BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF DELAWARE

IN THE MATTER OF INTEGRATED RESOURCE PLANNING FOR THE PROVISION OF STANDARD OFFER SERVICE BY DELMARVA POWER & LIGHT COMPANY UNDER 26 *DEL. C.* §1007(c) & (d) (OPENED JANUARY 11, 2011)	))))))	PSC DOCKET NO. 10-2

DNREC COMMENTS ON DELMARVA'S IRP

Intervenor, State of Delaware Department of Natural Resources & Environmental Control ("DNREC"), appreciates the opportunity to comment on the December 1, 2010, Delmarva Power and Light, Inc. ("DP&L") draft Integrated Resource Plan ("IRP"). DNREC has a unique appreciation for the complexity and difficulty of resource planning in a comprehensive manner having participated in the IRP development process as a stakeholder representing the interests of public health and environmental protection. We hope that the following comments assist DP&L in completing an analysis that more fully assesses the public health and environmental implications of current and future power purchase plans from the PJM power pool.

Participation in the *IRP process.* DNREC appreciates the several opportunities we had to sit down and work with DP&L and its consultants to discuss the parameters of an assessment process. We believe we share a mutual goal to accomplish an assessment that is comprehensive in scope and thorough in its consideration of important environmental and public health issues. For example, we appreciate that DP&L agreed to examine air quality changes and public health benefits beyond fence-line impacts and that regional impacts were considered using the CMAQ model with specific consideration of tagged contributions from various inventory elements. We also note that the consultants modified the tagging scheme in what we believe was in response to

DNREC comments to examine appropriate geographical divisions. While the consultants did not examine every geographical region requested, it is understandable that in areas where changes were too small to be observed, results need not be reported. We also note that the qualitative analysis of mercury benefits were included in the analysis despite the fact that—again—the findings were too small to warrant reporting.

The IRP analysis is limited by choice of scenarios examined. One of DNREC's primary concerns with the draft IRP analysis plan is that the choice of alternative scenarios examined is too limited. This study examined three alternative means of procuring approximately 80 percent of the total projected load increment (the increased Standard Offer Service ("SOS") capacity required to meet load projections is ~186 MW between 2011 and 2020). These included an additional 150 MW of onshore wind, an additional 150 MW of offshore wind, and an additional 135 MW of additional combined cycle gas power.

While these examples may explore a range of alternatives that exist wholly within DP&L's control to implement, they fall short of being able to fully explore all the "dimensions" the IRP lists for comparing the Reference Case with the three selected Scenarios—price, price stability, and environmental benefits. As we explain in these comments, there is little practical information to be taken from the CMAQ results that can inform to any significant extent a comparison of environmental benefits among the Scenarios, or even relative to the Reference Case. This seriously undermines the useful scope of the IRP. Delaware State legislation requires that, "In its IRP, DP&L shall explore in detail all reasonable short-term and long-term procurement or demand-side management strategies, even if a particular strategy is ultimately not recommended by the company."[1] It further states that, "The IRP must investigate all

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[1] 26 Del.C. §1007(c)(1)(a)

potential opportunities for a more diverse supply at the lowest reasonable cost." There is not enough developed information to evaluate a true set of reasonable strategies, particularly long-term implications.

The choice of these alternative scenarios may stem from DP&L's focus on the "lowest reasonable cost" aspect of IRP requirements. However, DNREC believes DP&L is interpreting these costs narrowly as only applying to electric system costs, whereas the legislation and regulations allow that the IRP may consider "the environmental and economic value" of a range of considerations including environmental and public health benefits. This point is addressed further below, but the result of ignoring alternative opportunities to engage in regional and federal programs as well as more aggressive RPS and efficiency targets significantly limits the utility of this study for understanding the potential benefits of the full range of options available to the State of Delaware.

The scenarios examined have literally no impact on emissions of nitrogen oxides (NOx) and mercury from power plants in the PJM power grid relative to the reference scenario (less than 0.02%). The emissions differences for the greenhouse gas carbon dioxide (CO_2) are less than 50,000 tons per year (tpy) within Delaware and less than 90,000 tpy within PJM (out of some 523 million tpy, again less than 0.02% of total emissions). Similarly, sulfur dioxide (SO_2) never varies by more than 5,000 tpy in PJM (out of 520,000 tpy, or about 1% of total emissions) and again, there is literally no difference between the scenarios within Delaware.[2]

The CMAQ modeling platform used in this analysis is a very useful tool for evaluating large differences in emission scenarios occurring on a regional scale. It is not, however, an appropriate tool for modeling small emissions changes on a regional scale arising from

[2] The characterizations are based on Tables 7 and 8 on pages 136 and 137 of the draft IRP, however calculated percentages use more precise numbers (where available) from excel files provided by DP&L to DNREC.

individual or small groups of sources. As a result, conclusions drawn from modeled air quality and public health impacts are suspect as they are outside the analytical framework's capabilities under the conditions of the Scenarios.[3]

From the portfolio model perspective, the situation is not much better. While the IPM model is *capable* of projecting small changes in dispatch choices based on such narrow set of alternatives, we question the *value* of the results given the overall accuracy of the system (see caveats on inherent uncertainty on Page 3-19 of Appendix 6). This is seen when those results are used in the CMAQ modeling scenarios. Scenario 1 projects negative health benefits throughout the region as a result of additional offshore wind power. Scenario 3, however, shows health benefits throughout the region due to additional natural gas combined cycle plants. In contrast, the model run tagging EGU emissions, which were then removed, predicted significant positive health benefits. This illustrates the shortcomings of the use of CMAQ for the two incremental scenarios. There is a discontinuity when a zero-emission wind source shows detrimental health impacts while an added fossil fuel source shows increased health benefits when extrapolating those incremental changes to the results of large modeled health benefits from removing *all* fossil fuel power plants from the model (Table 7.1 of the modeling appendix). Clearly, the chosen CMAQ scenarios create an overly constrained IRP process. Simply put, the results of the

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[3] For example, in a 2004 air pollution risk assessment, the U.S. Environmental Protection agency stated;

> The UAM-TOX and CMAQ models are examples of models which can simulate photochemically active air toxic species, including secondary formation of pollutants like formaldehyde. Because the complex secondary formation processes are nonlinear and can occur at locations distant from the emission source, these models are designed to be applied to an exhaustive set of sources over a large region, rather than to individual facilities or small groups of facilities. The models more typically applied to single or multiple facilities include SCREEN3, ISCST3, ISCLT3, AERMOD, ASPEN, CALPUFF, and UAM-TOX. [U.S. EPA, *Air Toxics Risk Assessment Library*, Vol. 1, Chapter 9, "Assessing Air Quality: Modeling," (2004), at p. 9-12 (available at http://www.epa.gov/ttn/fera/risk_atra_vol1.html).]

We note that ground-level ozone and secondary aerosols, like the air toxics species referenced above, are products of nonlinear secondary formation processes in the atmosphere, and are subject to the same modeling considerations.

limited scenarios create no useful knowledge for evaluating long-term procurement strategies, and their impacts on air quality and public health.

Where assumed changes in emissions are large, CMAQ is a more appropriate tool to use in evaluating alternative options and scenarios. For example, a key assumption in the Reference Case was the retirement of 15 GW of coal capacity due to a prospective EPA rule to reduce mercury and other hazardous air pollutants (HAPs) from coal- and oil-fired power plants ("Utility MACT Rule"). In the IRP analysis, the economics for retirement decisions are driven by the assumed stringency of controls required. As noted on page 19 of Appendix 4 ("*Supporting Documentation for the Delmarva Delaware IRP Filing Resource Modeling*"), "All coal units are assumed to require installation of [activated carbon injection], fabric filter and scrubber in response to HAPs. Should these not be installed, the unit would be retired." On a regional scale, 15 GW of coal retirements is significant from an air quality and health benefits perspective, as seen in the modeling results. This assumption dwarfs any impacts from the alternative Scenarios, which is foreseeable as the Scenarios involve only changes of 150 MW of wind power or 135 MW of gas-fired combined cycle units. As a regional capacity change, the Scenarios reflect only a 1% or less change compared to the assumed coal capacity retirements in the Reference Case. In this context, it stands to reason that probing the sensitivity of assumed coal capacity retirements would provide better information on long-term planning impacts than would be gleaned from the incremental additions in the alternative Scenarios.

The sensitivity to the 15 GW coal retirement projection is particularly salient here as it is based on an assumed Utility MACT Rule with little flexibility that would drive multiple control technology installations with large capital costs, essentially a "worst case" assumption. Electric sector industry analysts, however, have pointed out that there is already ample experience at coal-fired units in using a number of different control options that can meet the reduction requirements of the proposed Utility MACT Rule.[4,5,6] This flexibility to choose among a wider range of relatively more affordable control options can greatly alter assumed coal capacity retirement projections. This will in turn alter the environmental and health benefits in the Reference Case that are assumed to occur without any proactive planning decisions arising from the IRP process.

The choice to limit scenarios examined seems to stem from the assumption that only electricity cost needs to be minimized within the IRP context. As mentioned above and clearly referenced in the introduction to the draft IRP, DP&L is required to evaluate options that, "meet its customers' needs at a minimal cost."[7] However, legislation also points out that the IRP is to consider all reasonable options and that it may consider the economic and environmental value of "short- or long-term environmental benefits to the citizens of this State." The regulation implementing this legislation goes further in stating "The IRP must show an investigation of all reasonable opportunities for a more diverse supply at the lowest reasonable cost, including consideration of environmental benefits and externalities."[8] Thus the cost minimization exercise must incorporate the environmental and public health benefits to the extent they can be monetized and discussed qualitatively where they cannot.

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[4] Staudt, J.E. and M.J. Bradley & Associates. *Control Technologies to Reduce Conventional and Hazardous Air Pollutants from Coal-Fired Power Plants*. NESCAUM (Boston, MA), March 31, 2011. Available at http://www.nescaum.org/documents/coal-control-technology-nescaum-report-20110330.pdf/.

[5] Tierney, S. *Electric Reliability under New EPA Power Plant Regulations: A Field Guide*. World Resources Institute (Washington, DC), January 18, 2011. Available at http://www.wri.org/stories/2011/01/electric-reliability-under-new-epa-power-plant-regulations-field-guide.

[6] Tierney, S. and C. Cicchetti. *The Results in Context: A Peer Review of EEI's "Potential Impacts of Environmental Regulation on the U.S. Generation Fleet."* Analysis Group (Boston, MA), May 2011. Available at http://www.analysisgroup.com/uploadedFiles/News_and_Events/News/EEI_PeerReview_Tierney_Cicchetti%20_May2011.pdf.

[7] 26 *Del .C.* §1007(c)(1) and page 4 of draft IRP.

[8] Section 5.2, Public Service Commission, Title 26 Public Utilities, 3000 Energy Regulation, available at: http://regulations.delaware.gov/AdminCode/title26/3000/3010.shtml#TopOfPage

While the draft IRP tabulates the value of the large and significant reference scenario benefits accruing to the state as a result of participation in federal programs, the state RPS and the state's demand reduction goals, these benefits (and the lack thereof in the Scenarios 1 through 3) are not included in the calculation of costs and benefits to citizens in Table 2 of the draft IRP. This cost calculation reflects only costs borne by the power generation sector and seems to have driven the final scenario selection. Recognizing that the monetized benefits for 2020 shown in Table 4 as today's cost, a column could be added to table 2 to show the external cost of today's power plant emissions to Delaware in terms of $/MWh. This cost ranges between $410/MWh using the Low End estimate to $978/MWh using the High End estimate for the load forecast shown in Table 1. This value range should be added to the price of electricity shown in Table 2 to reflect the "cost" of electricity being supplied.

Given large benefits of Reference and the Bounding scenario, more scenarios like this should have been explored. Existing law dictates that the IRP explore the impact of recently enacted legislation such as the Energy Efficiency Act of 2009 which established reduction targets of 15 percent for energy consumption and demand and the July 2010 amendments to the Delaware Renewable Portfolio Standards (RPS) which increased the percentage of Renewable Energy Credits (RECs) that Delmarva needs to procure. The reference scenario results demonstrate that strong programs to be implemented under state law between 2011 and 2020 yield reductions of more than 1.7 Million tpy of SO_2 reduction, 72,000 tpy of NO_x reduction and more than 3 tpy of mercury reduction. These large, meaningful programs are the type that should be explored with the analytical framework and monetized to the extent feasible for comparison with electricity price impacts.

In addition, a "boundary scenario" was explored that made differing assumptions regarding the implementation of federal carbon policies and a mercury control program. This scenario assumed a potential delay of these programs by two to three years, which extended implementation beyond the time horizon of this analysis. The result is a ten percent increase in CO2 emissions, and 8 percent increase in SO2, a 13 percent increase in NOx and a 28 percent increase in mercury relative to the reference case. Again, this type of analysis—along with monetized and quantified health and environmental benefits—is needed to provide context for Delaware regulators as to the importance of participation in—and timing of—federal and regional programs that can have a significant effect on the *total cost* of electricity infrastructure on citizens of Delaware.

However, this seems to be the limit of alternative future outcomes that were examined. While three different—though conventional—ways to meet current requirements and a single policy sensitivity analysis were considered, they fail to examine the full range of potential opportunities as required. Several additional bounding analyses are needed to both (a) place the assumed future reference case and policy scenarios in context and to (b) explore the potential differences in outcome under alternatives. This was an issue discussed with DP&L and a principle recommendation given to DP&L prior to conducting the draft analysis filed on December 1.

Legislation clearly requires the IRP to explore "all available supply options" which would include an analysis of rigorous deployment of renewable generation and demand side management *beyond* existing policies. DNREC specifically recommended that DP&L explore these options under a range of realistic outcomes including more and less stringent carbon constraints over a more and less stringent timeframe; significant delay of implementation of

Clean Air Transport Rule for NOx and SO2 and an analysis of more stringent standards that were being proposed by the EPA such as 0.9 million ton NOx cap for the East proposed by the Ozone Transport Commission and $1.0 million ton SO2 cap under consideration in Senate.

In addition, exploration of more aggressive regional and federal policies may be outside the control of DP&L to implement, but are germane to the discussion of policies that should be pursued by the state as part of a broader initiative and therefore should be considered within the context of an IRP that explores "all available supply options."

The lack of analysis of any options beyond the electricity price sensitivity and a two to three year delay in other federal requirements has left the analysis devoid of meaningful insights into the potential air quality and public health benefits of alternative supply pathways.

DNREC recommends that future IRP analyses include the environmental and public health benefits in calculating the minimum cost to consumers. The current analysis approach—limited to analysis of only a very few, small initiatives—fails to recognize the potential least-cost tradeoffs that might be selected had environmental and public health benefits of these options been properly accounted for allowing a wider range of alternatives to fit within the "minimum cost" threshold used for scenario selection. We ask that future IRP analyses consider the following recommendations:

1. Monetized and annualized environmental and public health benefits that accrue to residents of Delaware as well as to surrounding populations in the Northeast U.S. should be evaluated and considered side-by-side with annualized capital investment, O&M, and fuel costs for various resource supply options.

2. The combination of electricity price impacts along with offsetting environmental and public health benefits should be used at the determinant for which scenarios meet the requirements of providing resource supply alternatives at "minimum cost."
3. A wide variety of alternative scenarios should be explored including, (a) bounding scenarios that look at the significant uncertainty related to the stringency and pace of federal environmental program implementation, (b) enhanced regional or federal programs targeted at emissions reductions, energy efficiency, and renewable power deployment, as well as (c) the prospect of enhanced in-state deployment of renewable power generation and demand-side management programs significantly in excess of current state requirements.
4. Continue to utilize the robust set of analytical tools employed for this IRP in a manner that broad-based environmental and human health impacts can be assessed over a wide geographical domain with a high degree of spatial resolution (utilizing pollutant tagging where appropriate and justified). Outcomes should be monetized to the extent feasible and discussed qualitatively where not.

Conclusion. In summary, DNREC finds the current analysis to be an excellent basis for understanding how the current state RPS and demand-side management programs are likely to be implemented and the associated air quality and public health benefits associated with these laws. We do not, however, feel that this adequately fulfils the charge to DP&L that "all available supply options" be analyzed taking cost into consideration. The potential environmental and public health cost savings associated with large-scale deployment of renewable energy and energy efficiency (beyond the existing requirements due to potential climate regulation and legislation or lack thereof) would provide a basis for understanding how the selected path compares in terms of cost, environmental impacts, and public health.

Respectfully submitted,

/s/

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CERTIFICATE OF SERVICE

State of Delaware Department of Natural Resources & Environmental Control ("DNREC"), by and through its counsel, Valerie M. Satterfield, on this 31st day of May, 2011, provided copies of DNREC's Comments to the attached Service List.

/s/

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