To: The RGGI Staff Working Group and other RGGI Stakeholders

From: Derek Murrow, Environment Northeast; Larry DeWitt, Pace Energy Project; Rob Sargent, National Association of State PIRGs; Marc Breslow, MA Climate Action Network; Dale Bryk, Natural Resources Defense Council; Cindy Luppi, Clean Water Action; Seth Kaplan, Conservation Law Foundation

Date: March 9, 2005

Re: Comments on RGGI Modeling Runs to Date

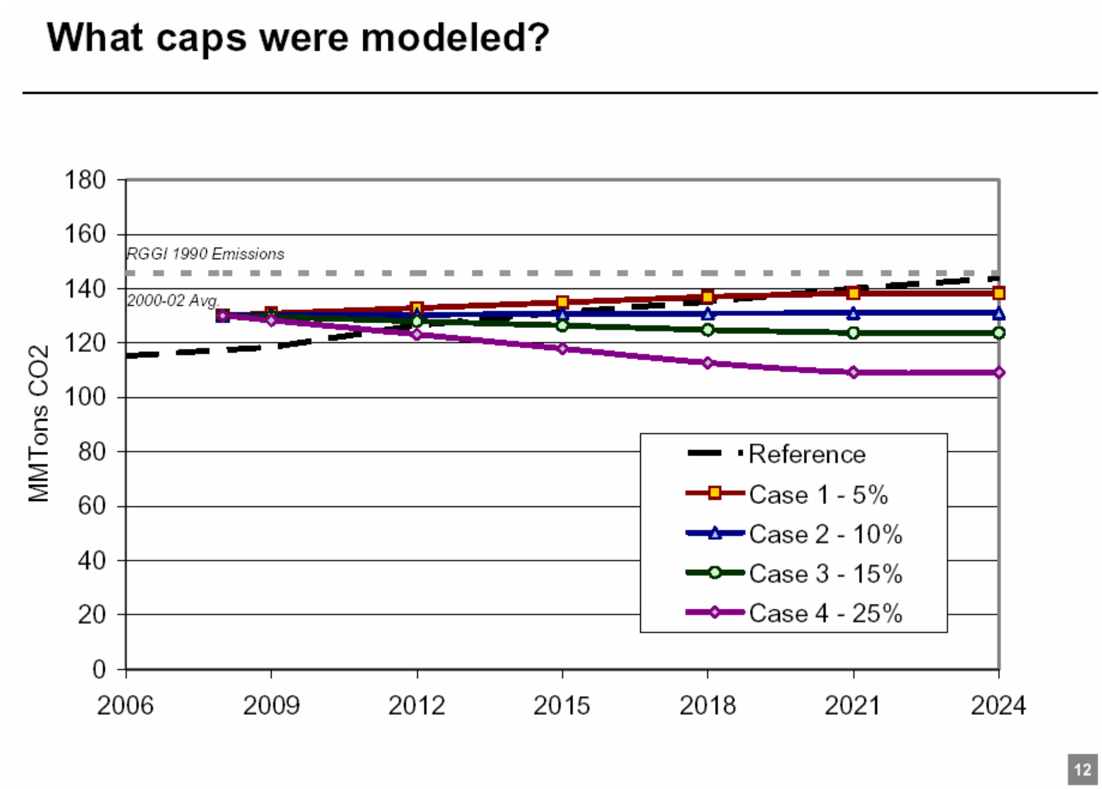
The modeling results presented by the RGGI Staff Working Group to date identify some questions and issues, and also present a promising picture in terms of developing a program at low cost that achieves real emissions reductions. We would like the staff working group to consider the following recommendations when reviewing the existing runs and developing future runs:

1. For modeling purposes, start the cap at the reference case starting point (120 million tons) in order to avoid distortions and better represent the market.

Any complicated model like ICF's IPM model is a good policy instrument that helps to identify trends and a range of potential outcomes. The results of the model are a rough forecast and should not be interpreted as precise predictions. The model is best used to compare between runs and assess the impacts of a range of policy decisions. The numbers used during modeling should be directionally right in comparison to a final policy, but do not need to and will not necessarily match actual emissions.

What the working group did was run the model with an initial cap based on actual emissions (130 million tons). Since this cap level was higher than emissions in the first model year (120 million tons), the model does not require emissions reductions and millions of tons of allowances are banked for future periods. This makes the outcome of the model and the market conditions it predicts very inconsistent with what we might see. In reality the cap would start at today's emissions levels (130) and generators would have a limited supply of allowances from day one.

The figure below illustrates the different cap level starting points versus the reference case starting point (ICF stakeholder presentation from the Feb. 16 stakeholder meeting).



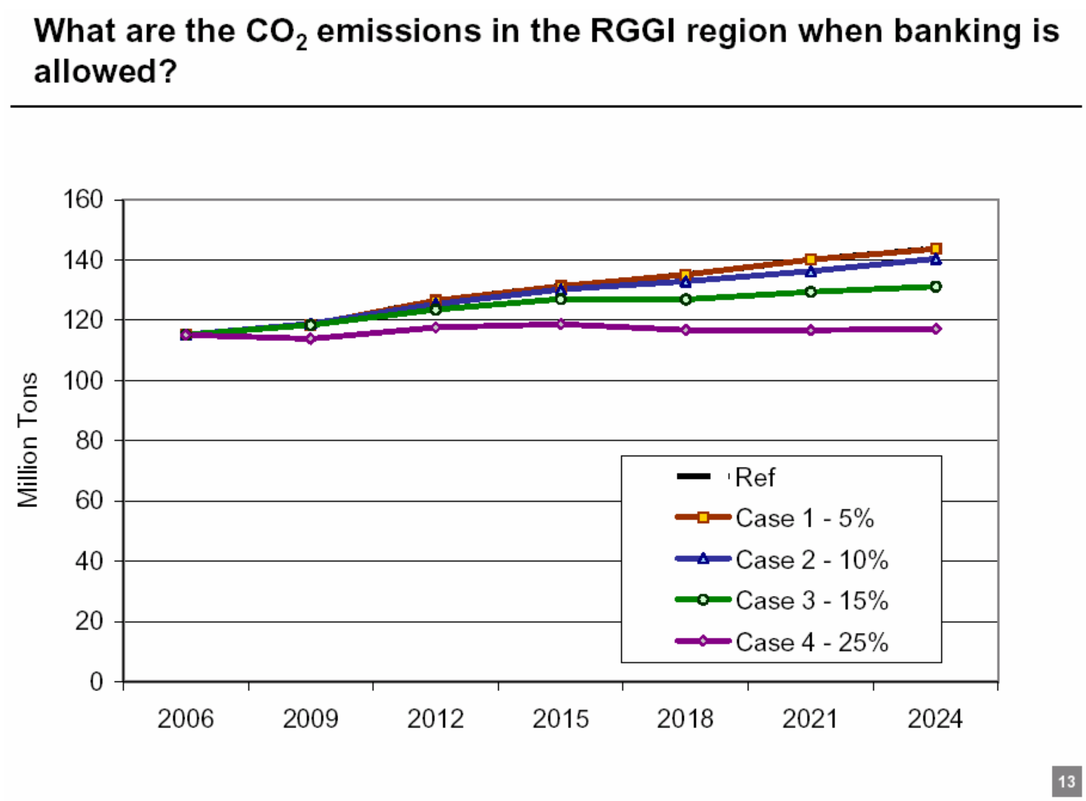
The best way to model a program that starts with today's emissions levels and declines with time is to identify the rate of the cap decline and apply that to the model. The cap would start out at the reference case starting point (120 million tons) and decline by a set rate (% per year) to achieve a long term target that could be in relation to today or 1990 (scaled to the model). This would give policy makers a sense of the likely outcome and various runs could be completed using different rates of cap decline (1.0%, 1.5%, 2.0% per year). When the actual model rule or MOU was created the states would not use the model numbers, they would collect information on actual emissions (might be closer to 130 million tons) and set the cap based on those actual emissions and then apply the same percentage based cap decline (2% per year).

2. **As requested in previous correspondence, model real and significant emissions reductions from current levels to achieve a 25% reduction by 2020.**

We have submitted previous requests for cap levels to model. We are highlighting the most important ones again in this memo (see Comment 3, below), but would like to see all of the runs we have requested previously. Because of the way the cap levels were set (1990 baseline and actual versus modeled numbers), the staff working group has not modeled a cap that is sufficiently stringent. We feel that a proper starting point would be 25% below today's emissions levels by 2020. We anticipate that in its initial form this cap level might look expensive.

However, it will not incorporate the flexibility and other policy options that may be included in the program, nor will it account for technological innovation. Subsequent runs that include limited offsets, expanded energy efficiency programs, potentially a circuit breaker (see ENE draft model rule proposal), and innovation will all significantly reduce the cost of the program. The program must achieve real and significant emissions reductions in the electric sector.

Because of the starting point for the cap and using 1990 as the baseline, the model runs to date have not led to actual emissions reductions. Even the modeling run that looks at a 25% reduction from 1990 levels using actual emissions as a starting point, does not reduce emissions (see Slide 13 from the Feb. 16th ICF presentation, below).



Using 1990 as the baseline is extremely problematic. Given the international use of 1990 it will be important to recognize the progress in relation to that year, but because of New York's unusually high emissions in 1990 basing a cap on emissions from that year is not credible or viable. 1990 emissions in New York were heavily influenced by temporary nuclear outages, and changes in electric system make-up since then have not been driven by global warming policies. Because New York represents almost half the emissions from the RGGI region, this anomaly throws off the regional emissions trend. A program that makes sense to policy makers and the public will have to make real reductions from today's emission levels.

3. As requested in previous correspondence, include a sensitivity run on the reference case and the final policy case that includes efficiency resources selected to achieve zero load growth.

As the first efficiency sensitivity run indicated, increased efficiency can have a dramatic impact on program costs. We believe that a sensitivity run should be completed for both the reference case and the final policy case that includes efficiency resources selected to achieve zero load growth. The rational for this goal will be presented in a separate memo from Environment Northeast and others on the role of efficiency in the RGGI program. Achieving zero load growth is possible and cost-effective and can be achieved by expanding existing efficiency programs, upgrading building energy codes, implementing appliance and equipment efficiency standards. This goal and policy decision will likely lead to overall cost savings and significant economic growth.

The efficiency resource data developed by ACEEE should be built into the sensitivity runs with the IPM model set to select the resources up to zero load growth. We believe this will be a reasonable depiction of the impacts of implementing new programs and should also develop a reasonable estimate of the cost of the expanded policies and programs.

4. Recognize that the leakage numbers may be an overestimate and include a modest national carbon policy starting in 2015 in future policy runs.

The initial policy runs indicate that significant leakage is occurring, primarily in the form of new plants built outside the RGGI region. We believe that the model may be overestimating the potential for leakage for the following reasons:

a. The ISOs are in the process of removing the import and export tariffs between the power pools. This will likely increase the utilization of existing transmission before RGGI comes into effect and limit available transmission capacity once RGGI is in place.

b. It is unlikely that a site's neighbors and the various siting authorities and air regulators would allow thousands of MW of new generation to be built in order to satisfy the demands of another region. The neighboring region would have to bear the environmental burden of these plants (real or perceived) and the neighboring region's ratepayers would also have to pay for significant gas and electric transmission upgrades.

c. Although the model predicts a price differential between the RGGI region and neighboring states, we do not believe that companies would bank on this differential existing over the full financing period of a new plant. We believe most companies are already factoring in carbon policies when they think about siting new plants. A company developing a plant outside RGGI would have to consider the possibility of RGGI expanding to that state or a national program being developed. We believe they would be just as likely to recognize the value of developing plants in constrained areas within RGGI and capturing higher capacity payments as siting plants outside RGGI in the hopes that there would never be a carbon policy there.

The Canadian and national CO_2 sensitivity run that the working group has already developed seems to be a good proxy for the regulatory risk that companies must consider when developing plants outside the RGGI region. We encourage the working group to continue to use this methodology in all other policy runs.

It is also important to look at where leakage is an issue. We believe the leakage problem is primarily confined to the states within PJM (NJ and DE) and results should be presented by power pool or region. It may be that a leakage policy fix could be developed for PJM but it would not be needed for New York and New England.

Leakage may still be a significant issue, but we should be sure to assess whether the model results are realistic. Leakage may be found to require a policy fix (see ENE and PACE model rule outline) and policy options should be modeled as a sensitivity and potentially be wrapped into the final combined policy run.

5. Be careful when selecting a high priced gas sensitivity to understand the assumptions that went into the forecast and also how the IPM model currently addresses demand growth and transmission.

The working group has thoroughly investigated and discussed the concerns around gas prices and gas transmission within the stakeholder modeling subgroup. Because the model is predicting large new additions of natural gas fired capacity in both the reference case and the policy cases, many people are concerned about the reliability of the results. We believe that the model is adequately capturing the commodity costs this new generation would face. The model includes gas curves that increase the price regionally as consumption rises. These curves, which are available in the IPM assumptions document, are forcing the new plants to pay higher fuel costs as demand goes up. It would be helpful if ICF presented gas prices as an output of the each modeling exercise so stakeholders could see what happens to price as gas demand goes up.

The Henry Hub price forecasts used in the reference case may be low, especially as they rely on many new LNG terminals being sited in the U.S. and the northeast region. However, the forecast represented a consensus at the time it was developed, and the working group has been very consistent in recognizing the need for higher priced sensitivity runs.

The working group should be careful when developing a high priced gas sensitivity. The study cited at the last stakeholder meeting makes an interesting comparison. This study from the American Gas Foundation (EEA and AGA authors), *Natural Gas Outlook to 2020*, was developed primarily to influence the national discussion on gas supply and the national energy bill. It presents three scenarios: Existing (which is a worst case, no new policies or assistance scenario), Expected (which incorporates the new policies the gas industry is anticipating), and Expanded (which includes a longer wish list of new policies). The results of this study are summarized in tabular and graphic format as an Attachment to this memo.

The first thing to note is that the study reports all prices in nominal dollars, which exaggerates the results. You have to dig into the appendix to extract the prices in today's dollars. All of the IPM forecasts have been in 2003$ and the results from the Gas Foundation report are presented in both nominal and 2003$ in the Attachment. In 2003$ the report forecasts 2020 prices of $9.0/MMBtu in the worst case forecast (Existing), $5.4/MMBtu in the Expected case, and $3.6/MMBtu in the Expanded case. We believe that the assumptions used in this study are very conservative and that we are not on course for the worst case forecast (Existing). The Expected case with prices of $5.4/MMBtu in 2020 (2003$) may be closer to reality. The working group should consult with gas forecast experts and choose a high priced forecast that is consistent with numbers industry is using for planning purposes.

6. Develop assumptions for a sensitivity run that models the potential impacts of innovation but recognize that we will not fully capture the opportunity that innovation presents.

The working group is right to recognize that the model can not fully capture the potential for innovation. It uses static assumptions and does not incorporate any innovation beyond slight improvements in cost and performance of existing technologies. Market based programs and regulations force companies to develop new technologies and create new incentives for the development of technologies that we can't imagine today. The presentations by GreenFuel Technologies Corporation and NeuCo at the last stakeholder meeting represent a small sample of the kind of technology that might be developed. It would be helpful to develop a set of assumptions for these kinds of technologies that could be run as a sensitivity.

With the EU and other trading programs related to Kyoto developing, there is likely to be significant innovation with or without RGGI. The history of environmental policy clearly shows that costs tend to be over predicted and that model results are likely to be significantly higher than actual costs. The documents and discussions related to RGGI should acknowledge this and policy makers should factor in the potential for innovation when deciding on the cap levels for the final program.

7. Be sure to develop a policy run that combines all of the likely RGGI policy elements to illustrate synergies and reduced costs

As mentioned in previous modeling memos, it will be important to combine all of the likely RGGI design elements into one final policy run. It is our understanding that the working group is planning to do this, but this run is critical and will best represent the final outcome of the program. This run should include the likely cap levels, flexibility mechanisms (banking and limited offsets), improved efficiency (reduced load growth through complimentary policies), and some level of innovation. The sensitivities on the policy run (gas prices, etc) should then be run off of this combined policy run.

8. Work with stakeholders to develop a methodology for modeling the impacts of different allocation schemes.

The staff working group also needs to engage in a discussion with stakeholders about how they are going to model the impacts of different allocation schemes on economic efficiency and equity. This can be done combining the IPM and REMI models, or through the modeling that Resources for the Future is conducting. However, this is a critical issue that Governor's and policy makers will need guidance and analysis on before they make decisions – even if allocation is left up to the individual states. We especially want to understand the impacts on the asset values of plants by fuel source and what the impact would be of an allocation scheme that had 50% of the allowances being focused on consumer benefits and primarily funding expanded energy efficiency programs (See ENE and Pace Model Rule Outline, http://www.rggi.org/docs/ne_pace_model_rule.pdf).

9. Share the details of the modeling results – increased transparency is needed to fully assess results and provide comments.

It is very hard to comment on modeling results when the only information we have been provided with is summary graphs in power point format. We recognize that the modeling runs presented to date were preliminary and that adjustments were needed based on changes to the reference case, but the working groups should be transparent and share both the assumptions and the full results for every modeling run once they have been finalized. Stakeholders and the staff working group have spent a lot of time and energy on the modeling issues and it's important for the results to be available in the same format as they have been for the reference case.

Two important sets of data we would like to see included in results, which we have requested in previous correspondence, are delivered natural gas prices (see Comment 5, above), representative production costs by region and plant type, and modeled electricity consumption or load (this will be especially important as we look at some of the efficiency sensitivities but it should be included in all result spreadsheets).

The memo submitted to the RGGI staff working group on November 19th by ENE and Pace Energy Project contains additional important modeling runs and suggestions (http://www.rggi.org/docs/ne_pace_model_rule.pdf) which we still would like to see addressed.

Comments or questions on this memo should be addressed to Derek K. Murrow, Environment Northeast, dmurrow@env-ne.org, (203) 495-8224

American Gas Foundation, *Natural Gas Outlook to 2020*

An EEA & AGA Report

Year	Gas Price Forecast @ Avg. Henry Hub (Nominal $/MMBTU)			Gas Price Forecast @ Avg. Henry Hub (2003$/MMBTU)		
	Policy Case - Existing	Policy Case - Expected	Policy Case - Expanded	Policy Case - Existing	Policy Case - Expected	Policy Case - Expanded
1997	2.49	2.49	2.49	2.80	2.80	2.80
1998	2.08	2.08	2.08	2.31	2.31	2.31
1999	2.26	2.26	2.26	2.47	2.47	2.47
2000	4.29	4.29	4.29	4.48	4.48	4.48
2001	3.99	3.99	3.99	4.19	4.19	4.19
2002	3.37	3.37	3.37	3.44	3.44	3.44
2003	5.49	5.49	5.49	5.49	5.49	5.49
2004	5.69	5.69	5.68	5.55	5.55	5.53
2005	7.71	7.74	7.61	7.33	7.36	7.23
2006	8.15	8.24	7.66	7.56	7.65	7.11
2007	6.53	6.81	6.39	5.92	6.17	5.79
2008	6.78	6.54	6.00	5.99	5.77	5.30
2009	6.37	6.01	4.33	5.49	5.18	3.73
2010	7.55	6.01	4.91	6.34	5.05	4.12
2011	8.30	6.25	3.54	6.81	5.13	2.91
2012	9.43	6.80	6.27	7.54	5.44	5.01
2013	9.69	6.22	4.73	7.56	4.86	3.70
2014	10.32	6.98	5.81	7.86	5.32	4.42
2015	11.31	5.28	3.49	8.40	3.92	2.60
2016	11.36	7.89	5.82	8.34	5.71	4.21
2017	11.91	6.26	5.92	8.42	4.43	4.19
2018	12.32	6.73	4.18	8.50	4.64	2.89
2019	13.15	6.68	5.65	8.85	4.50	3.80
2020	13.76	8.15	5.47	9.03	5.35	3.59

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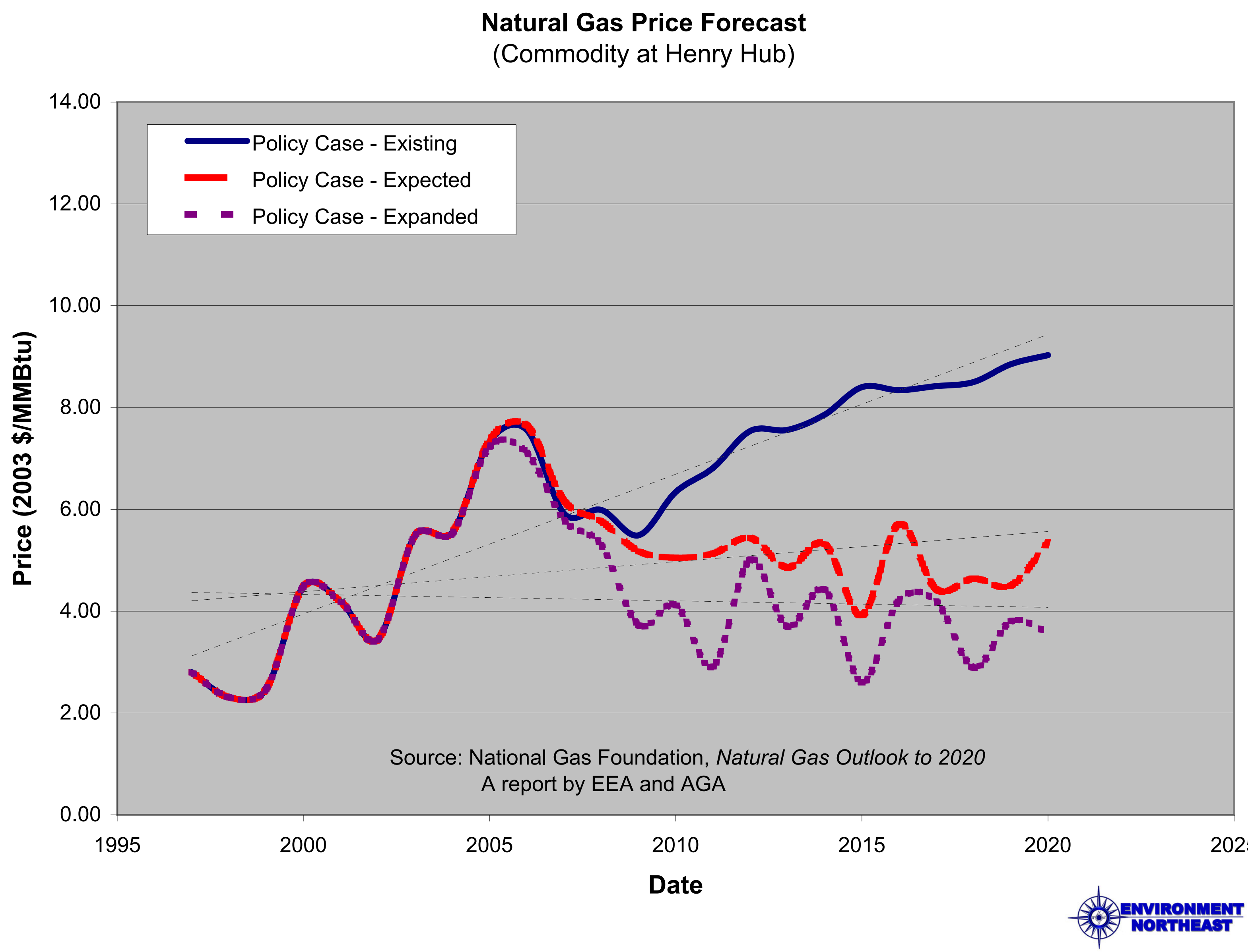
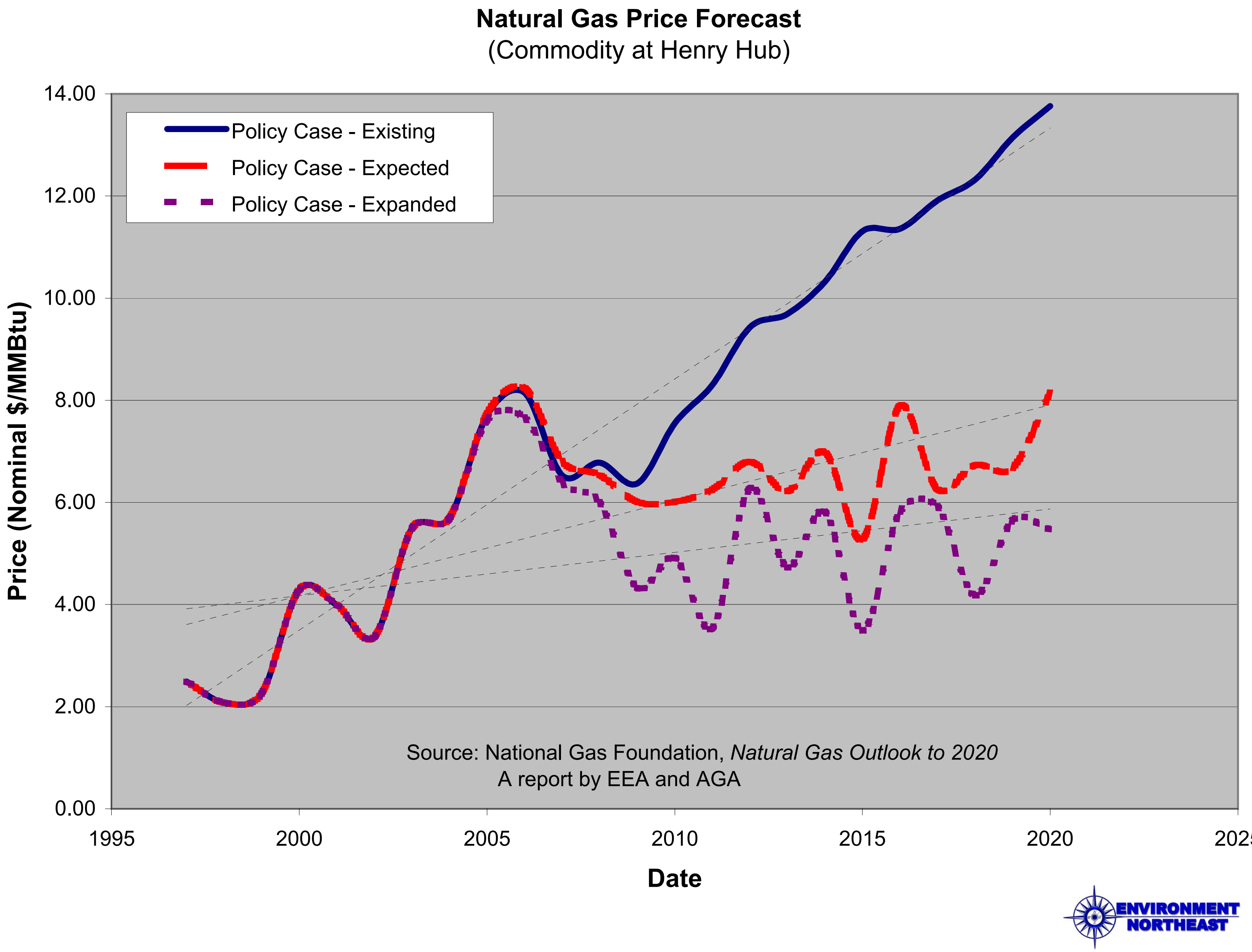


Natural Gas Price Forecast
(Commodity at Henry Hub)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Price (2003 $/MMBtu)
Policy Case - Existing
Policy Case - Expected
Policy Case - Expanded
Source: National Gas Foundation, Natural Gas Outlook to 2020
A report by EEA and AGA
1995
2000
2005
2010
2015
2020
2025
Date
ENVIRONMENT NORTHEAST


Natural Gas Price Forecast
(Commodity at Henry Hub)
Policy Case - Existing
Policy Case - Expected
Policy Case - Expanded
Price (Nominal $/MMBtu)
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1995
2000
2005
2010
2015
2020
2025
Date
Source: National Gas Foundation, *Natural Gas Outlook to 2020*
A report by EEA and AGA
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