



Mr. Jeff DeRouen  
Executive Director  
Kentucky Public Service Commission  
211 Sower Boulevard  
Frankfort, Kentucky 40601

October 24, 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 Second Set of Interrogatories and Requests for Production of Documents of Rick Clewett, Drew Foley, Janet Overman, Gregg Wagner, the Natural Resources Defense Council, and the Sierra Club dated August 25, 2011, in the above-referenced matter.

Also enclosed are an original and ten (10) copies of a Motion to Deviate from Requirement Governing Filing of Copies.

Also enclosed are an original and ten (10) copies of a Petition for Confidential Protection regarding certain information contained in response to Question Nos. 18(c) and 25(b). The information for Question No. 18(c) is included on the CD marked Confidential.

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

Sincerely,

Rick E. Lovekamp

cc: Parties of Record

RECEIVED

OCT 24 2011

PUBLIC SERVICE  
COMMISSION

**LG&E and KU Energy LLC**  
State Regulation and Rates  
220 West Main Street  
PO Box 32010  
Louisville, Kentucky 40232  
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VERIFICATION

COMMONWEALTH OF KENTUCKY )  
 ) SS:  
COUNTY OF JEFFERSON )

The undersigned, **Charles R. Schram**, being duly sworn, deposes and says that he is Director – Energy Planning, Analysis and Forecasting for LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.

*Charles R. Schram*  
Charles R. Schram

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 24<sup>th</sup> day of October 2011.

*James J. Ely* (SEAL)  
Notary Public

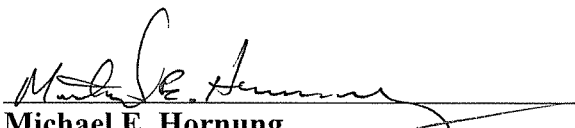
My Commission Expires:

November 9, 2014

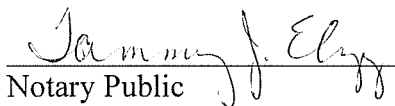
VERIFICATION

COMMONWEALTH OF KENTUCKY )  
 ) SS:  
COUNTY OF JEFFERSON )

The undersigned, **Michael E. Hornung**, being duly sworn, deposes and says that he is Manager of Energy Efficiency Planning & Development for LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.

  
**Michael E. Hornung**

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 24<sup>th</sup> day of October 2011.

 (SEAL)  
Notary Public

My Commission Expires:

November 9, 2014

**COMMONWEALTH OF KENTUCKY**  
**BEFORE THE PUBLIC SERVICE COMMISSION**

**In the Matter of:**

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

**RESPONSE OF**  
**LOUISVILLE GAS AND ELECTRIC COMPANY**  
**AND**  
**KENTUCKY UTILITIES COMPANY**  
**TO THE SECOND SET OF INTERROGATORIES AND**  
**REQUESTS FOR PRODUCTION OF DOCUMENTS OF**  
**RICK CLEWETT, DREW FOLEY, JANET OVERMAN, GREGG WAGNER,**  
**THE NATURAL RESOURCES DEFENSE COUNCIL, AND THE SIERRA CLUB**  
**DATED AUGUST 25, 2011**

**FILED: OCTOBER 24, 2011**



**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Second Set of Interrogatories and  
Requests for Production of Documents of  
Rick Clewett, Drew Foley, Janet Overman, Gregg Wagner,  
the Natural Resources Defense Council, and the Sierra Club  
Dated August 25, 2011**

**Case No. 2011-00140**

**Question No. 1**

**Witness: Charles R. Schram**

- Q-1. Refer to the Companies' response to Question No. 16 of the Intervenors' first set of discovery requests. Please provide the following.
- a. KU's actual electric energy sales in MWh by customer class for each of the years 2000 through 2010,
  - b. KU's actual peak loads in MW by customer class for each of the years 2000 through 2010,
  - c. KU's forecast peak loads in MW by customer class for each of the years 2011 to 2025,
  - d. LG&E's actual electric energy sales in MWh by customer class for each of the years 2000 through 2010,
  - e. LG&E's actual peak loads in MW by customer class for each of the years 2000 through 2010, and
  - f. LG&E's forecast peak loads in MW by customer class for each of the years 2011 to 2025.
- A-1.
- a. KU's actual energy sales in MWh by customer class for the years of 2000 to 2010 is attached.
  - b. Peak loads are not available by customer class.
  - c. Peak loads are not forecasted by customer class.

- d. LG&E's actual energy sales in MWh by customer class for the years of 2000 to 2010 is attached.
- e. Peak loads are not available by customer class.
- f. Peak loads are not forecasted by customer class.

KU	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Residential Sales .....	5,714,492	5,678,175	6,197,892	6,000,966	6,160,627	6,598,986	6,717,530	7,261,512	7,221,465	7,023,273	7,634,463
Commercial Sales .....	3,953,595	3,989,697	4,161,476	4,209,691	4,323,429	4,466,415	4,643,666	4,970,671	4,907,571	4,717,854	4,775,134
Industrial Sales .....	5,043,563	4,716,953	4,966,926	5,109,971	5,399,909	5,458,592	5,512,458	5,457,434	5,148,093	4,886,628	5,785,891
Mine Power Sales .....	766,517	770,705	766,337	721,697	731,653	802,642	1,041,879	1,099,361	1,065,003	963,791	885,815
Public Street and Highway Lighting Sales .....	56,223	56,608	55,952	56,489	56,535	53,741	56,647	58,159	59,086	55,842	57,619
Other Sales to Public Authorities .....	1,350,473	1,343,600	1,396,770	1,416,284	1,462,179	1,518,847	1,558,266	1,636,188	1,653,906	1,604,463	1,686,312
Municipal Pumping .....	88,687	80,579	79,911	78,601	77,939	77,101	76,534	80,587	79,424	71,655	72,259
<b>Total Sales - Ultimate Consumers .....</b>	<b>16,973,550</b>	<b>16,636,319</b>	<b>17,625,264</b>	<b>17,593,699</b>	<b>18,212,271</b>	<b>18,976,324</b>	<b>19,606,980</b>	<b>20,503,912</b>	<b>20,134,548</b>	<b>19,323,506</b>	<b>20,897,493</b>
Wholesale Sales .....	1,842,648	1,842,380	1,911,995	1,889,220	1,959,367	2,014,181	1,978,231	2,058,905	1,971,405	1,847,641	2,002,284
<b>Total</b>	<b>18,816,198</b>	<b>18,478,698</b>	<b>19,537,259</b>	<b>19,482,919</b>	<b>20,171,639</b>	<b>20,990,505</b>	<b>21,585,211</b>	<b>22,562,817</b>	<b>22,105,953</b>	<b>21,171,147</b>	<b>22,899,777</b>



I.G.&E	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Distribution of KWH Output											
Residential Sales .....	3,721,834	3,782,869	4,035,725	3,834,690	3,923,944	4,265,080	4,017,881	4,486,348	4,206,343	4,095,649	4,591,646
Small Commercial and Industrial Sales .....	1,248,383	1,271,236	1,285,467	1,262,836	1,281,817	1,332,677	1,318,801	1,428,384	1,392,051	1,344,247	1,461,031
Large Commercial Sales .....	2,102,229	2,123,746	2,207,050	2,219,413	2,251,711	2,349,488	2,295,259	2,409,169	2,331,120	2,272,700	2,332,211
Large Industrial Sales .....	3,042,929	2,976,234	3,028,490	2,935,754	3,018,652	3,076,790	3,067,655	2,991,980	2,850,830	2,412,419	2,602,852
Public Street and Highway Lighting Sales .....	69,850	69,599	69,102	69,484	68,573	63,785	60,716	60,424	61,975	59,013	54,325
Other Sales to Public Authorities .....	1,143,996	1,153,582	1,184,292	1,181,173	1,178,960	1,204,138	1,204,687	1,281,695	1,240,682	1,220,972	1,295,935
<b>Total Sales - Ultimate Consumers .....</b>	<b>11,329,221</b>	<b>11,377,267</b>	<b>11,810,125</b>	<b>11,503,350</b>	<b>11,723,656</b>	<b>12,291,958</b>	<b>11,965,000</b>	<b>12,658,000</b>	<b>12,083,001</b>	<b>11,405,000</b>	<b>12,338,000</b>



**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Second Set of Interrogatories and  
Requests for Production of Documents of  
Rick Clewett, Drew Foley, Janet Overman, Gregg Wagner,  
the Natural Resources Defense Council, and the Sierra Club  
Dated August 25, 2011**

**Case No. 2011-00140**

**Question No. 2**

**Witness: Charles R. Schram**

- Q-2. Please answer the following questions concerning curtailable load:
- a. Why do the Companies include only 51 MW of curtailable load in the forecast of summer peak, per the note below Table 5.(3)-8 on p 5-26 of the IRP, when on page 5-25, the IRP states that KU's curtailable load is estimated to be 66 MW?
  - b. Is the curtailable load expected to increase over the period of the IRP? Why or why not?
- A-2.
- a. The 51 MW is an estimate of curtailable load for 2010, however the 66 MW is the estimated level in the forecast for 2011.
  - b. Curtailable load is expected to increase as shown in Table 8.(4)(a)-1 on page 8-80 due to minor increases in the levels of expected load from curtailable customers.



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**Case No. 2011-00140**

**Question No. 3**

**Witness: Charles R. Schram**

- Q-3. Please answer the following questions concerning sales and load forecasts.
- a. Refer to Volume I, Table 5.(3)-2 of the IRP. Please state whether these sales forecasts weather normalized.
  - b. Refer to Table 1 on p. 20 of Appendix A to the Optimal Expansion Plan, Volume III of the IRP. Please state whether these load forecasts weather normalized
  - c. Please provide an electronic spreadsheet, with links intact, that reconciles the sales forecasts referenced in part (a) of this question with the load forecasts referenced in part (b)
- A-3.
- a. The forecasted sales contained in the referenced Table 5(3)-2 are weather-normalized.
  - b. The forecasted loads contained in the referenced Table 1 are weather-normalized.
  - c. Please see the attachment. Also, please see the folder titled Question No. 3 on the enclosed CD that includes the requested electronic spreadsheet.

Year	KU DSM	LE DSM	Combined Company Requirements Forecast (GWh)	Reconciled to Table 1 Appendix A
2011	118,715	118,551	36,019	35,782
2012	203,559	202,708	36,657	36,251
2013	279,110	272,127	37,271	36,720
2014	389,390	370,754	37,797	37,036
2015	486,644	449,127	38,451	37,515
2016	568,777	517,770	39,050	37,963
2017	637,856	578,885	39,557	38,340
2018	671,561	607,965	40,129	38,850
2019	676,018	609,584	40,773	39,488
2020	684,849	610,598	41,436	40,140
2021	691,017	611,545	41,987	40,685
2022	695,848	612,645	42,630	41,322
2023	699,460	613,740	43,209	41,896
2024	702,494	614,829	43,941	42,624
2025	705,519	615,912	44,590	43,268



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**Case No. 2011-00140**

**Question No. 4**

**Witness: Michael E. Hornung**

- Q-4. Refer to the Companies' response to Question No. 4 of Commission Staff's First Information Request. Please explain why the Commercial Conservation program's performance in 2008 and 2009 was so far below projections.
- A-4. The shortfall for the Commercial Conservation program was addressed in response to the Commission Staff's First Information Request Question No. 5 and in response to the Commission Staff's Second Information Request Question No. 3.

The following challenges and obstacles were experienced in implementing the DSM programs approved in Case No. 2007-00319: (1) budgets and energy/demand targets submitted assumed full program deployment within the first 12 months of operation; and (2) procurement/contracting and personnel efforts required to fully implement the programs took longer than anticipated. Implementation activities carried through the first quarter of 2009 when all programs became fully operational.





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**Case No. 2011-00140**

**Question No. 5**

**Witness: Michael E. Hornung**

- Q-5. Refer to the projected and actual energy and demand savings provided in the Companies' response to Question No. 4 of the Commission Staff's first information request.
- a. For each company and each program, please provide the proposed demand side management ("DSM") budget for the years 2008, 2009, and 2010.
  - b. For each company and each program, please provide actual DSM expenditures for the years 2008, 2009, and 2010.
- A-5. a. The proposed demand side management ("DSM") budget for the years 2008, 2009, and 2010 for each company and program are represented in the tables below.

	DSM Budget					
	LG&E			KU		
	2008	2009	2010	2008	2009	2010
Residential Audit	\$321,216	\$349,170	\$394,33	\$321,21	\$349,17	\$394,33
Residential WeCare	\$864,333	\$869,083	\$939,09	\$864,33	\$869,08	\$939,09
Residential Lighting	\$1,717,415	\$1,694,482	\$2,676,64	\$1,717,41	\$1,694,48	\$2,676,64
Residential HVAC	\$102,413	\$169,874	\$218,20	\$102,41	\$169,87	\$218,20
Residential Construction	\$429,997	\$432,146	\$740,94	\$429,99	\$432,14	\$740,94
Residential Demand	\$4,995,56	\$5,123,578	\$5,396,90	\$4,995,56	\$5,123,57	\$5,396,90
Responsive Smart Meters	\$1,272,349	\$260,27	\$296,26	\$0	\$0	\$0
Dealer Referral Network	\$78,694	\$72,49	\$74,23	\$78,69	\$72,49	\$74,23
Commercial Audit	\$1,588,664	\$1,574,54	\$1,585,01	\$1,588,66	\$1,574,54	\$1,585,01
Commercial HVAC	\$95,039	\$134,06	\$164,05	\$95,03	\$134,06	\$164,05
Commercial Demand	\$218,055	\$199,34	\$225,28	\$218,05	\$199,34	\$225,28
Education & Information	\$1,512,558	\$1,543,78	\$1,829,37	\$1,512,55	\$1,543,78	\$1,829,37
Development & Administration	\$368,160	\$379,33	\$419,09	\$368,16	\$379,33	\$419,09
<b>Total</b>	<b>\$13,564,453</b>	<b>\$12,802,16</b>	<b>\$14,959,44</b>	<b>\$12,292,10</b>	<b>\$12,541,89</b>	<b>\$14,663,18</b>

- b. The actual DSM expenditures for the years 2008, 2009, and 2010 for each company and program are represented in the tables below.

	DSM Expense					
	LG&E			KU		
	2008	2009	2010	2008	2009	2010
Residential Audit	\$273,085	\$322,135	\$401,448	\$189,308	\$272,026	\$346,589
Residential WeCare	\$870,540	\$872,578	\$916,035	\$530,712	\$670,483	\$404,065
Residential Lighting	\$31,539	\$847,070	\$2,052,134	\$30,946	\$1,125,288	\$2,214,947
Residential HVAC	\$0	\$145,512	\$75,248	\$0	\$170,914	\$66,859
Residential Construction	\$19,375	\$363,522	\$607,935	\$16,398	\$344,836	\$633,512
Residential Demand	\$2,804,131	\$5,182,726	\$3,396,098	\$2,759,683	\$4,569,094	\$3,232,081
Responsive Smart Meters	\$896,248	\$575,793	\$430,809	\$50,000	-\$49,432	\$120
Dealer Referral Network	\$0	\$28,496	\$42,894	\$0	\$28,515	\$42,587
Commercial Audit	\$273,549	\$512,334	\$1,159,800	\$216,910	\$581,676	\$1,250,464
Commercial HVAC	\$0	\$45,774	\$27,221	\$0	\$38,375	\$32,309
Commercial Demand	\$91,891	\$139,563	\$86,950	\$104,170	\$219,738	\$104,343
Education & Information	\$447,800	\$1,800,131	\$1,718,271	\$550,350	\$1,856,836	\$1,743,913
Development & Administration	\$237,033	\$418,640	\$516,285	\$236,292	\$405,929	\$520,897
Total	\$5,945,192	\$11,254,273	\$11,431,127	\$4,684,769	\$10,234,277	\$10,592,684



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**Case No. 2011-00140**

**Question No. 6**

**Witness: Michael E. Hornung**

- Q-6. Refer to the Companies' response to Question No. 25 of the Intervenor's first set of discovery requests. The Companies state that the current portfolio of DSM/EE programs through the end of 2010 has achieved a demand reduction of 182 MW and an energy reduction of 207,900 MWh.
- a. For each historical year starting in the first year of the Companies' DSM programs, please provide annual incremental energy, lifetime energy, and demand reduction by company and by program.
  - b. Please provide projected annual incremental energy, lifetime energy, and demand reduction by company for each current DSM program.
- A-6.
- a. Please see the attached historical energy and demand savings by program for LG&E and KU through 2010. Data by Company is not available for 2007 and prior. The historical energy and demand savings by program and Company were previously provided for 2008-2010 in response to the Commission Staff's First Information Request Question No. 4. Energy savings have been updated to be approximately 206,000 MWh at the end of 2010.
  - b. Projected energy and demand savings by program are provided in IRP Volume I Table 8.(3)(e)(3) found on pages 8-74 and 8-75. Projected program savings are expected to be split equally between LG&E and KU.

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total	
<b>Demand Savings (MW)</b>																			
Residential High Efficiency Lighting																			8
Residential New Construction																			2
Residential HVAC Tune Up																			0
Commercial HVAC Tune Up																			0
Customer Education and Public Information																			0
Dealer Referral Network																			0
Residential Responsive Pricing (RRP)																			0
Program Development & Administration																			0
Residential Conservation (HEPP)																			0
Residential Load Management								3	9	23	22	30	21	10	7	14			147
Commercial Load Management																			5
Residential Low Income Weatherization																			1
Commercial Conservation/Rebates											1	1	1	0	0	1			17
Smart Energy Profile																			
Residential Refrigerator Removal																			
Residential Incentives																			
<b>Total</b>	0	0	0	0	0	0	0	3	9	24	24	31	22	11	9	19	28		182

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total		
<b>Energy Savings (MWh)</b>																				
Residential High Efficiency Lighting																				113,625
Residential New Construction																				4,373
Residential HVAC Tune Up																				833
Commercial HVAC Tune Up																				40
Customer Education and Public Information																				0
Dealer Referral Network																				0
Residential Responsive Pricing (RRP)																				0
Program Development & Administration																				0
Residential Conservation (HEPP)																				0
Residential Load Management																				11,856
Commercial Load Management																				4,043
Residential Low Income Weatherization																				137
Commercial Conservation/Rebates																				17,720
Smart Energy Profile																				
Residential Refrigerator Removal																				
Residential Incentives																				
<b>Total</b>	112	1,076	1,486	1,149	719	800	202	1,628	2,666	4,939	5,332	6,653	6,057	4,754	7,307	-83,845	117,058		-205,983	



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**Case No. 2011-00140**

**Question No. 7**

**Witness: Michael E. Hornung**

- Q-7. Refer to the Companies' response to Question No. 3 of the Commission Staff's 2<sup>nd</sup> Information Request. Please indicate the status of the approval of the Demand Side Management/Energy Efficiency Program Plan. For each such program, please indicate the proposed and approved (if different from proposed) duration, budget, projected annual incremental energy savings, projected lifetime energy savings, and projected demand reduction.
- A-7. In reference to the proceeding that is the subject of Case No. 2011-00134, all parties have submitted information requests and responses as well as all testimony. An Informal Conference was held on September 21, 2011. The Companies submitted responses to the Commission Staff's Post-Informal-Conference Information Requests on September 28, 2011. With the submission of the responses, and in accordance with the views expressed by all of the parties during the September 21, 2011 informal conference, the Companies have respectfully requested that the evidentiary record in the proceeding be closed. The case is pending before the Commission for an Order.

The projected annual incremental energy and demand savings are provided in IRP Volume I Table 8.(3)(e)(3) found on pages 8-74 and 8-75. The proposed duration and budget are provided in IRP Volume I Table 8.(3)(e)-4 found on page 8-76.





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**Case No. 2011-00140**

**Question No. 8**

**Witness: Michael E. Hornung**

- Q-8. Please state whether the Companies reviewed the 2007 report titled “An Overview of Kentucky’s Energy Consumption and Energy Efficiency Potential” prepared by the Kentucky Pollution Prevention Center, University of Louisville and the American Council for an Energy-Efficient Economy.
- a. If so, please explain whether and how the information provided in the report was used to develop the Companies’ DSM program.
  - b. If not, please state why not.
- A-8. a. Yes, the Companies did review the 2007 report titled “An Overview of Kentucky’s Energy Consumption and Energy Efficiency Potential” along with other energy efficiency reports to develop the Demand Side Management/Energy Efficiency Program Plan, Case No. 2011-00134.

The Companies agree that energy efficiency is a viable means of addressing future energy demand and energy. As such, the Companies’ pending Demand Side Management/Energy Efficiency Program Plan provides residential and commercial customers’ program opportunities that reduce the highest end use areas assisting them to use energy more wisely, and improve their load factor. These voluntary programs serve to delay the need for the Companies to build additional electric generation.

- b. Not applicable.



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**Case No. 2011-00140**

**Question No. 9**

**Witness: Charles R. Schram**

- Q-9. Refer to Exhibit 2(b): Emissions Allowance Prices, in Appendix A of the GPA 2011 Study in Volume III of the IRP
- a. Please identify the source(s) for the emission prices and describe how the prices were estimated.
  - b. Please indicate whether and how the Companies considered the impact of the U.S. Environmental Protection Agency's (EPA) Cross-State Air Pollution Rule (CSAPR) on emissions prices. If the CSAPR was not considered, please explain why not.
- A-9.
- a. The emissions allowance prices are broker quotes as of May 28, 2010 from Amerex Brokers LLC.
  - b. The impact of the CSAPR was not considered in the 2011 IRP because the IRP was developed in late 2010 and early 2011, before EPA issued the final CSAPR in July 2011. That notwithstanding, the Companies do not presently anticipate that CSAPR will affect the capacity retirement and replacement projections contained in the 2011 IRP.



**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Second Set of Interrogatories and  
Requests for Production of Documents of  
Rick Clewett, Drew Foley, Janet Overman, Gregg Wagner,  
the Natural Resources Defense Council, and the Sierra Club  
Dated August 25, 2011**

**Case No. 2011-00140**

**Question No. 10**

**Witness: Charles R. Schram**

- Q-10. Refer to the Companies' response to Question No. 17 of the Intervenors' first set of discovery requests, regarding CO<sub>2</sub> emissions prices. Please produce any documents or analyses to support the statement that "current BACT solutions for fossil fueled generation, if triggered by permit actions, would not change the 2011 IRP."
- A-10. This statement was made in light of the fact that BACT solutions are not currently defined. Potential CO<sub>2</sub> regulations could take many forms, but the EPA has indicated by the "Tailoring Rule" that it will impose a BACT approach. It is unclear if, or when, commercially viable and scalable technologies will become available which could impose additional costs on fossil fueled generation fleets.



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**Case No. 2011-00140**

**Question No. 11**

**Witness: Charles R. Schram**

- Q-11. Refer to the Companies' response to Question No. 26 of the Intervenor's first set of discovery requests. Please state whether the Companies have done a model run without the environmental controls put on Brown, Ghent, Millcreek, and/or Trimble County?
- a. If so, please describe input assumptions and the results of the model run.
  - b. If not, please explain why not.
- A-11. The Companies have completed a model run without the environmental controls put on Brown, Ghent, Mill Creek, and/or Trimble County.
- a. Please refer to Volume III, page 13 of the 2011 Optimal Expansion Plan Analysis in the IRP. The "No Unit Retirements" case is a case without environmental controls on Brown, Ghent, Mill Creek, and/or Trimble County. In this case, the need for additional generating capacity is delayed to 2018.
  - b. Not applicable.





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**Case No. 2011-00140**

**Question No. 12**

**Witness: Charles R. Schram**

- Q-12. Please explain how upcoming EPA emission rules, including the CSAPR, will affect the operation of the companies' existing coal power plants. Have the Companies done any analysis of such effects? If so, please provide any work papers, memos, reports, or other documents describing this analysis. If the Companies have not analyzed any particular upcoming EPA emission rule(s), explain which rules the Companies did not analyze and why.
- A-12. The Companies presently anticipate that CSAPR will affect the operation of their coal-fired units in the near- and long-term. The Companies' near-term analysis is ongoing, and the Companies anticipate presenting that analysis to the Commission before the end of this year.

The Companies' analysis of the overall impact of EPA regulations, including CSAPR, was provided in response to the following data request:

- Case No. 2011-00161
  - Commission Staff's Second Request for Information
    - Question Nos. 2, 14, 28, 29, 30
  - Drew Foley, Janet Overman, Gregg Wagner, Sierra Club and the Natural Resources Defense Council
    - Question No. 27
- Case No. 2011-00162
  - Commission Staff's Second Request for Information
    - Question Nos. 2, 6, 24, and 25
  - Drew Foley, Janet Overman, Gregg Wagner, Sierra Club and the Natural Resources Defense Council
    - Question No. 27

In addition, the U.S. Environmental Protection Agency (“EPA”) issued the final Transport Rule (CSAPR) on July 6, 2011. Insofar as the rule will affect the Companies, the final rule is materially the same as the proposed rule.

In sum, the rule became effective on October 7, 2011, with the first phase of SO<sub>2</sub> and annual NO<sub>x</sub> compliance requirements becoming effective on January 1, 2012. A second, more stringent phase of SO<sub>2</sub> compliance obligations will go into effect on January 1, 2014. The rule’s ozone-season NO<sub>x</sub> emission limits will become effective on May 1, 2012.

On October 6, 2011, EPA released technical adjustments to CSAPR. These changes included adjustments to the allowance allocation amounts for Kentucky sources. The change was the result of EPA’s comparing CSAPR allocations to previously signed consent decrees and concluding that TVA’s Kentucky Electric Generating Units (“EGUs”) had been assigned too many SO<sub>2</sub> allowances. The Kentucky statewide SO<sub>2</sub> budget remained the same, so these additional SO<sub>2</sub> allowances, which were to become available in 2013 and 2018, were redistributed to the remaining EGUs in amounts proportional to their original allocations. The increased SO<sub>2</sub> allocations for the Companies are approximately 2% in 2013 and 2% in 2018. The EPA’s technical adjustments produced no change in the Companies’ ozone-season NO<sub>x</sub> allocations and only a very slight increase in the Companies’ annual NO<sub>x</sub> allocations in 2018.



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**Case No. 2011-00140**

**Question No. 13**

**Witness: Charles R. Schram**

Q-13. Refer to the statement on page 8-96 of the IRP Volume I that, “the Companies began construction of a number of projects to reduce fleet-wide sulfur dioxide (SO<sub>2</sub>) emissions, including the installation of FGDs on Ghent Units 2, 3, 4 and E. W. Brown Units 1, 2, and 3.”

- a. Please provide the cost of the projects to reduce SO<sub>2</sub> emissions, including FGDs for each of the electric generating units mentioned above. Please provide the data in terms of the total cost and the cost per ton of SO<sub>2</sub> reduction.
- b. Please explain if any other existing power plants also need to add FGDs, and if so, when.

A-13.

- a. The table below contains the Plant in Service balances and cost per ton of SO<sub>2</sub> reduction for the FGDs at Ghent Units 1, 3, and 4 and Brown Units 1, 2, and 3. The existing FGD on Ghent Unit 1 was re-configured to Ghent Unit 2 and a new FGD was added to Ghent Unit 1. The costs per ton of SO<sub>2</sub> reduction are computed based on annual levelized capital costs and projected SO<sub>2</sub> reductions.

Plant Name	Plant in Service (\$ Millions)	Cost per Ton of SO <sub>2</sub> Reduction (\$)
E.W. Brown 1, 2, and 3	431	437
Ghent 1	170	177
Ghent 3	129	160
Ghent 4	293	302

- b. Please see the Companies’ 2011 Air Compliance Plan. The Companies have recommended installing or upgrading the FGDs on Mill Creek Units 1, 2, 3, and 4.



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**Case No. 2011-00140**

**Question No. 14**

**Witness: Charles R. Schram**

- Q-14. Refer to Table 8.(3)(b) on page 8-18 of Volume I of the IRP. Please provide the capital, operating, and maintenance cost of SCRs and Baghouses assumed for each power plant unit in terms of the total cost and the cost per ton of emissions reduction for nitrous oxides (NO<sub>x</sub>) and particulate matter (PM).
- A-14. Please see the attachment. The costs per ton of emissions reduction for NO<sub>x</sub> and PM are computed based on annual levelized capital costs, annual operating and maintenance costs, and projected emission reductions.

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
<b>Baghouse VOM (\$000)</b>															
Brown 1	0	0	0	93	202	466	527	552	638	606	559	710	778	789	877
Brown 2	0	0	0	0	42	745	843	906	1,028	1,021	1,121	1,246	1,200	1,319	1,442
Brown 3	0	0	0	0	0	1,566	2,497	2,513	2,388	2,682	2,953	3,009	3,238	3,232	3,514
Ghent 1	0	0	0	0	0	2,482	4,189	4,103	4,511	4,496	4,015	4,957	4,765	5,240	5,155
Ghent 2	0	0	0	0	0	2,847	3,717	3,668	3,325	4,035	3,943	4,187	4,102	4,368	4,268
Ghent 3	0	0	0	0	673	3,462	3,126	3,891	3,884	4,141	4,196	4,435	4,373	4,417	5,008
Ghent 4	0	0	0	0	129	4,187	4,461	4,315	4,727	4,713	5,003	4,434	5,207	5,197	5,525
Mill Creek 1	0	0	0	458	2,784	2,780	2,988	2,887	3,124	2,763	3,268	3,119	3,392	3,265	3,529
Mill Creek 2	0	0	484	2,622	2,596	3,023	2,883	3,146	2,766	3,289	3,146	3,408	3,272	3,564	3,412
Mill Creek 3	0	0	0	0	2,131	3,946	3,782	4,125	3,622	4,317	4,144	4,480	4,313	4,694	4,511
Mill Creek 4	0	0	0	1,898	3,955	4,487	4,892	4,704	5,115	4,937	5,329	4,710	5,559	5,355	5,812
Trimble County 1	0	0	0	0	645	3,858	3,298	3,999	3,752	4,189	3,908	4,345	4,060	4,533	3,877
<b>SCR VOM (\$000)</b>															
Brown 3	0	1,322	2,554	2,597	2,719	3,239	3,563	3,585	3,407	3,827	4,214	4,294	4,619	4,611	5,014
<b>Baghouse VOM (\$/MWh)</b>															
Brown 1						1,2514	1,2764	1,3019	1,3280	1,3545	1,3816	1,4093	1,4375	1,4662	1,4955
Brown 2				1,2028	1,2269	1,1329	1,1566	1,1787	1,2023	1,2263	1,2508	1,2758	1,3014	1,3274	1,3539
Brown 3					1,1107	1,1582	1,1814	1,2050	1,2291	1,2537	1,2787	1,3043	1,3304	1,3570	1,3842
Ghent 1						1,2652	1,2905	1,3163	1,3426	1,3695	1,3969	1,4248	1,4533	1,4824	1,5120
Ghent 2						0,9692	0,9886	1,0084	1,0285	1,0491	1,0701	1,0915	1,1133	1,1356	1,1583
Ghent 3					1,3749	1,4024	1,4304	1,4591	1,4882	1,5180	1,5484	1,5793	1,6109	1,6431	1,6760
Ghent 4					1,2181	1,2425	1,2673	1,2927	1,3185	1,3449	1,3718	1,3992	1,4272	1,4557	1,4849
Mill Creek 1					1,2105	1,2347	1,2594	1,2846	1,3103	1,3365	1,3633	1,3905	1,4183	1,4467	1,4756
Mill Creek 2			1,2103	1,2345	1,2592	1,2844	1,3101	1,3363	1,3630	1,3903	1,4181	1,4464	1,4753	1,5049	1,5350
Mill Creek 3					1,2687	1,2941	1,3200	1,3464	1,3733	1,4007	1,4288	1,4573	1,4865	1,5162	1,5465
Mill Creek 4				1,2316	1,2562	1,2814	1,3070	1,3331	1,3598	1,3870	1,4147	1,4430	1,4719	1,5013	1,5313
Trimble County 1					1,1972	1,2211	1,2456	1,2705	1,2959	1,3218	1,3482	1,3752	1,4027	1,4308	1,4594
<b>SCR VOM (\$/MWh)</b>															
Brown 3		1,3276	1,5571	1,5862	1,6200	1,6524	1,6855	1,7192	1,7535	1,7886	1,8244	1,8609	1,8981	1,9361	1,9748

Escalation Rate: 2%



Generation (GWh)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Brown 1	126	194	220	178	165	372	413	424	480	447	405	504	541	538	587
Brown 2	269	453	449	551	495	658	729	769	855	833	897	976	922	993	1,065
Brown 3	1,587	1,454	1,640	1,635	1,678	1,960	2,114	2,085	1,943	2,140	2,310	2,307	2,434	2,382	2,539
Brown 4	14	12	9	14	12	13	15	10	5	6	7	9	10	13	6
Brown 5	25	19	11	22	17	17	19	19	7	7	10	13	14	19	12
Brown 6	21	15	11	16	16	16	19	19	6	6	9	11	13	16	12
Brown 7	12	10	9	15	12	13	15	9	5	6	8	9	11	14	8
Brown 8	8	8	7	12	10	11	12	7	4	5	6	8	9	11	6
Brown 9	8	6	6	10	9	9	11	6	3	4	5	6	8	10	5
Brown 10	6	5	5	8	7	7	9	5	3	3	4	5	7	9	4
Brown 11	438	376	307	461	450	0	0	0	0	0	0	0	0	0	0
CANE RUN 4	639	533	477	631	547	0	0	0	0	0	0	0	0	0	0
CANE RUN 5	772	522	476	607	642	0	0	0	0	0	0	0	0	0	0
CANE RUN 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CR G/O 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EE/LUNIT 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ghent 1	2,840	3,061	3,147	3,008	3,747	2,981	3,246	3,117	3,360	3,283	2,874	3,479	3,272	3,535	3,409
Ghent 2	3,663	3,270	3,667	3,715	3,791	3,626	3,760	3,836	3,232	3,846	3,685	3,836	3,665	3,846	3,685
Ghent 3	1,870	2,370	2,297	2,798	2,548	2,468	2,185	2,667	2,610	2,728	2,710	2,808	2,714	2,668	2,988
Ghent 4	3,429	3,652	3,812	3,544	3,327	3,370	3,520	3,338	3,365	3,505	3,647	3,169	3,649	3,570	3,721
GRRIVER 3	108	99	83	111	106	0	0	0	0	0	0	0	0	0	0
GRRIVER 4	303	373	321	432	493	0	0	0	0	0	0	0	0	0	0
HAEFELING 1	1	0	0	1	1	1	1	0	0	0	0	1	1	1	0
MILL CRK 1	2,415	2,046	2,334	2,219	2,300	2,252	2,380	2,247	2,384	2,067	2,390	2,243	2,391	2,257	2,391
MILL CRK 2	2,057	2,284	2,045	2,124	2,062	2,353	2,201	2,354	2,030	2,366	2,218	2,356	2,218	2,369	2,223
MILL CRK 3	2,662	2,849	2,545	2,900	2,358	3,049	2,866	3,064	2,637	3,082	2,900	3,074	2,901	3,096	2,917
MILL CRK 4	3,704	3,324	3,500	2,472	3,148	3,502	3,743	3,528	3,162	3,560	3,767	3,264	3,777	3,567	3,795
OVEC 1	677	821	666	794	863	1,058	930	1,012	1,072	991	1,000	1,045	944	906	918
PADDYS 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PADDYS 12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PADDYS 13	118	182	129	169	166	175	180	58	83	79	90	113	106	134	77
TC CT 5	114	154	121	185	153	198	121	179	153	93	107	127	132	151	110
TC CT 6	145	124	100	157	128	174	164	147	67	65	79	96	99	117	86
TC CT 7	118	100	79	133	104	144	126	114	55	54	66	81	85	101	70
TC CT 8	100	57	62	107	82	105	106	66	42	43	53	64	70	82	56
TC CT 9	79	66	49	87	66	80	87	71	31	33	41	50	55	65	46
TC CT 10	62	52	36	68	52	60	67	56	22	25	32	39	44	53	37
TC1 75% 1	2,732	3,212	2,938	3,203	2,931	3,159	2,648	3,147	2,895	3,169	2,898	3,160	2,895	3,168	2,857
TC2 75% 2	4,097	4,177	4,576	4,200	4,576	4,213	4,576	3,849	4,576	4,213	4,576	4,200	4,576	4,213	4,576
TYRONE 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYRONE 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYRONE 3	54	57	48	74	68	0	0	0	0	0	0	0	0	0	0
WATRSIDE 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WATRSIDE 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ZORN 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trimbale County 1	273	247	273	262	271	262	271	271	262	17	252	270	270	270	270
Trimbale County 2	159	147	152	147	17	144	146	165	134	130	125	134	134	134	134
Brown 3	38	44	19	0	2	16	13	24	10	5	3	4	3	6	4
Brown 1	72	63	26	45	19	54	48	68	38	23	6	32	6	32	32
Brown 2	223	204	174	7	164	190	185	216	159	144	142	151	144	151	144
Brown 3	318	297	319	85	223	266	258	293	242	211	258	242	211	245	224
Ghent 1	333	312	43	291	334	326	337	337	323	334	323	331	323	331	323
Ghent 2	310	279	186	250	141	283	282	297	74	63	178	204	178	204	178
Ghent 3	334	302	341	330	332	327	338	338	329	249	0	106	0	106	0
Ghent 4	210	190	204	202	206	203	210	197	160	160	160	208	160	208	160
Mill Creek 1	202	183	169	195	189	194	198	203	63	98	142	159	142	159	142
Mill Creek 2	269	244	165	80	165	201	193	224	180	199	215	222	178	222	222
Mill Creek 3	339	308	284	308	35	217	202	253	210	217	210	229	210	217	229
Mill Creek 4	273	247	273	262	271	262	271	271	262	17	252	270	270	270	270
Trimbale County 1	159	147	152	147	17	144	146	165	134	130	125	134	134	134	134

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
<b>\$000</b>															
<b>Fixed O&amp;M for New Controls</b>															
Brown 1	0	0	0	1,074	1,643	1,676	1,709	1,743	1,778	1,814	1,850	1,887	1,925	1,963	2,003
Brown 2	0	0	0	0	348	2,131	2,173	2,217	2,261	2,306	2,352	2,400	2,448	2,496	2,546
Brown 3	0	0	0	0	0	2,204	3,371	3,439	3,508	3,578	3,649	3,722	3,797	3,873	3,950
Ghent 1	0	0	0	0	0	4,015	6,143	6,266	6,391	6,519	6,650	6,783	6,918	7,057	7,198
Ghent 2	0	0	0	0	0	3,988	5,833	5,843	5,871	5,756	5,871	5,989	6,108	6,231	6,355
Ghent 3	0	0	0	0	1,539	6,277	6,403	6,531	6,661	6,795	6,931	7,069	7,211	7,355	7,502
Ghent 4	0	0	0	0	449	5,499	5,609	5,721	5,836	5,952	6,071	6,193	6,317	6,443	6,572
Mill Creek 1	0	0	0	605	3,700	3,774	3,849	3,926	4,005	4,085	4,167	4,250	4,335	4,422	4,510
Mill Creek 2	0	0	596	3,648	3,721	3,795	3,871	3,948	4,027	4,108	4,190	4,274	4,359	4,447	4,536
Mill Creek 3	0	0	0	0	3,817	5,190	5,294	5,400	5,508	5,618	5,731	5,845	5,962	6,081	6,203
Mill Creek 4	0	0	0	3,899	5,965	6,085	6,206	6,330	6,457	6,586	6,718	6,852	6,989	7,129	7,272
Trimble County 1	0	0	0	0	1,091	4,451	4,540	4,631	4,724	4,818	4,914	5,013	5,113	5,215	5,320
*75% TC															
BR1	0	0	0	964,808	1,476,156	1,505,679	1,535,793	1,566,509	1,597,839	1,629,796	1,662,391	1,695,639	1,729,552	1,764,143	1,799,426
BR1	0	0	0	108,965	166,716	170,051	173,452	176,921	180,459	184,068	187,750	191,505	195,335	199,241	203,226
BR2	0	0	0	0	317,239	1,941,504	1,980,334	2,019,941	2,060,340	2,101,546	2,143,577	2,186,449	2,230,178	2,274,781	2,320,277
BR3	0	0	0	0	30,914	189,195	192,979	196,839	200,776	204,791	208,887	213,065	217,326	221,672	226,106
BR3	0	0	0	0	0	167,423	256,157	261,280	266,506	271,836	277,272	282,818	288,474	294,244	300,129
GH1	0	0	0	0	0	3,835,709	5,868,635	5,986,008	6,105,728	6,227,842	6,352,399	6,479,447	6,609,036	6,741,217	6,876,041
GH1	0	0	0	0	0	-179,435	274,536	280,027	285,627	291,340	297,166	303,110	309,172	315,355	321,663
GH2	0	0	0	0	0	3,790,663	5,155,301	5,258,407	5,363,575	5,470,847	5,580,264	5,691,869	5,805,707	5,921,821	6,040,257
GH2	0	0	0	0	0	197,642	268,792	274,168	279,652	285,245	290,950	296,769	302,704	308,758	314,933
GH3	0	0	0	0	1,473,396	6,011,455	6,131,684	6,254,318	6,379,404	6,506,992	6,637,132	6,769,875	6,905,272	7,043,378	7,184,245
GH4	0	0	0	0	65,141	265,774	271,090	276,512	282,042	287,683	293,436	299,305	305,291	311,387	317,625
GH4	0	0	0	0	427,555	5,233,277	5,337,942	5,444,701	5,553,595	5,664,667	5,777,960	5,893,520	6,011,390	6,131,618	6,254,250
MC1	0	0	0	565,932	3,463,501	3,532,772	3,603,427	3,675,495	3,749,005	3,823,985	3,900,465	3,978,475	4,058,044	4,139,205	4,221,989
MC1	0	0	0	38,607	236,273	240,999	245,819	250,735	255,750	260,865	266,082	271,404	276,832	282,368	288,016
MC2	0	0	558,195	3,416,156	3,484,479	3,554,169	3,625,252	3,697,757	3,771,712	3,847,146	3,924,089	4,002,571	4,082,623	4,164,275	4,247,560
MC2	0	0	37,850	231,640	236,273	240,999	245,819	250,735	255,750	260,865	266,082	271,404	276,832	282,368	288,016
MC3	0	0	0	0	3,620,281	4,923,582	5,022,054	5,122,495	5,224,945	5,329,444	5,436,032	5,544,753	5,655,648	5,768,761	5,884,136
MC3	0	0	0	0	196,250	266,900	272,239	277,683	283,237	288,902	294,680	300,573	306,585	312,716	318,971
MC4	0	0	0	3,710,577	5,677,183	5,790,727	5,906,542	6,024,673	6,145,166	6,268,069	6,393,431	6,521,299	6,651,725	6,784,760	6,920,455
MC4	0	0	0	188,343	288,165	293,928	299,807	305,803	311,919	318,158	324,521	331,011	337,631	344,384	351,272
TC1	0	0	0	0	1,385,069	5,651,083	5,764,105	5,879,387	5,996,975	6,116,914	6,239,252	6,364,037	6,491,318	6,621,144	6,753,567
TC1	0	0	0	0	69,557	283,793	289,469	295,258	301,163	307,187	313,330	319,597	325,989	332,509	339,159



PM Emissions (Tons)	PM Emission Rate lb/MBtu
Brown 1	0.029
Brown 2	0.029
Brown 3	0.029
Ghent 1	0.051
Ghent 2	0.060
Ghent 3	0.060
Ghent 4	0.073
Mill Creek 1	0.081
Mill Creek 2	0.081
Mill Creek 3	0.098
Mill Creek 4	0.085
Trimble County 1	0.033

Fixed Charge Rate 10.45%

NOx Emission Rate lb/MBtu	2012 Fuel Burn 000MBtu	NOx Emissions tons
Brown 3	0.3000	27
		4

PM Emission Rate with FF  
SCR Removal Efficiency: 90%

**Total Fuel Consumed (000MBTU)**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Brown 1	1,391	2,139	2,394	1,935	1,800	4,029	4,473	4,583	5,197	4,839	4,381	5,444	5,839	5,811	6,326
Brown 2	2,732	4,619	4,541	5,583	5,019	6,666	7,394	7,796	8,678	8,432	9,081	9,890	9,331	10,066	10,788
Brown 3	17,023	15,566	17,581	17,489	17,968	20,743	22,367	22,025	20,482	22,578	24,332	24,255	25,551	24,999	26,615
Brown 5	31,270	33,664	34,610	33,009	41,059	32,771	35,668	34,245	36,905	36,056	31,601	38,190	35,942	38,817	37,430
Ghent 1	39,188	33,016	39,027	37,497	38,262	36,597	37,949	38,708	32,659	38,815	37,191	38,708	37,191	38,815	37,191
Ghent 2	21,135	26,798	25,972	31,629	28,780	27,948	24,696	30,169	29,521	30,859	30,627	31,751	30,677	30,350	33,762
Ghent 3	34,732	37,486	39,147	36,415	34,196	34,546	36,123	34,237	36,784	35,983	37,479	32,531	37,504	36,696	38,241
Mill Creek 1	24,972	21,103	24,064	22,894	23,718	23,269	24,601	23,222	24,639	21,355	24,708	23,176	24,725	23,326	24,725
Mill Creek 2	21,637	23,940	21,404	22,163	21,559	21,744	23,130	24,751	21,341	23,329	23,329	24,786	23,324	24,910	23,383
Mill Creek 3	27,213	29,052	25,961	29,569	24,042	31,147	29,280	31,300	26,966	31,494	29,648	31,410	29,658	31,636	29,828
Mill Creek 4	38,286	34,214	36,025	25,415	32,354	36,129	38,642	36,431	38,850	36,764	38,902	33,717	39,015	36,844	39,218
Trimble County 1	27,668	32,497	29,734	32,408	29,664	31,972	26,796	31,854	29,297	32,070	29,332	33,717	29,293	32,059	26,866

**Total Fuel Consumed (000MBTU)**

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Brown 1	1,391	2,139	2,394	1,935	1,800	4,029	4,473	4,583	5,197	4,839	4,381	5,444	5,839	5,811	6,326
Brown 2	2,732	4,619	4,541	5,583	5,019	6,666	7,394	7,796	8,678	8,432	9,081	9,890	9,331	10,066	10,788
Brown 3	17,023	15,566	17,581	17,489	17,968	20,743	22,367	22,025	20,482	22,578	24,332	24,255	25,551	24,999	26,615
Brown 5	255	210	146	235	198	222	251	175	90	96	118	151	165	213	100
Brown 6	347	258	157	307	228	238	269	257	91	96	135	177	198	257	168
Brown 7	290	218	148	329	264	223	264	259	81	86	120	177	180	222	161
Brown 8	183	152	136	223	187	191	226	142	73	86	111	139	166	203	114
Brown 9	121	119	110	180	154	160	183	104	57	71	95	111	133	166	86
Brown 10	120	95	92	145	129	129	154	82	47	60	78	95	115	145	74
Brown 11	92	74	74	116	106	105	127	64	39	50	64	79	97	123	61
CANE RUN 4	5,458	4,717	3,840	5,763	5,616	0	0	0	0	0	0	0	0	0	0
CANE RUN 5	7,581	6,358	5,688	7,486	6,492	0	0	0	0	0	0	0	0	0	0
CANE RUN 6	8,994	6,133	5,986	7,065	7,479	0	0	0	0	0	0	0	0	0	0
CR G/O 11	2	1	2	2	2	2	3	1	1	1	2	2	3	4	2
EEL UNIT 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ghent 1	31,270	33,664	34,610	33,009	41,059	32,771	35,668	34,245	36,905	36,056	31,601	38,190	35,942	38,817	37,430
Ghent 2	39,188	33,016	39,027	37,497	38,262	36,597	37,949	38,708	32,659	38,815	37,191	38,708	37,191	38,815	37,191
Ghent 3	21,135	26,798	25,972	31,629	28,780	27,948	24,696	30,169	29,521	30,859	30,627	31,751	30,677	30,350	33,762
Ghent 4	34,732	37,486	39,147	36,415	34,196	34,546	36,123	34,237	36,784	35,983	37,479	32,531	37,504	36,696	38,241
GRRIVER 3	1,387	1,285	1,089	1,437	1,383	0	0	0	0	0	0	0	0	0	0
GRRIVER 4	3,321	4,064	3,472	4,693	5,347	0	0	0	0	0	0	0	0	0	0
HAEFLNG1 1	10	8	7	12	11	11	14	7	4	5	7	9	12	16	8
MILL CRK 1	24,972	21,103	24,064	22,894	23,718	23,269	24,601	23,222	24,639	21,355	24,708	23,176	24,725	23,326	24,725
MILL CRK 2	21,637	23,940	21,404	22,163	21,559	21,744	23,130	24,751	21,341	24,878	23,329	24,786	23,324	24,910	23,383
MILL CRK 3	27,213	29,052	25,961	29,569	24,042	31,147	29,280	31,300	26,966	31,494	29,648	31,410	29,658	31,636	29,828
MILL CRK 4	38,286	34,214	36,025	25,415	32,354	36,129	38,642	36,431	38,850	36,764	38,902	33,717	39,015	36,844	39,218
OVEC 1	6,767	8,207	6,663	7,939	8,629	10,585	9,303	10,117	10,717	9,913	10,003	10,454	9,440	9,063	9,179
PADDYS 11	2	1	1	2	2	2	3	1	1	1	1	2	2	2	2
PADDYS 12	3	2	3	4	4	4	5	3	1	2	3	4	5	7	3
PADDYS 13	1,263	1,952	1,384	2,025	1,779	1,877	1,928	623	890	849	968	1,215	1,134	1,435	821
TC CT 5	1,433	1,982	1,559	2,356	1,976	2,236	2,284	2,021	1,076	1,040	1,222	1,452	1,503	1,728	1,235
TC CT 6	1,781	1,568	1,270	1,969	1,623	1,968	1,867	1,661	773	753	900	1,098	1,131	1,339	974
TC CT 7	1,428	1,252	987	1,651	1,307	1,636	1,444	1,289	634	628	758	929	966	1,150	789
TC CT 8	1,196	700	757	1,302	1,004	1,181	1,212	744	482	499	607	731	795	930	631
TC CT 9	935	802	592	1,035	374	902	984	799	356	564	463	564	622	736	511
TC CT 10	721	618	438	802	612	673	753	630	286	286	361	443	495	592	411
TC1 75% 1	32,497	29,734	32,408	32,408	29,664	31,972	26,796	31,854	29,297	32,070	29,332	31,974	29,293	32,059	26,866
TC2 75% 2	34,905	35,589	38,994	35,788	38,994	35,897	38,994	32,795	38,994	35,897	38,994	35,788	38,994	35,897	38,994
TYRONE 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYRONE 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TYRONE 3	699	735	613	949	862	0	0	0	0	0	0	0	0	0	0
WATRSIDE 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WATRSIDE 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ZORN 1	2	2	2	3	3	3	4	2	1	1	2	2	3	4	2

Trimble County 1

SO00	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
<b>Baghouse Capital</b>																
Brown 1	1,830	13,322	16,764	9,202	0	0	0	0	0	0	0	0	0	0	0	41,117
Brown 2	0	1,522	11,875	14,831	14,831	1,336	0	0	0	0	0	0	0	0	0	44,237
Brown 3	0	0	2,131	27,061	40,416	13,292	0	0	0	0	0	0	0	0	0	82,901
Ghent 1	0	0	4,575	56,726	83,047	27,043	0	0	0	0	0	0	0	0	0	171,392
Ghent 2	0	0	5,588	52,065	76,195	0	0	0	0	0	0	0	0	0	0	177,833
Ghent 3	0	0	19,280	87,298	87,298	9,036	0	0	0	0	0	0	0	0	0	152,200
Ghent 4	0	0	13,622	53,342	77,575	7,661	0	0	0	0	0	0	0	0	0	101,118
Mill Creek 1	0	9,531	34,693	51,804	5,090	0	0	0	0	0	0	0	0	0	0	97,229
Mill Creek 2	9,164	33,359	49,811	4,895	0	0	0	0	0	0	0	0	0	0	0	132,626
Mill Creek 3	0	2,455	36,297	50,451	41,423	0	0	0	0	0	0	0	0	0	0	159,453
Mill Creek 4	5,945	54,059	64,301	35,108	0	0	0	0	0	0	0	0	0	0	0	166,086
Trimble County 1	0	0	14,902	58,149	84,653	8,381	0	0	0	0	0	0	0	0	0	119,000
<b>SCR Capital (\$000s)</b>																
Brown 3	0	119,000	0	0	0	0	0	0	0	0	0	0	0	0	0	119,000
<b>Baghouse O&amp;M</b>																
Brown 1	0	0	0	1,167	1,845	2,141	2,236	2,295	2,416	2,420	2,409	2,597	2,703	2,753	2,880	2,880
Brown 2	0	0	0	0	391	2,876	3,016	3,123	3,290	3,327	3,474	3,645	3,648	3,815	3,988	3,988
Brown 3	0	0	0	0	0	3,769	5,869	5,951	5,895	6,260	6,603	6,732	7,035	7,105	7,464	7,464
Ghent 1	0	0	0	0	0	6,497	10,332	10,369	10,902	11,015	10,665	11,739	11,673	12,296	12,353	12,353
Ghent 2	0	0	0	0	0	6,835	9,141	9,400	8,968	9,791	9,814	10,175	10,211	10,598	10,623	10,623
Ghent 3	0	0	0	0	2,152	9,739	9,528	10,422	10,546	10,936	11,126	11,504	11,572	11,772	12,510	12,510
Ghent 4	0	0	0	0	579	9,686	10,070	10,036	10,563	10,666	11,074	10,627	11,524	11,640	12,097	12,097
Mill Creek 1	0	0	0	1,062	6,484	6,554	6,847	6,813	7,128	6,848	7,425	7,369	7,727	7,667	8,039	8,039
Mill Creek 2	0	0	1,080	6,269	6,317	6,754	7,094	7,084	6,794	7,397	7,336	7,662	7,632	8,011	7,948	7,948
Mill Creek 3	0	0	0	0	5,948	9,137	9,077	9,525	9,130	9,936	9,875	10,325	10,775	10,715	10,775	10,775
Mill Creek 4	0	0	0	5,797	9,920	10,572	11,098	11,034	11,572	11,523	12,047	11,562	12,548	12,484	13,083	13,083
Trimble County 1	0	0	0	0	1,736	8,309	7,838	8,630	8,475	9,007	8,822	9,356	9,173	9,748	9,197	9,197
<b>SCR O&amp;M (\$000s)</b>																
Brown 3	0	1,322	2,554	2,597	2,719	3,239	3,563	3,585	3,407	3,827	4,214	4,284	4,619	4,611	5,014	5,014
<b>PM Emissions Removed (Tons)</b>																
Brown 1	2.22	3.42	3.83	3.10	2.88	6.45	7.16	7.33	8.32	7.74	7.01	8.71	9.34	9.30	10.12	10.12
Brown 2	4.37	7.39	7.26	8.93	8.03	10.67	11.83	12.47	13.88	13.49	14.53	15.82	14.93	16.11	17.26	17.26
Brown 3	27.24	24.91	28.13	27.98	28.75	33.19	35.79	35.24	32.77	36.12	38.93	40.81	40.88	40.00	42.98	42.98
Ghent 1	424.16	436.09	436.09	415.91	517.34	412.91	448.42	431.49	465.00	454.30	398.18	481.20	452.87	489.10	471.61	471.61
Ghent 2	670.12	564.57	667.36	641.20	654.28	625.80	648.93	661.91	558.12	663.74	635.96	661.91	635.96	663.74	635.96	635.96
Ghent 3	361.40	458.25	444.12	540.86	492.14	477.91	422.31	515.90	504.81	523.72	523.72	542.95	524.58	518.98	577.33	577.33
Ghent 4	819.66	884.67	923.87	859.40	807.02	815.28	852.51	807.99	868.11	849.21	884.49	787.74	885.09	866.03	902.49	902.49
Mill Creek 1	689.23	582.43	664.16	631.86	654.62	642.22	679.00	640.93	680.04	589.41	681.94	639.67	682.40	643.80	682.40	682.40
Mill Creek 2	597.17	660.75	590.75	611.70	595.03	662.94	638.38	683.13	589.02	686.64	643.87	643.87	643.75	687.50	645.36	645.36
Mill Creek 3	982.39	1048.79	937.18	1087.44	867.93	1124.42	1057.00	1129.94	973.47	1136.93	1070.30	1133.91	1070.67	1142.07	1076.80	1076.80
Mill Creek 4	1133.27	1012.74	1066.33	752.27	957.67	1069.42	1143.80	1078.37	1149.97	1088.22	1151.51	998.02	1154.85	1090.57	1160.86	1160.86
Trimble County 1	99.60	116.99	107.04	116.67	106.79	115.10	96.47	114.67	105.47	115.45	105.59	115.10	105.46	115.41	96.79	96.79
<b>NOx Tons Removed</b>																
Brown 3	2,298	2,101	2,373	2,361	2,426	2,800	3,019	2,973	2,765	3,048	3,285	3,274	3,449	3,375	3,593	3,593
<b>Cost/Ton of PM Removed by Baghouse (\$)</b>																
Brown 1	0	0	0	0	2,132,953	998,680	912,968	899,013	807,292	867,515	956,769	791,512	749,270	758,229	709,023	709,023
Brown 2	0	0	0	0	0	703,048	645,702	621,001	569,893	589,259	557,266	522,506	553,953	523,887	486,870	486,870
Brown 3	0	0	0	0	0	0	406,074	414,716	444,242	413,103	392,119	396,691	383,976	394,221	378,720	378,720
Ghent 1	0	0	0	0	0	0	62,843	65,539	61,963	63,671	71,764	61,617	65,325	61,759	64,169	64,169
Ghent 2	0	0	0	0	0	0	39,395	39,014	45,493	39,495	41,256	40,184	41,880	40,711	42,528	42,528
Ghent 3	0	0	0	0	0	0	66,567	56,223	57,704	55,415	56,729	55,415	57,507	58,491	53,857	53,857
Ghent 4	0	0	0	0	0	0	31,389	32,105	30,489	31,289	30,502	34,558	30,990	31,806	31,027	31,027
Mill Creek 1	0	0	0	0	26,047	26,659	25,647	27,116	26,021	29,546	26,383	28,039	26,808	28,353	27,265	27,265
Mill Creek 2	0	0	0	26,859	27,692	24,861	26,497	25,258	28,764	25,570	27,174	26,083	27,638	26,431	28,059	28,059
Mill Creek 3	0	0	0	0	0	0	21,699	23,616	23,161	22,175	22,175	21,328	22,541	21,570	22,821	22,821
Mill Creek 4	0	0	0	0	27,758	25,467	24,271	25,684	24,553	25,901	24,932	28,281	25,294	26,726	25,624	25,624
Trimble County 1	0	0	0	0	0	222,983	261,170	226,607	244,920	228,349	247,913	232,084	251,568	234,846	274,339	274,339
<b>Cost/Ton of NOx Removed (\$)</b>																
Brown 3	-	-	6,315	6,367	6,248	5,597	5,298	5,388	5,729	5,335	5,068	5,109	4,944	5,051	4,856	4,856



**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Second Set of Interrogatories and  
Requests for Production of Documents of  
Rick Clewett, Drew Foley, Janet Overman, Gregg Wagner,  
the Natural Resources Defense Council, and the Sierra Club  
Dated August 25, 2011**

**Case No. 2011-00140**

**Question No. 15**

**Witness: Charles R. Schram**

- Q-15. Please state whether any costs for complying with pending regulations on disposal of coal combustion residuals, water intake structures, or effluent limitation guidelines been included in the modeling.
- a. If so, please identify the specific costs that were assumed for each electric generating unit for each of the pending regulations noted above.
  - b. If not, please explain why.
- A-15. The costs for complying with these pending regulations were not considered in the development of the 2011 IRP.
- a. Not applicable.
  - b. At the time the IRP was prepared, beginning in 2010, there was considerable uncertainty about these pending regulations and the Companies had not fully developed their view of resulting compliance costs. Ultimately, the Companies performed a more exhaustive analysis of the retire/retrofit decisions as part of the 2011 Air Compliance Plan (Case Nos. 2011-00161 and 2011-00162) analysis, which commenced subsequent to finalizing assumptions for the 2011 IRP. As such, the 2011 Air Compliance Plan contains, based on specified levels of regulations and cost studies, compliance costs for coal combustion residuals, water intake structures, and effluent limitation guidelines.





**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Second Set of Interrogatories and  
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the Natural Resources Defense Council, and the Sierra Club  
Dated August 25, 2011**

Case No. 2011-00140

Question No. 16

Witness: Charles R. Schram

Q-16. For each electric generating unit, please indicate whether the unit is controlled for NO<sub>x</sub>, SO<sub>2</sub>, and hazardous air pollutants, whether each unit needs or is expected to need additional controls, and how such controls will impact the unit's forward-going costs and operating characteristics.

A-16. Please see the table below.

	Current Controls			Expected Need for Controls		
	NO <sub>x</sub>	SO <sub>2</sub>	HAPs	NO <sub>x</sub>	SO <sub>2</sub>	HAPs
Brown 1	X	X				X
Brown 2	X	X				X
Brown 3	X	X		X <sup>1</sup>		X
Brown 5	X	NA				
Brown 6	X	NA				
Brown 7	X	NA				
Brown 8	X	NA				
Brown 9	X	NA				
Brown 10	X	NA				
Brown 11	X	NA				
Cane Run 4 <sup>2</sup>	X	X				
Cane Run 5 <sup>2</sup>	X	X				
Cane Run 6 <sup>2</sup>	X	X				
Cane Run 11		NA				
Dix Dam 1-3	NA	NA	NA			
Ghent 1	X	X		X		X
Ghent 2	X	X				X
Ghent 3	X	X		X		X
Ghent 4	X	X		X		X

	Current Controls			Expected Need for Controls		
	NO <sub>x</sub>	SO <sub>2</sub>	HAPs	NO <sub>x</sub>	SO <sub>2</sub>	HAPs
Green River 3 <sup>2</sup>	X					
Green River 4 <sup>2</sup>	X					
Haefling 1-3	X	NA				
Mill Creek 1	X	X			X	X
Mill Creek 2	X	X			X	X
Mill Creek 3	X	X		X	X	X
Mill Creek 4	X	X		X	X	X
Ohio Falls 1-8	NA	NA	NA			
Paddy's Run 11		NA				
Paddy's Run 12		NA				
Paddy's Run 13	X	NA				
Trimble County 1	X	X				X
Trimble County 2	X	X	X			
Trimble County 5	X	NA				
Trimble County 6	X	NA				
Trimble County 7	X	NA				
Trimble County 8	X	NA				
Trimble County 9	X	NA				
Trimble County 10	X	NA				
Tyrone 3 <sup>2</sup>	X					
Zorn 1		NA				

For the most updated estimates of forward-going costs and impacts to operating characteristics, please see Tables 12-91 of the Companies' 2011 Air Compliance Plan (Case Nos. 2011-00161 and 2011-00162).

Notes: 1 – The Brown 3 SCR is scheduled to be in service May 2012. Because construction of this project started prior to the development of the 2011 IRP and the 2011 Air Compliance Plan, its capital cost was not considered in either of these analyses.

2 – The Companies determined, as documented in the 2011 Air Compliance Plan, that retiring Cane Run 4-6, Green River 3-4, and Tyrone 3 is more cost-effective than installing additional controls on these units.



**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Second Set of Interrogatories and  
Requests for Production of Documents of  
Rick Clewett, Drew Foley, Janet Overman, Gregg Wagner,  
the Natural Resources Defense Council, and the Sierra Club  
Dated August 25, 2011**

**Case No. 2011-00140**

**Question No. 17**

**Witness: Charles R. Schram**

Q-17. Refer to the levelized costs, provided in \$/kW-yr, in Table 8.(5)(c)-2 on page 8-114 of Volume I of the IRP. Please provide the levelized cost of power from each unit in terms of \$/kWh.

A-17. Please see the table below.





**LOUISVILLE GAS AND ELECTRIC COMPANY  
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**Case No. 2011-00140**

**Question No. 18**

**Witness: Charles R. Schram**

- Q-18. Refer to the Companies' response to Question No. 6 of Commission Staff's First Information Request.
- a. Please describe the objective of the Request for Proposals (RFP).
  - b. Please provide the RFP document.
  - c. For each bid, please describe how much capacity was offered, the prime mover, fuel(s), and cost.
  - d. Please state whether the Companies incorporate any information that was obtained from the responses to this RFP into their IRP analysis. If so, please describe what information was incorporated and how. If not, why not?
- A-18. a. Please see the first paragraph on page 1 of the RFP document provided in response to Question No. 18 b.
- b. Please see the attached document.
  - c. The table below lists the capacity, prime mover, and fuel(s) for each RFP bid received. The responses to the RFP are being provided on the attached CD in the folder titled Question No. 18 and are a subject in the Petition for Confidential Protection. Please see these responses for detailed cost information.



<b>RFP #</b>	<b>Capacity (MW)</b>	<b>Prime Mover</b>	<b>Fuel(s)</b>
1A	625	Combined Cycle Combustion Turbine	Natural Gas
1B	625	Combined Cycle Combustion Turbine	Natural Gas
2A	660	Combined Cycle Combustion Turbine	Natural Gas
2B	660	Combined Cycle Combustion Turbine	Natural Gas
3	55	Biomass	Biomass
4	535	Combined Cycle Combustion Turbine	Natural Gas
5A	200	Nuclear	Nuclear fuel
5B	200	Nuclear	Nuclear fuel
6A	40	Wind	Wind
6B	40	Wind	Wind
6C	40	Wind	Wind
6D	100	Wind	Wind
6E	100	Wind	Wind
6F	100	Wind	Wind
7A	99	Wind	Wind
7B	99	Wind	Wind
7C	99	Wind	Wind
7D	99	Wind	Wind
8A	101	Wind	Wind
8B	101	Wind	Wind
8C	101	Wind	Wind
9	568	Combined Cycle Combustion Turbine	Natural Gas
10	200	Wind	Wind
11	180	Wind	Wind
12	895	Combined Cycle Combustion Turbine	Natural Gas
13A	165	Simple Cycle Combustion Turbine	Natural Gas
13B	330	Simple Cycle Combustion Turbine	Natural Gas
13C	495	Simple Cycle Combustion Turbine	Natural Gas
13D	165	Simple Cycle Combustion Turbine	Natural Gas
13E	330	Simple Cycle Combustion Turbine	Natural Gas
13F	495	Simple Cycle Combustion Turbine	Natural Gas
13G	265	Simple Cycle Combustion Turbine	Natural Gas
13H	532	Simple Cycle Combustion Turbine	Natural Gas
13I	806	Simple Cycle Combustion Turbine	Natural Gas
13J	806	Simple Cycle Combustion Turbine	Natural Gas
14A	100	Wind	Wind
14B	413	Nuclear	Nuclear fuel
15	578	Combined Cycle Combustion Turbine w/ biomass	Natural Gas - w/ biomass
16A	165	Biomass	Biomass
16B	50	Biomass	Biomass
16C	200	Biomass	Biomass

<b>RFP #</b>	<b>Capacity (MW)</b>	<b>Prime Mover</b>	<b>Fuel(s)</b>
17	300	Combined Cycle Combustion Turbine	Natural Gas
18	1	Solar	Solar
19A	600	Combined Cycle Combustion Turbine	Natural Gas
19B	600	Combined Cycle Combustion Turbine	Natural Gas
20A	300	Coal – Subcritical Pulverized Coal	Coal
20B	100	Coal – Subcritical Pulverized Coal	Coal
21A	6	Landfill Gas	Landfill Gas
21B	6	Landfill Gas	Landfill Gas
22	525	CFBC	Waste Coal

- d. The Companies did not incorporate information obtained from the RFP responses in the IRP analysis. The IRP process is not a request for approval of actionable items, nor is it designed to result in firm commitments for resource requirements on a short-term or long-term basis. Rather, it is a forum to provide a long-term view of resource needs based on a snapshot of current conditions and future expectations. Firm commitments for new resources are handled through the Certificate of Public Convenience and Necessity (“CPCN”) process, which thoroughly considers the alternatives, including market opportunities and self-build options, to meet particular resource needs as they arise.



**PPL companies**

**LG&E and KU Energy LLC**

Energy Services  
220 West Main Street  
Louisville, KY 40202  
www.lge-ku.com

Company  
Attn: Director Marketing and Trading  
Address

Charles A. Freibert, Jr.  
Director Marketing  
T 502-6273673  
charlie.freibert@lge-ku.com

December 17, 2010

**Subject: Request for Proposals to Sell Capacity and Energy (RFP)**

Dear Colleague in Development, Marketing and Trading of Electrical Power,

In order to meet pending environmental regulations and future load growth, Louisville Gas and Electric Company and Kentucky Utilities Company (the “Companies”) are evaluating alternatives means to provide least-cost firm generating capacity and energy to our customers. To this end, the Companies are requesting proposals from parties wishing to sell capacity and energy that will qualify as a Designated Network Resource (DNR) either as an owned asset by the Companies or a Power Purchase Agreement with the Companies. The Companies will consider offers that are reliable, feasible and represent the least-cost, including cost for transmission service and upgrades and voltage support, means of meeting our customers’ energy needs. The Seller should make its proposal as comprehensive as possible so that the Companies may make a definitive and final evaluation of the proposal’s benefits to its customers without further contact with the Seller. However, the Companies reserve the right to request additional information. Any failures to supply the information requested will be taken into consideration relative to the Companies’ internal evaluation of cost, risk, and value.

This inquiry is not a commitment to purchase and shall not bind the Companies or any subsidiaries of LG&E and KU Energy LLC in any manner. The Companies in their sole discretion will determine with which Respondent(s), if any, it wishes to engage in negotiations that may lead to a binding contract. The Companies shall not be liable for any expenses Respondents incur in connection with preparation of a response to this RFP. The Companies will not reimburse Respondents for their expenses under any circumstances, regardless of whether the RFP process proceeds to a successful conclusion or is abandoned by the Companies at their sole discretion.

1. **Background** - This RFP is being issued in order to evaluate alternatives for meeting existing and pending EPA regulations and to meet future load growth. All alternatives (including any of the Companies' self-build options) will be evaluated in the context of meeting customers' load in a least-cost manner. If the Companies determine that a proposal is in the best interest of the Companies' customers, the Companies will enter into negotiations which may lead to the execution of definitive agreements. The Companies will consider all applicable factors including, but not limited to, the following to determine the lowest total reasonable cost: (i) the terms of the purchased power proposal or facility or asset sale; (ii) Seller's creditworthiness; (iii) if applicable, the development status of Seller's generation facility including, but not limited to, site chosen, permitting, and transmission; or the operating history of Seller's generation facility; (iv) the degree of risk as to the availability of the power in the timeframe required; (v) the anticipated reliability of the power, particularly at times of winter and summer peak; and (vi) all other factors such as the cost of interconnection or transmission that may affect the Companies or their customers. The Companies are committed to implementing the best overall long-term solution for their customers.
  
2. **Requirements** - The Companies are interested in Power Purchase Agreements ("PPA"), Tolling Agreements ("TA") or Build Own Transfer Agreements ("BOT"), or alternative power supplies (combined "Supply Agreements") for minimum quantities of 1 MW up to a total of 700 MW of firm summer and winter capacity and associated energy per facility or offer with preference given to offers of 50 MWs or greater. The power being proposed must be generated from a defined source, a specific unit(s) or system that will qualify as a DNR and supply capacity/energy during the peak demand of the Companies' customers (typical Midwest seasonal load characteristics). The delivery of capacity and energy should begin no earlier than January 1, 2014, but later start dates will be considered. While the Companies prefer longer term proposals, shorter terms will be considered. The Companies may procure more or less than 700 MW and may aggregate capacity and energy from multiple Sellers to meet its needs. A Seller offering power from a resource connected directly to the Companies' transmission system must conform to the Companies' Open Access Transmission Tariff (OATT) and must obtain in a timely manner an Interconnection Agreement for the facility.
  
3. **Key Terms and Conditions** - For a Supply Agreement, the Seller's proposal should include the proposed terms and conditions, which should include, where applicable to the Seller's proposal, among other things:
  - 3.1. Seller will guarantee all pricing and terms that affect pricing such as but not limited to heat rate, fuel cost, operation and maintenance cost, etc., for at least 120 days after the Proposal Due Date.

- 3.2. Any Capacity Payments to the Seller will be based upon guaranteed capacity at the Summer Design Conditions. Unless the location of the Seller's facility justifies alternate conditions. Summer Design Conditions shall be the following.
    - 3.2.1. Dry Bulb: 89°F
    - 3.2.2. Mean Coincident Wet Bulb: 79.33°F
    - 3.2.3. Relative humidity: 66%
  - 3.3. Seller will guarantee the annual and seasonal availability and describe required maintenance outage schedule.
  - 3.4. Seller should address in their proposal its remedies for failure to meet availability guarantees.
  - 3.5. Seller will be responsible for any and all compliance related cost and fines (environmental, NERC, FERC, etc) incurred due to the non-compliance of the assets designated to supply power to the Companies.
  - 3.6. After the evaluation of proposals is completed, the Companies will enter into negotiations on a timely basis if the Companies determine that a proposal is in their customer's best interests. Any subsequent contracts will be contingent on obtaining the necessary regulatory approvals.
  - 3.7. The Companies termination rights will include, but may not be limited to: (i) failure to post or maintain required financial credit requirements, (ii) failure to meet key development and implementation milestones, (iii) failure to meet reliability requirements, and (iv) failure to cure a material breach under the Supply Agreement.
4. **Dispatching and Scheduling** (Required Proposal Content) - The Companies prefer flexibility in the utilization of the generation resource being offered by the Seller. The Companies desire, at the Companies' expense, to install equipment at the generator site to facilitate real time control/dispatch of generation to follow load changes and respond to system frequency changes. The Seller should state its desire and willingness to allow and cooperate with the Companies in establishing real-time control of generation.
  5. **Ancillary Services** (Required Proposal Content) - Under a Supply Agreement, the Companies desire to have the unrestricted right to utilize all ancillary services associated with generation being offered by the Seller. The Seller should describe the ancillary service capability of its proposal e.g., black start capability, voltage support, load following, energy imbalance, spinning reserve, and supplemental reserve. The

ancillary services that would be available to the Companies should not be limited to those defined in this paragraph. The Companies desire to have the unrestricted rights to any future ancillary services defined by the industry and capable of being provided by the generation capacity being offered. In the case where the Companies purchase only part of the generation capacity from a unit, system or facility, then the Companies desire to have unrestricted rights to ancillary services on a prorated basis.

6. **Pricing** (Required Proposal Content) - The Seller's pricing must be a delivered price to the Companies' transmission system. The Companies will only be responsible for Network Integrated Transmission Service (NITS) on the Companies transmission system. Prices must be firm, representing best and final data and quoted in U.S. dollars. If pricing involves escalation or indexing, the details of such pricing, including the specific indices or escalation rates, must be included for evaluation.
  - 6.1. The Seller's proposal must provide the product and generation characteristics on the attached form. Pricing information can be provided on the form or separately in another format that is appropriate for the offer. The Seller is encouraged to provide as much information as possible to aid in the evaluation of the offer. These attached data forms may be utilized in any filings with regulatory agencies (such as the KPSC) related to this RFP.
  
7. **Delivery** (Required Proposal Content) - The Companies consider reliable power delivery at the time of the typical summer and winter peak demand of its customers to be of the utmost importance. The delivery point is the Companies' transmission system. Under a Supply Agreement, Sellers would be responsible for providing firm transmission to the Companies' transmission system. The Seller is responsible for all costs associated with transmission interconnections and shall provide all studies and Interconnection Agreements. The Seller is responsible for all transmission including system upgrades up to the delivery point and shall provide all studies and Transmission Reservations/Agreements. All costs associated with interconnections and transmission up to the delivery point should be included in the Seller's pricing where appropriate under current FERC orders and rulings. Southwest Power Pool (SPP) is an Independent Transmission Operator that administers the Companies' OATT. Tennessee Valley Authority (TVA) serves as the Companies' Reliability Coordinator (RC). For purposes of the Companies' evaluation of the proposals, the Companies may estimate any transmission costs that are not supported by the appropriate studies including deliverability and the associated voltage support to the Designated Network Load ("DNL") of the Companies. If the Seller has not completed all required transmission studies, it is essential that the following information be provided in order for the Companies to evaluate the proposal:
  - Size of the unit
  - Point of interconnection to the grid
  - Impedance of the generator step-up transformer

- Transient and sub transient characteristics of the generator
8. **Environmental** - For the sale of generation capacity and energy to the Companies under a Supply Agreement, the Seller would be responsible for obtaining all necessary permits and providing all credits and allowances needed to comply with the permit requirements for the life of the agreement, where permits, credits and allowances are applicable for the product being sold. Failure to obtain or comply with any environmental permit or governmental consent would not excuse nonperformance by Seller. The Companies require that Sellers provide the following information for evaluation:
- Unit heat rate, fuel specification, and control technologies employed.
  - Emissions rates for NO<sub>x</sub>, SO<sub>x</sub>, CO, CO<sub>2</sub>, PM<sub>10</sub>, and Hg.
  - Copy of air permit or permit application if available.
  - Timing and status of all permit applications including water withdrawal, wastewater disposal, fuel byproducts handling and disposal, etc.
9. **Development Status** – Seller shall provide a comprehensive narrative of the status of the development of any generation project intended to be used to meet Seller’s obligations to the Companies. Seller’s narrative shall include the following.
- 9.1. A comprehensive development and construction schedule,
  - 9.2. A listing of all required permits and governmental approvals and their status,
  - 9.3. A listing of all required electric interconnection and or transmission agreements and their status,
  - 9.4. A financing plan, and
  - 9.5. A summary of key contracts (fuel, construction, major equipment) to the extent that they exist.
10. **Other Information Requirements** - Sellers shall provide a complete description of the generation facilities that would be used to fulfill the Seller’s obligations to the Companies. The description should include the following:
- Seller’s operating experience with similar technology.
  - Guaranteed capacity rating at Summer Design Conditions
  - Guaranteed annual and seasonal availabilities including EFOR values and planned maintenance schedules.
  - Technology employed (combined cycle, pulverized coal, CFB, super-critical, etc.)
  - Plant location along with proof or status of ownership or control of site
  - Zoning status of plant site.
  - If the plant site is subject to site approval by a governmental authority, provide a description of the approval status including a copy of the application. If approval has been granted, provide a copy of the approval.
  - Status of engineering and design work.

- Key project participants including owners, operators, engineer/contractors, fuel suppliers

The Seller should also provide any additional information the Seller deems necessary or useful to the Companies in making a definitive and final evaluation of the benefits of the Seller's proposal without further interaction between the Companies and Seller.

11. **Financial Capability** - Should the Companies elect to enter into an agreement with a Seller who fails to meet its obligations at any point in time, the Companies' customers may be exposed to the risk of higher costs. Therefore, the Sellers will be required to demonstrate, in a manner acceptable to the Companies, the Seller's ability to meet all financial obligations to the Companies throughout the applicable development, construction and operations phases for the term of the Supply Agreement. Under no circumstances, should the Companies' customers be exposed to increased costs relative to the cost defined in an agreement between the Seller and the Companies

11.1. At all times, the Seller will be required to maintain an investment grade credit rating with either S&P or Moody's or have a parent guarantee from an investment grade entity that meets the approval of the Companies.

11.2. Upon execution of the Supply Agreement, Sellers will be required to post a letter of credit ("LOC") to protect the Companies' customers in the event of default by the Seller. The exact amount of a LOC will be subject to approval by the Companies based upon the Companies' models. This amount shall take into account the cost of replacement energy and associated environmental cost with the production of replacement energy and any byproducts of such replacement energy. If the Companies draw down the LOC amount at any time, the Seller must replace the LOC to the original value within five days.

12. **Alternate Power Supplies** - Alternate power supply arrangements may include the acquisition of generation assets, existing generation facilities, projects under development, system firm products, or other power supply arrangements that meet the Companies' requirements described in this RFP. The Seller must make all transmission arrangements for the delivery of alternate power supply arrangements to the delivery point and include the cost for transmission in the pricing. Sellers interested in proposing alternative power supplies must provide all information specified in this document and applicable to the alternate power supply needed for the Companies to fully evaluate the proposal. Those Sellers proposing the sale of generation facilities should include the following:

- Complete description of the facilities included in the sale.
- Firm offer price
- Term sheet which identifies key terms and conditions



- Latest condition report
- Projected operating data including output, heat rate, and forced outage rate as appropriate
- Projected operating expenses and capital expenditures
- For existing facilities, provide historical operating data, operating expenses, and capital expenditures for a minimum of the latest five years or since the start of commercial operation if in commercial operation for less than five years

13. **RFP Schedule** - All proposals must be complete in all material respects and be received no later than 4 p.m. EST on Friday, January 28, 2011. Email proposals must be followed up with a signed original within two business days.

RFP Issued	Wednesday, December 1, 2010
Proposals Due	Friday, January 28, 2011
Evaluation Completed	Friday, March 18, 2011

Proposals will not be viewed until 4 p.m. EST on Friday, January 28, 2011. After the evaluation of proposals is completed, the Companies will enter into negotiations on a timely basis if the Companies determine that a proposal is in their customer's best interests. Any subsequent contracts will be contingent on obtaining the necessary regulatory approvals.

#### 14. **Treatment of Proposals**

14.1. The Companies reserve the right, without qualification, to select or reject any or all proposals and to waive any formality, technicality, requirement, or irregularity in the proposals received. The Companies also reserve the right to modify the RFP or request further information, as necessary, to complete its evaluation of the proposals received.

14.2. Sellers who submit proposals do so without recourse against the Companies for either rejection by the Companies or failure to execute an agreement for purchase of capacity and/or energy for any reason. Sellers are responsible for any and all costs incurred in the preparation and submission of a proposal and/or any subsequent negotiations regarding a proposal.

15. **Confidentiality** - As regulated utilities, it is expected that the Companies will be required to release proposal information to various government agencies and/or others as part of a regulatory review or legal proceeding. The Companies will use reasonable efforts to request confidential treatment for such information to the extent it is labeled in the proposal as "Confidential." Please note that confidential treatment is more likely to be granted if limited amounts of information are designated as

confidential rather than large portions of the proposal. However, the Companies cannot guarantee that the receiving agency, court, or other party will afford confidential treatment to this information. Subject to applicable law and regulations, the Companies also reserve the right to disclose proposals to their officers, employees, agents, consultants, and the like (and those of its affiliates) for the purpose of evaluating proposals. Otherwise, the Companies will not disclose any information contained in the Seller's proposal that is marked "Confidential," to another party except to the extent that (i) such disclosures are required by law or by a court or governmental or regulatory agency having appropriate jurisdiction, or (ii) the Companies subsequently obtain the information free of any confidentiality obligations from an independent source, or (iii) the information enters the public domain through no fault of the Companies.

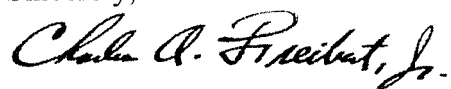
16. **Contacts** - All correspondence should be directed to:

Charles A. Freibert, Jr.  
Director Marketing  
LG&E and KU Energy LLC  
Energy Services  
220 West Main Street  
Louisville, KY 40202

E-mail: [charlie.freibert@lge-ku.com](mailto:charlie.freibert@lge-ku.com)  
Phone: 502-627-3673

In closing, I look forward to your response by 4 p.m. EST on Friday, January 28, 2011, and the possibility of doing business to meet the Companies' future power needs. Your interest in this request is greatly appreciated. Please contact me if you have any questions and would like to discuss further. For immediate concerns in my absence, please contact Donna LaFollette at 502-627-4765.

Sincerely,



Charles A. Freibert, Jr.

**LG&E and KU RFP Data Form**

*Note to bidder: Provide a separate term sheet for each different "Term of Contract" or capacity offering*

**Seller** \_\_\_\_\_

**Product and Generation Characteristics:**

Proposal Description \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Generation Source Description \_\_\_\_\_

Transmission Interconnection Point of the Source \_\_\_\_\_

Point of interconnection to the grid \_\_\_\_\_

Fuel Price (if applicable) \_\_\_\_\_

Start Date and Term of Contract \_\_\_\_\_

Summer Firm Capacity Amount \_\_\_\_\_ MW

Summer Maximum Dispatch Capacity Amount (if applicable) \_\_\_\_\_ MW

Summer Minimum Dispatch Capacity Amount (if applicable) \_\_\_\_\_ MW

Guaranteed Heat Rate (or heat rate curve) (if applicable) \_\_\_\_\_ Btu/kwh

Winter Firm Capacity Amount \_\_\_\_\_ MW

Winter Maximum Dispatch Capacity Amount (if applicable) \_\_\_\_\_ MW

Winter Minimum Dispatch Capacity Amount (if applicable) \_\_\_\_\_ MW

Output in 10 minutes \_\_\_\_\_ MW

Ramp capability \_\_\_\_\_ MW/minute

Start-up time to minimum capability \_\_\_\_\_

Start-up time to maximum capability \_\_\_\_\_

Minimum run time \_\_\_\_\_

Minimum down time \_\_\_\_\_

Constraints on production time (if applicable) \_\_\_\_\_

Forced Outage Rate \_\_\_\_\_ %

Guaranteed Availability \_\_\_\_\_

Planned Outage Schedule \_\_\_\_\_

**Pricing Information (provide a separate pricing form if applicable):**

Sale Price \_\_\_\_\_ or, Capacity Price \_\_\_\_\_ (\$/MW-yr)

Year of Capacity Price Quote \_\_\_\_\_

Capacity Price Escalation/Year \_\_\_\_\_

Energy Pricing (Provide energy pricing in one of the following formats)

1. Fixed Energy price over the term \_\_\_\_\_ (\$/MWh)
2. Escalating Price Over Term \_\_\_\_\_ (\$/MWh) escalating at \_\_\_\_\_ % per year
3. Production Cost: Variable O&M + Guaranteed Heat Rate \* Fuel Price over Term
  - a. Variable O&M \_\_\_\_\_ (\$/MWh)
  - b. Guaranteed Heat Rate \_\_\_\_\_ (Btu/kwh)
  - c. Fuel Price \_\_\_\_\_

Note: Energy pricing to include all ancillary service costs, taxes and other fees necessary for delivery of the energy to the Delivery Point.



**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Second Set of Interrogatories and  
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Rick Clewett, Drew Foley, Janet Overman, Gregg Wagner,  
the Natural Resources Defense Council, and the Sierra Club  
Dated August 25, 2011**

**Case No. 2011-00140**

**Question No. 19**

**Witness: Charles R. Schram**

- Q-19. Refer to the Supply-Side Analysis in Volume III of the IRP. Please state whether the high and low scenarios for capital costs include risks of high and low capital costs for retrofitting existing coal power plants.
- a. If so, please describe how high and low capital costs for retrofitting existing coal power plants were incorporated into the analysis, the input assumptions used, and the sources of those assumptions.
  - b. If not, please explain why not.
- A-19. The high and low scenarios for capital costs in the Supply-Side Analysis do not include risks of high and low capital costs for retrofitting existing coal power plants.
- a. Not applicable.
  - b. The purpose of the Supply-Side Analysis is to examine potential new supply-side resources, not environmental retrofits for existing coal power plants.



**LOUISVILLE GAS AND ELECTRIC COMPANY  
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Dated August 25, 2011**

**Case No. 2011-00140**

**Question No. 20**

**Witness: Charles R. Schram**

- Q-20. Refer to the Companies' response to Question No. 9 of the Commission Staff's second information request. Please provide detailed documentation, including but not limited to cost and performance penalties, for the recently constructed FGD system at E. W. Brown.
- A-20. The plant-in-service balances for E.W. Brown are provided in the Companies' response to Question No. 13.

Please see the table below.

<b>Unit</b>	<b>Net Capacity Impact</b>	<b>Net Heat Rate Impact</b>
Brown 1*	+1 MW	-100 btu/kWh
Brown 2	-1 MW	+60 btu/kWh
Brown 3	-17 MW	+440 btu/kWh

\*As a result of the FGD project, Brown Unit 3 assumed some of the auxiliary usage for Brown Unit 1. This explains the changes in net capacity and net heat rate for Brown Unit 1.





**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

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Dated August 25, 2011**

**Case No. 2011-00140**

**Question No. 21**

**Witness: Charles R. Schram**

- Q-21. Please state whether market purchases were incorporated into the Strategist modeling analysis.
- a. If so, please describe how they were incorporated, the input assumptions used, and the sources of those assumptions.
  - b. If not, please explain why not.
- A-21. Market purchases were not incorporated into the Strategist modeling analysis.
- a. Not applicable.
  - b. The concept of power transfers within the Eastern Interconnection is not relevant to the Companies' long term resource planning activities. In long-term planning, the Companies do not plan to meet native load customers' energy needs with power from elsewhere. The Companies are obligated to reliably provide customers with power at least-cost. The operational realities of transmission constraints and uncertainties limit the Companies' ability to summarily assume that unfettered access to power from other parts of the Eastern Interconnection will be available to reliably meet customer needs. The Companies are obligated to comply with applicable NERC Reliability Standards, including standard IRO-006, which recognizes that non-firm transmission is subject to hourly curtailment. As such, long-term planning cannot depend on non-firm transmission for market access to meet resource requirements.



**LOUISVILLE GAS AND ELECTRIC COMPANY  
KENTUCKY UTILITIES COMPANY**

**Response to the Second Set of Interrogatories and  
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the Natural Resources Defense Council, and the Sierra Club  
Dated August 25, 2011**

**Case No. 2011-00140**

**Question No. 22**

**Witness: Charles R. Schram**

- Q-22. Refer to the Supply-Side Analysis in Volume III of the IRP. Please describe the solar photovoltaic (PV) technology that was considered in the Companies' IRP resource analysis, including the PV system size(s) in MW, the type(s) of PV technology, and whether distributed (commercial and residential) and large utility scale PV systems were considered.
- a. If both distributed and utility scale PV systems were not considered, please explain why not.
- A-22. The PV technology considered in the Supply-Side Analysis consists of ten 2.5 MW units. The PV arrays are mounted at a fixed angle and use thin film PV panels.
- a. Fixed array and thin film PV technologies were chosen for their lower production and installation costs. The efficiency of this technology is in the range of 10%, and the capacity factor in the Companies' region is expected to be below 20%. Large utility scale grid-connected installations have the lowest capital cost per kWh installed due to economies of scale. For these reasons, the Companies' chose to consider utility scale PV systems instead of distributed PV systems. The Companies will purchase power generated from rooftop PV panels installed by residential, commercial, or third party owners. Further discussion of distributed generation is included in Volume III of the 2011 IRP, in the section titled "Recommendations in PSC Staff Report on the Last IRP – Case No. 2008-00148."



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**Case No. 2011-00140**

**Question No. 23**

**Witness: Charles R. Schram**

- Q-23. Please state whether the Companies consider the possibility of 2011 HB 239 becoming law, and how its enactment would impact the Companies' future plans.
- a. If so, please explain how the Companies' plans would be changed were 2011 HB 239 to be signed into law in 2011 or 2012, including how this legislation would change the Companies' plans for new and existing electric generating units, and please provide all work papers, memos, reports, or other documents providing details on this analysis.
  - b. If the Companies did not consider the possibility of the passage of 2011 HB 239, please explain why not.
- A-23. The potential enactment of 2011 HB 239 was not included in the assumptions of the 2011 IRP. HB 239 was received by the Tourism Development and Energy Committee in February 2011 but was not voted on by that Committee and was therefore never voted on by the House. While the Companies monitor the status of proposed relevant legislation, the Companies did not develop an integrated resource plan considering the provisions of HB 239.



**LOUISVILLE GAS AND ELECTRIC COMPANY  
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**Case No. 2011-00140**

**Question No. 24**

**Witness: Michael E. Hornung**

Q-24. The Governor has called for the establishment of an Energy Efficiency Resource Standard with a goal of reducing energy consumption by at least 16 percent below projected 2025 energy consumption, for a savings rate of 1.13% per year. Based on the data provided in Table 8.(3)(e)(3), the Companies' DSM proposal falls short of meeting the 2025 goal by over 10% and by almost three quarters of a percent on an annual basis. Please state whether the Companies intend to improve and accelerate the current DSM programs in the near future to meet the Governor's energy efficiency goal.

- a. If so, please explain the Companies' plans for doing so.
- b. If not, please explain why not.

A-24. a. The Companies understand the common energy goals and objectives that are set forth at the state level. The Companies' energy efficiency objective will continue to develop, implement, and promote program offerings that equip customers to make more efficient use of the energy. This strategy will support the reduction of growing demand for energy by the customer and support the Companies as we continue to provide the safe, reliable, lowest-reasonable-cost energy to our customers.

Currently, there is not an Energy Efficiency Resource Standard in Kentucky as contemplated within the Governor's "Intelligent Energy Choices for Kentucky's Future" report. In addition, all utility demand side management programs are voluntary to customers. Demand reductions achieved by the current portfolio of DSM/EE programs through the end of 2010 is 182 MW, making the total through year seven of the Program Plan equal to 491 MW and placing the Companies on target to meet their 2008 IRP cumulative demand reduction of 539 MW.<sup>1</sup> The

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<sup>1</sup> This total includes the Responsive Pilot Expansion assumptions within the IRP.

Companies will continue to research and explore opportunities for additional energy efficiency programming that will provide both the energy savings and value to customer that will increase the comprehensiveness and overall effectiveness of the Demand Side Management/Energy Efficiency Portfolio.

- b. Please see the response to part a.





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**Case No. 2011-00140**

**Question No. 25**

**Witness: Charles R. Schram**

- Q-25. The Companies' March 2011 "Analysis of Supply-Side Technology Alternatives," (2011 IRP Volume III) includes base, low, and high natural gas fuel costs for the period 2010 through 2025. KU/LG&E's April 2011 "2011 Optimal Expansion Plan Analysis," (2011 IRP Volume III) appears to use the same natural gas price forecasts as listed in the March 2011 document's base case. However, the companies' "2011 Air Compliance Plan Sensitivity Analysis," (July 2011) and provided in response to Staff Question 10 of their Second Information Request (June 29, 2011) shows lower natural gas prices on page 4 of the report.
- a. Identify the sources used to create the natural gas price forecasts published in each of the three documents listed above.
  - b. Provide all workpapers and source documents used to create the natural gas price forecasts published in each of the three documents listed above.
  - c. Explain how the company chose to use the natural gas price forecasts published in each of the three documents listed above.
  - d. Explain the discrepancy between the gas prices in the Sensitivity Analysis and the gas prices used in the Optimal Expansion Plan Analysis.
  - e. Please state whether the company's gas price forecast changed since the publication of these three documents. If so, what is the current company gas price forecast?
- A-25. a. The source of the base natural gas price forecasts shown in these three documents is the same. In the short term (2011-2015), the prices are NYMEX forward quotes as of May 28, 2010. For the long-term (2016-2025), the PIRA forecast as of April 27, 2010 was used.

- b. The workpapers used to create the natural gas price forecasts are attached. Certain information is considered confidential and is being filed pursuant to a Petition for Confidential Protection.
- c. The Companies chose to use the same natural gas price forecast in each of these documents in order maintain consistency across the analyses. This single gas price forecast was chosen for these analyses to be consistent with the gas price forecast that had previously been approved and used in the Companies' most recent planning and budgeting processes.
- d. The gas prices presented in the Sensitivity Analysis are Henry Hub prices. The gas prices presented in the Optimal Expansion Plan Analysis are delivered prices.
- e. The most recent gas price forecast used by Companies is shown in the table below. This information is considered confidential and is being filed pursuant to a Petition for Confidential Protection.

**Natural Gas Price Forecast**

\$/MMBtu

	<u>Henry Hub</u>
2012	4.34
2013	4.73
2014	5.13
2015	
2016	
2017	
2018	
2019	
2020	
2021	
2022	
2023	
2024	
2025	

2011-13 market view date: May 28, 2010

Monthly Price Projections

		Natural Gas (\$/MMBtu)			
		Henry Hub	LG&E	KU	Avg
2011	1				
2011	2				
2011	3				
2011	4				
2011	5				
2011	6				
2011	7				
2011	8				
2011	9				
2011	10				
2011	11				
2011	12				
2012	1				
2012	2				
2012	3				
2012	4				
2012	5				
2012	6				
2012	7				
2012	8				
2012	9				
2012	10				
2012	11				
2012	12				
2013	1				
2013	2				
2013	3				
2013	4				
2013	5				
2013	6				
2013	7				
2013	8				
2013	9				
2013	10				
2013	11				
2013	12				
2014	1				
2014	2				
2014	3				
2014	4				
2014	5				
2014	6				
2014	7				

2011-13 market view date: May 28, 2010

Monthly Price Projections

		Natural Gas (\$/MMBtu)			
		Henry Hub	LG&E	KU	Avg
2014	8				
2014	9				
2014	10				
2014	11				
2014	12				
2015	1				
2015	2				
2015	3				
2015	4				
2015	5				
2015	6				
2015	7				
2015	8				
2015	9				
2015	10				
2015	11				
2015	12				
2016	1				
2016	2				
2016	3				
2016	4				
2016	5				
2016	6				
2016	7				
2016	8				
2016	9				
2016	10				
2016	11				
2016	12				
2017	1				
2017	2				
2017	3				
2017	4				
2017	5				
2017	6				
2017	7				
2017	8				
2017	9				
2017	10				
2017	11				
2017	12				
2018	1				
2018	2				

2011-13 market view date: May 28, 2010

Monthly Price Projections

		Natural Gas (\$/MMBtu)			
		Henry Hub	LG&E	KU	Avg
2018	3				
2018	4				
2018	5				
2018	6				
2018	7				
2018	8				
2018	9				
2018	10				
2018	11				
2018	12				
2019	1				
2019	2				
2019	3				
2019	4				
2019	5				
2019	6				
2019	7				
2019	8				
2019	9				
2019	10				
2019	11				
2019	12				
2020	1				
2020	2				
2020	3				
2020	4				
2020	5				
2020	6				
2020	7				
2020	8				
2020	9				
2020	10				
2020	11				
2020	12				
2021	1				
2021	2				
2021	3				
2021	4				
2021	5				
2021	6				
2021	7				
2021	8				
2021	9				

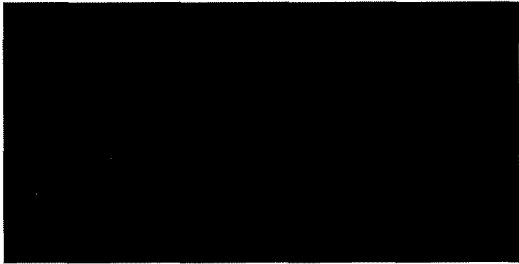
2011-13 market view date: May 28, 2010

Monthly Price Projections

		Natural Gas (\$/MMBtu)			
		Henry Hub	LG&E	KU	Avg
2021	10				
2021	11				
2021	12				
2022	1				
2022	2				
2022	3				
2022	4				
2022	5				
2022	6				
2022	7				
2022	8				
2022	9				
2022	10				
2022	11				
2022	12				
2023	1				
2023	2				
2023	3				
2023	4				
2023	5				
2023	6				
2023	7				
2023	8				
2023	9				
2023	10				
2023	11				
2023	12				
2024	1				
2024	2				
2024	3				
2024	4				
2024	5				
2024	6				
2024	7				
2024	8				
2024	9				
2024	10				
2024	11				
2024	12				
2025	1				
2025	2				
2025	3				
2025	4				

2011-13 market view date: May 28, 2010

Monthly Price Projections

		Natural Gas (\$/MMBtu)			
		Henry Hub	LG&E	KU	Avg
2025	5				
2025	6				
2025	7				
2025	8				
2025	9				
2025	10				
2025	11				
2025	12				



Monthly Henry Hub

Annual Henry Hub

Jan-11  
Feb-11  
Mar-11  
Apr-11  
May-11  
Jun-11  
Jul-11  
Aug-11  
Sep-11  
Oct-11  
Nov-11  
Dec-11  
Jan-12  
Feb-12  
Mar-12  
Apr-12  
May-12  
Jun-12  
Jul-12  
Aug-12  
Sep-12  
Oct-12  
Nov-12  
Dec-12  
Jan-13  
Feb-13  
Mar-13  
Apr-13  
May-13  
Jun-13  
Jul-13  
Aug-13  
Sep-13  
Oct-13  
Nov-13  
Dec-13  
Jan-14  
Feb-14  
Mar-14  
Apr-14  
May-14  
Jun-14  
Jul-14  
Aug-14  
Sep-14  
Oct-14

2011  
2012  
2013  
2014  
2015  
2016  
2017  
2018  
2019  
2020  
2021  
2022  
2023  
2024  
2025

Monthly Henry Hub

Annual Henry Hub

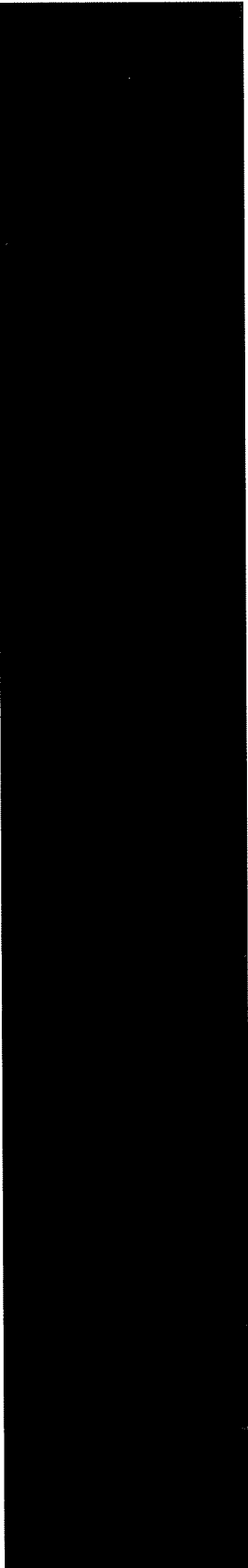
Nov-14  
Dec-14  
Jan-15  
Feb-15  
Mar-15  
Apr-15  
May-15  
Jun-15  
Jul-15  
Aug-15  
Sep-15  
Oct-15  
Nov-15  
Dec-15  
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May-17  
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Jul-17  
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Nov-17  
Dec-17  
Jan-18  
Feb-18  
Mar-18  
Apr-18  
May-18  
Jun-18  
Jul-18  
Aug-18



Monthly Henry Hub

Annual Henry Hub

Sep-18  
Oct-18  
Nov-18  
Dec-18  
Jan-19  
Feb-19  
Mar-19  
Apr-19  
May-19  
Jun-19  
Jul-19  
Aug-19  
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Jun-21  
Jul-21  
Aug-21  
Sep-21  
Oct-21  
Nov-21  
Dec-21  
Jan-22  
Feb-22  
Mar-22  
Apr-22  
May-22  
Jun-22



Monthly Henry Hub

Annual Henry Hub

Jul-22  
Aug-22  
Sep-22  
Oct-22  
Nov-22  
Dec-22  
Jan-23  
Feb-23  
Mar-23  
Apr-23  
May-23  
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Nov-24  
Dec-24  
Jan-25  
Feb-25  
Mar-25  
Apr-25  
May-25  
Jun-25  
Jul-25  
Aug-25  
Sep-25  
Oct-25  
Nov-25  
Dec-25



\*Velocity Suite

<u>Commodity Name</u>	<u>Trade Date</u>	<u>Contract Year-Month</u>	<u>Reported Index Price</u>
Henry Hub Natural Gas Futures	5/28/2010	2011-01	\$5.467
Henry Hub Natural Gas Futures	5/28/2010	2011-02	\$5.438
Henry Hub Natural Gas Futures	5/28/2010	2011-03	\$5.336
Henry Hub Natural Gas Futures	5/28/2010	2011-04	\$5.151
Henry Hub Natural Gas Futures	5/28/2010	2011-05	\$5.172
Henry Hub Natural Gas Futures	5/28/2010	2011-06	\$5.226
Henry Hub Natural Gas Futures	5/28/2010	2011-07	\$5.287
Henry Hub Natural Gas Futures	5/28/2010	2011-08	\$5.337
Henry Hub Natural Gas Futures	5/28/2010	2011-09	\$5.367
Henry Hub Natural Gas Futures	5/28/2010	2011-10	\$5.461
Henry Hub Natural Gas Futures	5/28/2010	2011-11	\$5.713
Henry Hub Natural Gas Futures	5/28/2010	2011-12	\$5.999
Henry Hub Natural Gas Futures	5/28/2010	2012-01	\$6.199
Henry Hub Natural Gas Futures	5/28/2010	2012-02	\$6.144
Henry Hub Natural Gas Futures	5/28/2010	2012-03	\$5.976
Henry Hub Natural Gas Futures	5/28/2010	2012-04	\$5.511
Henry Hub Natural Gas Futures	5/28/2010	2012-05	\$5.516
Henry Hub Natural Gas Futures	5/28/2010	2012-06	\$5.553
Henry Hub Natural Gas Futures	5/28/2010	2012-07	\$5.614
Henry Hub Natural Gas Futures	5/28/2010	2012-08	\$5.664
Henry Hub Natural Gas Futures	5/28/2010	2012-09	\$5.694
Henry Hub Natural Gas Futures	5/28/2010	2012-10	\$5.789
Henry Hub Natural Gas Futures	5/28/2010	2012-11	\$6.027
Henry Hub Natural Gas Futures	5/28/2010	2012-12	\$6.287
Henry Hub Natural Gas Futures	5/28/2010	2013-01	\$6.487
Henry Hub Natural Gas Futures	5/28/2010	2013-02	\$6.432
Henry Hub Natural Gas Futures	5/28/2010	2013-03	\$6.242
Henry Hub Natural Gas Futures	5/28/2010	2013-04	\$5.757
Henry Hub Natural Gas Futures	5/28/2010	2013-05	\$5.742
Henry Hub Natural Gas Futures	5/28/2010	2013-06	\$5.784
Henry Hub Natural Gas Futures	5/28/2010	2013-07	\$5.846
Henry Hub Natural Gas Futures	5/28/2010	2013-08	\$5.898
Henry Hub Natural Gas Futures	5/28/2010	2013-09	\$5.930
Henry Hub Natural Gas Futures	5/28/2010	2013-10	\$6.027
Henry Hub Natural Gas Futures	5/28/2010	2013-11	\$6.262
Henry Hub Natural Gas Futures	5/28/2010	2013-12	\$6.522
Henry Hub Natural Gas Futures	5/28/2010	2014-01	\$6.722
Henry Hub Natural Gas Futures	5/28/2010	2014-02	\$6.672
Henry Hub Natural Gas Futures	5/28/2010	2014-03	\$6.477
Henry Hub Natural Gas Futures	5/28/2010	2014-04	\$5.992
Henry Hub Natural Gas Futures	5/28/2010	2014-05	\$5.962
Henry Hub Natural Gas Futures	5/28/2010	2014-06	\$6.017
Henry Hub Natural Gas Futures	5/28/2010	2014-07	\$6.082
Henry Hub Natural Gas Futures	5/28/2010	2014-08	\$6.137
Henry Hub Natural Gas Futures	5/28/2010	2014-09	\$6.172

<u>Commodity Name</u>	<u>Trade Date</u>	<u>Contract Year-Month</u>	<u>Reported Index Price</u>
Henry Hub Natural Gas Futures	5/28/2010	2014-10	\$6.277
Henry Hub Natural Gas Futures	5/28/2010	2014-11	\$6.512
Henry Hub Natural Gas Futures	5/28/2010	2014-12	\$6.772
Henry Hub Natural Gas Futures	5/28/2010	2015-01	\$6.972
Henry Hub Natural Gas Futures	5/28/2010	2015-02	\$6.927
Henry Hub Natural Gas Futures	5/28/2010	2015-03	\$6.727
Henry Hub Natural Gas Futures	5/28/2010	2015-04	\$6.247
Henry Hub Natural Gas Futures	5/28/2010	2015-05	\$6.212
Henry Hub Natural Gas Futures	5/28/2010	2015-06	\$6.270
Henry Hub Natural Gas Futures	5/28/2010	2015-07	\$6.340
Henry Hub Natural Gas Futures	5/28/2010	2015-08	\$6.403
Henry Hub Natural Gas Futures	5/28/2010	2015-09	\$6.436
Henry Hub Natural Gas Futures	5/28/2010	2015-10	\$6.538
Henry Hub Natural Gas Futures	5/28/2010	2015-11	\$6.776
Henry Hub Natural Gas Futures	5/28/2010	2015-12	\$7.038
Henry Hub Natural Gas Futures	5/28/2010	2016-01	\$7.238
Henry Hub Natural Gas Futures	5/28/2010	2016-02	\$7.193
Henry Hub Natural Gas Futures	5/28/2010	2016-03	\$6.993
Henry Hub Natural Gas Futures	5/28/2010	2016-04	\$6.508
Henry Hub Natural Gas Futures	5/28/2010	2016-05	\$6.473
Henry Hub Natural Gas Futures	5/28/2010	2016-06	\$6.535
Henry Hub Natural Gas Futures	5/28/2010	2016-07	\$6.615
Henry Hub Natural Gas Futures	5/28/2010	2016-08	\$6.683
Henry Hub Natural Gas Futures	5/28/2010	2016-09	\$6.713
Henry Hub Natural Gas Futures	5/28/2010	2016-10	\$6.813
Henry Hub Natural Gas Futures	5/28/2010	2016-11	\$7.068
Henry Hub Natural Gas Futures	5/28/2010	2016-12	\$7.343
Henry Hub Natural Gas Futures	5/28/2010	2017-01	\$7.553
Henry Hub Natural Gas Futures	5/28/2010	2017-02	\$7.513
Henry Hub Natural Gas Futures	5/28/2010	2017-03	\$7.313
Henry Hub Natural Gas Futures	5/28/2010	2017-04	\$6.823
Henry Hub Natural Gas Futures	5/28/2010	2017-05	\$6.788
Henry Hub Natural Gas Futures	5/28/2010	2017-06	\$6.858
Henry Hub Natural Gas Futures	5/28/2010	2017-07	\$6.938
Henry Hub Natural Gas Futures	5/28/2010	2017-08	\$7.003
Henry Hub Natural Gas Futures	5/28/2010	2017-09	\$7.028
Henry Hub Natural Gas Futures	5/28/2010	2017-10	\$7.123
Henry Hub Natural Gas Futures	5/28/2010	2017-11	\$7.383
Henry Hub Natural Gas Futures	5/28/2010	2017-12	\$7.663
Henry Hub Natural Gas Futures	5/28/2010	2018-01	\$7.873
Henry Hub Natural Gas Futures	5/28/2010	2018-02	\$7.833
Henry Hub Natural Gas Futures	5/28/2010	2018-03	\$7.633
Henry Hub Natural Gas Futures	5/28/2010	2018-04	\$7.138
Henry Hub Natural Gas Futures	5/28/2010	2018-05	\$7.103
Henry Hub Natural Gas Futures	5/28/2010	2018-06	\$7.183
Henry Hub Natural Gas Futures	5/28/2010	2018-07	\$7.273
Henry Hub Natural Gas Futures	5/28/2010	2018-08	\$7.333

<u>Commodity Name</u>	<u>Trade Date</u>	<u>Contract Year-Month</u>	<u>Reported Index Price</u>
Henry Hub Natural Gas Futures	5/28/2010	2018-09	\$7.358
Henry Hub Natural Gas Futures	5/28/2010	2018-10	\$7.443
Henry Hub Natural Gas Futures	5/28/2010	2018-11	\$7.713
Henry Hub Natural Gas Futures	5/28/2010	2018-12	\$7.998
Henry Hub Natural Gas Futures	5/28/2010	2019-01	\$8.213
Henry Hub Natural Gas Futures	5/28/2010	2019-02	\$8.173
Henry Hub Natural Gas Futures	5/28/2010	2019-03	\$7.973
Henry Hub Natural Gas Futures	5/28/2010	2019-04	\$7.423
Henry Hub Natural Gas Futures	5/28/2010	2019-05	\$7.383
Henry Hub Natural Gas Futures	5/28/2010	2019-06	\$7.463
Henry Hub Natural Gas Futures	5/28/2010	2019-07	\$7.553
Henry Hub Natural Gas Futures	5/28/2010	2019-08	\$7.618
Henry Hub Natural Gas Futures	5/28/2010	2019-09	\$7.643
Henry Hub Natural Gas Futures	5/28/2010	2019-10	\$7.733
Henry Hub Natural Gas Futures	5/28/2010	2019-11	\$8.013
Henry Hub Natural Gas Futures	5/28/2010	2019-12	\$8.318
Henry Hub Natural Gas Futures	5/28/2010	2020-01	\$8.538
Henry Hub Natural Gas Futures	5/28/2010	2020-02	\$8.503
Henry Hub Natural Gas Futures	5/28/2010	2020-03	\$8.303
Henry Hub Natural Gas Futures	5/28/2010	2020-04	\$7.753
Henry Hub Natural Gas Futures	5/28/2010	2020-05	\$7.713
Henry Hub Natural Gas Futures	5/28/2010	2020-06	\$7.788
Henry Hub Natural Gas Futures	5/28/2010	2020-07	\$7.878
Henry Hub Natural Gas Futures	5/28/2010	2020-08	\$7.928
Henry Hub Natural Gas Futures	5/28/2010	2020-09	\$7.948
Henry Hub Natural Gas Futures	5/28/2010	2020-10	\$8.038
Henry Hub Natural Gas Futures	5/28/2010	2020-11	\$8.333
Henry Hub Natural Gas Futures	5/28/2010	2020-12	\$8.668
Henry Hub Natural Gas Futures	5/28/2010	2021-01	\$8.893
Henry Hub Natural Gas Futures	5/28/2010	2021-02	\$8.873
Henry Hub Natural Gas Futures	5/28/2010	2021-03	\$8.658
Henry Hub Natural Gas Futures	5/28/2010	2021-04	\$7.968
Henry Hub Natural Gas Futures	5/28/2010	2021-05	\$7.923
Henry Hub Natural Gas Futures	5/28/2010	2021-06	\$7.993
Henry Hub Natural Gas Futures	5/28/2010	2021-07	\$8.078
Henry Hub Natural Gas Futures	5/28/2010	2021-08	\$8.128
Henry Hub Natural Gas Futures	5/28/2010	2021-09	\$8.143
Henry Hub Natural Gas Futures	5/28/2010	2021-10	\$8.228
Henry Hub Natural Gas Futures	5/28/2010	2021-11	\$8.538
Henry Hub Natural Gas Futures	5/28/2010	2021-12	\$8.908
Henry Hub Natural Gas Futures	5/28/2010	2022-01	\$9.138
Henry Hub Natural Gas Futures	5/28/2010	2022-02	\$9.118
Henry Hub Natural Gas Futures	5/28/2010	2022-03	\$8.903
Henry Hub Natural Gas Futures	5/28/2010	2022-04	\$8.188
Henry Hub Natural Gas Futures	5/28/2010	2022-05	\$8.143
Henry Hub Natural Gas Futures	5/28/2010	2022-06	\$8.213
Henry Hub Natural Gas Futures	5/28/2010	2022-07	\$8.298

<u>Commodity Name</u>	<u>Trade Date</u>	<u>Contract Year-Month</u>	<u>Reported Index Price</u>
Henry Hub Natural Gas Futures	5/28/2010	2022-08	\$8.348
Henry Hub Natural Gas Futures	5/28/2010	2022-09	\$8.363
Henry Hub Natural Gas Futures	5/28/2010	2022-10	\$8.448
Henry Hub Natural Gas Futures	5/28/2010	2022-11	\$8.758
Henry Hub Natural Gas Futures	5/28/2010	2022-12	\$9.128



\*PIRA Long Term Henry Hub Natural Gas Outlook - 4/27/2010

2010  
2011  
2012  
2013  
2014  
2015  
2016  
2017  
2018  
2019  
2020  
2021  
2022  
2023  
2024  
2025



	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>Average</u>
January	1.01	1.06	1.07	1.05
February	1.00	1.05	1.06	1.04
March	0.99	1.02	1.03	1.01
April	0.95	0.95	0.95	0.95
May	0.96	0.95	0.94	0.95
June	0.97	0.95	0.95	0.96
July	0.98	0.96	0.96	0.97
August	0.99	0.97	0.97	0.98
September	0.99	0.98	0.98	0.98
October	1.01	0.99	0.99	1.00
November	1.06	1.03	1.03	1.04
December	1.11	1.08	1.07	1.09
Annual				



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**Case No. 2011-00140**

**Question No. 26**

**Witness: Charles R. Schram**

- Q-26. Refer to pages 9-10 of the Direct Testimony of John N. Voyles, Jr. in Case Nos. 2011-00161, which was provided as an electronic attachment (“Attachment to Question No. 38a - KU ECR Testimony of John N Voyles”) to the Companies’ response to Question 38 of the Commission Staff’s first set of information requests in the IRP proceeding (Case No. 2011-00140). The testimony states that “the Companies’ Generating Planning Group performed an analysis to determine if all of the unit-by-unit compliance equipment would be necessary to achieve compliance with the applicable air regulations. The results of that analysis were used to pare down and refine the compliance equipment to be included in each project (for example, we were able to eliminate SCRs for certain units from the 2011 Plan.” Provide the analysis “used to pare down and refine the compliance equipment” referenced in Voyles testimony as quoted above, and any workpapers or source documents that support this analysis.
- A-26. Please see the Companies’ response to Question No. 4 of the Interveners’ first set of requests for production of documents in the ECR proceeding (Case Nos. 2011-00161 and 2011-00162) for the PROSYM model runs “used to pare down and refine the compliance equipment” referenced in Mr. Voyles’s testimony. Also, please see section 4.1.1 of the 2011 Compliance Plan.



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**Case No. 2011-00140**

**Question No. 27**

**Witness: Charles R. Schram**

- Q-27. Refer to Direct Testimony of John N. Voyles, Jr. in Case Nos. 2011-00161, provided as attachment to Staff Question 38. The Voyles testimony in Case 2011-00161 contains Exhibit JNV-2, with Appendix F "Phase II Air Quality Control Study LG&E/KU Mill Creek Station - Addendum 1 - Without SCR." In the cover material, Black & Veatch noted that "on March 28, 2011 LG&E/KU determined that the installation of an SCR will not be required on Units 1 and 2 and requested revisions to the estimated overnight capital costs to reflect this change in scope."
- a. Provide all documents, excepting those protected by attorney-client privilege, relating to the decision to direct Black & Veatch to revise their study.
  - b. State each and every reason that SCR was determined not to be required on Mill Creek Units 1 and 2.
  - c. Provide explanations for each reason responsive to (b), above.
  - d. Name the individuals who were involved in the making of this decision, and provide their titles and work locations.
- A-27. a. – c.
- The Companies notified Black & Veatch about the SCRs on March 28, 2011. The need for additional SCRs has been discussed in material related to the Companies' 2011 ECR filings. Please see section 4.1.1 of the 2011 Air Compliance Plan, section 2.3 of the 2011 Air Compliance Plan Sensitivity Analysis, and section 2.3 of the 2011 Air Compliance Plan Sensitivity Analysis. Also, please see in Case Nos. 2011-00161 and 2011-00162 (a) KU's response to Commission Staff's First Information Request dated July 12, 2011, Question Nos. 57 and 59; (b) LG&E's and KU's responses to the First Set of Interrogatories of Rick Clewett, Raymond Berry, Sierra Club and the Natural Resource Defense Council dated July 12, 2011, Question No. 2; and (c)

LG&E's and KU's response to the Second Set of Interrogatories of Rick Clewett, Raymond Berry, Sierra Club and the Natural Resource Defense Council dated August 18, 2011, Question Nos. 15 and 24.

- d. The following were involved in the assessment and analysis of the SCRs:
- Gary Revlett – Director, Environmental Affairs; Louisville, KY
  - Charles R. Schram – Director, Energy Planning, Analysis and Forecasting; Louisville, KY.
  - David Sinclair – Vice President, Energy Marketing; Louisville, KY
  - John N. Voyles, Jr. – Vice President, Transmission and Generation Services; Louisville, KY





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**Case No. 2011-00140**

**Question No. 28**

**Witness: Charles R. Schram**

- Q-28. Refer to Direct Testimony of John N. Voyles, Jr. in Case Nos. 2011-00161, provided as attachment to Staff Question 38. The Voyles testimony in Case 2011-00161 contains Exhibit JNV-2, with Appendix G "Phase II: Air Quality Control Study LG&E/KU Ghent Station. - Addendum 1 - Without SCR." In the cover material, Black & Veatch notes that "on March 28, 2011 LG&E/KU determined that the installation of an SCR will not be required on Unit 2 and requested revisions to the estimated overnight capital costs to reflect this change in scope."
- a. Provide all documents, excepting those protected by attorney-client privilege, relating to the decision to direct Black & Veatch to revise their study.
  - b. State each and every reason that SCR was determined not to be required on the Ghent unit.
  - c. Provide explanations for each reason responsive to (b), above.
  - d. Name the individuals who were involved in the making of this decision, and provide their titles and work locations.
- A-28. a-d.  
Please see response to Question No. 27.



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**Case No. 2011-00140**

**Question No. 29**

**Witness: Charles R. Schram**

- Q-29. Refer to Direct Testimony of John N. Voyles, Jr. in Case Nos. 2011-00161, provided as attachment to Staff Question 38. The Voyles testimony in Case 2011-00161 contains Exhibit JNV-2, with Appendix G "Phase II: Air Quality Control Study LG&E/KU E.W. Brown Station - Addendum 1 - Without SCR." In the cover material, Black & Veatch notes that "on March 28, 2011 LG&E/KU determined that the installation of an SCR will not be required on Units 1 and 2 and requested revisions to the estimated overnight capital costs to reflect this change in scope."
- a. Provide all documents, excepting those protected by attorney-client privilege, relating to the decision to direct Black & Veatch to revise their study
  - b. State each and every reason that SCR was determined not to be required on Brown Units 1 & 2.
  - c. Provide explanations for each reason responsive to (b), above.
  - d. Name the individuals who were involved in the making of this decision, and provide their titles and work locations.
- A-29. a-d.  
Please see response to Question No. 27.



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**Case No. 2011-00140**

**Question No. 30**

**Witness: Charles R. Schram**

- Q-30. Reference the document "Analysis of Supply-Side Technology Alternatives" (March 2011) in the 2011 IRP Volume III. Page 22 of this document states that "However, due to anticipated environmental regulations, allowance price forecasts for NO<sub>x</sub> and SO<sub>2</sub> are significantly lower in 2011 through 2013 compared to recent years and then are assumed to be zero after 2013." This document appears to pre-date the final promulgated Cross State Air Pollution Rule (CSAPR), finalized in July of 2011.
- a. Does the final form of the CSAPR rule, as written, change the company's forecast of NO<sub>x</sub> and SO<sub>2</sub> prices? If yes, explain and please provide amended NO<sub>x</sub> and SO<sub>2</sub> prices.
  - b. Are the companies aware of assessments which show that trading prices for NO<sub>x</sub> and SO<sub>2</sub> will be greater than zero under the final CSAPR rule? If so, please provide the citations to such sources, and source documents if relied upon by the company for assessment in this case.
  - c. The EPA's assessment of the CSAPR rule suggests that trading prices for Group 1 states, including Kentucky, will be approximately \$1,000 per ton SO<sub>2</sub> in 2014 and around \$1,500 per ton NO<sub>x</sub> during the ozone season in 2014 (<http://www.epa.gov/airtransport/pdfs/CSAPRPresentation.pdf>). How would such prices change any elements of the company's 2011 Plan?
- A-30. a. The forecast of NO<sub>x</sub> and SO<sub>2</sub> allowance prices in the 2011 IRP pertain to allowances issued under the Clean Air Interstate Rule. CSAPR does not impact the Companies' price forecast for these allowances. The Companies' did not project prices for CSAPR allowances, recognizing that the development of markets for CATR (now CSAPR) was likely to be limited considering the rule's interstate trading restrictions. Therefore, the 2011 IRP assumes that the Companies will physically comply with the rule's NO<sub>x</sub> and SO<sub>2</sub> emissions caps based on the Companies allocated allowances.

- b. Yes. However, because CSAPR was promulgated after key assumptions for the 2011 IRP were finalized, no assessment of CSAPR allowance prices was incorporated in the development of the 2011 IRP. Furthermore, as stated in response to Question No. 30(a) above, the 2011 IRP assumes that the Companies will physically comply with the rule's NO<sub>x</sub> and SO<sub>2</sub> emissions caps based on the Companies' allocated allowances.
  
- c. The 2011 IRP represented a snapshot of an ongoing resource planning process using current business assumptions at the time the IRP was developed. However regarding the 2011 IRP specifically, the Companies do not plan to modify the IRP as information continues to change. Before embarking on any final strategic decisions or physical actions, the Company will continue to evaluate alternatives for providing reliable energy while complying with all regulations in a least-cost manner. Such decisions or actions will be supported by specific analyses and will be subject to the appropriate regulatory approval processes.



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**Case No. 2011-00140**

**Question No. 31**

**Witness: Charles R. Schram**

Q-31. Reference page 8-133 of the 2011 IRP Volume I, section entitled “Clean Water Act - Section 316(b)”. The section states that “In July 2004, EPA’s [sic] issued a rule for the utility industry which included two “performance standards” requiring facilities to reduce deaths of aquatic life...” The “performance standards” appear to refer to the thresholds set by the EPA as to which units would have to comply with entrainment and impingement criteria, given as a gallons per day threshold. Please provide the annual average water intake of each steam fossil unit in the companies’ fleet in gallons per day for the last five years.

A-31. Provided below are the annual average water intake flows for each station.

<b>Annual Average Water Intake Flows - MGD</b>							
	<b>E.W.</b>		<b>Green</b>			<b>Mill</b>	
<b>Year</b>	<b>Brown</b>	<b>Ghent</b>	<b>River</b>	<b>Tyrone</b>	<b>Cane Run</b>	<b>Creek</b>	<b>Trimble</b>
2006	26.1	61.3	134.9	52.2	340.3	245.8	10.0
2007	27.9	63.4	176.5	43.6	347.6	273.1	9.7
2008	28.0	64.8	151.6	60.4	333.4	241.0	13.4
2009	28.7	67.7	96.9	4.9	338.0	265.9	20.6
2010	34.3	76.6	146.8	28.0	380.4	257.8	23.3
2011 YTD <sup>1</sup>	36.3	72.9	139.4	6.3	372.7	258.5	33.6

<sup>1</sup> -- January through August 2011





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**Question No. 32**

**Witness: Charles R. Schram**

- Q-32. Reference page 8-133 of the 2011 IRP Volume I, section entitled "Clean Water Act - Section 316(b)". The section states that "possible requirements within the rule include: cooling towers on all active units, "helper" towers on once-thru [sic] cooling units for use during spawning season and low-flow periods, fine mesh screens, [etc]..."
- a. Has the company performed any analysis of the steam units which might trigger the rule under the proposed EPA rule, including but not limited to the mitigation measures which could be required or the costs of mitigating cooling water intake structures?
  - b. If the answer to (a) is yes, please provide any such studies and supporting workpapers or source documents.
- A-32. a. No formal studies have been performed to date.
- b. See response to part (a)



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**Case No. 2011-00140**

**Question No. 33**

**Witness: Charles R. Schram**

- Q-33. On page 20 of KU and LG&E's "2011 Optimal Expansion Plan Analysis," dated 2011 and provided in the KU and LG&E IRP Volume III, KU and LG&E provides forecasted load (MW) and annual energy (GWh).
- a. Are these data weather normalized?
  - b. Provide the past 15 years of actual summer coincident peaks (MW) and annual energy (GWh).
  - c. Provide all work papers, analyses, calculations, and documents used to forecast the low, base, and high forecasts for both load and energy.
- A-33. a. Yes, the data is weather-normalized.
- b. Coincident peak load by company:

Year	CC Summer Peak	LGE Coincident Summer Peak	KU Coincident Summer Peak
1996	5,425	2,270	3,155
1997	5,900	2,393	3,507
1998	5,986	2,427	3,559
1999	6,357	2,593	3,764
2000	6,317	2,542	3,775
2001	6,221	2,522	3,699
2002	6,513	2,623	3,890
2003	6,393	2,583	3,810
2004	6,223	2,479	3,744
2005	6,833	2,754	4,079
2006	6,863	2,713	4,150
2007	7,132	2,799	4,333
2008	6,352	2,474	3,878
2009	6,367	2,479	3,888
2010	7,175	2,852	4,323

Energy in GWh by company.

Year	Combined Company	LGE	KU
1996	28,889	11,149	17,740
1997	29,034	11,056	17,978
1998	30,389	11,599	18,791
1999	31,119	11,759	19,360
2000	32,113	12,032	20,081
2001	31,785	12,038	19,747
2002	33,375	12,546	20,829
2003	32,873	12,173	20,700
2004	33,939	12,532	21,408
2005	35,377	13,022	22,354
2006	34,738	12,724	22,014
2007	36,387	13,395	22,993
2008	35,313	12,802	22,511
2009	33,600	12,107	21,492
2010	36,636	13,185	23,452

- c. Please see the attachment. DSM and load shapes were then added to calculate the final outcome in Itron's Metrix LT program. Details of the Itron LT program are shown in IRP Volume 2, pp 209 – 211.

KU Calendar Sales			ODP Calendar Sales			LGE Calendar Sales (Weather Normalized)		
	Sales	Pct Change	Sales	Pct Change	Sales	Pct Change	Sales	Pct Change
2002	18,372,928		894,118		11,439,792		11,439,792	
2003	18,710,460	1.8%	904,405	1.2%	11,610,493	1.5%	11,610,493	1.5%
2004	19,456,115	4.0%	926,011	2.4%	11,631,858	0.2%	11,631,858	0.2%
2005	19,796,459	1.7%	948,173	2.4%	12,019,703	3.3%	12,019,703	3.3%
2006	20,113,344	1.6%	928,086	-2.1%	12,062,953	0.4%	12,062,953	0.4%
2007	20,427,115	1.6%	920,766	-0.8%	12,116,221	0.4%	12,116,221	0.4%
2008	20,155,346	-1.3%	911,185	-1.0%	11,940,672	-1.4%	11,940,672	-1.4%
2009	19,511,508	-3.2%	909,689	-0.2%	11,509,616	-3.6%	11,509,616	-3.6%
Mean		0.9%		0.3%		0.1%		0.1%
StDev		2.4%		1.8%		2.2%		2.2%

All Sales are Weather Normalized

KU 20,052,829

ODP 863,893

LGE 11,894,736

	Probability	Z-value
Low growth	0.05	-1.64
High growth	0.95	1.64

	Growth Rate	KU		Growth		ODP		Growth		LGE		Low	High
		Baseline	High	Low	High	Rate	Baseline	Low	High	Rate	Baseline		
2011	3.1%	20,673,192	21,455,849	19,890,534	21,455,849	3.8%	917,108	891,575	942,640	4.2%	12,390,840	11,962,541	12,819,139
2012	2.1%	21,105,165	21,912,035	20,298,295	21,912,035	0.8%	924,486	897,994	950,978	1.4%	12,559,093	12,112,930	13,005,255
2013	2.0%	21,518,610	22,342,340	20,694,879	22,342,340	0.6%	929,671	902,966	956,376	1.3%	12,727,887	12,275,667	13,180,108
2014	1.5%	21,842,547	22,682,414	21,002,680	22,682,414	0.6%	935,345	908,490	962,199	1.3%	12,894,759	12,436,460	13,353,058
2015	2.0%	22,259,868	23,122,378	21,417,358	23,122,378	0.9%	943,370	916,351	970,389	1.5%	13,092,252	12,627,944	13,556,559
2016	1.6%	22,623,465	23,492,653	21,754,277	23,492,653	1.0%	953,072	925,822	980,323	1.5%	13,291,872	12,820,453	13,763,290
2017	1.3%	22,927,822	23,810,811	22,044,833	23,810,811	0.7%	959,583	932,052	987,114	1.3%	13,464,127	12,985,521	13,942,734
2018	1.5%	23,271,815	24,166,683	22,376,947	24,166,683	0.8%	966,852	939,133	994,571	1.5%	13,659,769	13,174,961	14,144,578
2019	1.7%	23,664,800	24,573,094	22,756,506	24,573,094	0.8%	974,330	946,401	1,002,259	1.6%	13,874,066	13,382,213	14,365,919
2020	1.6%	24,054,832	24,978,464	23,131,200	24,978,464	0.8%	982,530	954,385	1,010,675	1.6%	14,102,379	13,602,810	14,601,949
2021	1.3%	24,378,412	25,317,267	23,439,557	25,317,267	0.7%	989,706	961,324	1,018,088	1.3%	14,286,897	13,779,106	14,794,687
2022	1.6%	24,765,582	25,717,067	23,814,098	25,717,067	0.8%	997,925	969,336	1,026,514	1.5%	14,486,294	13,981,860	15,010,729
2023	1.4%	25,113,484	26,080,079	24,146,889	26,080,079	0.8%	1,006,315	977,489	1,035,142	1.3%	14,683,102	14,161,128	15,205,077
2024	1.8%	25,568,655	26,548,829	24,588,482	26,548,829	0.8%	1,014,351	985,282	1,043,420	1.6%	14,919,679	14,390,978	15,448,380
2025	1.5%	25,964,083	26,962,022	24,966,144	26,962,022	1.0%	1,024,268	994,967	1,053,569	1.4%	15,122,195	14,584,976	15,659,415
2026	1.4%	26,335,177	27,348,550	25,321,805	27,348,550	0.8%	1,032,783	1,003,196	1,062,371	1.3%	15,323,379	14,778,867	15,867,890
2027	1.4%	26,711,562	27,739,419	25,683,706	27,739,419	0.9%	1,041,569	1,011,735	1,071,402	1.4%	15,536,896	14,985,140	16,088,652
2028	1.5%	27,123,360	28,165,906	26,080,813	28,165,906	0.9%	1,050,636	1,020,549	1,080,723	1.5%	15,769,841	15,210,397	16,329,285
2029	1.4%	27,513,908	28,572,527	26,455,289	28,572,527	0.8%	1,059,416	1,029,066	1,089,765	1.3%	15,975,880	15,408,048	16,543,712
2030	1.4%	27,890,684	28,964,556	26,816,832	28,964,556	1.0%	1,069,501	1,038,899	1,100,104	1.4%	16,193,446	15,618,195	16,768,696
2031	1.2%	28,216,746	29,305,313	27,128,178	29,305,313	0.8%	1,078,357	1,047,463	1,109,251	1.2%	16,381,472	15,798,387	16,964,556
2032	1.3%	28,590,358	29,691,651	27,489,064	29,691,651	0.8%	1,087,339	1,056,189	1,118,489	1.2%	16,580,669	15,990,815	17,170,524
2033	1.2%	28,947,203	30,063,079	27,831,327	30,063,079	0.8%	1,096,322	1,064,913	1,127,732	1.4%	16,811,107	16,214,080	17,408,134
2034	1.2%	29,286,525	30,416,329	28,156,722	30,416,329	0.8%	1,105,546	1,073,877	1,137,215	1.2%	17,008,146	16,402,821	17,613,471
2035	1.2%	29,639,720	30,782,767	28,496,673	30,782,767	0.8%	1,114,919	1,082,984	1,146,855	1.4%	17,237,799	16,625,379	17,850,218
2036	1.1%	29,965,065	31,121,897	28,808,233	31,121,897	0.9%	1,124,430	1,092,224	1,156,636	1.3%	17,466,873	16,846,184	18,087,562
2037	1.2%	30,311,795	31,481,325	29,142,265	31,481,325	0.8%	1,133,984	1,101,503	1,166,465	1.4%	17,704,943	17,076,006	18,333,881
2038	1.0%	30,627,037	31,810,100	29,443,975	31,810,100	0.8%	1,143,617	1,110,860	1,176,374	1.3%	17,936,446	17,298,936	18,573,956
2039	1.2%	30,988,697	32,184,063	29,793,330	32,184,063	0.9%	1,153,365	1,120,330	1,186,400	1.2%	18,166,817	17,510,972	18,802,663
2040	0.7%	31,220,075	32,429,557	30,010,592	32,429,557	0.6%	1,160,664	1,127,347	1,193,980	1.7%	18,467,176	17,813,396	19,120,957



COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

RECEIVED  
OCT 24 2011  
PUBLIC SERVICE  
COMMISSION

**In the Matter of:**

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

**MOTION OF LOUISVILLE GAS AND ELECTRIC COMPANY  
AND KENTUCKY UTILITIES COMPANY  
TO DEVIATE FROM REQUIREMENT  
GOVERNING FILING OF COPIES**

Louisville Gas and Electric Company (“LG&E”) and Kentucky Utilities Company (“KU”) (collectively, the “Companies”), by counsel, move the Kentucky Public Service Commission (“Commission”) to grant LG&E and KU approval, pursuant to 807 KAR 5:001 Section 14 to deviate from the requirement that parties file an original and ten (10) complete copies of all discovery responses and attachments. The Companies request that they be excused from filing any paper copies of a certain attachment to one of their responses because the attachment is voluminous. In support of their Motion, the Companies state as follows:

1. Pursuant to Commission’s May 26, 2011 and June 29, 2011 Orders, LG&E and KU must provide an original and ten (10) copies of all data responses and attachments to the Commission, along with a service copy to all parties of record. The Companies’ attachment to its response to the Second Set of Interrogatories and Requests for Production of Documents of Rick Clewett, Drew Foley, Janet Overman, Gregg Wagner, the Natural Resources Defense Council, and the Sierra Club (collectively, “Environmental Interveners”) No. 18(c) is voluminous. Due to the volume of the attachment, the Companies respectfully requesting permission to file with the Commission only electronic copies of the attachment, and for all service copies to be electronic.

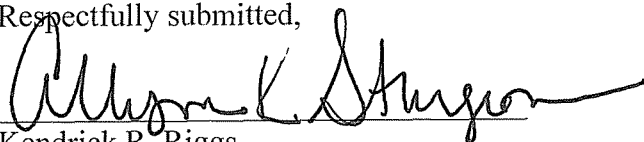
2. In response to the Environmental Interveners' DR No. 18(c), the Companies are providing as an attachment a collection of potential vendors' responses to the Companies' request for proposals for new generating capacity. (The attachment contains confidential information and is the subject of a Petition for Confidential Protection being filed contemporaneously herewith.) Each copy of the attachment would consume 1,200 pages if printed. Providing paper copies of just the Commission's original and ten copies would require over 13,000 pages, and service copies would require thousands more pages.

3. Due to the volume of the attachment, the Companies request permission pursuant to 807 KAR 5:001, Section 14 to deviate from the Commission's May 26, 2011 and June 29, 2011 Orders and provide on compact discs the Commission's original and ten copies of the attachment. (Because the original compact disc contains confidential information, it has a yellow label; the remaining public copies have white labels.) The Companies seek permission to provide compact-disc service copies to the other parties to the proceeding, as well.

**WHEREFORE**, Louisville Gas and Electric Company and Kentucky Utilities Company request a deviation from the requirement that parties provide an original and ten (10) paper copies of discovery responses. The Companies request that they be allowed to instead submit the attachment to response identified above on compact discs in compliance with this requirement.

Dated: October 24, 2011

Respectfully submitted,



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*Counsel for Louisville Gas and Electric Company  
and Kentucky Utilities Company*

**CERTIFICATE OF SERVICE**

I hereby certify that a true copy of the foregoing Motion was served via U.S. mail (first-class, postage prepaid), overnight delivery, or hand-delivery this 24th day of October 2011, upon the following persons:

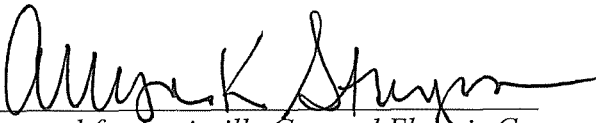
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and Kentucky Utilities Company*

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OCT 24 2011

PUBLIC SERVICE  
COMMISSION

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

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

PETITION FOR CONFIDENTIAL PROTECTION

Louisville Gas and Electric Company (“LG&E”) and Kentucky Utilities Company (“KU”) (collectively “Companies”) hereby petition the Kentucky Public Service Commission (“Commission”) pursuant to 807 KAR 5:001, Section 7, and KRS 61.878(1)(c) to grant confidential protection for the items described herein, which the Companies seek to provide in supplemental response to the Second Set of Interrogatories and Requests for Production of Documents of Rick Clewett, Drew Foley, Janet Overman, Gregg Wagner, the Natural Resources Defense Council, and the Sierra Club (“Environmental Intervenors”) Nos. 18(c), 25(b), and 25(e). In support of this Petition, the Companies state as follows:

1. Under the Kentucky Open Records Act, the Commission is entitled to withhold from public disclosure commercially sensitive to the extent that open disclosure would permit an unfair commercial advantage to competitors of the entity disclosing the information to the Commission. See KRS 61.878(1)(c). Public disclosure of the information identified herein would, in fact, prompt such a result for the reasons set forth below.

2. The confidential information contained in the Companies’ response to Environmental Intervenors’ DR No. 18(c) is a collection of potential vendors’ responses to the Companies’ request for proposals for new generating capacity. Disclosing publicly such information would result in harm to the Companies and their customers by permitting competing

vendors to understand what their competitors are offering and offering the Companies only slightly better deals rather than their truly best offers. Also, vendors are more likely to participate in RFP processes and make their best offers when they know that their responses will be held in confidence rather than being broadcast to their competitors; having as many vendors as possible competing for the Companies' business at the best prices benefits the Companies' customers. To protect the Companies' customers from harm, this information should be afforded confidential protection.

3. The confidential information contained in the Companies' responses to Environmental Interveners' DR Nos. 25(b) and 25(e) includes projected fuel prices the Companies purchased from reputable vendors to enable the Companies to make prudent business decisions of several kinds, including fuel contracting decisions and environmental-compliance decisions. If the Commission grants public access to this information, the vendors from whom the Companies purchased the fuel forecast information at issue could refuse to do business with the utilities in the future, which would do serious harm to the Companies' ability to make prudent fuel contract, environmental compliance, and other decisions. All such commercial harms would ultimately harm the Companies' customers. Moreover, publicly disclosing such information would do immediate and costly harm to the firms from which the Companies purchased the fuel forecast information at issue; the firms derive significant revenues from developing and selling such forecasts to customers under strict license agreement obligations not to disclose. Any public disclosure of the forecasts would render them commercially worthless.

4. The Companies have obtained consent from the fuel forecast vendors to disclose on a limited basis the confidential information described herein, pursuant to an acceptable

protective agreement, to interveners with legitimate interests in reviewing the same for the purpose of participating in this case.

5. The Commission has given confidential treatment to projected fuel cost information in previous IRP cases. For example, see the Commission's letter to the Companies dated May 1, 2008, concerning the Companies' 2008 IRP case (Case No. 2008-00148); the Commission's letter to the Companies dated April 28, 2005, concerning the Companies' 2005 IRP case (Case No. 2005-00162); the Commission's letter to the Companies dated October 24, 2002, concerning the Companies' 2002 IRP case (Case No. 2002-00367); and the Commission's letter to the Companies dated March 6, 2000, concerning the Companies' 1999 IRP case (Case No. 99-430).

6. If the Commission disagrees with this request for confidential protection, it must hold an evidentiary hearing (a) to protect the Companies' due process rights and (b) to supply the Commission with a complete record to enable it to reach a decision with regard to this matter. Utility Regulatory Commission v. Kentucky Water Service Company, Inc., Ky. App., 642 S.W.2d 591, 592-94 (1982).

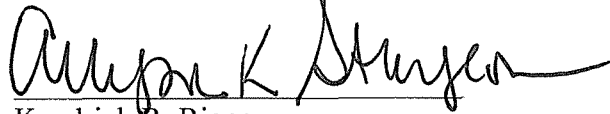
7. In accordance with the provisions of 807 KAR 5:001, Section 7, LG&E and KU are filing with the Commission one copy of the Confidential Information highlighted and ten (10) copies without the Confidential Information. The attachment to the Companies' response to DR No. 18(c) is voluminous and is being provided on compact disc pursuant to a Motion to Deviate, which is being filed contemporaneously herewith. The compact disc containing the confidential information has a yellow label; the other public copies have white labels.

**WHEREFORE**, Kentucky Utilities Company and Louisville Gas and Electric Company respectfully request that the Commission grant confidential protection for the information at

issue, or in the alternative, schedule and evidentiary hearing on all factual issues while maintaining the confidentiality of the information pending the outcome of the hearing.

Dated: October 24, 2011

Respectfully submitted,



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Company and Kentucky Utilities Company*



**CERTIFICATE OF SERVICE**

I hereby certify that a true copy of the foregoing Petition for Confidential Protection was served via U.S. mail (first-class, postage prepaid), overnight delivery, or hand-delivery this 24th day of October 2011, upon the following persons:


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