
# Integrated Resource Plan

## Demonstration of Compliance with Non-Unanimous Stipulation and Agreement from AmerenUE's 2005 Chapter 22 (4 CSR 240-22.010-.080) Electric Utility Resource Plan

May 2008

**1. AmerenUE agrees it will perform another full IRP analysis using a participatory planning process that includes the Staff, OPC and intervenors in this case (stakeholders). Specifics of the participatory process are found below.**

AmerenUE performed another full IRP analysis in full compliances with Chapter 22 and gave substantial consideration to the input of stakeholders through the participatory process. The 2005 IRP Stipulation and Agreement included a minimum of eight meetings and six conference calls. The process included almost 30 meetings and conference calls. The meetings and calls with the stakeholders facilitated discussion on various aspects of the planning process as detailed later in this filing.

**2. The IRP analysis will be filed on February 5, 2008 (the 2008 filing). AmerenUE's next three year IRP filing will be filed on April 5, 2011 (the 2011 filing), assuming there are no changes to the Chapter 22 IRP Rules that preempt this filing schedule.**

AmerenUE filed its IRP on February 5, 2008.

**3. AmerenUE, the Staff, OPC, and intervenors agree to work together to develop a process to provide the opportunity for public input.**

During 2007, AmerenUE management conducted more than two dozen meetings with representatives from organizations that included consumer advocates, representatives who serve low-income customers, advocates for large business interests, environmental activists and officials from the Department of Natural Resources, the Office of Public Counsel and the MoPSC staff. (See Stakeholders Comment On The Process.)
These stakeholders joined AmerenUE in developing a suite of energy management programs.

AmerenUE worked with Stakeholders during two meetings (September 10, 2007 and October 2, 2007) to develop the approach and content for public workshops on the energy efficiency and energy management programs. In addition, several email exchanges discussed ideas and suggestions. In October 2007, Stakeholders joined AmerenUE in conducting well-publicized workshops on the programs in St. Louis, Cape Girardeau and Jefferson City to get public comment. More than 200 citizens attended these workshops and offered comments to help shape the two dozen initiatives.

In addition to the DSM Workshops, AmerenUE publicized the filing of its IRP with instructions to downloading public versions of the final filing. The public filing was also put on Ameren.com.

**4. The goal of the 2008 filing is full compliance with the Missouri's Electric Utility Resource Planning / IRP Rules, 4 CSR 240-22 (Chapter 22), except where waivers have been applied for by AmerenUE and approved by the Commission prior to the 2008 filing..**

In addition to full compliance with the IRP Rules, in many instances, AmerenUE's analysis and filing exceed the requirements.

After extensive consultation with stakeholders AmerenUE filed the IRP waivers on April 19, 2007 in Case No. EO-2007-0409. The Commission approved the waivers on May 10, 2007 without any changes. The waivers were incorporated into the February 5, 2008 IRP filing.

One additional waiver was requested on February 5, 2008. That waiver requested a release from the requirement to complete an IRP analysis without Callaway Unit #1 in service after 2024. That waiver request has not been objected to by any party; however, the Commission has not issued an order on this request.

**4 CSR 240-22.010**
**Policy Objectives**

**5. AmerenUE commits to treat demand-side resources on the same basis as supply-side resources. As part of that commitment, AmerenUE agrees to finance all aspects of the demand-side analysis described in paragraphs 18 through 23 of this document and the programs that result from the analysis. AmerenUE agrees to demonstrate its ongoing commitment to demand-side analysis in the 2008 filing by providing, at a minimum: (a) a demand-side annual budget; (b) a list of employees involved in demand-side analysis; and (c) AmerenUE's procedures implemented to introduce future demand-side programs.**

**(a) a demand-side annual budget**

AmerenUE documented its demand-side annual budget in 4 CSR 240-22.070 (9) (B) page 82.

**(b) a list of employees involved in demand-side analysis; and**

Current employees involved in demand-side analysis (not all full-time):
Steve Kidwell
Dan Laurent
Rick Voytas (AMS)
Greg Lovett
Judd Moritz (AMS)
Mike Whitmore (AMS)
Dan Danahy (AMS)
Laureen Welikson
Wade Miller

In addition, AmerenUE is creating 6 new positions to manage implementation of its energy efficiency and demand response programs. Senior Program Managers for mass markets (residential & small commercial) and business-to-business (large commercial &

industrial) should be in place by May 31, with selection processes for the other positions commencing immediately thereafter.

**(c) AmerenUE's procedures implemented to introduce future demand-side programs**

AmerenUE' procedures implemented to introduce future demand-side programs are documented in 4 CSR 240-22.070 (9) (B) page 82-85 and 4 CSR 240-22.070 Appendix B.

**4 CSR 240-22.020**

**Definitions**

**6. AmerenUE will place the load analysis and forecasting results for the entire 20 year planning horizon into the body of the formal 2008 filing rather than in the supporting workpapers.**

AmerenUE included all load analysis and forecasting results through December 2030 in the body of the formal 2008 filing as well as providing them in the supporting workpapers. In the 4 CSR 240-22.030 Load Analysis and Forecasting document, customer forecasts can be found in pages 145-150, sales forecasts can be found in pages 198-239, and coincident peak forecasts by class and total system peak forecast can be found in pages 240-255.

**7. AmerenUE agrees to use the terms as defined within the IRP Rules, in particular 4 CSR 240-22.020, or will identify and explain any differences.**

AmerenUE used the terms as defined within the IRP Rules, in particular 4 CSR 240-22.020, or identified and explained any differences.

## 4 CSR 240-22.030
## Load Analysis and Forecasting

**8. AmerenUE agrees to use a single methodology for the peak load forecast and for the integration analysis.**

AmerenUE did use a single methodology for the peak load forecast and for the integration analysis as stated in page 195 of 4 CSR 240-22.030 Load Analysis and Forecasting document.

**9. AmerenUE will attempt to separate the weather components from the statistically adjusted variables used within its modeling process to allow a focus on the impact of weather on energy usage in a manner that can be separated from the nonheating, ventilation and air conditioning appliances used by the customers. AmerenUE will incorporate the use of weather normalized data in preparing its forecast, in addition to performing the forecast using actual usage data. Results of both analysis methods will be reviewed with the stakeholders and a decision will be made to choose the analytical method that produces the most accurate forecast. If the work, as specified within the rule, does not prove to be useful, AmerenUE will file for the appropriate waiver of 4 CSR 240-22.030 (1) (B).**

If the weather components are taken out of the SAE (Statistically Adjusted End-Use) variables, the models do not produce meaningful coefficients or results; however, it is possible to show the impact of weather on energy separated from the non-heating, ventilation and air conditioning appliances once the modeling process is complete. Expected change in energy usage in response to one degree day change is provided on page 162 of 4 CSR 240-22.030 Load Analysis and Forecasting document.

In addition to modeling with actual historical sales and actual historical weather data, AmerenUE used weather normalized sales data and normal weather in forecast models. The analysis showed that the difference between the results from using weather normalized sales and using actual sales is not material. A summary of these results are provided on pages 129-130 of 4 CSR 240-22.030 Load Analysis and Forecasting document.

All MetrixND models are provided in the workpapers.

**10. For purposes of demand side management analysis, AmerenUE will develop load profiles by each major class and these loads will be adjusted to match net system loads. In addition, AmerenUE will develop weather normalized representations of these loads which will be aggregated to a weather normalized system load shape.**

AmerenUE developed the load profiles by rate and revenue class and these loads were adjusted to match the net system load. These load profiles were weather normalized and aggregated to the weather normalized system load shape. A summary of the development of load profiles and the data can be found in pages 21-24 and in pages 109-125 of 4 CSR 240-22.030 Load Analysis and Forecasting document. Actual and weather normalized hourly profiles were also provided in the workpapers.

## 4 CSR 240-22.040
## Supply-Side Resource Analysis

**11. As one data source for AmerenUE's analysis, public data from the Tall Tower wind assessments in Missouri will be used as part of its evaluation of wind generation, to the extent this information is available.**

While performing wind resource characterization and evaluation in April/May of 2007, AmerenUE's consultants (Black & Veatch) worked with Neil Fox (Department of Soil, Environmental and Atmospheric Sciences) to confirm with him that the Tall Towers program has not yet collected a full year's worth of data. The first met tower was erected in June 2006 in the northwest corner of Missouri. Several others were installed in August 2006. Without having a full year of data, they were not able to use the Tall Towers data for the Supply Side Resource Option Study.

Although these data resources should prove useful for future wind development in Missouri and, perhaps, future Supply Side studies for AmerenUE, Black & Veatch proposed that the most readily available and representative data would be found in the Wind RFP responses. The projects proposed in the RFP should represent the most developable and most economic wind resources in Missouri.

The wind resource data that Black & Veatch needed for the Supply Side study was captured by project capacity factor. The capacity factor combined wind resource, turbine power curve, project electrical losses, and siting nuances for utility scale projects. The capacity factors in the Wind RFP responses should be based on wind data that has been correlated to long term wind data sets. These estimates of capacity factor would be more accurate than any estimate B&V could have made with the time and data resources they had at their disposal. By using a "typical" capacity factor from the Wind RFP responses, B&V was able to accurately characterize the cost of electricity for a current wind project in Missouri without having to speculate.

**12. AmerenUE will include in its resource planning work its environmental compliance strategy as it becomes finalized. As part of semi-annual resource planning meetings held at no greater than six-month intervals with the stakeholders, AmerenUE will provide unit-by-unit updates of AmerenUE's environmental compliance plans, including annual cash expenditures (both actual expenditures to current date by year and.**

AmerenUE complied with this item by conducting briefing sessions with stakeholders on July 12, 2007 and February 26, 2008. During those briefings, the information requested as a part of item 12 above was provided to stakeholders. Feedback received from stakeholders was that this information was satisfactory to item 12's intent. In addition, in the February 5, 2008 IRP filing AmerenUE included a discussion of various environmental compliance strategies under various climate scenarios. Those strategies can be found in Appendix G of 4CSR 240.22.040. The preferred environmental compliance plan and the implementation plan included in the IRP can be found in 4CSR 240.22.070 (6) and (9). In addition, AmerenUE has more recently finalized its updated environmental compliance strategy. A report documenting the analysis performed is planned to be released to stakeholders in the near future.

**13. Through the use of an appropriate Request for Proposals (RFP), AmerenUE agrees to investigate possible new supply-side resources outside the Midwest Independent Transmission System Operator, Inc. (MISO) footprint to discover additional resources that may reduce costs. Only those RFP responses from outside the MISO footprint that are competitive with RFP responses inside the MISO footprint will be considered for an impact study in order to determine the total cost for use in the final analysis of capacity options. The RFP will include appropriate disclosures regarding the possibility that none of the proposals will be pursued as resource options. Such disclosures will be discussed with the stakeholders prior to the issuance of the RFP, with the intent that the disclosures not render the issuance of the RFP a useless exercise. Furthermore, AmerenUE will share the RFP with the stakeholders at least 30 days prior to the RFP being issued for the purpose of AmerenUE receiving and considering comments from the stakeholders. Additionally, AmerenUE will identify and describe the process used to insure the distribution system is capable of delivering energy to its load.**

AmerenUE solicited professional services from qualified firms to assist in identifying, collecting data, and screening potential supply-side resources outside the Midwest Independent Transmission System Operator, Inc. (MISO) footprint.

Burns & McDonnell (B&Mc) was engaged to develop the Request For Information (RFI) (4 CSR 240-22.040 Appendix N). B&Mc emailed the RFI directly to the bidder's that expressed interests as well as posted announcements on various industry web pages. The announcements pointed interested parties to a web site where they could obtain copies of the RFI. B&Mc collected questions, proposed answers to AmerenUE, and posted the questions and answers to the web site. They received, opened, and screened the proposals. This task was done in private. After they had the conforming proposals identified, they performed a bus bar analysis using levelized cost comparisons of the various offers.

An RFI was developed (4 CSR 240-22.040 Appendix O) to solicit brief descriptions of proposed resource options and information from parties who may have or be developing supply side resources that would be of benefit to AmerenUE. The RFI solicited information on capacity and energy sources that could be used by AmerenUE to satisfy its reserve and load serving obligations starting in approximately 2014. Options were solicited for peaking, intermediate and base load type operations. The RFI indicated a variety of contracting options for these resources would be consideration as part of the planning process. The RFI sought only indicative offers and pricing terms. A draft of the RFI was shared with Stakeholders at the April 13th, 2007 meeting. The RFI was issued on June 1, 2007.

For more information on this matter or to view the results of the RFI, see AmerenUE's 2008 IRP filing 4 CSR 240-22.040(5).

**14. AmerenUE agrees to include in its resource plan those upgrade projects to existing plants which show favorable screening results in some of its alternative resource plans.**

Upgrades to existing plants were looked at very closely during the IRP process and are discussed in greater detail in AmerenUE's filing in section 4 CSR 22-040 (4). The process included an extensive list of potential upgrades that were presented to Stakeholders during workshops held in 2007. The most promising and economical plant upgrades where then submitted to B&V for economic screening. The top 5 upgrades to existing plants were then added to the MIDAS model and included in 106 of the 110 alternative resource plans modeled by AmerenUE for this IRP.

**15. AmerenUE will continue actively investigating opportunities for sales of capacity and will incorporate into the 2008 IRP filing a capacity sales analysis for those sales that could impact the timing of large capacity additions.**

AmerenUE constantly monitors capacity markets through the use of brokers, and direct interaction with counterparties. Our long term trader transacts capacity in the current and next year.

For long term opportunities, Union Electric relies on the relationships that our Origination Executive has established with wholesalers, as well as Request for Proposals (RFPs) issued through trade publications and associations.

During Integration Analysis, AmerenUE developed alternative resource plans that included bringing new supply-side capacity online when roughly half of that capacity was needed to satisfy reserve requirements. For example, a 750 MW PC unit is added to a portfolio when AmerenUE is roughly 375 MW short of the required 17 percent reserve margin. In all plans, short term purchases are required in the years preceding new unit coming online, and short term sales are made for a few years after it comes online. Each alternative resource plan was constructed to delay the expenditures for large baseload plants before the plant is in-service by purchasing short-term capacity from the market. After a unit comes into service, any capacity above the required reserve margin was sold into the capacity market. Using this methodology, the 2008 IRP filing considered capacity sales (and purchases) that could impact the timing of large capacity additions.

**16. In addition to its current practices for obtaining purchased power, AmerenUE agrees to develop and issue RFPs for short-term and long-term Power Purchase Agreements as a part of its Integrated Resource Planning process, with appropriate disclosures regarding the possibility that none of the proposals will be pursued as resource options. Such disclosures will be discussed with the stakeholders prior to the issuance of the RFPs, with the intent that the appropriate disclosures not render the issuance of the RFPs a useless exercise. Furthermore, AmerenUE will share the RFPs with the stakeholders at least 30 days prior to the RFPs being issued for the purpose of AmerenUE receiving and considering comments from the stakeholders.**

AmerenUE solicited professional services from qualified firms to assist in identifying, collecting data, and screening potential short-term and long-term Power Purchase Agreements as a part of its Integrated Resource Planning process.

Burns & McDonnell (B&Mc) was engaged to develop the Request For Information (RFI) (4 CSR 240-22.040 Appendix N). B&Mc emailed the RFI directly to the bidder's that expressed interests as well as posted announcements on various industry web pages. The announcements pointed interested parties to a web site where they could obtain copies of the RFI. B&Mc collected questions, proposed answers to AmerenUE, and posted the questions and answers to the web site. They received, opened, and screened the proposals. This task was done in private. After they had the conforming proposals identified, they performed a bus bar analysis using levelized cost comparisons of the various offers.

An RFI was developed (4 CSR 240-22.040 Appendix O) to solicit brief descriptions of proposed resource options and information from parties who may have or be developing supply side resources that would be of benefit to AmerenUE. The RFI solicited information on capacity and energy sources that could be used by AmerenUE to satisfy its reserve and load serving obligations starting in approximately 2014. Options were solicited for peaking, intermediate and base load type operations. The RFI indicated a

variety of contracting options for these resources would be consideration as part of the planning process. The RFI sought only indicative offers and pricing terms. A draft of the RFI was shared with Stakeholders at the April 13th, 2007 meeting. The RFI was issued on June 1, 2007.

For more information on this matter, see AmerenUE's 2008 IRP filing 4 CSR 240-22.040(5).

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**17. AmerenUE agrees that estimated nuclear capital costs shall be obtained from a qualified engineering firm actively engaged in the nuclear industry. The firm providing the estimate shall be required to identify the critical uncertain factors that may cause the capital cost estimates to change significantly and to provide a range of estimates and an associated subjective probability distribution that reflects this uncertainty. In developing the range of estimates, the firm will consider historic nuclear plant construction costs. The 2008 filing will include documentation of the development of the range of estimates and the probability distribution. As a part of the participatory process, the firm will present this information to stakeholders and give consideration to their input.**

AmerenUE retained Black & Veatch Corporation to develop capital cost estimates for the nuclear technology. Black & Veatch with over 9,000 employees is one of the leading and largest engineering firms in the world providing services to the nuclear industry. Black & Veatch is currently providing engineering, procurement, and construction (EPC) services for the Lungmen Nuclear Project, one of the very few nuclear plants in the world that is currently under construction. Black & Veatch is also the EPC contractor for numerous coal and natural gas units throughout the country providing current costs for commodities and labor.

B&V identified the critical uncertain factors that may cause the capital cost estimates to change significantly and to provide a range of estimates and an associated subjective probability distribution that reflects this uncertainty. In developing the range of estimates, the B&V considered historic nuclear plant construction costs. For more information, see AmerenUE's 2008 IRP filing 4 CSR 240-22.040 (8) (B).

B&V presented their results to Stakeholders at the July 31$^{st}$, 2007 workshop and gave consideration to Stakeholder feedback.

## 4 CSR 240-22.050
## Demand-Side Resource Analysis

**18. AmerenUE will perform a cost/benefit analysis of potential DSM programs, including engaging a consultant to assist in this evaluation, to work on program design and to create an implementation plan. The specific tasks to be accomplished with respect to the DSM analysis and their expected duration are listed in the Stipulation and Agreement.**

AmerenUE retained ICF to perform the DSM analysis work as specified in the Stipulation and Agreement. Documentation of this work can be found in AmerenUE's 2008 IRP filing 4 CSR 240-22.050, 4 CSR 240-22.050 Appendix A-J, and 4 CSR 240-22.070 Appendix B.

**19. The goal is to complete these eight tasks by July 1, 2007. This work has already begun. AmerenUE sent all stakeholders a draft of the RFP as well as the bidders' list for comment prior to issuing the RFP. AmerenUE shared its evaluation of bids to the RFP. A meeting was held to discuss the bids and the three finalists were brought to St. Louis and were interviewed by the participating stakeholders. A finalist was agreed upon by all participating stakeholders.**

AmerenUE hired finalist (ICF) as agreed upon by all participating stakeholders. While a good portion of the work was completed by July 1st 2007, the portfolios were not completed until November due to the inclusion of delayed input from Stakeholders.

**20. In addition, prior to completion of Task 7, AmerenUE and the stakeholders will sponsor at least one meeting open to the public to provide an overview of the DSM process and potential programs and to receive public input.**

AmerenUE worked with Stakeholders during two meetings (September 10, 2007 and October 2, 2007) to develop the approach and content for public workshops on the energy efficiency and energy management programs. In addition, several emails exchanges discussed ideas and suggestions. In October 2007, Stakeholders joined AmerenUE in conducting well-publicized workshops on the programs in St. Louis, Cape Girardeau and Jefferson City to get public comment. More than 200 citizens attended these programs and offered comments to help shape the two dozen initiatives.

**21. AmerenUE will conduct market research studies, customer surveys, pilot DSM programs, test marketing programs and other activities to develop the information necessary to design and implement cost-effective demand-side programs.**

AmerenUE is working with the consulting firm Summit Blue, Inc to develop a strategic, comprehensive market assessment plan. The primary objective of the plan is to support the implementation of programs in the current 3-year implementation plan. The secondary objective is to support future energy efficiency and demand response planning work. We expect to receive meaningful input from both the AmerenUE energy efficiency program implementation teams and Evaluation, Measurement, and Verification (EM&V) teams in the development of the market assessment plan. Since the full contingent of AmerenUE implementation and EM&V prime contractors are expected to be engaged by July 2008, we expect to have the market assessment plan finalized shortly thereafter.

**22. If the approach to demand-side analysis described in paragraph 18 of this document does not result in more than four energy efficiency and five demand-response programs in the 2008 filing, AmerenUE will research and document why so few demand-side programs are cost effective..**

AmerenUE's DSM Implementation Plan includes 13 energy efficiency and five demand response programs. For more details reference 4 CSR 240-22.070 Appendix B, pages 5-7.

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**23. AmerenUE will evaluate the potential load building impacts of proposed DSM programs.**

The AmerenUE portfolio of energy efficiency programs does not have load building impacts. The programs do not have fuel switching aspects nor do they encourage the proliferation of additional energy consumption.

## 4 CSR 240-22.060
## Integrated Resource Analysis

**24. AmerenUE agrees to include several alternative resource plans with and without the Callaway nuclear plant in the 2008 filing consistent with 4 CSR 240-22.060(1). AmerenUE also agrees that merely substituting an identical unit in age and cost as that of the current Callaway plant does not meet the intent of scenarios developed to address the "without Callaway" resource plans..**

AmerenUE completed its analysis of the cost of relicensing the Callaway nuclear plant. The analysis has made it clear that relicensing is a better option than replacing Callaway with any other type of baseload generation. Accordingly, AmerenUE has decided it will seek an extension of the Callaway nuclear license and it no longer makes sense for AmerenUE to spend the time and effort necessary to run alternative resource plans which do not include Callaway as an available resource.

Given the result of this analysis, AmerenUE asks the Commission to waive the portion of the Agreement which would require it to run alternative resource plans without Callaway nuclear plant as an available resource.

Prior to filing the waiver request, AmerenUE discussed it with all parties in this case. The Commission Staff, Office of the Public Counsel, Missouri Energy Group, Missouri Industrial Energy Consumers and the Missouri Department of Natural Resources do not object to this waiver.

A waiver was requested on February 5, 2008. That waiver requested a release from the requirement to complete an IRP analysis without Callaway Unit #1 in service after 2024.

**25. AmerenUE agrees that as part of its integration and risk analysis work it will:**

**A. Model demand-side resources (both energy efficiency resources and demand response resources) in some of its alternative resource plans for the entire planning horizon (i.e., 20 years) over which the costs and benefits of alternative resource plans are evaluated. At least two portfolios of demand-side resources (including both moderate and aggressive portfolios) will be modeled in some of the alternative resource plans.**

**B. Model at least 300 MW of wind generation as a supply-side resource that goes in-service during the first five years of the planning horizon in some of its alternative resource plans. The wind resources may go in service in multiple stages (e.g., 150 MW in year 2 and 150 MW in year 4).**

**C. Model both demand-side resources (including energy efficiency resources and demand response resources) and wind generation supply side resources in some of its alternative resource plans where they are both implemented during the first five years of the planning horizon.**

A. The process of developing the final portfolio was necessarily iterative, as program element participation rates and costs were adjusted to yield a mix of program elements satisfying not only the statutory savings and spending constraints, but the Company's overall portfolio design goals and stakeholder concerns as well. Initially, the portfolio model was run with baseline assumptions regarding the rate of customer participation and energy and demand impacts and costs were calculated accordingly. Participation was then adjusted to yield a variety of alternative portfolios with different trajectories for savings and costs. Following discussions with stakeholders, two final portfolios were agreed to, labeled Moderate and Aggressive. For more information on Portfolio Construction reference 4 CSR 240-22.070 Appendix A, page 142.

For a discussion of AmerenUE's IRP filing alternative resource plans, see 4 CSR 240-22.060 (6). AmerenUE used 110 alternative resource plans: 46 plans included the Aggressive DSM Portfolio, 32 included the Moderate DSM Portfolio, and another 32 did not include DSM.

B. AmerenUE modeled five renewable portfolios in the 110 alternative resource plans, reference 4 CSR 240-22.040 (2)(C ) page 145-158. Three of the renewable resource had at least 300 MW of wind generation as a supply-side resource going in-service during the first five years of the planning horizon.

C. For a discussion of AmerenUE's IRP filing alternative resource plans, see 4 CSR 240-22.060 (6). AmerenUE used a total of 110 alternative resource plans, 78 of which included combinations of renewable portfolios (that included wind) AND demand-side portfolios.

## *Alternative Resource Plans*

| | DSM Portfolio | | Renewable Portfolio | | Supply-side Technology | | Resource Plans |
|---|---|---|---|---|---|---|---|
| *Aggressive* | *(1)* | x | *(5)* | x | *(8)* | = | *40* |
| *Moderate* | *(1)* | x | *(4)* | x | *(8)* | = | *32* |
| *None* | *(1)* | x | *(4)* | x | *(8)* | = | *32* |
| | | | | | | | *104* |

*1) None*
*2) Low ***
*3) Moderate*
*4) High*
*5) All Wind*

*** Aggressive DSM Only*

*1) EPR 100%*
*2) EPR 75%*
*3) Coal 100%*
*4) Coal 50%*
*5) Coal 50% w/ CCS*
*6) CCGT*
*7) Pumped Hydro*
*8) SSGT*

***At the Dec 19th Integration Workshop, it was decided to add a 6th renewable portfolio: Low w/ "No Additional" Wind***

| | DSM Portfolio | | Renewable Portfolio | | Supply-side Technology | | Resource Plans |
|---|---|---|---|---|---|---|---|
| *Aggressive* | *(1)* | x | *(1)* | x | *(2)* | = | *2* |

*1) Low no Wind*

*1) EPR 100%*
*2) CCGT*

| | DSM Portfolio | | Renewable Portfolio | | Supply-side Technology | | Resource Plans |
|---|---|---|---|---|---|---|---|
| *Aggressive* | *(1)* | x | *(2)* | x | *(2)* | = | *4* |

*1) Low No Wind*
*2) Moderate*

*1) EPR 100%*
*2) CCGT*

## 4 CSR 240-22.070
## Risk Analysis and Strategy Selection

**26. AmerenUE will include in the 2008 filing a discussion of the rationale used by its decision-makers to judge the appropriate trade-offs among competing planning objectives, expected performance and risk. This discussion will include identification of the decision-makers by name and title.**

For a full discussion of the rationale used by AmerenUE decision-makers to judge the appropriate trade-offs among competing planning objectives, expected performance and risk, reference AmerenUE IRP filing sections 4 CSR 4 CSR 240-22.070 (1), (2), (5), and (6).

In section 4 CSR 240-22.040 (8) (D), the scenario tree presented illustrates the critical uncertain factors that produced the nine sets of integrated projections of key IRP inputs (i.e., scenarios) to be used in the strategy selection phase. The responses to sections 4 CSR 240-22.030 (7), 4 CSR 240-22.040 (2) (B) 1- 3, and 4 CSR 240-22.040 (8) (A) clarify how the load growth, CO2 policy, and natural gas price branches of the probability tree were developed, and how AmerenUE assigned subjective probabilities to each of these scenarios. The final probability tree, including the critical independent uncertainties and the subjective probabilities assigned to them, appears in the response to section 4 CSR 240-22.070 (5). The response to section 4 CSR 240-22.070 (8) details how AmerenUE derived the expected value of perfect information (EVPI) for each of the critical scenario and independent uncertainties. Finally, the response to section 4 CSR 240-22.070 (5) (B) presents the cumulative distribution function (cdf) of the difference from the best plan, in terms of the present value of revenue requirements (PVRR), as well as deciles of this cumulative probability for each of the top 18 alternative resource plans subjected to risk analysis. From this analysis, a preferred alternative resource plan emerged, the NUC1600-Agg-LowNoWind option. 4 CSR 240-22.070 Appendix A introduces a concept called risk preference, and reinforces the preferred status of the NUC1600-Agg-LowNoWind plan within all reasonable levels of risk aversion.

In section 4 CSR 240-22.070(10) (A) page 103 of the IRP filing, AmerenUE provided verification hat the resources acquisition strategy was officially approved by AmerenUE. The verification included the name, position and signature of the AmerenUE employees who approved the resource acquisition strategy for AmerenUE.

4 CSR 240-22.070 (10) (A) A preferred resource plan selected pursuant to section (6) of this rule;

AmerenUE President and Chief Executive Officer, Tom Voss, has approved the preferred resource plan detailed in 4CSR 240-22.070.6. The letter in the summary document “Integrated Resource Plan Report” states his endorsement.

**27. AmerenUE will document the subjective assessments of probabilities by AmerenUE decision-makers for the likelihood of adverse outcomes for uncertain factors that are critical to the performance of the various alternative resource plans. The names and positions of these decision-makers will also be documented.**

For documentation of the assessments of probabilities by AmerenUE decision-makers for the likelihood of adverse outcomes for uncertain factors that are critical to the performance of the various alternative resource plan and the names and positions of the decision-makers that were designated experts to assign subjective probabilities refer to:

- 4 CSR 240-22.030(7) page 270
- 4 CSR 240-22.040(2)(B)3 page 121
- 4 CSR 240-22.040(8)(A) page 199

In section 4 CSR 240-22.070(10) (A) page 103 of the IRP filing, AmerenUE provided verification that the resources acquisition strategy was officially approved by AmerenUE. The verification included the name, position and signature of the AmerenUE employees who approved the resource acquisition strategy for AmerenUE.

**28. AmerenUE agrees contingency planning is an on-going process. AmerenUE agrees to continue to develop and update its contingency plan in the 2008 resource planning filing. Contained within AmerenUE's contingency analysis will be either a contingency plan or an explanation of why a contingency plan is not needed for at least each of the risk factors identified in 4 CSR 240-22.070(2). In addition, the following will be included in AmerenUE's ongoing contingency planning: either a contingency plan for (a) emissions of all pollutants, not limited to SO2, that are subject to cap-and-trade regulation under current air quality rules or rules in development; and (b) significant decreases or disruptions in available supply of natural gas; or an explanation of why a contingency plan is not needed for these factors.**

AmerenUE documented its contingency analysis and plan in section 4 CSR 240-22.070(10) (C)-(E). The responses to sections 4 CSR 240-22.030 (7), 4 CSR 240-22.040 (2) (B) 1- 3, and 4 CSR 240-22.040 (8) (A) explain how the load growth, $CO_2$ policy, and natural gas price branches of the probability tree were developed. 4CSR 240-22.030(7) Figure 6, 4CSR 240-22.040(2)(B)2 Figure 6, and 4CSR 240-22. 040(8)(A) Figure 27 graphically present the bounds for each of the critical uncertain factors comprising the probability tree. To reiterate, each of these cases reflects a range of values around the given trajectory, from the perspective of how the probability elicitation process was structured. For example the $CO_2$ policy branches depicted in 4CSR 240-22.040(2)(B)2 Figure 6 do not reject the possibility of 2012 $CO_2$ prices above $15 or below $5, but instead offer a representative range of politically probable $CO_2$ trading regimes.

As first presented in the response to section 4 CSR 240-22.070 (8), the EVPI analysis provides a roadmap for contingency plan development. First, it bears repeating that the potential for "extreme" outcomes was overtly acknowledged in the creation of a probability tree of critical uncertain factors. The branches developed for each critical uncertain factor were intended to span only a reasonable range of likelihood. Moreover, AmerenUE subject matter experts assigned subjective probabilities to each of these branches; in turn, "extreme" outcomes for critical factors were represented

probabilistically. Second, given the tree branches for each critical factor, there is only a need to develop a contingency plan if a resource plan other than the preferred plan under complete uncertainty, NUC1600-Agg-LowNoWind, has the lowest expected PVRR value given perfect information for any "branch" of the uncertain variable. In other words, a contingency plan is only necessary where the EVPI for a particular variable is positive. As Figure A-4 of 4 CSR 240-22.070 Appendix A attests to, this is only true for two of the critical uncertainties, $CO_2$ policy and capital costs. In fact, the contingency plan itself is simply given by the resource plan with the lowest expected PVRR given perfect information.

The only additional decision-making tool necessary to facilitate contingency plan implementation revolves around <u>when</u> the plan with the lower expected PVRR given certainty about $CO_2$ policy or capital costs should be triggered. This process is linked to a great extent to the information tracking protocol established in the response to section 4 CSR 240-22.070 (10) (E). Furthermore, the protocol is different depending upon the variable being tracked. In the case of $CO_2$ policy, the passage (or non-passage) of a national $CO_2$ cap-and-trade scheme is the clearest signal of what $CO_2$ world will transpire. If AmerenUE finds itself in any $CO_2$ realm outside of the "High Price" scenario, then it should consider invoking a contingency schedule around the resource plan with the lowest expected PVRR given in perfect information. Figure A-4 of 4 CSR 240-22.070 Appendix A shows that this contingency resource plan is the Combine Cycle-Agg-LowNoWind plan in the "Moderate Price" world, the Combine Cycle-Agg-Moderate plan in the "Mandates" world, and the Coal425W/OCCS-Agg-no plan in the BAU world. For capital costs, AmerenUE will systematically monitor the precursors and market fundamentals for power plant capital costs. If, within this framework, AmerenUE spots a persistent, sustainable trend towards high capital costs, then the contingency schedule around the Combine Cycle-Agg-LowNoWind resource plan should be pursued. Note that AmerenUE need not wait until it is in a world with high capital costs to commence implementation of this contingency plan.

In the area of environmental retrofits, the contingency options that have been identified are as follows:

$SO_2$ – acceleration or delay of the installation dates of $SO_2$ control technology at its coal facilities, retirement of existing coal facilities to reduce system emissions, and purchase of additional $SO_2$ allowances if required by regulations for compliance

NOx – acceleration or delay of the installation dates of NOx control technology at its coal facilities, retirement of existing coal facilities to reduce system emissions, and purchase of additional NOx allowances if required by regulations for compliance

Hg – acceleration or delay of the installation dates of Hg control technology at its coal facilities, retirement of existing coal facilities to reduce system emissions, and purchase of additional Hg allowances if required by regulations for compliance

$CO_2$ – The economics of $CO_2$ capture is highly uncertain and many issues need to be resolved before storage is a viable option. If all of the issues surrounding the technology are satisfactorily resolved, then the options would the installation of carbon capture and sequestration equipment and associated infrastructure to reduce $CO_2$ emissions, retirement of existing coal facilities to reduce system emissions, and purchase of additional $CO_2$ allowances if required by regulations for compliance

AmerenUE officers have identified an annual review process as a means to update the AmerenUE Environmental Compliance Plan. That annual review will consider the impact that changes in the critical uncertain factors may have on the timing and selection of environmental control technology and the current Environmental Compliance Plan.

**29. AmerenUE agrees to create demand-side and supply-side implementation plans that cover the implementation period between the 2008 filing and the 2011 filing.**

AmerenUE's demand-side and supply-side implementation plans that cover the implementation period between the 2008 filing and the 2011 filing are documented in 4 CSR 240-22.070(9) page 79.

**30. The supply-side implementation plan will include environmental compliance activities and investments for the implementation period. Environmental compliance activities include, but are not limited to, (1) the analysis of environmental compliance strategies; (2) emission allowance transactions; and (3) research, planning, and construction activities related to environmental compliance. Information on environmental compliance strategies and plans for environmental compliance research and construction activities will include unit-by-unit information regarding projected annual cash expenditures (both actual expenditures to current date by year and budgeted future expenditures by year) and schedules for construction and research activity milestones and completion dates.**

AmerenUE complied with this item in two ways. First, as a part of the briefing sessions with stakeholders on July 12, 2007 and February 26, 2008, AmerenUE provided information regarding its research activities and construction activities and schedules. In addition, in the February 5, 2008 IRP filing AmerenUE included a discussion of various environmental compliance strategies under various climate scenarios. Those strategies can be found in Appendix G of 4CSR 240.22.040. The preferred environmental compliance plan and the implementation plan included in the IRP can be found in 4CSR 240.22.070 (6) and (9). In addition, AmerenUE has more recently finalized its updated environmental compliance strategy. A report documenting the analysis performed is planned to be released to stakeholders in the near future.

**31. The demand-side implementation plan will include a robust combination of demand response, energy efficiency and low-income programs to the extent the integrated and risk analysis shows that such programs are expected to contribute to outcomes that satisfy planning objectives identified in (1) the Chapter 22 IRP Rules and (2) by AmerenUE. The demand-side implementation plan will also include provisions to accomplish the planning, evaluation and research activities required by 4 CSR 240- 22.070(9)(B) and (D).**

AmerenUE demand-side implementation plan includes a robust combination of demand response, energy efficiency and low-income programs. The implementation plan submitted as 4 CSR 240-22.070 (9)_Appendix - DSM Implementation Plan, covers a three year implementation period beginning on June 1, 2008 and extending through May 31, 2011. The plan describes in detail AmerenUEs proposed DSM programs, the research activities conducted to determine the programs and the implementation approach and timeline to bring the programs to the public. AmerenUE did not include evaluations of past programs since such programs have not existed at AmerenUE in the past. 4 CSR 240-22.070 (9)_Appendix - DSM Implementation Plan represents AmerenUE's dedicated launch into the DSM program arena. The table below summarizes the estimated energy and demand savings and costs estimated for this period.

| | 2008 | 2009 | 2010 |
|---|---|---|---|
| Estimated energy savings (MWh) | 61,918 | 123,835 | 269,185 |
| Estimated demand reduction (MW) | 53 | 106 | 131 |
| Estimated costs (Program costs only) | $13 M | $24.5 M | $31.9 M |

**Estimated Savings and Costs for the Implementation Period**

The Plan represents AmerenUE's commitment to meeting these savings levels and by doing so to enhance the value we deliver for our customers. The Company engaged ICF International, a leader in Demand Side Management consulting services and worked with a diverse group of stakeholders to develop a portfolio of programs that uses best practice program design and delivery to reach all key customer groups with cost-effective energy efficiency options. The portfolio has been crafted to meet clear public policy and

corporate objectives, and represents the first step in an ongoing process to offer the best customer energy management services possible to our customers.

The Company's Plan reflects a detailed analysis process that included the economic screening of close to 865 energy efficiency measures, a review of utility program design best practices and a formal uncertainty and risk analysis.

The Company, in cooperation with a broad group of stakeholders, has developed an aggressive portfolio of energy efficiency and demand-response programs as part of its integrated resource plan that will meet these statutory requirements. The portfolio as a whole is cost-effective with a TRC test benefit-cost ratio of 1.71. The portfolio was constructed to offset at least 25% of energy and demand growth by 2016, and achieve a minimum reduction of 230 MW by 2012 and 540 MW by 2025.

The portfolio is built around two broad programs, each of which contains several program elements intended to provide a diverse range of energy efficiency options for all customer classes.

- **Residential Energy Solutions** offers a wide range of options for residential customer energy management. The program is intended to offer customers multiple points of entry to the services offered by the Company, while at the same time promoting comprehensive actions that can create the most value for customers. An important objective of this program is to use customer education, training, and technology to build a foundation for market transformation. During the first implementation cycle, we expect that most program elements will be technology-based and focused on relatively simple customer actions. Coupled with a strong consumer awareness and education effort, our objective is to transform initial technology focused services into more comprehensive "whole home" solutions. The Residential Energy Solutions portfolio includes the following programs:
    - Lighting and appliance rebates
    - Central air conditioner diagnostics and tune-up

  - New central air conditioner proper installation incentives
  - A Multi-Family Program.
  - Home Energy Performance.
  - Web-based residential energy audits.
  - ENERGY STAR Homes Program.
  - Residential Low Income.
  - Direct Load Control
  - Critical Peak Pricing with a Smart Thermostat.

- Business Energy Solutions offers a complementary set of energy management options to commercial and industrial customers. A wide range of Individual technology or device incentives will be available, but the objective of the program over time is to move customers towards comprehensive solutions. Customers will be able to enter the program through any individual program element, although the Company will encourage customers to use building benchmarking services available through the program as a first step toward adoption of a "whole building" perspective on energy management. Specific program elements will include:

  - Prescriptive incentives.
  - Custom incentives.
  - Retro-Commissioning incentives.
  - Commercial New Construction.
  - Commercial Demand Credit.
  - Industrial Interruptible Tariff.
  - Critical Peak Pricing with a Smart Thermostat.

Most programs will be implemented by third party contractors selected by the Company through competitive bid. The Company will explore the use of performance-based contracts that reward cost effective delivery of verified energy savings. The implementation contractors will be responsible for development of final detailed program designs and implementation plans, including all program participation and incentive forms and marketing collateral subject to approval by the Company. In most cases, the contractors will be responsible for customer recruitment, delivery of program services and incentive fulfillment, although the AmerenUE key account representatives will retain the primary relationships with the Company's key accounts.

The Company intends to issue requests for proposals (RFP) for programs in early 2008, and to have contracts in-place by May. Implementation contractors will have until the end of June to develop detailed program designs and implementation plans in consultation with the Company. Concurrent with the issuance of RFPs for the implementation contractors, AmerenUE will also issue a separate RFP for an Evaluation, Measurement and Verification (EM&V) contractor. The Company's expectation is to have the EM&V contractor under contract prior to program design since program design and evaluation methodologies are directly linked. The Company intends to launch most programs in the third quarter of 2008.

## 4 CSR 240-22.080
## Filing Schedule and Requirements

**32. AmerenUE will provide workpapers as created and used to develop its Integrated Resource Plan. AmerenUE agrees to minimize the use of hard numbers (no formula linked to the number) and, in situations where hard numbers need to be used, AmerenUE will document the source of the number and/or explain how the number was derived. AmerenUE will request consultants to indicate what is being quantified and the units of measure in workpapers which contain quantitative assumptions, estimates or data.**

AmerenUE had workpapers available on February 5, 2008 and forwarded all workpapers via CDs to stakeholders on or about February 8, 2008. AmerenUE made every effort to minimize the use of hard numbers in its workpapers.

**33. AmerenUE agrees to have all workpapers and other supporting documentation, including the workpapers of its consultants, available at the time of filing. AmerenUE will require all of the consultants that it hires to provide workpapers to AmerenUE. Further, AmerenUE agrees to encourage consultants to deliver their workpapers as soon as they can reasonably be delivered and to inform the stakeholders when workpapers become available. Stakeholders may request copies of any workpapers that are available prior to the time of filing and AmerenUE agrees to meet reasonable stakeholder requests.**

Workpapers were requested from and delivered by all consultants prior to the actual filing date. AmerenUE forwarded all workpapers via CDs to stakeholders on or about February 8, 2008.

**34. AmerenUE agrees to provide verification that the resources acquisition strategy has been officially approved by AmerenUE. This verification will include the name, position and signature of the AmerenUE employees who approved the resource acquisition strategy for AmerenUE.**

In section 4 CSR 240-22.070(10) (A) page 103 of the IRP filing, AmerenUE provided verification that the resources acquisition strategy was officially approved by AmerenUE. The verification included the name, position and signature of the AmerenUE employees who approved the resource acquisition strategy for AmerenUE.

4 CSR 240-22.070 (10) (A) A preferred resource plan selected pursuant to section (6) of this rule;

AmerenUE President and Chief Executive Officer, Tom Voss, has approved the preferred resource plan detailed in 4CSR 240-22.070.6. The letter in the summary document “Integrated Resource Plan Report” states his endorsement.

**35. All waiver requests will be discussed with the stakeholders in workshops during the first two months of project (Initiation Phase). In many instances, AmerenUE will be hiring various consulting expertise to lead workshops and develop the waiver requests. AmerenUE will file waiver requests within one month of completing the Initiation Phase. Each waiver request will include an explanation of the rationale for the request. Since each stakeholder will be involved with AmerenUE waiver request development, the stakeholders agree to file a response with the Commission to each waiver request within ten (10) business days of AmerenUE's waiver request filing. The prompt response by stakeholders is intended to facilitate an expedited decision by the Commission. AmerenUE's IRP filing will comply with the Commission decision regarding each waiver request. The stakeholders may, by consensus, and as set forth in a written agreement, extend the time for AmerenUE requesting the waivers.**

Waivers were discussed with the stakeholders during the numerous workshops that took place during the first quarter of 2007. After extensive consultation with stakeholders AmerenUE filed the IRP waivers on April 19, 2007 in Case No. EO-2007-0409. The Commission approved the waivers on May 10, 2007 without any changes. The waivers were incorporated into the February 5, 2008 IRP filing.

One additional waiver was requested on February 5, 2008. That waiver requested a release from the requirement to complete an IRP analysis without Callaway Unit #1 in service after 2024. That waiver request has not been objected to by any party; however, the Commission has not issued an order on this request.