February 19, 2015

Dear RGGI Member States:

Thank you for the opportunity to provide further comments on the 2016 RGGI Program Review. Below, we provide comments on the initial reference case modeling that was presented to stakeholders on February 2 in Wilmington, DE. In addition to this standalone submission, NRDC also contributed to—and has signed on to—two additional joint comments on the proposed policy scenarios that the RGGI states should model in the Program Review through the *Collaborative for a Stronger RGGI* and with other environmental organizations. NRDC also submitted earlier comments addressing questions raised by the RGGI states about program design issues, which we incorporate here by reference.[1]

The RGGI states have an opportunity in the 2016 Program Review to make significant progress toward their goals of reducing economy-wide greenhouse gas emissions in the range of 35-45% by 2030 and 80% by 2050,[2] if they commit to further carbon pollution reductions and build on the success of RGGI's first seven years. Toward this end, and as we address further in the joint comments that we are filing with other parties, we urge the states to consider a range of future cap trajectories that would reduce power sector carbon pollution well beyond business as usual, consistent with achieving the states' medium- and long-term climate targets.

A reference case that reflects the anticipated emissions trajectory of the region is also important in the Program Review. As the RGGI states have explained, the reference case is the situation against which future policy scenarios will be compared. If the reference case fails to realistically model the future, these comparisons will be impaired. In particular, the states should ensure that their reference case fully accounts for state and federal policies and actual and anticipated trends in renewable energy and energy efficiency that will independently reduce emissions. Accounting for these factors will likely reveal that more ambitious cap trajectories are achievable.

As explained further below, we recommend the following improvements to the reference case:

- Incorporate the recent extensions of the federal Production Tax Credit (PTC) and Investment Tax Credit (ITC) for wind and solar renewable energy;
- Use improved data on renewable energy technology costs from the National Renewable Energy Laboratory (NREL), which more accurately reflect recent trends;
- Incorporate NY's Clean Energy Standard (CES) and NY DPS staff's projections of future load growth (or rather, load decline), which better account for energy efficiency; and
- Ensure that all state energy efficiency policies and investments are fully captured.

[1] *Joint Stakeholder Comments* (Dec. 4, 2015), *available at* http://www.rggi.org/docs/ProgramReview/2016/11-17-15/Comments/Joint_Stakeholder_Comments.pdf; *NRDC Comments* (Dec. 11, 2015), *available at* http://www.rggi.org/docs/ProgramReview/2016/11-17-15/Comments/NRDC_Comments.pdf.

[2] A table of the RGGI states' 2030 and 2050 targets (compiled by Acadia Center) is attached to these comments.

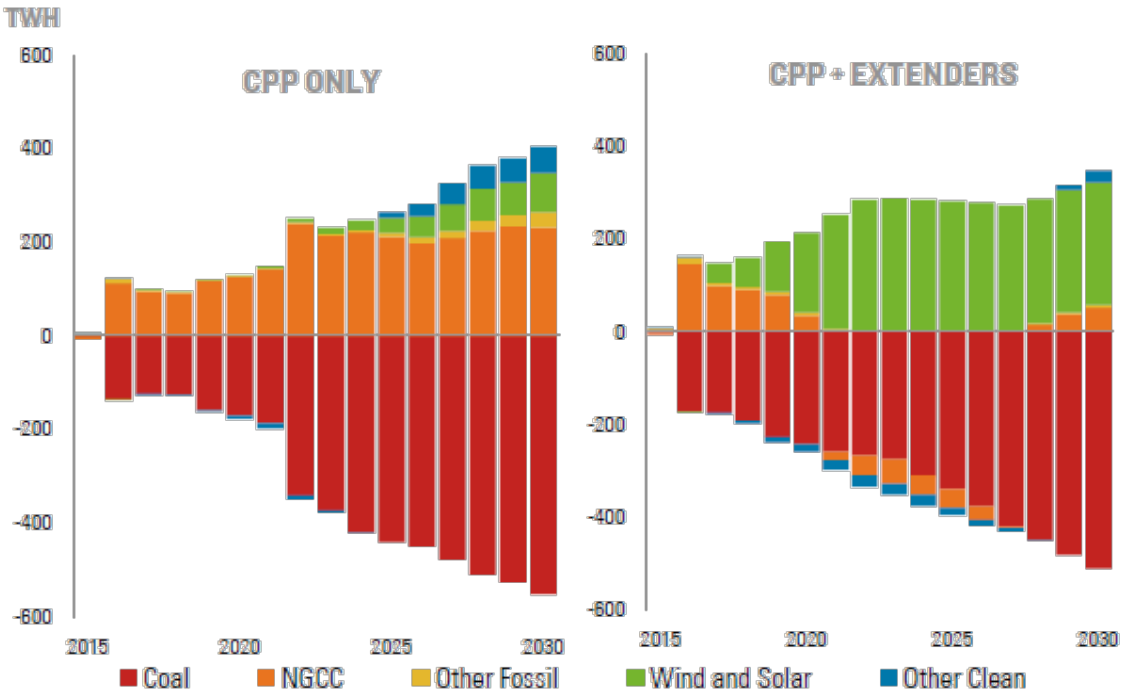
Comments on the Initial Reference Case Model

We appreciate the states' release of additional materials on the initial reference case modeling and assumptions as requested by stakeholders at the February 2 meeting. We also thank the states for incorporating PJM's updated 2016 load forecast in the reference case, as previously requested by NRDC, which is an improvement over PJM's 2015 forecast. There are several additional areas where the reference case should be improved, which would have a significant effect on projected generation and emissions under the reference case and policy scenarios.

1. **The RGGI states should incorporate the recent extensions of the federal Production Tax Credit (PTC) and Investment Tax Credit (ITC) in the reference case model.**

   The current reference case does not include the recent extensions of the federal PTC and ITC, which passed as part of the 2016 Consolidated Appropriations Act. Analysis by the Rhodium Group shows that the PTC and ITC extensions are likely to significantly shift the balance between renewables and natural gas.[3] As shown below, without the extensions, Rhodium predicted that the majority of new generation nationally under the Clean Power Plan would come from natural gas-fired power plants. ICF similarly projected comparatively few new wind and solar additions beyond 2020 and large additions of new natural gas units in the RGGI region in the initial reference case. With the PTC and ITC extensions, Rhodium predicts most new generation will come from renewables instead. These extensions are adopted law and should be incorporated in the RGGI reference case and policy scenarios.

Figure I: Change in generation from AEO2015 reference case, 2015-2030

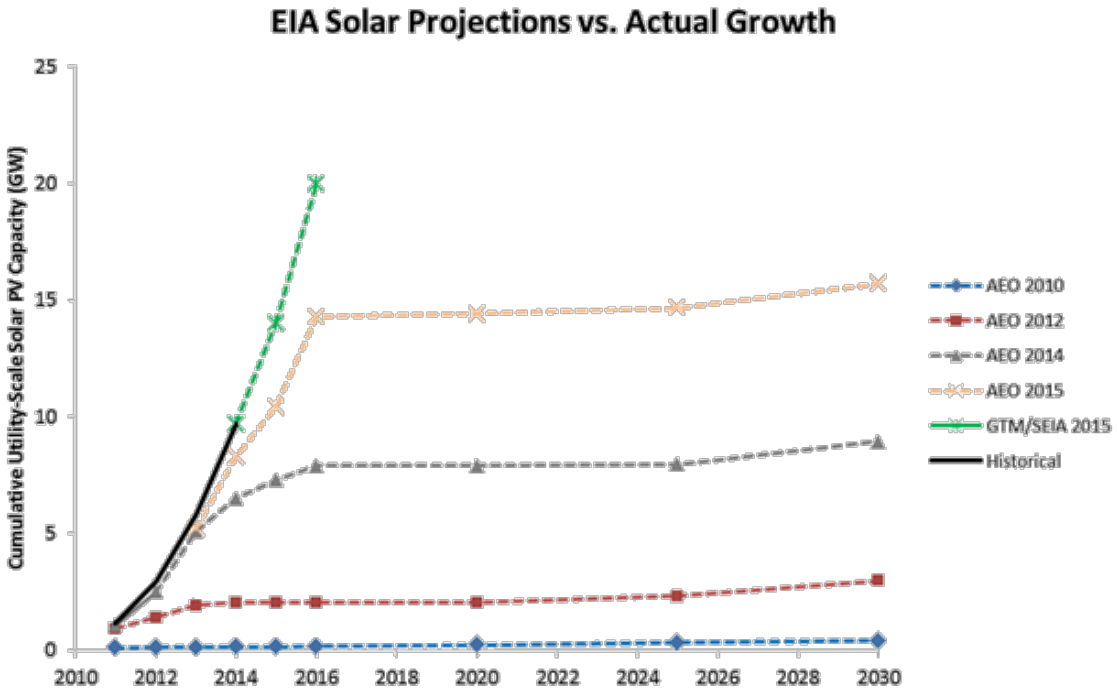


Source: Rhodium Group analysis. Note: "Wind and Solar" includes utility-scale generation only. "Other Fossil" includes combustion turbines, oil/gas steam, and carbon capture equipped units. "Other Clean" includes nuclear, hydro, and biomass.

[3] Rhodium Group, *Renewable Tax Extenders: The Bridge to the Clean Power Plan* (Jan. 27, 2016), *available at* http://rhg.com/notes/renewable-tax-extenders-the-bridge-to-the-clean-power-plan.

2. The RGGI states should follow EPA's lead and use improved data on renewable energy costs from the National Renewable Energy Laboratory (NREL) in their modeling.

The current reference case relies on EIA's AEO2015 estimates for the cost of new renewable energy resources. However, this data is outdated and significantly overestimates the costs of these resources. EIA's estimates rely on installed costs for renewable energy, which means that the data has an 18-month or greater time lag. As Lawrence Berkeley National Laboratory has noted, installed cost data "may reflect transactions that occurred several or more years prior to project completion" and therefore are often unable to accurately reflect current prices in such a rapidly-changing industry.[4] This delay causes EIA's analysis to miss key data showing major recent price declines in renewable energy, and therefore significantly overestimate current costs and underestimate recent performance. For example, a 2014 NRDC analysis found that EIA's cost estimates in AEO2013 were 46 percent higher than current average costs for wind and solar energy.[5] As shown below, AEO2015's estimates improved somewhat, but still do not keep up with current industry data and expectations.



Importantly, there is no reason to believe that the recent declines in renewable energy costs will not continue. The DOE/NREL Sunshot Vision study, which constructs a detailed roadmap for continued cost declines in solar PV technologies, projects that solar system prices can drop 75% between 2010 and 2020.[6] In its 2014 update on Solar PV pricing trends,

[4] Lawrence Berkeley National Laboratory, *Tracking the Sun VII* (Sept. 2014), at 39, *available at* http://emp.lbl.gov/publications/tracking-sun-vii-historical-summary-installed-price-photovoltaics-united-states-1998-20.
[5] Natural Resources Defense Council, *The EPA's Clean Power Plan Could Save Up to $9 Billion in 2030* (Nov. 2014), available at http://www.nrdc.org/air/pollution-standards/files/clean-power-plan-energy-savings-IB.pdf.
[6] DOE/NREL, *Sunshot Vision Study* (Feb. 2012), *available at* http://energy.gov/eere/sunshot/sunshot-vision-study.

NREL projected that solar prices are still on track to meet the Sunshot goal of $1/W_{dc}$ by 2020 for utility-scale systems.[7] This would place utility-scale solar projects in direct competition with natural gas combined cycle (NGCC) plants, without any incentives or carbon policy.[8] Likewise, many industry analysts predict that wind and solar will become increasingly competitive with new NGCC plants and will make up a major market share of new U.S. demand.[9]

In its final Clean Power Plan analysis, EPA decided to use renewable energy cost data from NREL instead of EIA, finding that, "In comparing the two data sets with current project costs, recent trends, and a reasonable expectation of the future, EPA found that [NREL's Annual Technology Baseline (ATB)] mid-case estimates are more in line with current costs and recent market analysis and projections than the AEO2013 costs." RGGI should follow EPA's lead and use NREL's ATB projections for renewable energy costs[10] in the RGGI reference case and policy scenarios.

3. **We support New York's commitment to include the state's Clean Energy Standard (CES) and to use NY DPS staff's recent projections of future electricity demand in the next update to the reference case. We similarly urge other RGGI states to ensure that their state clean energy policies are captured in the model.**

At the February 2 regional RGGI stakeholder meeting in Wilmington and New York's separate state stakeholder meeting in Albany on February 11, New York officials committed to fully incorporate the states' CES targets, including the 50% renewable energy by 2030 target, and NY DPS staff's projections of future electricity demand, which more fully account for energy efficiency savings,[11] into the next update of the reference case. We commend New York for this commitment, and strongly support incorporating these policies.

As a recent NY DPS staff whitepaper concludes, "The CES, by clearly stating both an absolute mandate and interim targets, will support the development of a vibrant clean energy market and provide the scale and certainty necessary for broad competition that encourages private investment and reduces costs."[12] These targets are independent of RGGI, and New York rightly concludes that they should be incorporated in the reference case. We similarly urge other RGGI states to ensure that their state clean energy policies are captured in the reference case model.

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[7] *Id.*
[8] *Id.*
[9] Cardwell, D., *Solar and Wind Energy Start to Win on Price vs. Conventional Fuels. New York Times* (Nov. 23, 2014), *available at* http://www.nytimes.com/2014/11/24/business/energy-environment/solar-and-wind-energy-start-to-win-on-price-vs-conventional-fuels.html; Credit Suisse, *The Transformational Impact of Renewables* (Dec. 2013); Bloomberg New Energy Finance, *2030 Market Outlook: Focus on Americas* (2013), *available at* http://bnef.folioshack.com/document/v71ve0nkrs8e0/106y4o; Greentech Media, *Experts: The Cost Gap Between Renewables and Natural Gas 'Is Closing'* (May 2014) *available at* http://www.greentechmedia.com/articles/read/The-Price-Gap-Is-Closing-Between-Renewables-and-Natural-Gas.
[10] NREL, *Annual Technology Baseline and Standard Scenarios*, *available at* http://www.nrel.gov/analysis/data_tech_baseline.html.
[11] NY DPS, *Staff White Paper on Clean Energy Standard* (Jan. 25, 2016), at App. B, p. 2, *available at* http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={930CE8E2-F2D8-404C-9E36-71A72123A89D}.
[12] *Id.*, at 3.

4. The RGGI states should ensure that all state energy efficiency policies are fully incorporated in the reference case, and that, at a minimum, current annual energy savings levels are continued into the future.

At the February 2 meeting, RGGI state staff requested feedback on the fact that energy efficiency is currently only incorporated into the reference case to the extent that it is embedded in the load forecasts produced by ISO-NE, NYISO, and PJM. As Acadia Center[13] and NRDC[14] pointed out in earlier comments, these forecasts have historically overestimated demand growth, in part because they have underestimated energy efficiency savings. As Acadia Center wrote, ISO-NE's forecast includes "heavy discounting of future energy efficiency" in the New England states, such that the states' energy efficiency policies and investments are only partially embedded in the forecasts.[15] As shown in the table below from Synapse Energy Economics, the result is that ISO-NE's energy efficiency forecasts consistently fall short of the level of energy efficiency that annually clears in the region's forward capacity market (FCM), which itself reflects only a subset of total energy efficiency resources in the region.[16]

Table 2. Forecasted energy efficiency versus FCM cleared energy efficiency

ISO-NE MW	2015	2016	2017	2018
2012 forecast	249	233	218	205
2013 forecast		231	218	204
2014 initial			245	230
2014 forecast				239
FCM Cleared	**246**	**243**	**320**	**276**

Source: Synapse Energy Economics from ISO-NE EEFWG and FCM data.

In committing to use NY DPS staff's projections of future energy demand growth instead of NYISO's projections in the next update to the reference case, New York has similarly recognized that NYISO's forecast fails to account for all expected energy efficiency. As NY DPS staff wrote in their recent whitepaper on the CES, NYISO's "Goldbook load forecast does not factor in the extensive electric vehicle and heat pump (EV/HP) load forecasted in the SEP. Nor does it take into account expected energy efficiency efforts from 2015 and on."[17] NY DPS staff's alternate projection that accounted for these measures results in a projected net decrease of more than 10,000 GWh by 2030 from current levels.[18]

[13] *Acadia Center Comments* (Nov. 20, 2015), *available at* http://www.rggi.org/docs/ProgramReview/2016/11-17-15/Comments/Acadia_Center_Comments.pdf.
[14] *NRDC Comments* (Dec. 11, 2015), *available at* http://www.rggi.org/docs/ProgramReview/2016/11-17-15/Comments/NRDC_Comments.pdf
[15] *Supra* note 13.
[16] Synapse Energy Economics, Challenges for Electric System Planning (July 24, 2015), at 10, *available at* http://www.synapse-energy.com/sites/default/files/Challenges-for-Electric-System-Planning_0.pdf.
[17] NY DPS, *supra* note 11, at Appendix B, p. 1.
[18] *Id.* at Appendix B, p. 2.

Other RGGI states should similarly make adjustments to their respective ISO/RTO forecasts to ensure that the numerous investments that they are making in energy efficiency are fully reflected in the reference case. At a minimum, we recommend assuming that current annual energy savings levels and commitments will be achieved and continued into the future. We note that continuing only existing policies is itself a conservative assumption given ongoing innovation and policy development, such as Massachusetts' recent commitment to raise its energy savings target to 2.93% of electric retail sales per year.

Ensuring that RGGI's reference case fully accounts for policies such as the PTC and ITC, New York's CES, and other state clean energy policies, as well as actual and projected trends in renewable energy and energy efficiency, is critical to provide an accurate baseline for discussion and comparison of future policy scenarios in the 2016 Program Review. Thank you for considering our comments, and we look forward to engaging further on these issues as this important process continues.

Sincerely,

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Regional Greenhouse Gas Initiative State 2030 and 2050 Economy-wide Climate Goals

State	2030 Target	2050 Target	Sources
Connecticut	35-45% below 1990	80% below 2001	2030: Conf. of New England Govs. Resolution 39-1 (http://www.cap-cpma.ca/data/Signed%2039-1En.pdf) 2050: C.G.S. 22a-200a (enacted by H.B. 5600) (https://www.cga.ct.gov/2008/ACT/PA/2008PA-00098-R00HB-05600-PA.htm)
Delaware	30% below 2008	n/a	2030: Climate Framework for Delaware (Dec. 31, 2014) (http://www.dnrec.delaware.gov/energy/Documents/The%20Climate%20Framework%20for%20Delaware.pdf)
Maine	35-45% below 1990	75-80% below 2003[a]	2030: Conf. of New England Govs. Resolution 39-1 (http://www.cap-cpma.ca/data/Signed%2039-1En.pdf) 2050: Maine Rev. Stat. ch. 3-A § 576(3) (enacted by PC 2003, C. 237) (http://legislature.maine.gov/statutes/38/title38sec576.html)
Maryland	40% below 2006	Up to 90% below 2006	2030: Recommendation of the Maryland Commission on Climate Change (Oct. 29, 2015) 2050: Md. Env. Code § 2-1201 (2009) (http://law.justia.com/codes/maryland/2013/article-gen/section-2-1201/)
Massachusetts	35-45% below 1990	80% below 1990	2030: Conf. of New England Govs. Resolution 39-1 (http://www.cap-cpma.ca/data/Signed%2039-1En.pdf) 2050: Mass.Gen.L. ch. 21N § 3(b) (https://malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter21N/Section3)
New Hampshire	35-45% below 1990	80% below 1990	2030: Conf. of New England Govs. Resolution 39-1 (http://www.cap-cpma.ca/data/Signed%2039-1En.pdf) 2050: 2009 New Hampshire Climate Action Plan (http://des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/documents/nhcap_final.pdf)
New York	40% below 1990[b]	80% below 1990	2030: 2015 New York State Energy Plan (http://energyplan.ny.gov/Plans/2015) 2050: Executive Order No. 24 (2009) (http://www.dec.ny.gov/energy/71394.html)
Rhode Island	35-45% below 1990	80% below 1990	2030: Conf. of New England Govs. Resolution 39-1 (http://www.cap-cpma.ca/data/Signed%2039-1En.pdf) 2050: Resilient Rhode Island Act of 2014, Sec. 42-6.2-2 (http://webserver.rilin.state.ri.us/Statutes/TITLE42/42-6.2/42-6.2-2.HTM)
Vermont	35-45% below 1990	75% below 1990	2030: Conf. of New England Govs. Resolution 39-1 (http://www.cap-cpma.ca/data/Signed%2039-1En.pdf) 2050: 10 V.S.A. § 578 (enacted by S. 259) (http://www.leg.state.vt.us/docs/legdoc.cfm?URL=/docs/2006/acts/ACT168.HTM)

[a] = "Long term" target; date not specified

[b] = "Energy Sector" only – excludes agriculture