDA-RFF presentation.

I explained in my comments that I first became involved with pollution trading programs nearly 30 years ago and have been involved in the Regional Greenhouse Gas Initiative (RGGI) carbon pricing program since it was being developed in 2003. During that time, I analyzed effects of these programs on operations and was responsible for compliance planning and reporting for affected sources until my retirement. My comments are based on practical experience with carbon pricing programs and I have observed a gulf between theory and practice. I have followed the New York State Independent System Operator's (NYISO) carbon pricing initiative since its inception and my analyses of that program and others is the primary basis for my comments on the Draft Scoping Plan chapter on economy-wide strategies.

Draft Scoping Plan Comments

My submitted comments summarized three main points:

> My overview comments explain why I believe carbon pricing will always be a regressive tax. I also explain that there are a number of practical reasons that carbon pricing will not work as theorized. Leakage is an insurmountable problem. A fundamental problem with all carbon pricing schemes is that funds decrease over time as carbon emissions decrease unless the carbon price is adjusted significantly upwards over time. There are gaps between the theory of carbon pricing and market reality, especially regarding how affected sources can act with limited control options. Based on investment results for RGGI proceeds, the programs funded are not cost-effectively reducing emissions. The Climate Act mandate for funding in Disadvantaged Communities will exacerbate that issue. The Regulatory Analysis Project (RAP) recently completed a relevant study: Economic Benefits and Energy Savings through Low-Cost Carbon Management for Vermont that concludes "carbon pricing alone will be a weak tool to deal with the realities of consumer behavior, our historic buildings infrastructure, rural settlement patterns, and the many barriers that working families and businesses face in choosing to invest in energy efficiency or other low-carbon options".

In addition to my practical concerns "A Practical Guide to the Economics of Carbon Pricing by Ross McKitrick defines how carbon pricing is supposed to work in theory. His guide is at odds with the Draft Scoping Plan for every point. He explains that "First and foremost, carbon pricing only works in the absence of any other emission regulations", but the proposal is in addition to the emission regulations of the Climate Act itself. The Guide goes to note "another important rule for creating a proper carbon-pricing system is to be as careful as possible in estimating the social cost of carbon". He argues that "whatever the social cost of carbon is determined to be, the carbon price must be discounted below it by the marginal cost of public funds (MCPF) — that is, the economic cost of the government raising an additional dollar of tax, on top of what is already being raised". The Draft Scoping Plan does not even recognize the importance of this aspect of carbon pricing. He concludes: "There may be many reasons to recommend carbon pricing as climate policy, but if it is implemented without diligently abiding by the principles that make it work, it will not work as planned, and the harm to the Canadian economy could well outweigh the benefits created by reducing our country's already negligible level of global CO2 emissions." Substitute New York for Canada and I believe this describes this policy option.

The estimates of current (2019) emissions coupled with the New York value of carbon yield very high revenues. The AP-NORC Center and the Energy Policy Institute at the University of Chicago (EPIC) survey regarding climate change included survey questions asking whether respondents would support, oppose, or neither support or oppose a law that imposed "a fee on carbon to combat climate change". Only 45% support $1 per month per household additional costs and $1 per month per person in New York only provides revenues of $237 million. All of the projections in Table 2 estimate costs far higher than that level so I do not think the public perception of affordable will be met by any carbon pricing scheme using the New York value of carbon guidance.

The Draft Scoping Plan lists eleven considerations for evaluating the three potential policy mechanisms. My comments addressed those considerations explicitly.

NYSERDA-RFF Presentation

Members of the Workgroup should keep in mind that the NYSERDA-RFF Carbon Pricing Project: Lessons Learned from the Literature Review and Policy Design Experience presentation is not a critical review of carbon pricing approaches. Instead, it describes the theory without regard to conflicting issues and only summarizes three ways to implement a carbon pricing scheme.

The first slide in the New York Policy Context section poses the question why jurisdictions pursue carbon pricing. It claims that "Pricing provides an efficient market signal to reduce emissions" and goes on to argue that:

- Does not require policy makers to pick technologies and creates incentives for private actors to make clean investments and reduce fossil fuel use
- Provides cost-effective implementation by investing in low-cost emissions reductions
- Internalizes the environmental cost of emissions in economic decisions
- Carbon pricing involves price stability that yields a behavioral response that is three times greater than market-driven price variations of the same magnitude (Andersson 2019).

The presentation claims that jurisdictions pursue carbon pricing because it "does not require policy makers to pick technologies and creates incentives for private actors to make clean investments and reduce fossil fuel use". However, the later Carbon Fee versus Emissions Cap slide states "Recent emissions cap programs have opted for a cap-and-invest model which directs carbon revenues toward program-related investments to accelerate emissions reductions". Directing carbon revenues explicitly picks technologies contradicting this "benefit". In my Draft Scoping Plan comments, I quoted Paul Homewood who made the point that "The only logical reason for a carbon tax is to reduce emissions. Such a tax might help to reduce energy consumption, but only at punitive levels, because energy demand is so inelastic." The key point is that there aren't any cost-effective retrofit technologies to reduce greenhouse gas emissions so the only way to reduce fossil fuel use is to convert energy consumption to a less emitting resource or reduce use.

The presentation claims that jurisdictions pursue carbon pricing because it "Provides cost-effective implementation by investing in low-cost emissions reductions". One of the underlying presumptions in any carbon price program is that the funds received will be spent effectively. I have evaluated the results of the investments made by regulatory agencies to date in RGGI measured as the cost per ton reduced. The RGGI states have been investing investments of RGGI proceeds since 2008 but their investments to date are only directly responsible for less than 5% of the total observed reductions. Furthermore, from the start of the program in 2009 through 2017, RGGI has invested $2,527,635,414 and reduced annual CO_2 emissions 2,818,775 tons. The resulting cost efficiency, $897 per ton reduced, far exceeds the Social Cost of Carbon (SCC) that represents the value of reducing CO_2 today to prevent climate change damages in the future.

Finally, the presentation claims that jurisdictions pursue carbon pricing because it "Internalizes the environmental cost of emissions in economic decisions". The Draft Scoping Plan avoided societal costs from GHG emissions are the largest benefits claimed. In my comments on the Plan benefits I included a description of the SCC and the caveats associated with the alleged benefits. The methodology calculates the benefits out to 2300 so they will accrue to the next 11 generations not just our children and grandchildren. Jurisdictions that cannot afford investment in resilient agriculture, sea-level rise mitigation, and disease prevention have larger impacts so the benefits will accrue to them rather than New York. The bottom line is that the costs are real but the internalized environmental benefits are mostly imaginary.

Misconceptions

There are misconceptions in two claims that carbon pricing has been successful that need to be addressed for a full understanding of economywide strategies.

The first claim states that "Murray and Maniloff (2015) find that RGGI has driven about half of the region's emission reductions in the power sector since the program's inception". I disagree with conclusion. The Murray and Maniloff analysis relied on econometric modeling that assumes that compliance with the program is made more efficient by an allowance acquisition program that resembles commodities markets. In reality, based on my experience in the utility allowance trading business and discussions with my peers, the vast majority of companies and possibly all companies treat allowance acquisition as simply a tax. Allowances are purchased in the auctions or on the secondary market based on short-term compliance needs. The over-riding concern is compliance and there is no efficiency gain due to the market.

In my opinion the Murray and Maniloff analysis assumed that companies would do things to reduce their CO2 emissions rather than just buying allowances as a tax. However, the only thing that affected sources could do is to improve combustion efficiency to use less fuel. Fuel costs are the over-riding driver for operating costs so plants have already looked into this and probably made the efficiency changes that they could afford so there were few opportunities left to become more efficient. In addition, EPA's New Source Review program can penalize old facilities that make efficiency improvements because they are concerned that they those improvements could extend the life of a higher emitting facility. Based on my experience and discussions with colleagues in the industry, no affected generating units did anything to explicitly control emissions for RGGI compliance. More importantly when this analysis observed facilities shutting down, Murray and Maniloff claimed that was due to RGGI. In fact, all the facilities that I am familiar with would have shut down even if RGGI were not in effect. For all these reasons I do not accept this reference as credible evidence for RGGI success.

There are two ways to determine why the emission reductions occurred using data and observations and using that approach produces a far different result. The first way to determine why emissions dropped over this period is to evaluate the emissions data. I queried the database at EPA Clean Air Markets Division data and maps and downloaded emissions, load and heat rate data for the nine RGGI states for the years 2000-2018. In order to determine what fuel was used I had to use these data instead of the data in the RGGI system because the EPA data includes fuel type information. This means that there are differences in the annual totals because the EPA data set has more units in it. Prior to the start of RGGI I had to ask for data from "all programs" and for consistency kept that constraint even after the start of RGGI.

The RGGI Nine-State EPA Clean Air Markets Division Annual Emissions Data by Primary Fuel Type table lists load and CO2 mass data from 2006 to 2018. In order to establish a baseline, I used the average of the three years prior to the start of the program. The CO2 mass and load from coal-fired units went down over 80% from the baseline to 2018. The RGGI states have a relatively high concentration of residual oil-fired units and load and CO2 mass went down nearly as much. Diesel and other oil-fired units went down over 50%. On the other hand, natural gas firing loads went up 35% and their CO2 mass went up 43%. Because natural gas firing has much lower CO2 per MWhr emission rates the total CO2 mass went down 41% from my baseline to 2018. Because fuel prices are the primary driver of unit operations and because the RGGI allowance price was relatively small in comparison to the fuel price differential of natural gas relative to coal and oil I conclude that the primary driver of RGGI region CO2 emission reductions was fuel switching not RGGI.

RGGI Nine-State EPA Clean Air Markets Division Annual Emissions Data by Primary Fuel Type

	Coal		Residual Oil		Natural Gas		Diesel and Other Oil		Other Fuels		Totals	
Year	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass
2006	79,876,883	74,482,225	17,841,866	14,216,973	76,722,461	37,048,932	3,210,697	1,984,279	941,311	445,565	178,593,218	128,177,974
2007	80,378,481	75,223,761	19,288,306	15,440,978	83,638,696	39,607,929	3,890,864	2,480,820	1,337,594	1,001,373	188,533,942	133,754,861
2008	70,378,752	67,977,062	13,590,343	10,472,201	77,326,718	37,452,817	3,456,509	2,081,110	1,359,254	1,428,256	166,111,577	119,411,446
Base	76,878,039	72,561,016	16,906,839	13,376,718	79,229,291	38,036,559	3,519,357	2,182,070	1,212,720	958,398	177,746,245	127,114,761
2009	55,736,606	57,324,247	10,904,728	7,419,112	77,140,120	40,602,093	2,612,089	1,834,159	1,040,705	1,164,165	147,434,248	108,343,776
2010	56,477,189	59,736,642	13,527,743	9,088,692	88,333,568	46,987,412	2,045,691	1,557,561	727,608	1,054,168	161,111,800	118,424,476
2011	41,629,255	43,871,136	7,458,574	5,755,660	102,588,964	51,801,174	2,027,136	1,504,451	591,395	1,751,905	154,295,324	104,684,325
2012	27,600,843	29,096,542	10,645,733	7,559,969	110,716,230	55,084,597	2,652,141	1,905,569	770,941	1,761,228	152,385,888	95,407,904
2013	30,372,792	31,759,050	7,263,391	5,441,067	97,580,676	48,973,865	2,187,134	1,599,335	782,313	1,171,191	138,186,304	88,944,508
2014	30,174,568	31,060,039	8,717,201	6,308,721	94,324,131	48,531,158	1,785,071	1,394,087	1,050,179	2,039,574	136,051,149	89,333,579
2015	22,393,732	23,279,018	8,527,440	6,271,650	102,503,061	52,983,907	1,765,839	1,335,326	1,196,944	2,280,321	136,387,016	86,150,223
2016	20,350,467	20,929,372	5,154,865	3,660,965	105,523,592	53,932,828	1,641,758	1,236,303	1,271,752	2,676,946	133,942,434	82,436,414
2017	12,596,575	13,522,351	2,286,126	1,568,617	96,632,232	49,092,154	1,492,473	1,103,075	1,175,014	2,312,145	114,182,421	67,598,342
2018	13,608,379	14,471,264	3,898,190	2,720,734	106,655,136	54,285,738	1,376,460	1,088,328	1,109,978	2,346,499	126,648,143	74,912,563

RGGI Reduction Since Average of Three Years Before Start of Program

	Coal		Residual Oil		Natural Gas		Diesel and Other Oil		Other Fuels		Totals		Gas Displace Coal&Residual	
Year	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass
2009	-21,141,433	-15,236,769	-6,002,110	-5,957,606	-2,089,171	2,565,533	-907,268	-347,911	-172,015	205,767	-30,311,997	-18,770,985	-30,311,997	-18,770,985
2010	-20,400,850	-12,824,374	-3,379,095	-4,288,025	9,104,277	8,950,853	-1,473,666	-624,509	-485,112	95,770	-16,634,446	-8,690,285	-16,634,446	-8,690,285
2011	-35,248,784	-28,689,880	-9,448,265	-7,621,058	23,359,673	13,764,615	-1,492,221	-677,618	-621,325	793,507	-23,450,921	-22,430,435	-23,450,921	-22,430,435
2012	-49,277,196	-43,464,474	-6,261,106	-5,816,749	31,486,938	17,048,037	-867,216	-276,500	-441,779	802,830	-25,360,358	-31,706,857	-25,360,358	-31,706,857
2013	-46,505,247	-40,801,966	-9,643,448	-7,935,650	18,351,384	10,937,305	-1,332,223	-582,735	-430,407	212,793	-39,559,941	-38,170,253	-39,559,941	-38,170,253
2014	-46,703,471	-41,500,977	-8,189,637	-7,067,997	15,094,839	10,494,598	-1,734,286	-787,983	-162,541	1,081,176	-41,695,096	-37,781,182	-41,695,096	-37,781,182
2015	-54,484,307	-49,281,998	-8,379,399	-7,105,067	23,273,770	14,947,348	-1,753,517	-846,744	-15,776	1,321,923	-41,359,229	-40,964,538	-41,359,229	-40,964,538
2016	-56,527,572	-51,631,644	-11,751,974	-9,715,753	26,294,301	15,896,269	-1,877,598	-945,766	59,032	1,718,548	-43,803,812	-44,678,347	-43,803,812	-44,678,347
2017	-64,281,464	-59,038,665	-14,620,712	-11,808,101	17,402,941	11,055,594	-2,026,884	-1,078,994	-37,705	1,353,747	-63,563,824	-59,516,419	-63,563,824	-59,516,419
2018	-63,269,660	-58,089,751	-13,008,649	-10,655,984	27,425,844	16,249,179	-2,142,897	-1,093,742	-102,741	1,388,101	-51,098,103	-52,202,198	-51,098,103	-52,202,198

RGGI Percentage Reduction Since Average of Three Years Before Start of Program

	Coal		Residual Oil		Natural Gas		Diesel and Other Oil		Other Fuels		Totals	
Year	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass	Gross Load	CO2 Mass
2009	-27.5%	-21.0%	-35.5%	-44.5%	-2.6%	6.7%	-25.8%	-15.9%	-14.2%	21.5%	-17.1%	-14.8%
2010	-26.5%	-17.7%	-20.0%	-32.1%	11.5%	23.5%	-41.9%	-28.6%	-40.0%	10.0%	-9.4%	-6.8%
2011	-45.9%	-39.5%	-55.9%	-57.0%	29.5%	36.2%	-42.4%	-31.1%	-51.2%	82.8%	-13.2%	-17.6%
2012	-64.1%	-59.9%	-37.0%	-43.5%	39.7%	44.8%	-24.6%	-12.7%	-36.4%	83.8%	-14.3%	-24.9%
2013	-60.5%	-56.2%	-57.0%	-59.3%	23.2%	28.8%	-37.9%	-26.7%	-35.5%	22.2%	-22.3%	-30.0%
2014	-60.8%	-57.2%	-48.4%	-52.8%	19.1%	27.6%	-49.3%	-36.1%	-13.4%	112.8%	-23.5%	-29.7%
2015	-70.9%	-67.9%	-49.6%	-53.1%	29.4%	39.3%	-49.8%	-38.8%	-1.3%	137.9%	-23.3%	-32.2%
2016	-73.5%	-71.2%	-69.5%	-72.6%	33.2%	41.8%	-53.4%	-43.3%	4.9%	179.3%	-24.6%	-35.1%
2017	-83.6%	-81.4%	-86.5%	-88.3%	22.0%	29.1%	-57.6%	-49.4%	-3.1%	141.3%	-35.8%	-46.8%
2018	-82.3%	-80.1%	-76.9%	-79.7%	34.6%	42.7%	-60.9%	-50.1%	-8.5%	144.8%	-28.7%	-41.1%

The second way to determine the effect of RGGI is to use RGGI's own information. The Investment of RGGI Proceeds in 2017 report tracks the investment of the RGGI proceeds and the benefits of these investments throughout the region. I recently calculated that the total annual reductions since the start of the program were: 4,014,410 MWh of electricity use avoided, 9,824,199 MMBtu of fossil fuel use avoided, and 2,818,775 short tons of CO2 emissions avoided. The total reduction in load from the baseline until 2018 is 51,098,013 MWh so the direct investments of RGGI auction proceeds were responsible for 7.9% of the observed reduction in load. The total reduction in CO2 from the baseline until 2018 is 52,202,198 tons so the direct investments of RGGI auction proceeds were responsible for only 5.4% of the observed emissions reduction.

The second misunderstanding is incomplete summarization associated with the claim that "Carbon pricing involves price stability that yields a behavioral response that is three times greater than market-driven price variations of the same magnitude (Andersson 2019)". The abstract states "This quasi-experimental study is the first to find a significant causal effect of carbon taxes on emissions, empirically analyzing the implementation of a carbon tax and a value-added tax on transport fuel in Sweden". This analysis modeled emission reductions with and without the carbon tax and then had to "disentangle" the carbon tax and the extension of a value-added tax to include gasoline and diesel. Based on my findings for RGGI this kind of modeling is prone to prove the pre-conceived notions of the researcher. He claims that this is the first quasi-experimental study to find a significant causal effect of a carbon tax on emissions. However, he admits and the NYSERDA-RFF presentation neglects to point out that:

> This result is in contrast to earlier empirical studies that find no effect from the Swedish carbon tax on domestic transport CO2 emissions (Bohlin 1998, Lin and Li 2011), and the estimated reduction is 40 percent larger than an earlier simulation study finds (Ministry of the Environment and Energy 2009). In fact, my finding differs from all earlier empirical studies of carbon taxes, which find that the taxes have had very small to no effect on CO2 emissions in the countries that implemented them (Bohlin 1998, Bruvoll and Larsen 2004, and Lin and Li 2011).

Conclusion

I prepared this email because the discussions of the carbon pricing approach in the Draft Scoping Plan and the NYSERDA-RFF presentation ignore the many limitations of the approach. While the theory is great, I believe practical limitations in general and in the three proposed approaches makes it likely that it will not work as planned and the harm to the New York economy could well outweigh the benefits created by reducing New York's already negligible level of global CO2 emissions. The limitations of this approach should be considered by the subgroup.

The opinions expressed in this comment 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.

Roger Caiazza
Pragmatic Environmentalist of New York