



PPL companies

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December 12, 2011

**RE: *The 2011 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company – Case No. 2011-00140***

Dear Mr. DeRouen:

Please find enclosed and accept for filing the original and ten (10) copies of the response of Louisville Gas and Electric Company and Kentucky Utilities Company to the Corrected Comments of Intervenors Natural Resources Defense Council and Sierra Club, in the above-referenced matter.

Should you have any questions regarding the enclosed, please contact me at your convenience.

Sincerely,

  
Rick E. Lovekamp

cc: Parties of Record

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE 2011 JOINT INTEGRATED RESOURCE )  
PLAN OF LOUISVILLE GAS AND ELECTRIC ) CASE NO. 2011-00140  
COMPANY AND KENTUCKY UTILITIES COMPANY )

JOINT RESPONSE OF  
LOUISVILLE GAS AND ELECTRIC COMPANY  
AND KENTUCKY UTILITIES COMPANY TO THE  
CORRECTED COMMENTS OF INTERVENORS  
NATURAL RESOURCES DEFENSE COUNCIL AND SIERRA CLUB

Louisville Gas and Electric Company (“LG&E”) and Kentucky Utilities Company (“KU”) (collectively, the “Companies”), pursuant to the Commission’s September 29, 2011 scheduling order in this proceeding, hereby submit their response to the Corrected Comments of Intervenor Natural Resources Defense Council and Sierra Club (collectively, the “Environmental Groups”). For their responsive comments, the Companies state:

**I. The Integrated Resource Plan Standards and Their Purpose and History**

The Environmental Groups begin their comments with a section concerning the Commission’s Integrated Resource Plan (“IRP”) standards, as set forth in 807 KAR 5:058, that is basically accurate but incomplete.<sup>1</sup> The “Necessity, Function, and Conformity” statement at the beginning of the IRP regulation states that its purpose is to “prescribe[] rules for regular reporting and commission review of load forecasts and resource plans of the state’s electric utilities to meet future demand with an adequate and reliable supply of electricity at the lowest possible cost for all customers within their service areas ....”<sup>2</sup> As the Commission recently stated:

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<sup>1</sup> See Environmental Comments at 2.

<sup>2</sup> 807 KAR 5:058.

The goal of the Commission in establishing the IRP process was to ensure that all reasonable options for the future supply of electricity were being examined and pursued, and that ratepayers were being provided a reliable supply of electricity at the lowest possible cost.<sup>3</sup>

To achieve its purposes, the regulation requires the utilities to which it applies to file an IRP triennially, which includes five basic components: a plan summary, a statement of significant changes from the most recently filed IRP, a fifteen-year load forecast, a resource assessment and acquisition plan for the fifteen years covered by the IRP, and a collection of basic financial information.<sup>4</sup> The Companies' 2011 IRP fully satisfies the Commission's requirements in all their particulars.

But in addition to recognizing what the IRP is, it is important to state what it is not. The IRP is not a declaration of what the Companies will do in the future regardless of changed circumstances; rather, it is the Companies' expectation, at a moment in time, of what their customers' needs will be and the least-cost means of meeting those needs. Also, the IRP does not require or even permit the Commission to approve a load forecast, a resource plan, or proposed revenue requirements; rather, a Commission Staff report of comments and recommendations is the final product of the IRP process.<sup>5</sup>

The fact that the IRP process does not bind the Commission or a utility to a particular course of action does not reduce its importance. On the contrary, for over 20 years the IRP process has been an important means by which utilities have presented to the Commission what they believe the future holds, and by which the Commission Staff has communicated its insights

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<sup>3</sup> *In the Matter of: The 2009 Integrated Resource Plan of Kentucky Power Company, Inc.*, Case No. 2009-00339, Staff Report at 1 (Mar. 4, 2011).

<sup>4</sup> 807 KAR 5:058 §§ 5-9.

<sup>5</sup> 807 KAR 5:058 § 11(3).

to utilities before the utilities have sought CPCNs or taken other actions that affect their customers.

## **II. The Companies' Load Forecast Meets the Commission's IRP Requirements and Takes into Account Uncertainties.**

The Environmental Groups' criticism that the Companies' IRP load forecast lacks "a meaningful sensitivity analysis" ignores the Commission's requirements concerning IRP load forecasts and overlooks the uncertainties the Companies' load forecasting approach implicitly takes into account.<sup>6</sup> By relying on historical data to determine annual growth rate volatilities for upper and lower uncertainty ranges around the base load forecast, the Companies have complied with the Commission's requirements and accounted for both known and unknown uncertainties implicit in past events.

The portion of the Commission's IRP regulation that contains load forecasting requirements, 807 KAR 5:058 § 7, requires utilities to create long-term load forecasts with upper and lower ranges of uncertainty:

(3) For each of the fifteen (15) years succeeding the base year, the utility shall provide a base load forecast it considers most likely to occur and, to the extent available, alternate forecasts representing lower and upper ranges of expected future growth of the load on its system. Forecasts shall not include load impacts of additional, future demand-side programs or customer generation included as part of planned resource acquisitions estimated separately and reported in Section 8(4) of this administrative regulation. Forecasts shall include the utility's estimates of existing and continuing demand-side programs as described in subsection (5) of this section.

Although the Environmental Groups criticize the Companies' load forecast for not including a sensitivity analysis, the forecast fully complies with the Commission's requirements and accounts for more uncertainties than the Environmental Groups name in their comments.

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<sup>6</sup> Environmental Comments at 3-4.

Though it might appear that the Companies' "high case" and "low case" simply assume a 4% increase or decrease to the 2011 base forecast, that is not how the Companies created the upper and lower ranges.<sup>7</sup> Consistent with the Commission's requirements, the Companies developed their high and low energy forecasts by using historical annual growth rate volatility by company to determine statistical ranges for future annual growth rates, and, in accordance with the Commission's requirements, did not include the possible effects of future demand-side-management and energy-efficiency programs. The Companies developed their upper and lower uncertainty ranges by moving 1.64 standard deviations from the baseline projection each year for each company. The upper and lower ranges represent a 90% confidence interval for the growth rates over the next 15 years, and constitute a statistically valid representation of the forecast range using the base load forecast that the Companies consider most likely to occur. Using this statistical approach further ensures the forecasts take into consideration numerous known uncertainties, such as economic growth and population growth, as well as unknown uncertainties, which are inherent in the historical weather-normalized data.

Concerning the Environmental Groups' criticism of the Companies' projected energy and peak demand growth rates (particularly as compared to the Companies' 2008 IRP), a few observations should settle the concerns.<sup>8</sup> First, the Companies' 2011 IRP does indeed anticipate higher growth rates for energy and demand over the planning period as compared to the 2008 IRP due to the 2008 recession, which was not contemplated in the 2008 IRP. Despite the forecasted economic recovery using macroeconomic variables that had higher short-term growth rates as the economy recovered (which is not unusual), the annual energy levels in the 2011 IRP are still lower in total than the annual levels in the 2008 IRP as shown in IRP Table 6(1)-1. Also,

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<sup>7</sup> See Environmental Comments at 4.

<sup>8</sup> Environmental Comments at 3.

the 2011 IRP's projected peak demand remains below the 2008 IRP levels until 2025, as shown in Table 6(1)-2.

Second, after taking into account the projected effects of the Companies' Demand-Side Management ("DSM") and Energy Efficiency ("EE") programs, the projected energy and peak demand growth levels fall within the bounds the Environmental Groups cite in their comments. IRP Table 8(4)(a)-1, which shows the peak demand growth including the impact of DSM-EE programs, shows the peak demand growth rate from 2011 to 2015 is 1.1%, and the compound annual growth rate from 2011 to 2025 is 1.35%, both well less than the 1.9% peak demand growth rate projected by IHS CERA ("CERA") and cited by the Environmental Groups.<sup>9</sup> Similarly, IRP Table 8(4)(b) shows the projected compound annual growth rate for energy requirements from 2011 to 2025 to be 1.37% after taking into account DSM-EE programs. So the Companies' projected peak demand and energy growth rates appear to be within the range of reasonableness suggested by the Environmental Groups.

Moreover, the data cited by the Environmental Groups concerning other entities' peak demand projections gives some idea of what limited use such comparisons are. Such comparisons must be made accurately and consistently to ensure relevance. As noted above, the Environmental Groups cite CERA as projecting nationwide peak demand growth of 1.9% per annum from 2010 to 2015.<sup>10</sup> But the Environmental Groups further cite the U.S. Department of Energy's Energy Information Administration ("EIA") as projecting a mere 0.1% annual peak demand growth over what would appear to be the same period, significantly less than the CERA projection.<sup>11</sup> First, it is important to note that the EIA information from their Electric Power

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<sup>9</sup> Environmental Comments at 3-4.

<sup>10</sup> Environmental Comments at 3-4.

<sup>11</sup> Environmental Comments at 4.

Annual 2010 uses actual 2010 data (an especially hot year) that is not weather-normalized.<sup>12</sup> This lack of weather normalization causes future peak demand growth, which is based on expectations for normal weather, to look low. Second, the 0.1% value appears to be only the change from 2010 to 2011, so is not comparable to the CERA data. Using the same 2010-2015 time period, EIA projects a growth rate (using the weather inflated 2010 actual value) of 1.29%. In addition, regions, states, and even localities tend to have different growth rates than the national average. For these reasons, it is not useful, and may be misleading, to take the Environmental Groups' approach of comparing the Companies' growth projections to national growth projections with inconsistent bases and different forecast periods.

**III. The Companies Used a Methodology to Determine Their Proposed Reserve Margin that Rationally Seeks to Minimize Costs to Customers in Accordance with the IRP's Stated Objectives.**

Somewhat curiously, the Environmental Groups criticize the Companies for proposing too high a reserve margin;<sup>13</sup> in other words, they criticize the Companies for desiring to be well prepared to handle foreseen and unforeseen events. It is a strange criticism because the Environmental Groups assert later in their comments that the Companies have not taken adequate account of uncertainty.<sup>14</sup> Regardless, as discussed below, the Companies' proposed reserve margin is not excessive, but rather is calculated to minimize overall costs to customers, both the costs of carrying reserves and the avoided costs related to possible curtailments resulting from inadequate capacity.

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<sup>12</sup> U.S. Energy Information Administration Electric Power Annual 2010: Table 4.1.B, available at: <http://www.eia.gov/electricity/annual/pdf/table4.1.b.pdf>.

<sup>13</sup> Environmental Comments at 4-6.

<sup>14</sup> Environmental Comments at 15.

As an initial matter, the methodology employed by Astrape Consulting (“Astrape”) in computing the minimum reserve margin for the 2011 IRP is philosophically unchanged from the methodology employed in past IRPs. Since the early 1990s, the Companies’ methodology for determining the minimum reserve margin has focused primarily on minimizing costs to customers. The Companies contracted with Astrape because their SERVVM model provides the ability to more robustly model the uncertainty in load, unit availability, and import capability from interconnected regions when calculating energy costs across a distribution of possible reliability levels. As a result, SERVVM enhances the Companies’ ability to evaluate the impact of carrying additional reserve margin capacity on overall energy costs.

The Environmental Groups’ first misguided attack on this approach is that it overstates the required reserve margin by taking into account two kinds of uncertainty, weather uncertainty and economic uncertainty, both based on historical loads, which “increases the amount of uncertainty being modeled and raises questions about the possibility of historical uncertainty being duplicated by the multiple methods used in the RMS [reserve margin study].”<sup>15</sup> Contrary to the Environmental Groups’ assertions, economic uncertainty and weather uncertainty are two distinct uncertainties in the load forecast that should be considered when establishing a minimum reserve margin, particularly for 5 years into the future, as is the case in the Companies’ reserve margin study. Because the economic uncertainty is modeled based on historical weather-normalized loads, the methodology used to consider these uncertainties neither overstates the total load forecast uncertainty in the analysis, nor does it overstate the minimum reserve margin.

Moreover, the reserve margin study considers a full distribution of load forecast error relative to the economic growth uncertainty. Because the Companies’ load forecast is a “50/50” forecast, the distribution is centered at a load forecast error of zero, i.e., there is an equal

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<sup>15</sup> Environmental Comments at 5.



probability that actual loads will be lower or higher than the forecast. In the most extreme cases modeled, load can be as much as 4.76% higher than the 5-year forecast due to economic growth assumptions. This scenario has a 2.25% probability of occurring, as the Environmental Groups correctly note. But the reserve margin study also considers an equal number of cases where load can be as much as 4.76% lower than the 5-year forecast. This scenario, too, has a 2.25% probability of occurring. Therefore, the consideration of a full distribution of load forecast error does not improperly increase the minimum reserve margin.

The Environmental Groups' second criticism asserts that the method Astrape used to compute the Companies' loss-of-load probability does not comport with traditional loss-of-load probability computation methods, which use 50/50 load forecasts, whereas the Companies' study "reflects economic uncertainty such that the worst case load has less than 2.25% chance of being exceeded ... before weather-driven load forecast uncertainty is taken into account ...."<sup>16</sup> But this criticism misses the fact that, in computing the loss-of-load probability, the Companies' reserve margin study considered a full range load forecasts, not just one extreme load forecast; as discussed above, the Companies' load forecast is indeed a 50/50 forecast. Thus, the scenarios on the upper end of the load forecast distribution were balanced by scenarios on the lower end of the distribution.

The Environmental Groups' third criticism is that the Companies' reserve margin study overstates the level of reserve margin needed to achieve a particular loss-of-load probability.<sup>17</sup> To support their criticism, the Environmental Groups cite examples of other utilities' reserve margins and their purported loss-of-load probabilities. But this criticism and comparison overlooks regional and local differences that affect the reserve margin necessary to achieve a

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<sup>16</sup> Environmental Comments at 5.

<sup>17</sup> Environmental Comments at 5-6.

given loss-of-load probability. For a given region, the optimal reserve margin is a function of the size and type of the generating resources and their reliability, the nature of the load, and the import capability from interconnected regions. Because these characteristics vary from one region to another, reserve margin comparisons from one region to another are not always helpful.

Moreover, for any group of examples one party can cite, there are always counterexamples another party can cite. In this case, using documents the Environmental Groups cited in support of other positions taken in their comments, the Companies found several utility reserve margins that are higher than the Companies' proposed 16% reserve margin:

- Duke Energy Carolinas targets a 17% reserve margin.<sup>18</sup>
- Public Service Company of Colorado targets a 16.3% reserve margin.<sup>19</sup>
- Ameren Missouri targets a 17% reserve margin.<sup>20</sup>

Although, as stated above, comparing reserve margins from region to region is not always helpful, these examples demonstrate that the Companies' proposed reserve margin is not unreasonable per se. Furthermore, Duke Energy Ohio's 15.3% reserve margin target illustrates that even utilities in the same holding company system can target different reserve margins based on the unique local and regional circumstances they face.<sup>21</sup>

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<sup>18</sup> Duke Energy Carolinas, LLC's 2011 Integrated Resource Plan at 8 (Sept. 1, 2011) ("Meeting the Company's 17% target planning reserve margin over the 20-year horizon."), available at: <http://dms.psc.sc.gov/pdf/matters/26119DFA-D0CF-FD5D-97F4F5EA41BE58F1.pdf>.

<sup>19</sup> Public Service Company of Colorado's 2011 Electric Resource Plan at 1-58 (Oct. 31, 2011) ("For the 2011 ERP, Public Service proposes to utilize a planning reserve margin target of 16.3% in assessing the need for additional power supply resources."), available at: <http://www.xcelenergy.com/staticfiles/xcel/Regulatory/Regulatory%20PDFs/PSCo-ERP-2011/Exhibit-No-KJH-1-Volume-1.pdf>. Please note that the Environmental Groups mislabeled this as being a PacifiCorp study in their footnote 15.

<sup>20</sup> Ameren Missouri's 2011 Integrated Resource Plan at 3-53 ("The long-term reserve margin utilized in this IRP is 17%."), available at: <http://www.ameren.com/sites/aeu/Environment/Renewables/Documents/Chapter3LoadAnalysisForecasting.pdf>.

<sup>21</sup> Duke Energy Ohio 2011 Integrated Resource Plan at 142 (July 15, 2011) ("Since Duke Energy Ohio will be a Fixed Resource Requirement ('FRR') entity when it transfers to PJM, PJM will establish the reliability requirement.

Also, several factors are responsible for the higher target reserve margin in the Companies' 2011 IRP compared with their 2008 IRP. First, contingency reserve obligations increased from 91 MW prior to 2007 to 212 MW in 2010, then to 240 MW in 2011 with the dissolution of the Midwest Contingency Reserve Sharing Group.<sup>22</sup> Because carrying contingency reserves is a NERC requirement, the Companies must plan to have adequate capacity to meet peak load and contingency reserve obligations. Second, compared with previous IRPs, the Companies' future generation portfolio will be concentrated in fewer and larger units, e.g., Trimble County Unit 2, which increases the reliability impact of a forced outage event. Finally, the IRP provides an example of how the Companies have recently faced operational challenges even when its actual reserve margin was 15%.<sup>23</sup> Based on these factors, an increased reserve margin is reasonable.

The Environmental Groups' fourth attack is that the Companies' reserve margin study does not "appear to give any credit to demand side resources" because it does not treat controllable demand-side resources as generating capacity, which is inconsistent with the North American Electric Reliability Corporation's ("NERC") reserve margin calculation approach.<sup>24</sup> Part of this claim is incorrect, and the rest is misleading. The Companies have two forms of controllable demand-side resources: dispatchable demand-side management (load control devices) and curtailable-service customers. The methodology Astrape used in the Companies' reserve margin study counts the loads of curtailable service customers as generation capacity, just as the Environmental Groups want it to be treated. Dispatchable demand-side management,

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The reliability requirement for an FRR entity for planning year 2011/2012 is 15.3."), available at: <http://dis.puc.state.oh.us/TiffToPDF/A1001001A11G15B53607E02098.pdf>.

<sup>22</sup> See Midwest Contingency Reserve Sharing Group Operating Protocols, approved February 8, 2007 (updated March 5, 2007).

<sup>23</sup> See IRP Volume 1 at 8-99 - 8-101.

<sup>24</sup> Environmental Comments at 6.

however, is subtracted from load and capacity in the reserve margin study, which was consistent with NERC's methodology prior to its 2011 Summer Reliability Assessment. NERC issued that assessment in May 2011;<sup>25</sup> the Companies filed their 2011 IRP on April 21, 2011. The Companies therefore followed the then-applicable NERC approach to reserve margin calculation concerning demand-side resources when they prepared the 2011 IRP, and they will follow the then-applicable NERC approach when they prepare their next IRP.

The final criticism the Environmental Groups have concerning the Companies' reserve margin study is its apparent failure to consider the Contingency Reserve Sharing Group ("CRSG") agreement to which the Tennessee Valley Authority, East Kentucky Power Company, and the Companies are parties.<sup>26</sup> The CRSG is an operational agreement that reduces the amount of contingency reserves the Companies would otherwise be required to carry to comply with NERC reliability standards. Contingency reserves cannot be counted on to meet peak load like other resources. When the Companies have insufficient contingency reserves, they are obligated to replenish such resources as quickly as possible to avoid declaring an emergency energy alert. In the reserve margin study, the Companies' contingency reserves could be utilized if needed for one hour in the event of an unplanned outage. After one hour, it was assumed that the Companies would shed firm load if necessary to maintain contingency reserve requirements. Therefore, the Companies' contingency reserves were evaluated appropriately in determining the Companies' target reserve margin.

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<sup>25</sup> See [http://www.nerc.com/files/2011%20Summer%20Reliability%20Assessment\\_FINAL.pdf](http://www.nerc.com/files/2011%20Summer%20Reliability%20Assessment_FINAL.pdf).

<sup>26</sup> Environmental Comments at 6.

#### **IV. The Companies Have Reasonably Accounted for Cost-Effective DSM-EE Programs in Their 2011 IRP.**

While applauding the Companies for their recent DSM-EE efforts, the Environmental Groups believe the Companies can cost-effectively achieve energy savings of 1% to 2% per year through additional DSM-EE programs, rather than the 0.25% annual reduction the Companies have achieved since 2008.<sup>27</sup> Indeed, the Environmental Groups go even further by recommending that the Companies achieve 1% annual energy savings from DSM-EE for the next three years, and then achieve 2% annual energy savings indefinitely thereafter.<sup>28</sup> But the Environmental Groups do not propose any improvements to the Companies' existing or recently approved DSM-EE programs, nor do they give even a single example of a DSM-EE program they believe the Companies could cost-effectively implement. It is, therefore, a less than fully constructive criticism.

It is instructive that the Environmental Groups' did not provide even a single example of a cost-effective DSM-EE program the Companies could deploy (that they are not already deploying or planning to deploy). As the Commission is aware from its review and approval of the Companies' most recent DSM-EE plan,<sup>29</sup> the Companies have reviewed and analyzed dozens of possible DSM-EE programs.<sup>30</sup> They continue to do so. They then vet possibly cost-effective programs with their Energy Efficiency Advisory Group, which helps narrow the field of possible programs to those most likely to have success with the Companies' customers. The Companies then seek Commission approval for programs that pass through those stages of review and

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<sup>27</sup> Environmental Comments at 6-9.

<sup>28</sup> Environmental Comments at 9.

<sup>29</sup> *In the Matter of: Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for Review, Modification, and Continuation of Existing, and Addition of New, Demand-Side Management and Energy Efficiency Programs*, Case No. 2011-00134, Order (Nov. 9, 2011).

<sup>30</sup> *See, e.g., In the Matter of: The 2008 Joint Integrated Resource Plan of Louisville Gas and Electric Company and Kentucky Utilities Company*, Case No. 2008-00148, Commission Staff Report (Oct. 13, 2009).

continue to support passing cost-benefit scores for the Companies' overall portfolio of DSM-EE programs.<sup>31</sup> It is a rigorous and ongoing process that ensures that potentially meritorious programs are reviewed. Therefore, it is unlikely that any currently cost-effective DSM-EE programs have been overlooked.

But one reason the Environmental Groups may believe there are cost-effective DSM-EE programs the Companies have overlooked is that they largely dismiss the Ratepayer Impact Measure ("RIM") cost-benefit test, which is one of the California Standard Practice Manual tests the Commission requires utilities to perform.<sup>32</sup> The RIM test attempts to measure the impact that a given DSM-EE program or set of DSM-EE programs has on non-participant utility customers. Although the Environmental Groups are correct that no one test should determine whether a DSM-EE program should be approved,<sup>33</sup> neither should a test be ignored. Certainly it would be easy to achieve additional energy and demand savings if the cost to non-participants were no object, which appears to be the implicit thrust of the Environmental Groups' comments in this regard. But the Companies take the RIM test seriously and attempt to make their suite of DSM-EE programs cost-effective for all customers, including non-participants, as evidenced by the 0.82 RIM score their new portfolio of programs received.<sup>34</sup>

Working to have such a DSM-EE portfolio has produced good results. The average annual peak demand reduction of 0.52% and energy savings of 0.25% calculated by the Environmental Groups are correct when calculating energy and demand savings divided into the

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<sup>31</sup> See, e.g., *In the Matter of: Joint Application of Louisville Gas and Electric Company and Kentucky Utilities Company for Review, Modification, and Continuation of Existing, and Addition of New, Demand-Side Management and Energy Efficiency Programs*, Case No. 2011-00134, Application (Apr. 14, 2011).

<sup>32</sup> *In the Matter of the Joint Application of the Members of the Louisville Gas and Electric Company Demand-Side Management Collaborative for the Review, Modification, and Continuation of the Collaborative, DSM Programs, and Cost Recovery Mechanism*, Case No. 1997-00083, Order at 20 (April 27, 1998).

<sup>33</sup> Environmental Comments at 7-8.

<sup>34</sup> Environmental Comments at 7; IRP at 8-111.

Companies' total sales.<sup>35</sup> But the Companies have DSM-EE programs for residential and commercial customers only. If one performs the savings calculations for only the residential and commercial loads that the Companies' DSM-EE programs serve, these values would be approximately 1% annual demand and energy savings for these customer classes.

The Environmental Groups further overlook a few unavoidable facts concerning the Companies' DSM-EE programs and the overall project of DSM-EE in Kentucky that affect demand and energy savings. First, the Companies in particular, and Kentucky's electric utilities more broadly, have some of the lowest rates in the nation. That is certainly a good thing for customers, but it decreases the financial incentive for customers to conserve. Second, because Kentucky has not yet set demand or energy savings requirements, it is unreasonable to follow the Environmental Groups' approach of comparing the Companies' DSM-EE demand and energy savings to the savings utilities are achieving (or project they will achieve) in states that have such legislative or regulatory requirements. In Kentucky, DSM-EE programs are, by legislation, optional to utilities, and participation in such programs is optional to customers.<sup>36</sup> Without a requirement to achieve demand or savings targets regardless of cost effectiveness, and with completely voluntary participation in DSM-EE programs for customers, there is considerable uncertainty concerning the potential and actual energy and demand savings such programs can produce. Therefore, the fact that the governor has stated a desire to have energy savings of 1.13% per year neither is evidence that such a goal can be achieved under the current statutory and regulatory regime concerning DSM-EE, nor is it adequate authority for the Companies or

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<sup>35</sup> Environmental Comments at 7.

<sup>36</sup> See KRS 278.285.

any other utility to depart from that regime.<sup>37</sup> And it cannot reasonably be used to deduce that the Companies' DSM-EE efforts are in any way lacking.

**V. Because CO<sub>2</sub> Costs Are Unknown and Unknowable, and Because the Likelihood of Such Costs Being Imposed Are Markedly Lower than They Were in 2008, It Was Reasonable for the Companies Not to Include Them in the 2011 IRP.**

Although the Environmental Groups believe the Companies have erred by not including any analysis of possible future CO<sub>2</sub> costs, the Environmental Groups' own examples of other utilities' attempts to project future CO<sub>2</sub> costs highlight that there is simply no way to know whether there will be any CO<sub>2</sub>-related regulatory costs, what those costs might be, and what forms the regulations giving rise to the costs might take.<sup>38</sup> In the Environmental Groups' list of various utilities' modeling of CO<sub>2</sub> costs, the projected costs range from \$0 per ton for all future years to \$94 per ton in 2030 (though another cited utility projected a cost of \$42 per ton by 2031, and yet another projected a cost of \$47.22 per ton by 2040).<sup>39</sup> One utility projected a CO<sub>2</sub> cost of as much as \$30 per ton beginning in 2015, another projected a cost of \$12 per ton beginning in 2015, and yet another projected a cost of just \$7.50 beginning in 2015 (to say nothing of the utilities projecting \$0 per ton in 2015).<sup>40</sup> The Environmental Groups' consultant in the Companies' ECR cases projected no CO<sub>2</sub> cost at all before 2018.<sup>41</sup> So the Environmental

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<sup>37</sup> See Environmental Comments at 8.

<sup>38</sup> Environmental Comments at 9-11.

<sup>39</sup> Environmental Comments at 10-11.

<sup>40</sup> Environmental Comments at 10-11.

<sup>41</sup> *In the Matter of: The Application of Kentucky Utilities Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00161; *In the Matter of: The Application of Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00162, Direct Testimony of Jeremy Fisher (Sept. 23, 2011).



Groups' own evidence shows there is simply no way to know if there will be any CO<sub>2</sub> costs, what they might be, or what form they might take.

Although the Companies included a CO<sub>2</sub>-related sensitivity analysis in their 2008 IRP, which made no difference in the resources selected compared to the base-case plan, the events of the intervening years have made the prospect of CO<sub>2</sub> pricing significantly less likely. As David S. Sinclair's rebuttal testimony in the Companies' most recent Environmental Cost Recovery ("ECR") proceedings explains at length, regional, national, and international efforts to create enforceable CO<sub>2</sub> regulatory regimes have largely failed, and the momentum behind such efforts has significantly declined as a result of the Climategate scandal, the global recession, and recent political developments.<sup>42</sup> Since the writing of Mr. Sinclair's testimony, a second round of Climategate e-mails has been released, casting further doubt on the science underlying anthropogenic CO<sub>2</sub>-driven climate change.<sup>43</sup> For these reasons, it was reasonable not to include a CO<sub>2</sub>-related sensitivity analysis in the 2011 IRP.

Moreover, as Mr. Sinclair's rebuttal testimony in the Companies' most recent ECR proceedings fully discussed, there is value in not exercising an option until one has to exercise it, including the option of how to comply with the unknown and unknowable requirements of merely possible CO<sub>2</sub> regulations.<sup>44</sup> It is irrational to prejudice planning decisions today on the assumption that an unknown and unknowable CO<sub>2</sub>-regulatory cost will be imposed on each ton

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<sup>42</sup> *In the Matter of: The Application of Kentucky Utilities Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00161; *In the Matter of: The Application of Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00162, Rebuttal Testimony of David S. Sinclair at 19-24 (Oct. 24, 2011).

<sup>43</sup> <http://www.forbes.com/sites/larrybell/2011/11/29/climategate-ii-more-smoking-guns-from-the-global-warming-establishment/>

<sup>44</sup> *In the Matter of: The Application of Kentucky Utilities Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00161; *In the Matter of: The Application of Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00162, Rebuttal Testimony of David S. Sinclair at 26-33 (Oct. 24, 2011).

of CO<sub>2</sub> emitted; by definition, if including such purely hypothetical costs changed a resource planning decision, it would be a change that would prove to be uneconomical if the hypothesized CO<sub>2</sub> regulations did not materialize in a comparable form and magnitude. As Mr. Sinclair explains in his testimony, the better approach is to keep the option alive as long as possible. In this proceeding, there is no reason to exercise any option; as discussed at the outset of these comments, this proceeding will not result in a Commission order or an action by the Companies. Therefore, contrary to the Environmental Groups' assertions, if there is a single forum in which it is least appropriate to include unknown and unknowable CO<sub>2</sub> costs as part of the Companies' base-case projections, it is this proceeding.

Finally, the Environmental Groups are wholly incorrect to assert that existing federal Greenhouse Gas ("GHG") Tailoring Rule requirements will require the Companies to establish Best Available Control Technology ("BACT")-based GHG emission limits for certain generating units because the units will undergo "major environmental modifications."<sup>45</sup> Gary H. Revlett explained in the Companies' ECR proceedings that none of the projects the Companies proposed would qualify as a major modification that would cause the GHG Tailoring Rule's BACT requirement to apply.<sup>46</sup> The Companies were therefore correct not to include Tailoring-Rule-related CO<sub>2</sub> costs in their 2011 IRP.

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<sup>45</sup> Environmental Comments at 11.

<sup>46</sup> *In the Matter of: The Application of Kentucky Utilities Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00161, and *In the Matter of: The Application of Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00162, Rebuttal Testimony of Gary H. Revlett at 12-14 (Oct. 24, 2011).

## **VI. The Companies Have Taken Appropriate Account of the Costs of Existing Units.**

The Environmental Groups give three and a half pages of their comments to summarizing the testimony they withdrew from the Companies' most recent ECR proceedings.<sup>47</sup> (They also attached the withdrawn testimony as an exhibit to their comments.) Rather than burden this record with the entirety of the Companies' rebuttal testimony in the ECR proceedings, the Companies respectfully incorporate the relevant testimony herein by reference.<sup>48</sup> Quoted below from the Companies' ECR testimony are their responses to the points the Environmental Groups present from Dr. Jeremy Fisher's withdrawn ECR testimony, which the Groups now characterize as a "report":

Natural gas price correction: Dr. Fisher argued that the Companies used a "highly inflated" natural gas price forecast. Mr. Sinclair shows that Dr. Fisher and his colleagues at Synapse made a fundamental, elementary mistake by using their real-dollar gas price forecast along with the Companies' gas price forecast in nominal-dollar terms. Mr. Sinclair further shows that Synapse erred by treating all of the Companies' Strategist inputs as being in real dollars, when they were actually in nominal dollars. Mr. Sinclair corrects these errors and shows that the Companies' gas price forecast falls within other forecasts Synapse believes to be mainstream, and shows that the corrected Synapse analysis (using Synapse's gas price forecast) produces the same retire-or-retrofit decisions as does the Companies' analysis.

SCR cost: Dr. Fisher asserts that the Companies should have included selective catalytic reduction systems ("SCRs") for certain generating units in their modeling. I [Charles Schram] show that the Companies did indeed consider the possible future need for SCRs on certain units, and that there is only a small likelihood that

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<sup>47</sup> Environmental Comments at 11-14.

<sup>48</sup> *In the Matter of: The Application of Kentucky Utilities Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00161, and *In the Matter of: The Application of Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00162, Rebuttal Testimonies of John N. Voyles, Gary H. Revlett, David S. Sinclair, and Charles R. Schram (Oct. 24, 2011).

present or proposed regulations would require SCRs on units that would affect the Companies' retire-or-retrofit analysis.

CO<sub>2</sub> price risk: Dr. Fisher asserts that the Companies should have included unknown and unknowable future CO<sub>2</sub> pricing in their analysis in these proceedings. Mr. Sinclair shows that Dr. Fisher has incorrectly treated CO<sub>2</sub> pricing at some level as essentially inevitable, and has ignored the value of creating the real option of addressing the greenhouse gas issue in the future.

Oversized replacement capacity: Dr. Fisher claims that the Companies' modeling uses "oversized" capacity additions. I rebut that claim by showing that the capacity additions result from an overall cost optimization process that considered possible capacity additions as small as 5 MW.

Utility modeled in isolation: Dr. Fisher argues that the Companies should have modeled greater amounts of transfer capability with the Eastern Interconnection. I demonstrate the flawed thinking in this criticism by pointing out that the Companies are engaged in capacity planning, and cannot assume that abundant quantities of cost-effective energy will be available at all times in the future; given the Companies' obligation to reliably serve their customers, any such assumption would be imprudent. Also, I show that there are often significant transmission constraints that hamper the Companies' ability to import energy from neighboring systems, further contradicting Dr. Fisher's assertion.

Emergency generation purchases: Dr. Fisher contends that the Companies used too high a cost for emergency energy in their modeling. I refute that contention by showing that even using a significantly lower cost of emergency energy does not affect the retire-or-retrofit results, and argue that Dr. Fisher again misunderstands the difference between a utility's planning for future capacity to serve native load over the long term—the project in which the Companies are engaged—and optimizing dispatch on the basis of existing generating sources across a broader footprint.

NO<sub>x</sub> and SO<sub>2</sub> Prices: Dr. Fisher asserts that the Companies used incorrect emission allowance prices. I explain that the Companies conducted their analyses on the assumption that limited allowance trading could lead to an emissions allowance market with uncertain liquidity, and that physical compliance, consistent with allocated allowances, is a prudent strategy for the Companies.

Order of Retirement: Dr. Fisher asserts that the Companies chose a "semi-arbitrary" order in which to consider units in their retire-or-

retrofit analysis, and that changing the order could result in a more optimal solution. I show that the order of unit retirement is not relevant to the Companies' recommendations; there was nothing arbitrary about the order in which the Companies conducted their analysis; and that considering the units Dr. Fisher believes should be retired but the Companies propose to retrofit (Brown Units 1 and 2) leads to a less optimal and more costly portfolio than what the Companies have proposed.<sup>49</sup>

Concerning the Environmental Groups' assertions that some of the Companies' existing coal-fired generating units are "aging" and have exceeded their design lives, it is important to understand that power plants, like cars, can operate safely, reliably, and efficiently well beyond their initial "design lives" if they are properly maintained.<sup>50</sup> That is precisely what the Companies have done with respect to their generating units. Below is a partial list of the ways the Companies keep their generating units in good operating condition:

- Predictive Maintenance (PdM) – Long-established program of monitoring equipment condition and using that information for analysis to optimize maintenance decisions on repair or pro-active replacement.
- AWARE – AWARE is a boiler condition tracking tool that is used to collect detailed information on our boilers and then predict future performance issues for targeted replacement or repair.
- Detailed boiler inspections are conducted on a periodic basis to also assist in the decision making process to ensure longevity and safe operation of the boiler.
- During major outages, the Companies perform turbine and generator work, which ensures safe and reliable operation of their turbines and generators.
- Strong routine maintenance program that continuously identifies needed repairs and replacements, then prioritizes and addresses them.

The various units' historical heat rates are evidence of how well these programs have worked to keep even older units operating in good form. For example, the average heat rate for

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<sup>49</sup> *In the Matter of: The Application of Kentucky Utilities Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00161, and *In the Matter of: The Application of Louisville Gas and Electric Company for Certificates of Public Convenience and Necessity and Approval of Its 2011 Compliance Plan for Recovery by Environmental Surcharge*, Case No. 2011-00162, Rebuttal Testimony of Charles R. Schram at 1-4 (Oct. 24, 2011).

<sup>50</sup> Environmental Comments at 13-14.

Brown Unit 2 is approximately 10,300 Btu/kWh, which is second only to Trimble County Unit 2 in the Companies' fleet.<sup>51</sup> So the bare fact that a unit is old tells little about its remaining useful life or expected performance.

The careful maintenance programs the Companies have in place for their units are why the Environmental Groups are incorrect to assume the Companies have not fully accounted for non-environmental capital costs for the Companies' older coal units.<sup>52</sup> The Environmental Groups erroneously assume that the Companies must not have taken full account of likely capital costs for older units because they "assumed relatively steady non-environmental capital investments increasing at a rate of 2.5% per year."<sup>53</sup> But the regimen of consistent maintenance the Companies have used to keep their units in good operating condition does not justify assuming anything else.

Concerning the "other regulations" the Environmental Groups assert the Companies have not taken into account, namely the pending federal regulations concerning coal combustion residuals, cooling water intake structures, and effluent limitation guidelines, it is important to note that it is not at all clear what these regulations might require.<sup>54</sup> The coal combustion residuals regulation has been pending for over a year, and it is not clear which of three different possible regulatory approaches the U.S. Environmental Protection Agency will take, if any. Regardless, if the Companies must incur costs to comply with the final regulation, they will have to incur them in any event to deal with their existing coal combustion residual storage facilities; no new coal units are being considered, so no costs related to the regulation could be avoided. Concerning the cooling water intake structure rule, it too is merely proposed, and what it will

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<sup>51</sup> See 2011 IRP at 8-17 - 8-65.

<sup>52</sup> See Environmental Comments at 13-14.

<sup>53</sup> Environmental Comments at 13.

<sup>54</sup> Environmental Comments at 14.

require if it becomes final will be determined on a case-by-case basis, and likely will not add a material cost to any resource alternative. Finally, the effluent limitation guidelines have not even been proposed, much less are they final, so it was not possible to include costs for them in the IRP.

## **VII. The Companies' IRP Adequately Accounts for Uncertainty and Risk.**

The Environmental Groups' closing attack on the Companies' 2011 IRP is a bare assertion that the IRP does not take into account six kinds of risk: (1) load growth risk, (2) potential resource cost risks, (3) financial variables (e.g., inflation rates), (4) resource implementation and "lumpiness" risks, (5) environmental and regulatory risks, and (6) planning risk associated with the possibility that a selected resource could become obsolete or unnecessary during construction.<sup>55</sup> The Environmental Groups are simply incorrect with respect to the first five kinds of risk. The Commission's IRP regulation requires the Companies to provide information concerning all those risks, which information the Companies have provided in this proceeding. Indeed, the Environmental Groups complained that the Companies took account of too much uncertainty in their reserve margin study, so it is odd for the Environmental Groups to complain at the end of their comments that the Companies did not take into account enough risk.

There are two responses to the sixth cited risk, the risk that a resource could become obsolete mid-construction. First, the IRP is not an application for a CPCN, and it is not an inviolable, unalterable fifteen-year resource plan; indeed, it would be novel if the IRP did not change in its 2014 iteration. So it is not in an IRP proceeding, but rather in a CPCN proceeding, in which it is appropriate to determine the prudence of building a particular asset at a particular time, including the possibility that a resource could become obsolete. Second, conventional resources, which the Environmental Groups appear to disfavor, are mature technologies unlikely

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<sup>55</sup> Environmental Comments at 15.

to become technologically obsolete. In contrast, the renewable resources the Environmental Groups appear to favor are still emerging technologies, and are therefore much more likely to become technologically obsolete if future performance improvements and cost-reductions materialize as their promoters predict.

Therefore, contrary to the Environmental Groups' assertions, the Companies have therefore accounted for the full range of uncertainties and risks required by the Commission's IRP regulations.

### **VIII. Conclusion**

The Commission's approach to the IRP process has worked well for utilities and the Commonwealth for over 20 years, and has allowed the Companies to provide continuous service during that time period, never having to curtail load due to a lack of generation supply. In their 2011 IRP, the Companies have continued to follow that process, as set out in the Commission's IRP regulation and previous Commission Staff comments, by producing a complete and thorough long-term resource plan and load forecast that take into account all reasonably foreseeable risks and uncertainties. Nothing in the Environmental Groups' comments demonstrates the need to change that long-standing and well-functioning process, and the Companies look forward to the Commission Staff's report.



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Respectfully submitted,



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**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that a true and correct copy of the foregoing Joint Response was served on the following persons on the 12th day of December 2011 by United States mail, postage prepaid:

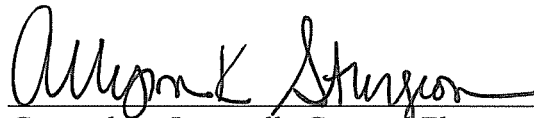
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