January 12, 2022

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RE: RGGI Program Review Comment – IPM Base Case Modeling and Need for Equity and Health Analyses and Improvements to Stakeholder Processes

Dear Mr. McKeon and Members of the RGGI Board:

Thank you for the opportunity to provide comments on the RGGI states' planned power sector modeling for the third RGGI program review. NRDC strongly supports the RGGI states conducting rigorous analysis of RGGI's past and projected future performance to ensure that the program contributes to an equitable, clean, healthy, and affordable regional power system.

As noted in NRDC's initial November 29, 2021, program review comments,[1] previous analyses have shown that RGGI has provided numerous benefits to participating Eastern states over the program's 13-year history. These benefits include helping to reduce conventional air pollution and climate pollution regionally from RGGI-covered power plants;[2] providing billions of dollars in health benefits, including fewer pollution-related asthma attacks, heart attacks, and premature deaths, thanks to cleaner air;[3] and generating billions of dollars for investments in cost-saving energy efficiency and other clean energy initiatives that are lowering energy bills for households and businesses.[4]

Significant opportunities to further grow these benefits and strengthen the RGGI program, however, remain. Power plant emissions data show that RGGI's carbon pollution cap is

[1] NRDC, RGGI Program Review Comment (November 29, 2021), https://www.rggi.org/sites/default/files/Uploads/Program-Review/2021_Comments/Session2/NRDC_Public_Comment_2021-11-29.pdf ("NRDC November 2021 Comments").

[2] Acadia Center, *The Regional Greenhouse Gas Initiative: Ten Years in Review* (September 17, 2019), at 2-3 and 7, https://362kp444oe5xj84kkwjq322g-wpengine.netdna-ssl.com/wp-content/uploads/2019/09/Acadia-Center_RGGI_10-Years-in-Review_2019-09-17.pdf.

[3] Abt Associates, *Analysis of the Public Health Impacts of the Regional Greenhouse Gas Initiative, 2009–2014* (January 2017), at 1-2, https://www.abtassociates.com/sites/default/files/2018-06/Analysis%20of%20the%20public%20health%20impacts%20of%20regional%20greenhouse%20gas.pdf.

[4] RGGI, Inc., "Investments of Proceeds," https://www.rggi.org/investments/proceeds-investments (accessed January 6, 2022).

insufficiently ambitious and continues to lag the region's observed rate of power sector decarbonization, leaving greater, cost-effective pollution reduction opportunities on the table.[5] As RGGI states have recognized, it is also essential that their third program review prioritize environmental justice and equity.[6] Through this review, the states must ensure that justice and equity are at the heart of program implementation and design as RGGI moves forward.

Numerous stakeholders, including organizations representing environmental justice and frontline communities in the region,[7] have submitted comments in response to the RGGI states' previous request for comments on the scope and priorities for the third program review. These comments include requests for several program improvements to ensure, for example:

- That RGGI's carbon pollution cap and other program design elements, including the range of power plants covered by the program, are consistent with the need to rapidly decarbonize the power sector and economy to avoid the worst impacts of climate change;

- That health-harming pollution, including dangerous nitrogen oxide (NOx) emissions, from power plants are addressed under RGGI and other programs;

- That the RGGI states revisit their current allowance proceed allocation practices to prioritize the program's investments to provide economic and health benefits, including air pollution reductions and ensuring energy affordability, in low-income communities, communities of color, and frontline communities, and to ensure that *at least* 40-50 percent of program investments go to these communities; and

- That RGGI stakeholder processes, including during the program review and broader program implementation, are open, accessible, and inclusive; include dedicated outreach to and engagement with environmental justice and equity stakeholders; and provide such

[5] Acadia Center, *The Regional Greenhouse Gas Initiative: Ten Years in Review*, *supra* note 2, at 3.

[6] RGGI, Inc., *RGGI Program Review: Topics for Public Consideration* (September 13, 2021), at 2, https://www.rggi.org/sites/default/files/Uploads/Program-Review/9-13-2021/RGGI%20Topics%20for%20Public%20Participation_2021-09-07.pdf ("The RGGI states seek comment on how states can further address environmental justice and other equity concerns, including through program design and/or the use of RGGI auction proceeds to support underserved and/or otherwise affected communities. Sample topics for consideration may include, but are not limited to, inclusive and expanded public participation, just transition and workforce development, and air quality monitoring, among other topics.").

[7] *See* Organizations representing frontline communities in Pennsylvania (Pennsylvania Utility Law Project, POWER Interfaith, The Black Church Center for Justice and Equality, Center for Coalfield Justice, and Moms Clean Air Force), *RGGI Program Review Comment* (November 29, 2021), https://www.rggi.org/sites/default/files/Uploads/Program-Review/2021_Comments/Session2/PA_Frontline_Communities_Public_Comment_2021-11-29.pdf ("PA Frontline Communities Comments"); Northeast Regional Members of the Climate Justice Alliance (Alternatives for Community & Environment, Connecticut Coalition for Environmental Justice, GreenRoots, Inc., Institute for Policy Studies, New York City Environmental Justice Alliance, People for Sustainable Housing Buffalo, and United Puerto Rican Organization of Sunset Park), *Northeast Environmental Justice and Climate Justice Region Wide Stakeholder Comments to RGGI* (December 3, 2021), https://www.rggi.org/sites/default/files/Uploads/Program-Review/2021_Comments/Session2/CJA_Public_Comment_2021-12-03.pdf ("Climate Justice Alliance Comments").

stakeholders and communities with representation and roles in RGGI's implementation, including with respect to investment decisions.

NRDC urges RGGI states to prioritize these issues, which are discussed in more detail in comments previously submitted by our organization and by others, in the review. We further request that the states provide written responses to stakeholder comments received throughout the review so that stakeholders can understand how our comments are being considered and incorporated.

At the December 13, 2021, RGGI program review public meeting, RGGI states presented on the regional power sector modeling that states will conduct with ICF using the Integrated Planning Model (IPM®) and requested stakeholder input on states' proposed modeling assumptions for the Base Case that will be used for this modeling.[8] Below, we provide specific feedback from NRDC on the states' proposed IPM Base Case assumptions. First, however, we provide further comments and recommendations on the broader scope of analysis that RGGI states should conduct in the program review, including the need for equity and health analyses and direct engagement with environmental justice and equity stakeholders on these analyses and the program review more broadly as it unfolds.

I. Need for Equity and Health Analyses and Improvements to Stakeholder Processes

In our previous program review comments, NRDC and other organizations provided recommendations on a suite of analyses—beyond what RGGI states have already committed to conducting—that the RGGI states should undertake in the current program review to understand RGGI's impacts to date and opportunities for further progress and program improvement. We reiterate our earlier comments and repeat our call for the states to undertake such analyses.

Organizations representing environmental justice and frontline communities in the region, for example, have urged the RGGI states to conduct analyses of RGGI's equity impacts and outcomes, including:

- "An ongoing place-based equity analysis and report on the distribution of emissions reductions, including a cumulative burden analysis that considers the proximity of multiple power plants, including facilities below the 25 Megawatt threshold;"[9]

- "A comprehensive environmental impacts analysis, which examines and quantifies any localized or generalized economic or air quality impact of RGGI implementation on low-income communities, communities of color, and frontline communities, and whether investments through the program are effectively remediating those impacts;"[10] and

[8] RGGI, Inc., *Regional Greenhouse Gas Initiative Program Review: Public Meeting* (December 13, 2021), https://www.rggi.org/sites/default/files/Uploads/Program-Review/12-6-2021/RGGI_Public_Meeting_Presentation_Dec_2021.pdf.

[9] Climate Justice Alliance Comments, *supra* note 7, at 4.

[10] PA Frontline Communities Comments, *supra* note 7, at 2.

- "An analysis of individualized energy burdens of residential customers at each income tier (50/100/150/200/250/300% of the Federal poverty level), and whether RGGI has impacted those energy burdens."[11]

NRDC supports these requests to conduct equity-focused analyses as an integral and ongoing part of RGGI and the third program review. As we have previously commented, the states' program review analyses should include "analyses of historic and predicted emissions trends, community outcomes, and past RGGI investments" and "should be added to the program review timeline on a schedule that ensures robust opportunities for public comment and engagement" to enable "the results of these equity analyses . . . to inform the direction and outcomes of the program review, including potential reforms to RGGI."[12] Emissions analyses should include both greenhouse gases and other dangerous health-harming air pollutants, including NOx, sulfur dioxide (SO_2), particulate matter (PM), and mercury.

We further have urged the states to "expand analyses of public health outcomes and consumer benefits and impacts as a part of the program review" and to "build analyses of health and consumer benefits more meaningfully into the front end of the RGGI program review, including by conducting—and sharing with stakeholders—analyses of these issues earlier in and iteratively throughout the review."[13] Equity- and health-focused analyses are an essential component of examining RGGI's past and projected future performance and should not be left until only the end of the review.

It is essential that the states conduct "dedicated outreach and engagement"[14] to environmental justice and equity stakeholders as part of these analyses (and the program review more broadly) and ensure that community voices and perspectives are centered.[15] As articulated in public comments by environmental justice stakeholders and others at the December 13, 2021, RGGI program review public meeting, outreach to date on the program review to environmental justice and equity stakeholders has been insufficient. While we appreciate the modest steps that the RGGI states have taken to provide multiple public meeting opportunities on individual topics, including meetings held during evening hours, and language translation services, the RGGI states must do more. As the review continues, the states must prioritize—both at the regional and individual state levels—making the program review process more accessible, including through the types of materials provided and discussed, and by conducting direct outreach to environmental and equity stakeholders, including low-income communities,

[11] *Id.*

[12] NRDC November 2021 Comments, *supra* note 1, at 5.

[13] *Id.*

[14] Climate Justice Alliance Comments, *supra* note 7, at 8.

[15] Organizations representing frontline communities in Pennsylvania have recommended that "RGGI, Inc. establish an Equity Advisory Board, with representation from each RGGI state, including those states which are in the process of joining RGGI" and that "each state should have at least two members, and at least one of those members should be a frontline community member." Among other roles, the Equity Advisory Board would be involved in and review RGGI equity analyses and would be tasked with "develop[ing] a standardized set of metrics and points for evaluation" to "ensure that the data and analysis can be evaluated across RGGI states." PA Frontline Communities Comments, *supra* note 7, at 2-3.

communities of color, frontline communities, labor, and others, on the topics of the review. This outreach must not be delayed or limited to only later stages of the review.

We request that the RGGI states articulate the engagement that they are undertaking and are planning to undertake to ensure that the perspectives of environmental justice and equity stakeholders, including low-income communities, communities of color, frontline communities, labor, and others, are heard and incorporated into the review. We also request that the states provide a clear timeline and plan for the range of analyses, including equity- and health-focused analyses, that they are intending to conduct in the program review, and the opportunities that stakeholders will have to provide input on these plans and analyses.

II. Recommendations on IPM Base Case Model

NRDC provides the following recommendations in response to the RGGI states' December 13, 2021, request for stakeholder input on the Base Case power sector modeling that the states and ICF will conduct using IPM.

A. Responses to the States' Considerations for the IPM Base Case[16]

1. How should state-specific electricity sector or economy-wide net-zero emissions targets be incorporated?

The Base Case should assume that all electricity sector and economy-wide emissions reduction targets and commitments that have been made in the RGGI region will be achieved. This should include (1) statutes, executive orders, and other regulatory actions taken and adopted to date; and (2) statutes and regulations reasonably expected to be adopted while the modeling effort is ongoing.

To the extent that individual RGGI states have articulated emissions reduction targets on an economy-wide rather than electricity sector-specific basis, the Base Case should assume, as a conservative assumption, that the electricity sector will reduce emissions at least as quickly as the economy-wide emissions reduction rate. In states that have mandated that the electricity sector reduce emissions at a faster rate than the economy-wide target (e.g., New York, which requires a zero-emissions power sector by 2040 and a net-zero emissions economy by 2050), the electricity sector should be assumed to reduce its emissions at the faster rate, as required.

Individual RGGI states should further work with ICF to ensure that their state-specific emissions reduction mandates are implemented correctly in the model, including requirements for specific levels of in-state renewable energy generation and in-state emissions reductions.

2. How should state-specific goals for decarbonization through fuel switching and beneficial electrification be incorporated?

[16] RGGI, Inc., *Regional Greenhouse Gas Initiative Program Review: Public Meeting* (December 13, 2021), at p. 19, https://www.rggi.org/sites/default/files/Uploads/Program-Review/12-6-021/RGGI_Public_Meeting_Presentation_Dec_2021.pdf.

In states that have specific goals for decarbonization through fuel switching and beneficial electrification, the Base Case should assume that these goals will be achieved by reasonably adjusting energy demand and load for these policies.

3. *How should states address uncertainty regarding climate and energy policy in the 2030-2040 timeframe?*

The Base Case should assume continuation of other climate and clean energy policies in the 2030-2040 timeframe and beyond.

In states that have specified renewable, clean, and/or distributed energy (including storage) portfolio targets that end (or would remain flat after a specified year) prior to 2040, we recommend assuming that these portfolios will be strengthened such that they will require at least the same annual rate of growth in renewable, clean, or distributed energy use in the state in future years. For example, Rhode Island's Renewable Energy Standard (RES) requires that generation from new renewable energy grow, as a percentage of retail electricity sales, by 1.5 percent per year through 2035.[17] We recommend that the Base Case assume a continued 1.5 percent annual increase in the state's RES in years after 2035.

Similarly, we recommend that the Base Case assume that states' energy efficiency targets will continue to require at least the annual rate of energy savings required under states' and/or utilities' most recently adopted or approved energy efficiency plans or policies in future years for which such plans or policies have not yet been adopted.

While future federal climate and clean energy policy is uncertain, we recommend that the states include in the Base Case, or as a sensitivity, additional federal policy actions, such as adoption of clean energy tax credits under the Build Back Better legislative framework and federal regulatory action on greenhouse gas emissions from power plants, potentially modeled as a CO_2 price and/or requirements that any new gas-fired power plants must include carbon capture and sequestration (CCS) after 2025.

4. *Should the model assume that the excess allowance pool is completely exhausted or that a residual bank remains at the end of the analysis period, if so, what percentage remains and why?*

Throughout RGGI's history, we have seen accumulation of excess emissions allowances in the market that are not exhausted by the end of RGGI's compliance periods. This suggests that market participants value these RGGI allowances for potential future compliance, perhaps based on an expectation of further tightening of the RGGI cap and/or higher future compliance costs.

While NRDC hopes that the RGGI states will further lower RGGI's cap to avoid the continued creation and release of excess allowances—and make other related program

[17] R.I. Gen. Laws § 39-26-4(a)(4).

improvements[18]—as part of the third program review, for purposes of the IPM Base Case, we recommend assuming that excess allowances will continue to be held in future years and will not be exhausted fully at the end of the analysis period. One potential approach would be to take an average of the excess allowances in circulation at the end of previous control periods and assume that a similar volume of allowances will continue to be banked in future periods.

B. Recommendations on Specific Base Case Assumptions

1. Fuel Prices – Gas

We support the states' proposed/potential approach of using Henry Hub futures contract prices for gas at the time of modeling and blending these futures contract prices with the U.S. Energy Information Administration's (EIA) Annual Energy Outlook (AEO) 2022 Reference Case for gas in later years. Given uncertainty in nearer term gas prices, we believe this approach is most reasonable. In order to present a fuller picture, we recommend that the states also consider a sensitivity that uses the AEO 2022 Low Oil and Gas Resource Case.

2. Fuel Prices – Oil & Coal

We support the states' proposed/potential approaches.

3. Hydrogen

Hydrogen should only be incorporated in the Base Case and other modeling scenarios if appropriate and if conservative limitations are included on the costs and availability of this fuel. Hydrogen is a nascent fuel source for the power sector with significant uncertainties in its future costs and availabilities as well as its full-lifecycle climate and environmental impacts.

If hydrogen is included as a fuel option in the model, only green hydrogen (hydrogen produced from water and 100 percent renewable electricity) should be made available, and the costs and supply of hydrogen should reflect green hydrogen's characteristics. Currently, hydrogen is not a selectable fuel type in the latest versions of the U.S. Environmental Protection Agency's (EPA) Platform v6,[19] which appears to be the proposed IPM version for the RGGI states' modeling effort. In addition, the costs of retrofitting combustion power plants to burn high levels of hydrogen (i.e., up to 100 percent) or of converting existing gas pipelines to be able to

[18] For example, NRDC recommends that the RGGI states "build in a requirement for automatic adjustments for excess banked allowances into the design of the RGGI program itself. This could be accomplished, for example, by adding language to the Model Rule (and states' implementation of the Model Rule) that requires a calculation of the number of excess allowances in regional circulation at the end of each 3-year compliance period and an automatic pro rata adjustment to each state's allowance budget to eliminate this excess allowance bank over the subsequent 3-year compliance period." NRDC November 2021 Comments, *supra* note 1, at 6. We also urge the states to adopt necessary reforms to RGGI's current Cost Containment Reserve (CCR) to prevent this mechanism from continuing to release emissions allowances above the RGGI cap, which both undermines RGGI's climate goals and contributes to the accumulation of excess allowances in the market. *See id.*, at 9-10.

[19] *See* U.S. Environmental Protection Agency, *Documentation for EPA's Power Sector Modeling Platform v6 Using the Integrated Planning Model* (September 2021), https://www.epa.gov/system/files/documents/2021-09/epa-platform-v6-summer-2021-reference-case-09-11-21-v6.pdf ("EPA Platform v6").

carry 100 percent hydrogen, as would be needed to achieve net-zero emissions, are not well known and not included in the IPM model. As a result, even if hydrogen is included as a fuel option with a specific $ per MMBtu cost, the model is likely to underestimate the costs of using hydrogen in the electricity sector. NRDC would also note that there is significant uncertainty as to the cost, availability, and performance of hydrogen-fired turbines, including the non-CO_2 emissions that may be associated with hydrogen combustion in turbines.

To address these large uncertainties around the use of hydrogen in the power sector, we recommend limiting hydrogen use in the model until no earlier than 2035 or 2040 and assuming a conservative price for green hydrogen. While uncertainties about the costs and technical feasibility of scrubbers for power plants burning hydrogen remain, we also recommend requiring within the model that all plants using alternative fuels, including hydrogen, have NOx scrubbers installed.

4. Renewable and Synthetic Gas

Renewable biogas and synthetic methane gas should also be subject to strict supply limits in the Base Case. RNG sourced from anaerobic digesters that has demonstrated lower lifecycle greenhouse gas emissions than the fossil gas it would replace may appropriately be included in the Base Case. RNG sourced from other processes such as thermal gasification of wood, forestry, and agricultural residues, which is energy-intensive and can lead to negative climate impacts such as increased methane emissions, however, should generally be excluded. If included in the model, the supply of RNG and synthetic methane should reflect the likely limited availability of these fuels. According to NRDC analysis, nationally, ecologically sound RNG has the potential to replace up to 2 to 5 percent of the country's total 2019 gas use amount (not necessarily for use in the electricity sector) by 2040. Renewable synthetic methane could potentially replace an additional 1 to 2 percent by 2040.[20] We recommend that the states adopt NRDC's RNG and synthetic methane supply analysis in the Base Case model. We further urge the states to use conservative assumptions for the cost of RNG and synthetic methane, both of which are likely to be significantly more expensive than fossil gas per MMBtu, in the Base Case model.

The Base Case model should report the full combustion emissions of RNG and synthetic methane used for electricity production in the model. These fuel sources should not be treated, by default, as carbon neutral in the model. To the extent RNG and synthetic methane are included, we further recommend that the RGGI states estimate the upstream emissions and other environmental impacts of these fuels to understand their full potential climate and health impacts.

If RNG and synthetic methane are included in the modeling, the RGGI states must also specify how potential emissions benefits from the limited use of these fuels would be tracked and accounted for in the region. As noted above, RNG and synthetic methane should only be included if these fuels have demonstrated lower lifecycle greenhouse gas emissions than the fossil gas that they would replace. RNG and synthetic methane should not be credited for

[20] NRDC, *A Pipe Dream or Climate Solution? The Opportunities and Limits Of Biogas and Synthetic Gas to Replace Fossil Gas* (June 2020), https://www.nrdc.org/sites/default/files/pipe-dream-climate-solution-bio-synthetic-gas-ib.pdf.

emissions reductions relative to fossil gas if the emissions characteristics of these alternative fuels can be unbundled and sold into other markets outside the RGGI region. Current regulatory frameworks in the region are insufficient to prevent this from happening, however.

5. Regional Energy and Peak Demand

The Base Case should reflect the impact of electrification and energy efficiency programs and goals, where they are able to be estimated. Many of the RGGI states are moving forward with programs to reduce peak demand and to enable more flexible demand through distributed resources like batteries and programs that control heating and cooling loads at peak times to reduce grid stress and reduce air pollution. Times of peak demand are usually when the oldest and dirtiest generators and fuels are used (winter and summer) contributing to poor air quality throughout the region. The modeling should include and represent these types of programs and other complementary policies on beneficial electrification in the assumptions for the Base Case.

The states' have provided potential approaches for the different market regions to try to account for these policies. We would support the use of the New York Climate Action Council (CAC) study to better reflect the likely load impact of legislative and regulatory requirements on energy demand within the state. For ISO-NE, we would suggest using either the central case assumptions from ISO-NE's study on Pathways to the Future Grid or the high electrification trajectory from the National Renewable Energy Laboratory's (NREL) Electrification Futures Study (EFS) to best represent the load impacts from beneficial electrification, energy efficiency, and behind the meter resources in the region. For RGGI-PJM states, we would support using state-specific load forecasts based on regulatory requirements where they are available (e.g., for Maryland and New Jersey) and using the high electrification trajectory from the NREL EFS for the other RGGI-PJM states. We would suggest not adjusting the load forecast or using the NREL EFS reference trajectory for non-RGGI states in PJM and using EIA AEO 2022 for regional growth estimates outside of the RGGI region.

6. Firmly Planned Capacity Changes – Offshore Wind

We support assuming that states' offshore wind capacity goals and mandates will be achieved by including offshore wind resource levels needed to meet these goals and mandates as firm capacity builds in the Base Case.

7. Energy Storage Capacity Additions

The Base Case should assume that states' energy storage goals and mandates will be achieved by including levels of storage needed to meet these goals and mandates as firm capacity builds.

The Base Case model should include additional storage duration levels than the 4- and/or 6-hour durations proposed. The proposed source, NREL's 2021 Annual Technology Baseline (ATB), includes 2-, 4-, 6-, 8-, and 10-hour duration storage as available technology options. NRDC would recommend including all duration options, or at a minimum, also 8- and 10-hour duration options to provide longer-duration options to meet energy needs. Further, in addition to

standalone storage, the Base Case model should include hybrid solar plus storage resources as an option. NREL's 2021 ATB includes PV-Plus-Battery resources that could be used as a source for assumptions for these hybrid resources.

The states should further ensure that the capacity values of these storage and hybrid resources are properly set and treated in IPM. In addition, ICF should explain their assumptions about how and when the batteries will be charged after use to demonstrate whether and where they could contribute to additional air pollution at peak times.

8. Firmly Planned Transmission Additions

We support the states' proposed/potential approach.

9. Renewable Portfolio Standards

As noted above, we recommend assuming in the Base Case that the states' renewable portfolio standards and related policies will be achieved. We further recommend, in states that have portfolio targets that end (or would remain flat after a specified year) prior to 2040, assuming that these portfolios will be strengthened such that they will require at least the same annual rate of growth in renewable or clean energy use in the states in future years. States should ensure that in-state generation and emissions targets are properly modeled. The Base Case should also consider potential renewable energy purchases beyond state policy targets in states that have enabled such purchases by implementing voluntary renewable set-asides under RGGI.

10. Firmly Planned Generation and Retirements

We support the states' proposed/potential approach.

11. Cost and Performance of New Generation

We recommend that the states use NREL's mid-case costs for technologies other than offshore wind and use NREL's low costs for offshore wind, to account for state targets and policies that will likely drive offshore wind deployment up and costs down more quickly.

12. Cost and Performance of Pollution Controls

We support the states' proposed/potential approach.

13. Transmission Capability

We support the states' proposed/potential approach.

14. Nuclear Plant Construction/Retirements & Coal Plant Construction

We recommend that the Base Case allow for plant life extensions to 80 years for plants without an announced retirement date, with assumptions on the cost of extension. One option for

cost assumptions would be to use EPA's Nuclear Power Plant Life Extension Cost methodology.[21]

15. Reserve Margins and Local Reserve Requirements

We support the states' proposed/potential approach.

16. State Environmental Policies

We support the states' proposed/potential approach.

17. Federal Environmental Policies

We support the states' proposed/potential approach to include the specified federal environmental policies in the Base Case. As noted above, we also recommend that the states include in the Base Case, or as a sensitivity, additional federal policy actions, such as adoption of clean energy tax credits under the Build Back Better legislative framework and federal regulatory action to reduce greenhouse gas emissions from power plants.

C. Additional Recommendation on the Base Case and IPM Modeling

1. Reporting Both Climate and Air Pollution Emissions

In reporting the Base Case and future policy cases, we strongly urge the RGGI states and ICF to provide emissions data for dangerous, health-harming air pollutants, in addition to greenhouse gases. In particular, modeling results should include CO_2, NOx, SO_2, and, if available, PM, and/or mercury emissions projections for all emitting power plants, ideally by fuel type. These data are already collected for power plants in the region and with little effort, they could be incorporated into RGGI program modeling.

Air pollutant modeling should be compared to historic values for specific facilities that the RGGI states have in their emission inventories. Any projected increases in communities near a facility must be discussed in detail with those communities to discern additional measures that could be taken to reduce exposure to air pollution.

2. Biomass-Based Energy

As we have previously commented, biomass-based energy generation should not be treated or reported as zero-carbon given abundant evidence that biomass burning can contribute

[21] Eastern Research Group, Inc., *IPM Model – Nuclear Power Plant Costs: Nuclear Power Plant Life Extension Cost Development Methodology: Final*, prepared by Sargent & Lundy LLC (January 2018), https://www.epa.gov/sites/default/files/2019-03/documents/attachment_4-1_nuclear_power_plant_life_extension_cost_development_methodology_1.pdf.

to climate change.[22] We recommend that the RGGI states' modeling include the following sensitivities: (1) an assumed CO_2 emissions rate for biomass that reflects the actual stack emissions at combustion (reflecting no discounting of emissions); and (2) an assumed CO_2 emissions rate for biomass that reflects a partial discounting of CO_2 emissions for forest harvest residue materials that would otherwise decompose (reflecting an emissions rate between zero and the full stack emissions).

3. Model Reporting Years

We recommend that the RGGI states and ICF provide as many run-year results as possible for the Base Case and future policy cases within the states' modeling timeframe. EPA's Platform v6 Summer 2021 version of IPM, for example, reports results for four run years—2023, 2025, 2028, and 2030— for years within this decade.[23] The RGGI modeling should report results at least as frequently through its modeling term.

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Thank you for the opportunity to provide comments on the RGGI states' planned Base Case modeling analysis for the third program review and other program review topics. If you have any questions about our comments, please do not hesitate to contact us.

Sincerely,

/s/ Bruce Ho

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[22] *See, e.g.,* NRDC comments (March 15, 2016), https://www.rggi.org/sites/default/files/Uploads/Program-Review/2-2-2016/Comments/NRDC_Additional_Comments.pdf.

[23] EPA Platform v6, *supra* note 19, at 1-2.