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1. Executive Summary

Ameren Missouri provides this Integrated Resource Plan ("IRP") Annual Update pursuant to the Missouri Public Service Commission's ("PSC" or "Commission") Electric Utility Resource Planning rules as a means of keeping the Commission and other stakeholders informed of changes in the planning environment since the filing of the Company's 2011 IRP and 2012 IRP Annual Update and the potential implications of those changes for future resource decisions.

As this is simply an update it cannot take the place of a full IRP analysis and report, as is required every three years. Rather, it provides transparency into the current and expected conditions, issues and considerations that are important to prudent resource planning decisions. In doing so, the analysis and discussion presented here highlight the fact that significant uncertainty remains with respect to key decision drivers, including environmental regulations, economic conditions, future fuel and power prices and other long-term market trends. As a result, maintaining effective resource options to meet our customers' future energy resource needs remains of paramount importance.

Environmental Regulation

The specific requirements of federal environmental regulations continue to evolve as new rules continue to be considered, drafted and implemented. While some requirements have become clearer since the filing of the Company's 2012 IRP Annual Update Report in April 2012, much uncertainty remains as additional rules are drafted and court challenges are heard. Ameren Missouri has continued to evaluate its plans for environmental compliance against its assumptions of known and expected regulations. This report reflects consideration of those regulations which have been finalized and certain potential regulations, while acknowledging that changes are still likely to occur.

In July 2011, the U.S. Environmental Protection Agency ("EPA") finalized the Cross-state Air Pollution Rule ("CSAPR"), to replace the Clean Air Interstate Rule ("CAIR") that was remanded to EPA by the courts in 2008. While CSAPR was stayed by the U.S. Court of Appeals in December 2011 and vacated in August 2012, our expectation is that the ultimate regulation will be very similar to that represented by the final CSAPR issued in July 2011.

Our plan to address those requirements included entering into a long-term contract for ultra-low sulfur coal that eliminated and/or deferred the need to make significant

investments in environmental control equipment by 2017, thus avoiding associated increases in customer electric rates.

In December 2011, EPA released its final Mercury and Air Toxics Standards ("MATS"). The requirements of the final rule were largely similar to the draft rule released by EPA in March 2011. Ameren Missouri has put in place plans for compliance with MATS at each of its existing coal-fired plants, which includes upgrading some of our electrostatic precipitators ("ESP") at our coal-fired power plants. As a result of these environmental regulations, as well as other potential environmental regulations, we continue to carefully evaluate compliance options at the Meramec plant, our oldest coal-fired generating plant. At this time, should no additional environmental regulations be promulgated that affect Meramec, continued operation of the plant may still be in the best interest of our customers and the state. However, much uncertainty continues to exist with respect to future environmental regulations as well as long-term market conditions. Further monitoring and analysis of this issue will be conducted as part of the Company's 2014 IRP development.

While more is known about the CSAPR and MATS rules than was known when the Company filed its 2011 IRP, the possibility still exists for further emission reduction requirements under these and/or other standards in the future. Rules for water use and coal combustion residuals (coal ash) are also expected to be promulgated in the next two years. Further, the potential impact of future rules limiting carbon emissions remains, especially in light of rules issued by the EPA for new coal-fired power plants and renewed talk of federal action on climate change through legislation and/or regulation. These additional emissions reductions and regulations could clearly have a significant impact on our future resource planning.

Resource Options

As we discussed in our 2012 IRP Annual Update Report, it is important to evaluate the potential for emerging technologies that may represent robust options for dealing with the uncertainties of the market. For its 2011 IRP, Ameren Missouri evaluated a host of demand side and supply side options. The top options were further analyzed as part of our 2012 IRP Annual Update. The supply side options included resources powered by renewable resources such as wind, lower-carbon fossil fueled resources such as simple cycle or combined cycle gas turbines, and zero-carbon resources such as nuclear generation.

While the Company's 2011 IRP evaluation of nuclear resources was based on large, single-unit reactor technology, emerging small modular reactor ("SMR") technologies were also assumed to be represented by the analysis because of the expected similarities in cost and operating performance characteristics. For the 2012 IRP Annual

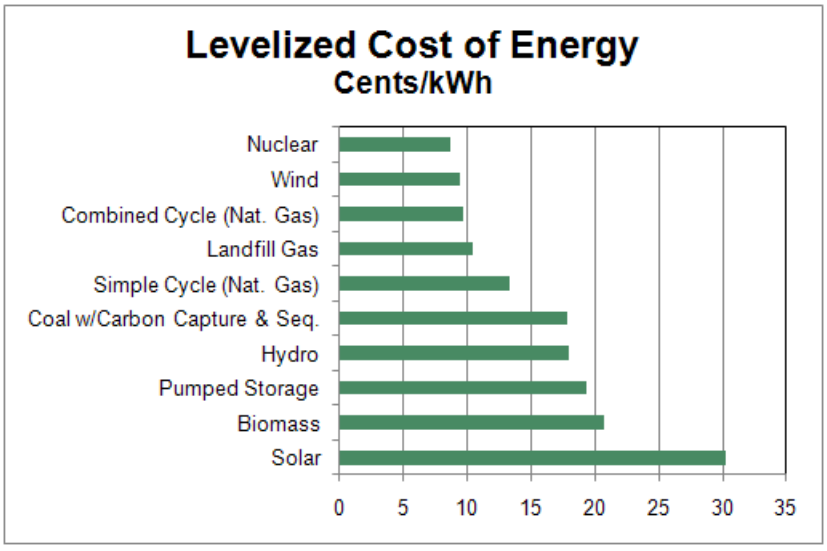
Update, the Company chose to specifically evaluate SMR technology as a resource option because of the increased flexibility it can provide in terms of operation, scalability, construction risk, and financing considerations.

Consistent with our commitment to taking proactive steps today to maintain generation options to meet our state's energy needs in the future, Ameren Missouri and Westinghouse Electric Company announced in April 2012 an alliance to apply for Department of Energy ("DOE") SMR investment funds of up to $452 million. The investment funding, initially announced by the DOE last March, will support first-of-its-kind engineering, design certifications and operating licenses for up to two SMR designs over five years.

The objectives of the DOE program are to support efforts for the United States to become the global leader in the design, engineering, manufacture and sale of American-made SMRs around the world, as well as expand our nation's options for nuclear power. This DOE program presents an opportunity for savings associated with design and operating license development costs. It also comes with a transformational economic development opportunity for the state of Missouri which includes becoming the hub for the engineering design, development, manufacturing and construction of American-made SMR technology in Missouri, in the United States and around the world. While the initial funding by DOE under this program was awarded to another alliance, program funding remains. On March 11, 2013, the DOE announced that it would accept applications through July 1, 2013, for up to $226 million in investment funding. The program, contingent on continued funding by Congress, aims for SMR deployment by 2022 and will cover up to 50% of the chosen projects' costs. Ameren Missouri and Westinghouse are currently studying this opportunity.

Figure 1.1 shows the levelized cost of energy ("LCOE") for a range of potential supply side resources. The costs for the nuclear resource represent the SMR technology. Because SMR technology is by definition modular, implementation of the technology requires shorter lead-times and construction schedules,

Figure 1.1 Levelized Cost of Energy



which results in significant savings in financing during construction. This savings results in a levelized cost of energy which is lower than that for wind or combined cycle gas turbines. In addition, the potential cost savings from DOE investment funding have not been factored into our analysis at this time. It is important to note that levelized cost of energy figures, while useful for convenient comparisons of resource alternatives, do not fully capture all of the relative strengths and challenges of each resource type. For example, wind resources are intermittent resources and therefore cannot be counted on for meeting peak demand requirements in the same way a nuclear or gas-fired resource can. The levelized cost of wind resources presented in Figure 1.1 also does not reflect the full cost of transmission infrastructure needed to integrate wind and other intermittent resources into the electric grid. Such costs are allocated to members of the Midwest Independent System Operator ("MISO") based on methods approved by the Federal Energy Regulatory Commission ("FERC").

The levelized cost of energy for future resource options is an important measure for assessing these options. However, it is not the only factor that must be considered in making resource decisions. Facts and conditions surrounding future environmental regulations, commodity market prices, economic conditions, economic development opportunities, and other factors must be considered as well. A robust range of uncertainty exists for many of these factors, all of which leads to one overriding conclusion – maintaining effective options to pursue alternative resource options in a timely fashion is a prudent course of action.

Natural Gas Prices

Significant changes have occurred in the market for natural gas in recent years and therefore in the long-term outlook for natural gas prices. Because of the developments in the extraction of domestic shale gas over the past few years, the Company's current forecasts for natural gas prices reflect a range of $4/MMBtu to $6/MMBtu average real prices over the planning horizon, as was the case in our 2012 IRP Annual Update.

One thing is clear with respect to natural gas prices – they can be volatile. In light of the significant changes we have seen in this area, this is an issue that will need to be closely monitored. While these market changes may result in low long-term prices for natural gas, future prices are subject to a host of changes in both supply and demand, including those driven by regulation, and are by no means assured.

Energy Efficiency

Ameren Missouri's 2011 IRP demonstrated that meaningful savings could be realized by customers through participation in energy efficiency programs. Our analysis also showed that under the previous regulatory treatment for investments in energy efficiency, the Company would suffer significant financial losses by implementing such

programs. To address this issue and unlock the benefits of energy efficiency for both customers and investors, Ameren Missouri filed with the PSC in early 2012 for approval of energy efficiency programs and supportive rate mechanisms under the Missouri Energy Efficiency Investment Act ("MEEIA").

Among other things, MEEIA requires that the Commission align the incentives of utilities with helping customers use energy more efficiently. The intent of MEEIA is that by achieving such alignment of incentives as well as providing timely cost recovery and appropriate and timely earnings opportunities, Missouri customers will realize the benefits of all cost-effective energy efficiency. In August 2012, the PSC approved a stipulation and agreement adopting a three-year plan for energy efficiency programs and rate treatment including cost recovery and incentives. The PSC subsequently approved for recovery in rates amounts that reflect the program costs and net shared benefits, to mitigate the throughput disincentive, approved in the MEEIA Order in December 2012.

Ameren Missouri filed a notice of change in Preferred Resource Plan with the PSC on February 8, 2013. In that filing, the Company indicated that its new Preferred Resource Plan includes implementation of the approved 3-year energy efficiency program plan as well as continued pursuit of demand-side management ("DSM") programs through the entire planning horizon at the Realistic Achievable Potential level. The Company also indicated that the implementation of future programs will depend on policies that reflect timely cost recovery, proper alignment of incentives, and appropriate earnings opportunities, as required by MEEIA. As the Company noted in its February 8th filing,

> "*In making this change, the Company's management is mindful that the realization of significant future energy savings through demand-side management (DSM) programs is by no means certain, and the mechanisms needed to continue to fully support the state's policy as reflected in MEEIA may need to be modified. Certainly, as energy savings are realized and further reductions in usage become more difficult to achieve, the nature of cost recovery and the steps needed to ensure that utility financial incentives are aligned with helping customers use energy more efficiently, among other things, will likely have to change to address the changing costs and risks inherent in the development and utilization of demand-side resources. Should conditions and expectations associated with future implementation of energy efficiency programs and/or PSC actions regarding cost recovery and alignment of incentives warrant a further change in the Company's Preferred Resource Plan, the Company will make the appropriate notifications to the PSC in accordance with the PSC's Electric Utility Resource Planning rules.*"

Ameren Missouri is now in the process of updating its assessment of DSM potential, which will be used in analysis as part of the Company's 2014 IRP and its next MEEIA filing, which is expected to be made in December 2014. Because our plans for continued implementation of energy efficiency programs are highly dependent on appropriate regulatory treatment and other factors, it is important to evaluate our potential resource needs under a variety of such circumstances.

Load Forecast and Resource Needs

Another factor that could affect the timing for new resources is load growth in our service territory. Several factors will impact long-term load growth, including general economic conditions and energy intensity. During the development of our 2011 IRP, we generally expected annual load growth to approximate 1%. Under that scenario, there could be a need for new resources in the 2026-2030 timeframe. This assumes that no additional environmental regulations or other meaningful changes in fuel prices, economic conditions, customer use or other factors take place. Should certain of these factors drive the closure of our Meramec plant by the 2020 timeframe, our need for new resources could be advanced to the 2021-2025 timeframe.

Since the filing of our 2011 IRP, recent data suggests that current economic conditions and efficiency have slowed load growth somewhat. Because of the number of factors and uncertainties that could influence load growth, it is important to assess this important factor within a range of possible values. Resource needs are highly dependent on load growth assumptions, the status of Meramec and the extent to which DSM programs are continued after our current 3-year DSM program plan. For this and other reasons, it remains prudent to preserve all available resource options to meet future customer demand.

Summary

As was mentioned at the outset, this document represents only an update on the conditions that affect resource planning decisions. As such, the discussion and analysis presented here must be viewed as a work in progress as better information is acquired with respect to environmental regulations, costs of building and operating various resource options, customers' energy usage, the way resources are treated in the ratemaking process, and economic development opportunities for the state of Missouri.

The Company continues to analyze the most attractive options identified in its 2011 IRP. With low prices for natural gas, gas-fired combined cycle generation continues to look attractive, with low capital costs and relatively low operating costs. Nuclear resources remain attractive as an option, particularly if natural gas prices continue to be volatile in the long run and in light of the uncertainties associated with existing and potential environmental regulations limiting carbon emissions. Another key factor to consider is

the potential cost savings and significant economic development opportunities associated with statewide actions being taken in connection with the continuing DOE funding opportunity associated with SMR technology. The promise of operating and construction flexibility afforded by SMR technology further adds to the attractiveness of new nuclear resources. Wind resources also remain an attractive energy option.

While this annual update does not, nor could it, serve as a complete reconsideration of all the options, variables and other considerations that go into the development of a full IRP filing, it presents a comprehensive view of conditions that affect resource planning decisions at this time. Based on our analysis and review, we believe that our recently updated Preferred Resource Plan remains appropriate at this time as we continue to evaluate environmental regulations, commodity prices, economic conditions, and economic development opportunities. We will continue to monitor these key assumptions as implementation of our approved energy efficiency programs gets underway, and as we continue to evaluate options for future supply. One thing is very clear from our updated analysis – key factors impacting future resource decisions remain highly uncertain, and in some cases volatile. Consequently, the ability to maintain effective options to pursue alternative resources in a timely fashion is a prudent course of action for our customers and the state of Missouri.

2. Technical Overview

2.1 Purpose of Annual Updates

Annual Updates are required by 4 CSR 22.080(3). The rules indicate that the purpose of annual updates is to ensure that members of the stakeholder group have the opportunity to provide input and to stay informed regarding the items listed below.

- The utility's current preferred resource plan (see Chapter 1)
- The status of the identified critical uncertain factors (see section 3.3)
- The utility's progress in implementing the resource acquisition strategy (see section 2.4)
- Analyses and conclusions regarding any special contemporary issues identified by the Commission (see section 2.5)
- Resolution of any deficiencies or concerns in the utility's most recent triennial filing, either as agreed to among the utility and the other parties or as found by the Commission in its Order in the case (see section 2.3)

Ameren Missouri has created this annual update report to satisfy the intended purpose established in the IRP rules and has updated its assessment of general planning conditions. Each item explicitly cited in the rules is addressed in the referenced chapter or section of this report as noted above.

2.2 Ameren Missouri's Approach to its Annual Update

In its Order in File EO-2012-0039 establishing special contemporary issues to be evaluated by Ameren Missouri in its 2012 IRP Annual Update, the Commission noted that, "the requirement to examine special contemporary issues should not be allowed to expand the limited annual update report into something more closely resembling a triennial compliance report." Ameren Missouri agrees with the Commission that the scope and depth of an IRP Annual Update should not be comparable to that for a triennial IRP filing. On that basis, Ameren Missouri has relied heavily on the groundwork developed in its 2011 IRP and advanced in its 2012 IRP Annual Update as a basis for reviewing its assumptions and analysis and reporting its findings.

The Company also views the IRP Annual Update in its proper role as just that, an update on the nature of key variables and the conclusions that follow. Based on the conclusions drawn from the review and analysis discussed here, the Company believes

that its recently communicated preferred resource plan is still appropriate at this time. Should the Company's continued planning and consideration of relevant issues lead to a conclusion that its Preferred Resource Plan is no longer appropriate, the Company will notify the Commission of its decision in accordance with 4 CSR 240-22.080(12).

2.3 Status on Resolution of Deficiencies and Concerns

On March 28, 2012, the PSC issued its Report and Order on the Company's 2011 IRP (File EO-2011-0271). That order included the following areas of deficiency in the Company's filing:

- Evaluation of demand side resources compared to existing supply side resources
- Use of a two-year rate case cycle for analysis compared to the requirement to use an assumption of annual rate cases for computing Present Value Revenue Requirements ("PVRR")
- Analysis of wind resources, including analysis pursuant to a stipulation and agreement in File EO-2007-0409

Regarding the evaluation of existing supply side resources, the Company is including in its 2014 IRP work plan economic evaluation of all of its existing coal resources and has begun to develop long-range cost estimates for each coal-fired plant. More information regarding the Company's plans for this analysis will be shared as part of the stakeholder process for our 2014 IRP.

As was indicated in the Company's 2012 IRP Annual Update Report, all PVRR results in the Company's 2012 IRP Annual Update and its 2011 IRP reflected an assumption of annual rate cases. Ameren Missouri will continue to use this practice for calculating PVRR in its future IRP analysis.

The evaluation of the impact of both the existing RES and an alternative RES in the Company's 2012 IRP Annual Update clearly showed that the inclusion of additional wind as a stand-alone resource option results in an increase in costs to customers, even when the resource build is spread over many years and is not needed to meet capacity requirements. This is consistent with the results of the RES compliance analysis included in the 2011 IRP and satisfies the first portion of the deficiency related to wind analysis.

Regarding the stipulation portion of the wind analysis deficiency, Ameren Missouri has engaged Black and Veatch to perform an analysis of wind resources consistent with the agreement made with the Missouri Department of Natural Resources ("MDNR") in File EO-2007-0409. Specifically, the following scope of work, which was reviewed and agreed to by MDNR, is being performed:

- For each state in the 11-state (North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Minnesota, Iowa, Missouri, Wisconsin, Illinois, and Indiana) region identified in Ameren Missouri's 2011 IRP, identify at least one multi-county area that represents a highly desirable location for development of wind resources
    - The selection of these multi-county areas will be based on an overlay of GIS wind maps at 80, 100, and 120 meter hub heights with transmission system maps that represent both the current transmission system and also reasonably expected transmission system expansions during the planning horizon based on current regional transmission organization ("RTO") expansion plans
    - For each multi-county area, the relevant RTO will be identified
    - At least one multi-county area within the MISO system will be identified for each state identified above in which MISO operates
    - At least two multi-county areas will be identified in Missouri
- Direct transmission interconnection costs (those attributable directly to the project for connection to the bulk transmission system) will be estimated on a generic basis (i.e., distance and cost per mile)
- The LCOE will be calculated for each multi-county area at 80, 100 and 120 meter hub heights, including transmission-related costs attributable to wind projects
- Levelized cost will be calculated both with and without continuation of federal Investment Tax Credits
- The generic projects and associated costs characterized by the identified multi-county areas will be used to develop wind supply curves to be used by Ameren Missouri to appropriately assess wind resources for Ameren Missouri for at least the following purposes:
    - Satisfaction of any state or federal RES compliance requirements
    - Use as capacity and/or energy resources needed to meet customer load (i.e., as a supply side resource alternative)
    - Supply curves used for the above purposes may be limited by geographical or RTO deliverability constraints as appropriate

Ameren Missouri will review the results of this analysis with stakeholders as part of discussions for the preparation of its 2014 IRP.

2.4 Implementation of Current Preferred Resource Plan

Ameren Missouri filed a notice of change in Preferred Resource Plan with the PSC on February 8, 2013. In that filing, the Company indicated that its new Preferred Resource Plan includes implementation of the approved 3-year energy efficiency program plan as well as continued pursuit of DSM programs through the entire planning horizon at the

Realistic Achievable Potential level. The Company also indicated that the implementation of future programs will depend on policies that reflect timely cost recovery, proper alignment of incentives, and appropriate earnings opportunities, as required by MEEIA. Also included in the filing was an updated implementation plan. Following is an item by item status on the implementation steps listed in the notification filed with the Commission in February 2013 regarding the Company's change in Preferred Resource Plan.

Demand-Side Resources Implementation

Ameren Missouri notified the Commission on February 8, 2013, that it had determined that its previous preferred plan was no longer appropriate and that it was selecting a new preferred plan to reflect the actions taken by the PSC to align the Company's incentives with helping customers to use energy more efficiently, as required by MEEIA. In that same notification, the Company indicated its implementation plan includes approximately $147 million in spending on DSM programs consistent with the three-year DSM plan approved by the PSC in August 2012. Implementation of programs under that plan commenced on January 2, 2013, and is expected to produce nearly 800 thousand MWH of annual energy savings.

Combined Cycle Evaluation

The 2011 IRP indicated that if environmental regulations are expected to result in significantly higher costs of compliance than those currently assumed, retirement of Meramec may be preferred and replacement with a new combined cycle could be a preferred option. Our 2012 update indicated that retirement of Meramec or conversion to gas-fired operation may be viable alternatives to costly environmental retrofits should environmental regulations require such mitigation measures and that gas-fired combined cycle generators remain a viable resource option among several. The Company continues to evaluate the potential for new generation resources.

Nuclear Option Preservation

Because the unique opportunity for new nuclear generation continues to be attractive under certain conditions, preserving the option for new nuclear generation at the Company's Callaway site remains a priority. Ameren Missouri and Westinghouse Electric Company announced on April 19, 2012, an alliance to apply for DOE SMR investment funds of up to $452 million. The investment funding, initially announced by the DOE on March 22, 2012, will support first-of-its-kind engineering, design certifications and operating licenses for up to two SMR designs over five years.

The objectives of the DOE program are to support efforts for the United States to become the global leader in the design, engineering, manufacture and sale of

American-made SMRs around the world, as well as expand our nation's options for nuclear power.

This DOE program presents an opportunity for savings associated with operating license development cost. It also comes with a transformational economic development opportunity which includes becoming the hub for the engineering design, development, manufacturing and construction of American-made SMR technology in Missouri, in the United States and around the world. While the initial funding by DOE under this program was awarded to another alliance, program funding remains. On March 11, 2013, the DOE announced that it would accept applications through July 1, 2013, for up to $226 million in investment funding. The program, contingent on continued funding by Congress, aims for SMR deployment by 2022 and will cover up to 50% of the chosen projects' costs. Ameren Missouri and Westinghouse are currently studying this opportunity.

Baseload Investment Financing

Ameren Missouri plans to continue evaluating the financial feasibility of all resource options, including those which require significantly large investments of capital, such as a baseload power plant.

Renewable Energy Standard Compliance

Ameren Missouri does not expect to need new resources to meet the non-solar renewable energy requirement of the existing Missouri RES through 2018. However, the Company must acquire solar renewable energy credits ("SRECs") to comply with the solar requirements, whether through market purchases or through installation of new company-owned solar generation resources. Ameren Missouri will file its next required annual report and compliance plan with the Commission in April 2013.

Meramec Long-run Costs

Ameren Missouri continues to evaluate the long-run costs of operation of the Meramec plant in the context of its ongoing environmental compliance analysis. As mentioned in this report, the Company will be evaluating all of its coal-fired resources as part of its 2014 IRP analysis.

Refinement of Environmental Retrofit Costs

The Company continues to refine its estimates for environmental controls as part of its ongoing environmental compliance analysis.

2.5 Special Contemporary Issues

The Commission included in its Order in File EO-2013-0104 two special contemporary issues to be addressed by Ameren Missouri in its 2012 IRP Annual Update. Following are the special contemporary issues included in the Order and a discussion of Ameren Missouri's evaluation of each.

> **Aggregators of Retail Customers** – *"Investigate and document the impacts on the Company's preferred resource plan and contingency plans of aggressive regulations by the FERC, regional transmission organizations ("RTOs") or Missouri statutes or regulations to allow aggregators of retail customers ("ARCs") to operate and market demand response services in Missouri;"*

There are two key points to consider in evaluating this issue. First, Ameren Missouri's current Preferred Resource Plan does not include any company-sponsored demand response programs, nor did any of its contingency plans. Second, Ameren Missouri operates within the MISO market, and MISO's tariff precludes Ameren Missouri from benefiting from peak load reductions resulting from ARC demand response programs.

Because Ameren Missouri's current Preferred Resource Plan does not include any company-sponsored demand response programs, implementation of ARC-sponsored programs would not result in any program overlap of demand response services. Should Ameren Missouri include demand response programs in its future plans, the potential for overlap may need to be considered to the extent ARCs are expected to offer demand response services to Ameren Missouri customers.

Should ARCs be permitted to operate in the state by order, rule or statute, it must be recognized that any capacity or planning resource credits associated with the demand response enrolled by such ARCs will not affect the resource capacity requirements of the host Load Serving Entity (LSE) – in particular, Ameren Missouri. The ARC, as market participant for the registered demand response resource, and not the host LSE, is the entity entitled by the MISO tariff to obtain the capacity benefits of the demand response through the resource adequacy process. The host LSE is not permitted to net any such reductions against its load forecast, as such netting would constitute an impermissible double count – with the ARC receiving the associated capacity credit and the LSE reducing its load forecast. As such, the resource adequacy requirement of the host LSE is unaffected by the ARC activity. Should the MISO tariff be revised in the future in a way that changes how demand response load reductions through ARC programs are applied to resource adequacy requirements of the host LSE, this issue will have to be reassessed.

> **Distributed Generation and Combined Heat and Power** – *"Analyze and document the impacts of opportunities to implement distributed generation, DSM programs and combined heat and power ("CHP") projects in collaboration with municipal water treatment plants and other local waste or agricultural/industrial processes with on-site electrical and thermal load requirements, especially in targeted areas where there may be transmission or distribution line constraints."*

Ameren Missouri is currently updating its assessment of DSM potential to support analysis for the Company's 2014 IRP and to support development of our next three-year DSM plan, which we expect to file in December 2014 for Commission approval. As part of the DSM potential study, which is expected to be completed in the fourth quarter of 2013, Ameren Missouri and its consultants will be specifically addressing potential for distributed generation and combined heat and power opportunities at a variety of facilities including those listed in the Commission's order. This information will provide a reasonable basis for assessing such opportunities for potential inclusion in the Company's future plans. Without this information, a meaningful assessment is not possible.

3. Planning Environment

3.1 Overview of Current Conditions

For this update, Ameren Missouri reexamined its key IRP inputs, including the critical uncertain factors identified in its 2011 IRP. The following discussion provides an overview of the key assumptions and uncertainties that were examined.

Climate and Environmental Regulation

Ameren Missouri's 2012 IRP Annual Update reflected a probability for enactment of federal climate policy with a price on carbon starting in 2025. Until recently, there has been little further serious discussion regarding federal climate policy action. While we continue to monitor the potential for such action, we also focus on the continued development of regulations affecting coal-fired generation. EPA finalized the CSAPR in 2011, and published the final MATS rule (formerly "Utility MACT" rule) in the Federal Register on February 16, 2012. While CSAPR was vacated by the U.S. Court of Appeals in August 2012, Ameren Missouri has assumed for its planning that the rule, or something very similar to it, will be in effect in the long term.

To reflect a broader-based approach to consideration of environmental and climate legislation and regulation, Ameren Missouri chose to more generally represent their effects on market conditions in terms of coal power plant retirements as a scenario variable for its 2012 IRP Annual Update. We continue to use this approach in our review of uncertainties as part of this update. At the same time, we still believe that some type of action on climate policy that results in an explicit price on carbon emissions sometime during the planning horizon is possible. Our approach is discussed in greater detail in section 3.3.1.

Natural Gas Prices

Natural gas price forecasts were updated for the 2012 update and reflected the continued drop in price outlook seen in the market over the past few years. While natural gas prices continue to be subject to volatility, our long-term price expectations are still within the range presented in that update. Natural gas price scenarios are discussed in section 3.3.1.

Load Growth

The third and final variable used for scenario definition and modeling is load growth in the Eastern Interconnect, which is also discussed in section 3.3.1. While load growth

could exceed 1% under assumptions of more robust economic growth, probable expectations for long-term annual load growth remain within the 0.5% to 1.0% presented in our 2012 IRP Annual Update.

Scenario Modeling

For our 2012 IRP Annual Update, Ameren Missouri performed scenario modeling to determine associated prices for wholesale electric power for each combination of coal retirements, natural gas price forecasts and load growth. Based on our review of current expectations for scenario variables, which indicates that current expectations are within the previously defined ranges, this modeling has not been updated.

Independent Uncertain Factors

Critical independent uncertain factors identified in Ameren Missouri's 2011 IRP, and updated for our 2012 IRP Annual Update, have been reviewed in light of current and expected financial market conditions and expected capital costs for new resources. Our current assumptions for each of the independent uncertain factors are within the ranges identified in our 2012 update. Our review of critical independent uncertain factors is discussed in section 3.3.3.

Ameren Missouri added evaluation of coal price ranges as an independent uncertain factor in its 2012 IRP Annual Update. Coal price forecasts are discussed and presented in section 3.3.4. Again, our current assumptions are within the ranges identified in our 2012 update.

Peak Demand and Retail Energy Sales

The Company has updated its peak and energy forecasts to account for changes in conditions including economic conditions in our service territory. While future load growth cannot be precisely predicted, for this update our planning case load forecast reflects 0.6% annual load growth. Based on this single planning case, the need for new supply side resources is delayed somewhat compared to the 2012 IRP Annual Update. As stated previously, because of the many factors that can influence load growth, assessing this key factor within a range of possible values for long-term planning purposes is appropriate. The Company's updated forecasts for peak demand and energy are discussed in greater detail in section 3.5.

3.2 Environmental Regulation

Ameren Missouri has reviewed its assumptions on the eventual requirements for pending environmental regulations. Table 3.1 summarizes the current and pending environmental regulations for which Ameren Missouri must implement mitigation measures, along with expectations for compliance requirements for certain potential regulations.

Table 3.1 Current/Pending Environmental Regulations

Regulatory Driver	Summary Requirements	Regulation Status	Compliance Timing
Cross-State Air Pollution Rule (CSAPR)	Reduction in Nox and SO2 allowances vs. CAIR; New allowances for trading program (state level caps)	Court Decision Aug 2012 to vacate rule; EPA appeals; CAIR remains in place until CSAPR resolved	2014-2016
Revisions to National Ambient Air Quality Standards (NAAQS)	Lower PM, NOx and SO2 limits; Expansion of non-attainment areas	SO2 final rule May, 2010; Attainment designations June 2013; Nonattainment plans 2016. Fine particulate (PM2.5) lowered 1/15/2013; Attainment designations 03/2015; Nonattainment plans 2018. Ozone proposal to lower 12/2013; Final 12/2014; Attainment designations 2016; Nonattainment plans 2017+	SO2 - 2016-2018 PM 2.5 2020 - 2025 Ozone 2018 - 2020
Clean Air Visibility Rule (CAVR)	Application of Best Available Retrofit Technology (BART); Targets reduction in transported SO2 and NOx; Satisfied by CAIR in Missouri; status of CSAPR may require state to change approach.	Final rule issued by EPA in 1999; States submit progress reports in 2013	2013 - 2018
Mercury and Air Toxics Standards (MATS)	Reduction in emissions of Mercury, HCl (proxy for acid gases) and particulate emissions (proxy for non-mercury metals)	Final rule released by EPA December 21, 2011; published in Federal Register February 16, 2012; effective April 16, 2012.	April 16, 2015 (with possible one-year extension that can be approved by the state); MDNR approved 1-yr extensions for Labadie and Meramec.
Clean Water Act Section 316(b) - Protection of Aquatic Life	Case-by-case determination of controls required to meet entrainment standards; national standard for impingement	Final rule from EPA delayed until June 2013	2016-2021
Clean Water Act Section 316(a) - Thermal Standards	Potential revisions to existing thermal limitations on once-through cooling systems; Implementation through NPDES permit conditions	Evaluation triggered by NPDES permit renewals	2014-2020
Coal Combustion Residuals (CCR)	Conversion to dry bottom ash and fly ash; Closure of existing ash ponds; Dry disposal in landfill	Final rule from EPA 2013 or possibly 2014	2014 -2020
Revisions to Steam Electric Effluent Guidelines (EGL)	Lower effluent emissions for existing parameters; Installation of wastewater treatment facilities; Implemented through NPDES permit conditions	EPA proposal April 19, 2013; final rule May 22 2014	2016-2019
Clean Air Act Regulation of Greenhouse Gases (GHG)	Inclusion of GHG in permitting; Projects can trigger BACT for GHG Output-based emission limit	"Tailoring Rule" applies as of January 2, 2011; New unit NSPS proposed March 2012; final rule pending. Potential for .Existing unit NSPS	2011 2012+ 2014+

As was the case in our 2012 update, our assessment of environmental mitigation for this update includes assumptions for compliance with particulate emissions standards

through ESP upgrades and particulate matter ("PM") continuous emissions monitoring systems ("CEMS") for existing coal units. Implementation of activated carbon injection ("ACI") and mercury ("Hg") CEMS have been included for compliance with the MATS mercury standard. Due to the low chlorine content of coal used by Ameren Missouri and the installation of flue gas desulfurization ("FGD") systems at Sioux, compliance with the MATS hydrochloric acid ("HCl") limits is not expected to require additional mitigation. Additional monitoring (CEMS or emissions tests) will also be required for HCl.

While mitigation has been included in our analysis for current and certain potential future regulations, further changes in regulations remain likely. The Company continues to monitor the potential for further changes in regulation that may impact resource planning decisions.

3.3 Uncertain Factors

3.3.1 Scenarios

For the Company's 2012 IRP Annual Update, a range of market scenarios was defined through combinations of independent uncertain factors. Two independent uncertain factors, or scenario variables, used in both the 2011 IRP and the 2012 update are natural gas prices and load growth (Eastern Interconnect). The 2011 IRP also included federal greenhouse gas policy as a third independent uncertain factor. For the 2012 update, the Company chose to more broadly represent the impacts of environmental and climate policy in terms of retirements of existing coal generation, an approach which we continue to use.

Figure 3.1 Scenario Tree

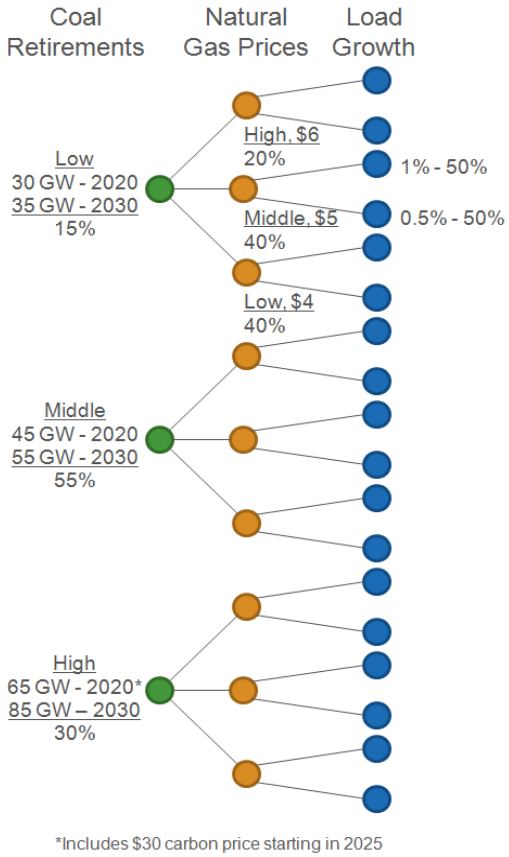


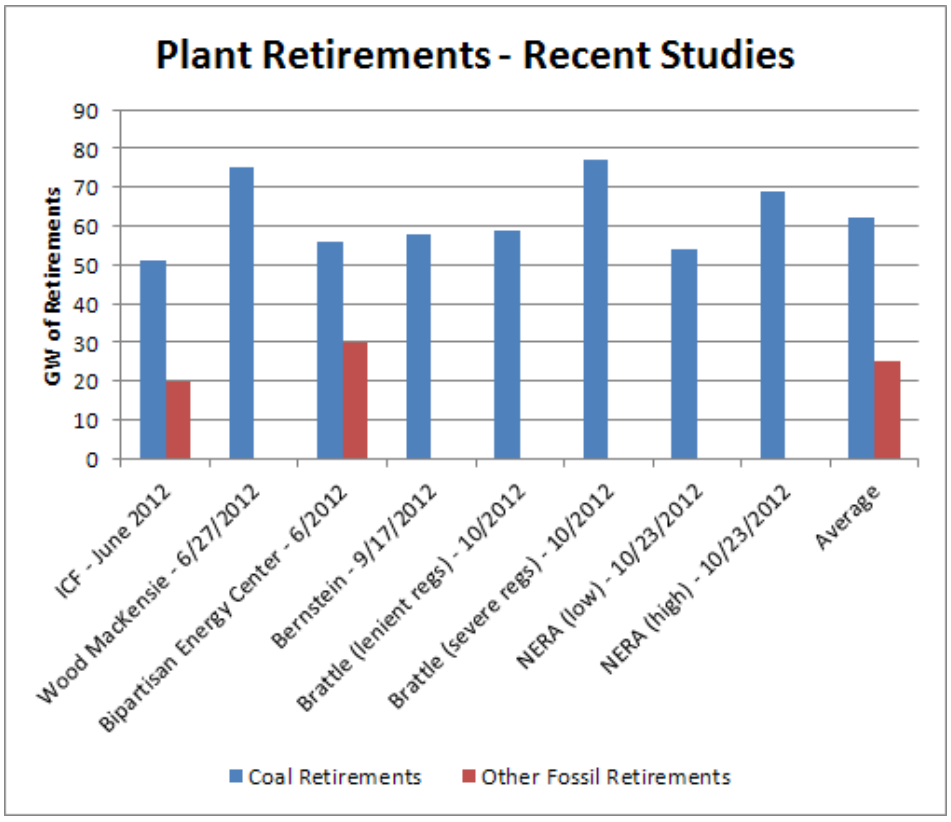
Figure 3.1 shows the scenario probability tree used for the 2012 IRP Annual Update. This scenario probability tree was based on environmental regulations, natural gas prices, and load growth. For this update, Ameren Missouri reviewed the assumptions used previously and compared those to current expectations. Our review and conclusions for each scenario variable are discussed further in this section.

Coal Retirements

As explained in our 2012 IRP Annual Update Report, it is problematic to precisely define various scenarios in terms of specific regulations. To understand the impact of environmental regulations on market price forecasts, it is more practical to capture the uncertainty in terms of how the electricity generation fleet responds to environmental regulations, rather than in terms of a range of discrete, explicitly determined environmental regulations. Using this approach ensures that whatever Ameren Missouri's resource plans include with respect to environmental mitigation is not inconsistent with the scenarios we use to evaluate the plans.

To test the assumptions used in the 2012 update, Ameren Missouri reviewed recent studies of anticipated coal retirements due to environmental regulation. Figure 3.2 summarizes the results of the studies that were reviewed, all of which have been published in the last year while few changes have come with respect to expected future environmental regulation. The chart shows both coal retirements and other fossil retirements, which generally include older gas and oil fired units. Based on our review, we conclude that the expected level of coal retirements is within the range defined in our 2012 IRP Annual Update.

Figure 3.2 Summary of Recent Retirement Studies



Natural Gas Prices

Ameren Missouri consulted internal experts on natural gas markets to test our previous assumptions for natural gas prices. In assessing current expectations, the Company's assumptions for basic fundamentals affecting the market price of natural gas are largely unchanged. Specifically, the following fundamental drivers are considered.

Supply – US natural gas production has continued to surge with an expansion of domestic resources. Efficiencies in horizontal drilling have continued to reduce gas production costs. New shale basins have proven to hold greater reserves than initial estimates.

Demand – Reduction in demand from the economic downturn has shown to be structural in nature with heavy energy intensive industry moving from US shores. Several directional indicators did help to frame the perspectives on both supply and demand. While current expectations indicate that industrial demand may return in future years this growth expectation is still limited.

Rig Count – Rig count can be an indicator of health of the supply of gas, but with new technologies being deployed by drillers (i.e. horizontal and directional drilling) this indicator is not as helpful as it had been in the past. When a single rig can now drill in several directions for natural gas this efficiency gain often overcomes the lack of increases in rig count.

Fuel Switching – High coal or oil price increases can place pressure on the users of these energy sources to switch to natural gas, putting potential upward pressure on gas prices. Recent gas demands have shown that fuel switching is taking place.

Export Capacity & Potential – The current US market continues to be in an import capacity oversupply situation caused by cheap domestic shale gas production. This will continue to create pressure to re-export LNG that arrives to the US with Global supply/demand factors influencing the potential for exports and upward price pressures.

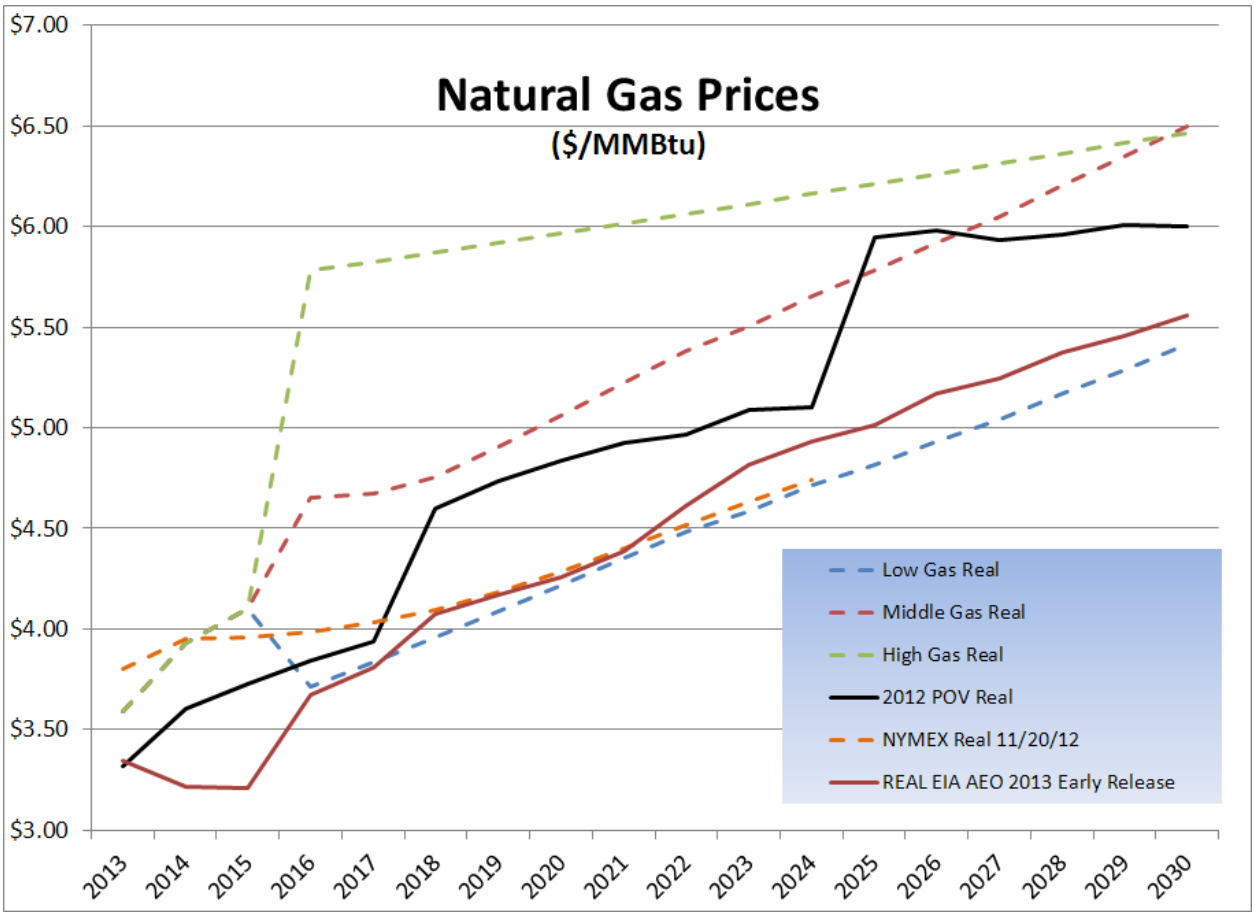
Economic Health of Producers – The gas industry is very fragmented and diverse and if this highly leveraged group experiences financial stress, a period of consolidation could put upward pressure on the price of natural gas.

Environmental Regulation –Environmental regulations continue to become more restrictive for domestic shale drillers. Should this trend continue and the cost of meeting these regulations rise beyond current expectations, upward pressure would be placed on the market price for natural gas.

Several sources of forward natural gas projections have been reviewed in the determination of current forecast natural gas price assumptions. These sources include

Wood Mackenzie and Bentek, along with the NYMEX Henry Hub market prices. These research services, along with general market knowledge of the natural gas industry, have helped to frame the long term projections used and to provide context to the drivers of the market clearing price of natural gas.

Figure 3.3 Natural Gas Price Forecasts



Based on our assessment of the market fundamentals at this time, the Company has developed a view on future prices for natural gas that are represented by the price levels shown in Figure 3.3 as "2012 POV Real". In general, the current view assumes real natural gas prices remain between $4/MMBtu and $6/MMBtu during the planning horizon. Figure 3.3 shows price forecasts for natural gas (in real terms) corresponding to the three levels shown on the scenario tree in Figure 3.1 and used in our 2012 IRP Annual Update analysis as well as Ameren's current Point Of View expectations for natural gas prices and the U.S. Energy Information Administration ("EIA") Annual Energy Outlook ("AEO") 2013 early release price forecast. As the chart shows, our current forecast assumptions for natural gas prices are within the range presented in our 2012 IRP Annual Update.

Load Growth

In the probability tree in Figure 3.1, load growth has 2 different value levels – one features a 1% compound annual growth rate ("CAGR") over the IRP 20-year timeframe, with a 50% subjective probability; the other is 0.5% CAGR over the IRP 20-year timeframe, also with a 50% subjective probability. While it is certainly possible that load growth could exceed 1% or fall short of 0.5% over the planning horizon, for the 2013 IRP update we continue to use these two values to represent the distribution of potential load growth based on a review of assumptions with our internal subject matter experts. Our load growth assumptions for Ameren Missouri's service territory continue to fall predominantly within this range (see section 3.5).

3.3.2 Scenario Modeling

Because current assumptions for each of the three scenario variables described in section 3.3.1 are within the ranges defined in our 2012 IRP Annual Update, no updated scenario modeling is needed at this time. The power price forecasts for the scenarios modeled for the 2012 update are presented in section 3.4 for reference.

3.3.3 Independent Uncertain Factors

The Company reviewed its expectations and previous value ranges for the independent uncertain factors identified in the 2011 IRP. Coal price uncertainty, which was added to the list of uncertain factors modeled for the 2012 update, is discussed in section 3.3.4.

Project Cost Uncertainty

For our 2012 IRP Annual Update, Ameren Missouri consulted with internal subject matter experts to update cost assumptions and ranges for supply side resource project costs and major environmental retrofit costs, including FGD and selective non-catalytic reduction ("SNCR"). For the 2013 update, Ameren Missouri consulted the same subject matter experts to review the previous cost assumptions and ranges. Based on this review and discussion, we have concluded that the ranges used in the 2012 update remain appropriate.

Table 3.2 shows the project cost ranges used in the 2012 update along with the ranges used in the 2011 IRP. Note that cost estimates for new resources are in 2012 dollars per kilowatt, and cost estimates for environmental retrofits are in millions of dollars.

Table 3.2 2012 Annual Update vs. 2011 IRP Overnight Project Costs

$2012	Size	2012 Annual Update			2011 IRP		
Resource Type ($/kW)	(MW)	Low	Base	High	Low	Base	High
Nuclear (Conventional)	1,600	4,238	4,901	5,941	3,875	4,613	5,444
Nuclear (Modular)	480	3,936	4,777	5,719	-	-	-
Combined Cycle	600	1,071	1,258	1,445	1,077	1,260	1,512
Simple Cycle	692	649	811	988	714	835	1,002
Wind	800*	1,683	2,148	2,608	1,871	2,190	2,632
Conversion/Compliance Option ($MM)		**Low**	**Base**	**High**	**Low**	**Base**	**High**
SNCR		7.0	8.1	9.2	6.9	8.1	9.7
FGD - Rush Island		578	691	812	579	677	814

* Nameplate capacity; regulatory capacity credit is 14.9% of nameplate.

Cost of Capital Uncertainty

To test our assumptions for long-term interest rates and allowed returns on equity, Ameren Missouri reviewed Blue Chip Financial Forecasts outlook for long term interest rates and evaluation of historical allowed returns on equity. Table 3.3 shows the forecast for the years 2019 through 2023 from Blue Chip based on the consensus of a 49-member panel for corporate bonds with Aaa and Baa ratings. Ameren Missouri used a weighted average with 20% assigned to the Aaa bond yield forecast and 80% to the Baa bond yield forecast, also shown in Table 3.3. For the 2019-2023 period, the weighted average forecast yield is 6.9%. The 2019-2023 forecast value was used to represent an expected value long-term average rate for the planning period through 2030. This rate falls within the range used for our 2012 IRP Annual Update of 4.31% to 8.21%.

Table 3.3 Forecast Bond Yields and Expected Long-term Debt Rate

Long-term Bond Yield Blue Chip Consensus Forecast	2019-23
Corporate Aaa Bond Yield (20%)	6.1%
Corporate Baa Bond Yield (80%)	7.1%
Weighted Average Yield	**6.9%**

To forecast the expected long-term allowed return on equity, Ameren Missouri once again analyzed historical allowed returns on equity for utility companies, adjusting for future interest rate expectations. Based on this approach, the expected long-term

allowed return on equity is 10.97%. This value falls within the range used for our 2012 update of 10.16% to 13.73%.

DSM Cost and Performance Uncertainty

Ameren Missouri is currently in the process of updating its assessment of DSM potential, which will inform analysis to be conducted as part of the development of the Company's 2014 IRP. This update will include an assessment of uncertainty with respect to cost and performance based on the updated market research and evaluation of key drivers of uncertainty. No other updates are being made at this time.

3.3.4 Coal Price Forecasts

Ameren Missouri included coal prices as an additional critical independent uncertain factor in its 2012 IRP Annual Update analysis pursuant to the Commission's prior order on special contemporary issues. For the 2013 IRP update, the framework used to develop coal prices as described in this section has been reviewed and determined to remain consistent with Ameren Missouri's current approach. Ameren Missouri's Fuels team provided price curves for three major types of coal, each with a base forecast and a high forecast. The three coal types for which price forecasts were prepared are Illinois Basin ("ILB") coal, generic Power River Basin ("PRB") coal with a sulfur content of 0.8 lb/MMBtu, and an Ultra-Low Sulfur PRB ("LS PRB") coal with a sulfur content of 0.55 lb/MMBtu or less, which is considered a subset of PRB. The basis for each coal forecast is described below, reflecting updated assumptions regarding key drivers, and the price forecasts are presented at the end of this section.

Long Term Coal Supply/Demand Fundamentals Overview

The two biggest fundamental drivers affecting Ameren Missouri's long term coal price outlook are EPA regulations in the U.S. and global demand for coal. PRB and ILB coal reserves are expected to be more than adequate over the planning horizon. Short term coal prices are influenced by power demand, coal inventories, railroad performance and natural gas prices. Current short term coal markets have been in decline since the Company's 2011 IRP was filed mainly due to the low price of abundant natural gas and weak power demand growth. Mid-2012 to early-2013 coal markets have remained depressed despite an increase in PRB coal demand. Some earlier coal-to-gas switching is returning to coal generation as natural gas prices have shown moderate increases. Ameren Missouri believes PRB coal will be competitive with natural gas in the long term.

The environmental assumptions reflected in the development of coal price assumptions are: (a) regulations similar to the final CSAPR rule (July 2011) will become effective

long-term despite legal challenges, (b) implementation of the MATS by April 2015, (c) EPA's review of the ozone National Ambient Air Quality Standards ("NAAQS") has been delayed until 2013, and (d) the effective date of greenhouse gas regulation for existing sources will be delayed beyond this decade.

PRB Base Case Methodology

Ameren Missouri's currently expected fuel prices represent the Base Case for PRB pricing. This Base Case represents Ameren Missouri's perspective of the generic (0.8 lb/MMBtu SO_2) PRB market even though the majority of our hedged coal through 2017 is from ultra-low sulfur (0.55 lb/MMBtu or less) sources. Beyond 2017 the base case is taken from a compilation of several outside consultant's professional modeling and projections reports for supply, demand and pricing.

PRB High Case Methodology

The High Case for PRB coal is based on the EIA's AEO for 2012. EIA provided a forecast for a high case sub-bituminous Wyoming PRB coal (mine mouth prices). These were calculated as nominal prices and then assumed for these high marks from 2013 to 2030.

PRB Fundamentals

Long term demand for PRB coal in the US may be affected by sustained low natural gas prices, EPA regulations, and contraction of eastern U.S. coal supply. Appalachian coal supply to domestic markets is expected to shrink due to tighter mine regulations and increasing mining costs, along with increasing exports out of the eastern seaboard. Both PRB and ILB supply are expected to increase to backfill Appalachian demand and to supply export markets.

Several factors are expected to drive PRB production costs higher. First, strip ratios (overburden vs. coal seam) are expected to continue to increase as mining progresses from east to west in the basin. These ratios have increased from 3 to 4 (33% increase) over the past 10 years and are expected to increase another 25% over the next 10 years. Second, government regulations continue to increase reclamation costs, severance taxes, and coal lease fees. Third, the cost of materials and supplies such as diesel fuel, explosives, and haul truck tires continue to increase. Finally, haul distances from coal pit to load-out are expected to increase.

Low Sulfur PRB Fundamentals

Generic PRB has an established sulfur specification of 0.8 lb SO_2/MMBtu, which is markedly lower sulfur as compared to ILB and Northern Appalachian ("NAPP") coals that can range as high as 7.0 lb SO_2/MMBtu. LS PRB coal, considered to be 0.55 lb

SO_2/MMBtu or less, can be burned at projected levels in Ameren Missouri's coal fleet to meet projected SO_2 emissions limits of the original CSAPR rule without the construction and operation of additional scrubbers (i.e., FGD equipment). This position will be re-evaluated by Ameren Missouri once the EPA issues a court-ordered restructuring of the emissions limits in CAIR.

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The PRB produces more than 400 million tons of coal per year (referred to as the "southern PRB"). Only two mines in the basin currently meet the ultra-low sulfur levels – Peabody's North Antelope Rochelle Mine ("NARM") and Cloud Peak's Antelope Mine. Arch has announced that its Black Thunder Mine will be segregating its products to supply a portion of the mine into the LS PRB market. Together these LS PRB sources will represent about 200 million tons of annual production, or about half of the PRB.

Illinois Basin (ILB) Base Case and Fundamentals

Similar to the PRB Base Case, this ILB Base Case is based on the expected Ameren Missouri fuel prices. Approximately 20% of the coal supply for the Sioux Energy Center is sourced from the ILB.

Illinois Basin production, currently at 125 million tons per year, has made a resurgence over the past few years as several new mines have been developed in central and southern Illinois and in western Indiana and Kentucky. The ILB and the PRB will continue to increase output in the next few years while eastern US coal supplies, Central Appalachia ("CAPP") and NAPP, shrink. CAPP coal serves both the steam markets and the metallurgical coal markets (used for steelmaking) but are expected to lose production capacity due to the increasing costs associated with more stringent mining regulations and permitting issues along with geologic challenges.

Coal Price Forecasts

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Figure 3.4 PRB and LS PRB Price Forecasts HC

3.4 Power Price Forecasts

For the 2012 update, Ameren Missouri modeled ranges of forecasts of dependent uncertain factors represented in Figure 3.1, yielding 18 unique forecasts for wholesale around-the-clock ("ATC") power prices which are shown in Figures 3.5 and 3.6. Figure 3.5 shows price forecasts for scenarios with 0.5% load growth, and Figure 3.6 shows prices forecasts for scenarios with 1% load growth. As described in the 2012 IRP Annual Update, prices for scenarios including high coal retirements reflect the inclusion of an explicit price on carbon emissions starting in 2025, resulting in a significant step change in power prices.

Figure 3.6 ATC Power Prices for 0.5% Load Growth

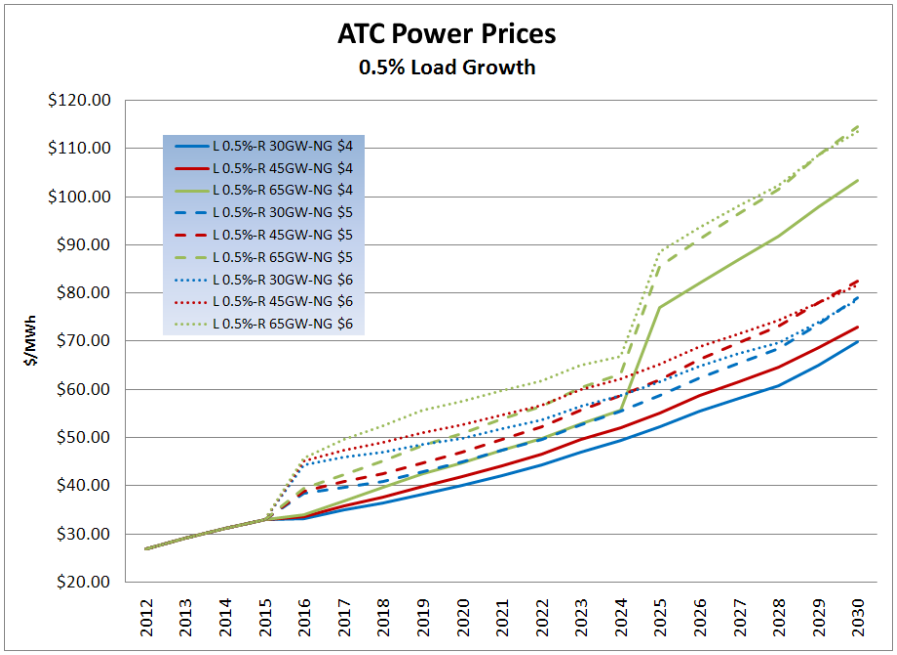
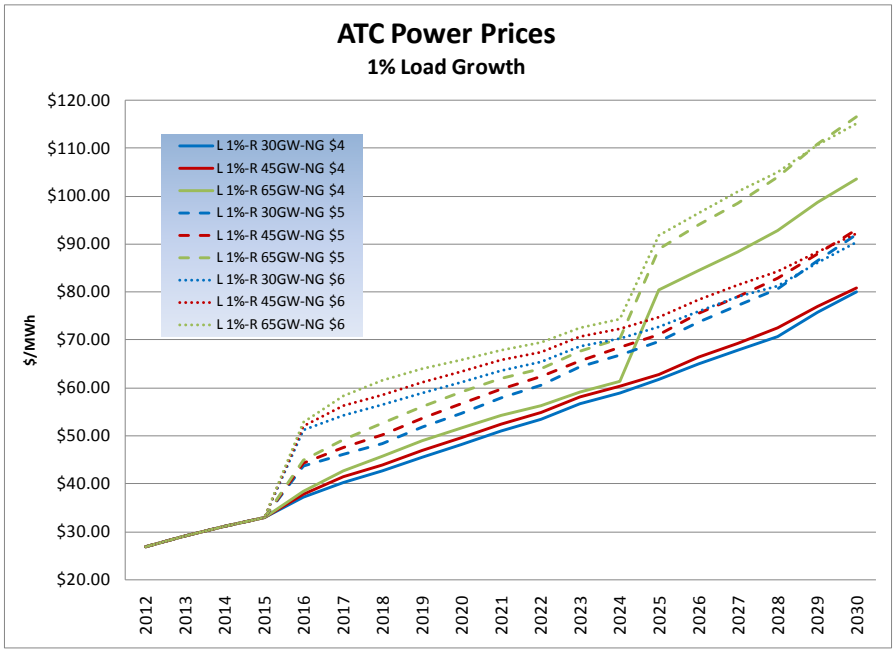


Figure 3.6 ATC Power Prices for 1.0% Load Growth



3.5 Energy and Peak Forecasting

The IRP process formerly consisted of a comprehensive analysis performed only once every three years. To address the time lag introduced by preparing analysis only once every three years, this process has lately added a series of annual updates in the intervening years. These updates are by necessity less detailed than the comprehensive triennial analyses.

Thus in this 2013 update, as in the immediately prior 2012 update, an analysis/update was performed on the key macro-level drivers of load to produce the energy and peak forecasts, while continuing to use the more detailed analyses, processes and procedures used in the most recent triennial version's comprehensive analysis.

3.5.1 Updates/Adjustments

The 2013 update was produced by running the same econometric and "statistically-adjusted end use ("SAE") models" that were used in the 2012 IRP update, and which were discussed in detail in the comprehensive 2011 IRP filing in section 3.1.4, "Energy Forecasting." However, before re-running these models, two updates were performed in this 2013 update:

- Values for the models' driver variables were updated using the latest values from Ameren Missouri's economic vendor, Moody's Analytics
- Models were re-estimated to include actual sales data that had occurred since preparation of the 2012 IRP

Updated Economic Driver Values

For the 2013 IRP Update, the same economic indicators used in the 2012 IRP update and the comprehensive 2011 IRP analysis were used as independent variables (driver variables) in our energy forecasting process but with updated values. There were two reasons for using updated values. One reason is that since forecasts of future economic conditions do not remain static, current estimates from Moody's Analytics of future conditions are more suitable for this update than outdated estimates used for the prior IRP update.

Table 3.4 shows some of the more important econometric variables used in our energy forecasting models, along with their growth rates over the forecast period for the original IRP analysis (2011-2030) in this string of updates/analyses. The CAGR for these items in the 2013 update is compared to the CAGRs for these variables in the 2012 update, with lower growth evident in the 2013 update.

Table 3.4 Updated Values of Driver Variables

Economic driver	*CAGR, 2011-2030*	Class impacted
Population	0.5%	Residential
Households	0.8%	
Real Personal Income	2.3%	
GDP	2.9%	Commercial
Employment	1.0%	
GDP for Manufacturing	4.1%	Industrial
Employment for Manufacturing	0.5%	

Driver variables for the load forecast of residential class energy sales included service territory population, households, and personal income. Driver variables for forecasts of commercial class energy sales included service territory GDP disaggregated by major industry group (such as financial activities, educational & health services or professional & business services). Driver variables for the forecast of industrial class energy sales included manufacturing employment and manufacturing GDP.

A second reason for using updated values is that a portion of the forecast period in the 2012 IRP update can now be replaced with actual results. The models used for the 2013 IRP update include actuals through May 2012, while those used for the 2012 IRP update included actuals through August 2011. Thus model performance was improved by the use of newly available additional actual values.

"Reconstituted" Loads

By the time of the 2013 IRP update, Ameren Missouri had implemented energy efficiency programs for several years, including an additional year since the time of the 2012 IRP update. Table 3.5 shows the impact of these programs by class by year up to the time of the 2013 IRP update.

Table 3.5 Energy Efficiency Impact, MWHs

Energy Efficiency Program Impact, MWhs				
Year	Residential	Commercial	Industrial	Total
2009 partial	1,338	6,741	1,858	9,936
2010	66,413	45,953	18,279	130,645
2011	194,129	129,200	53,865	377,194
2012 partial	99,007	88,118	37,159	224,284

Since the load forecast models use relationships of historical actual loads to the driver variables to build projections of future loads, it is important that the stream of actual historical loads be consistent with the driver variables used to model them.

However, the set of load forecast driver variables do not include the impacts of Company sponsored energy efficiency. Specifically, the saturation and efficiency levels used in the SAE modeling are, as described more fully in the comprehensive 2011 IRP load forecast section, derived from a combination of secondary data provided by EIA via the consulting firm Itron and primary data from the 2009 Market Potential Study conducted by Ameren Missouri and its consultant Global Energy Partners. Neither of these sources would have reflected in their base case assumptions any new DSM programs by Ameren Missouri.

Therefore, to use loads impacted by Company programs with end-use assumptions that do not reflect such programs would result in a mismatch in the independent and dependent variables used in the forecast model.

For this reason, it is better to produce a forecast of loads from historical actual loads that have had the energy efficiency impacts from historical programs added back to the loads, and then deduct from this forecast the projected impacts of the historical programs on future loads.

Thus in the 2013 IRP update, as in the 2012 IRP update, this “reconstituted” load dataset was used to produce a load forecast excluding energy efficiency. Then a “net” load forecast was produced by deducting from it the future impacts associated with historical energy efficiency programs.

Newly Available Actual Loads

For the portion of the forecast horizon where newly available actuals were used to replace forecasted values, the differences between actual and previously forecasted values in the 2013 update are smaller than the differences in the 2012 update. Larger differences occurred in the 2012 update vs. the 2011 analysis because significantly lowered growth expectations were used for the 2012 update compared to the 2011 IRP analysis. By contrast, the 2013 update reflected similar (but slightly lowered) growth expectations compared to those in the 2012 update.

3.5.1 Energy Forecast

After a variety of updates/adjustments to the model inputs and parameters as mentioned above, this 2013 IRP update used the same energy and peak models and processes as were used in the 2012 update and the 2011 IRP analysis. More complete details on those models and processes can be found in the 2011 IRP’s comprehensive report in “Chapter 3 Load Analysis and Forecasting.”

To summarize the key points from the 2011 IRP, Ameren Missouri's energy sales forecast was developed with traditional econometric forecasting techniques, as well as a functional form called Statistically Adjusted End-Use.

Table 3.6 Energy Sales by Class

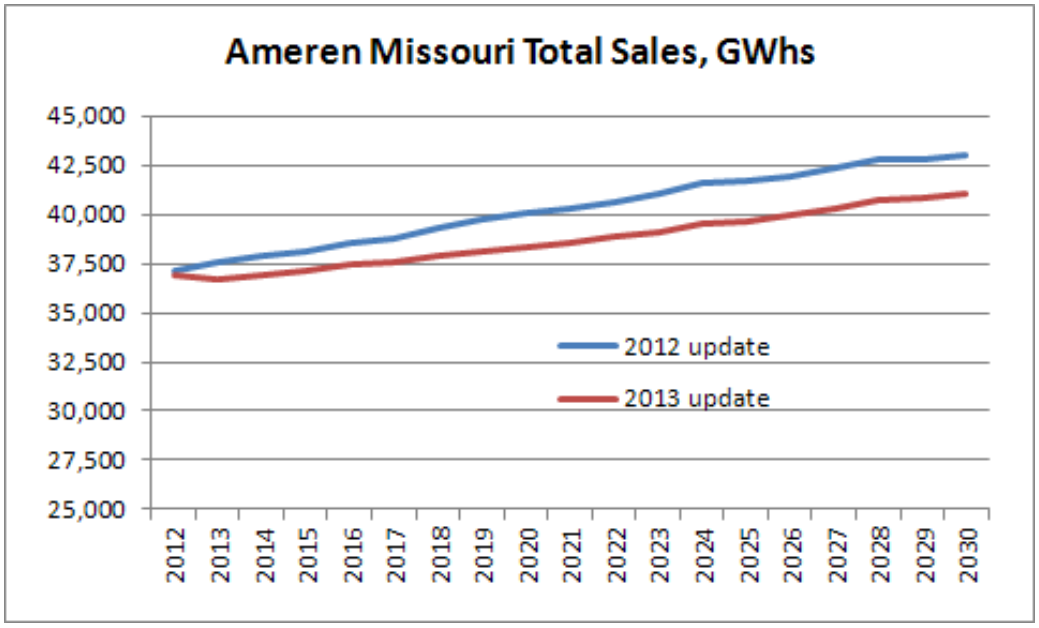
	Energy Sales By Class, GWhs					
	Residential	Commercial	Industrial	Noranda	Other	Total
2012	13,512	14,485	4,496	4,180	228	36,902
2013	13,263	14,583	4,495	4,173	220	36,735
2014	13,309	14,769	4,441	4,173	221	36,913
2015	13,362	14,923	4,489	4,173	221	37,168
2016	13,468	15,085	4,522	4,173	221	37,470
2017	13,513	15,161	4,525	4,173	221	37,593
2018	13,641	15,292	4,526	4,173	220	37,852
2019	13,752	15,441	4,531	4,173	220	38,118
2020	13,844	15,594	4,534	4,173	221	38,366
2021	13,855	15,740	4,529	4,173	221	38,518
2022	13,956	15,929	4,554	4,173	221	38,832
2023	14,045	16,099	4,558	4,136	234	39,073
2024	14,222	16,313	4,584	4,136	234	39,490
2025	14,232	16,432	4,583	4,136	234	39,617
2026	14,301	16,634	4,613	4,136	235	39,919
2027	14,410	16,869	4,657	4,136	235	40,306
2028	14,596	17,071	4,684	4,136	233	40,720
2029	14,594	17,158	4,668	4,136	233	40,789
2030	14,665	17,312	4,668	4,136	233	41,014
CAGR 2013 update	0.5%	1.0%	0.2%	-0.1%	0.1%	0.6%
CAGR 2012 update	0.6%	1.4%	0.5%	0.0%	0.2%	0.8%

The SAE framework was used to forecast energy sales in our residential general service rate class, and for all four of our commercial rate classes. The four industrial rate classes were forecasted without including estimates of appliance saturation or efficiency that distinguish the SAE models from more traditional econometric models. The four industrial rate classes lack the homogeneity necessary to make the SAE approach useful.

There are three other classes of energy sales which fell into neither the SAE nor econometric form of forecasting. Those three were Noranda, Street Lighting and Public Authority, and Dusk to Dawn lighting. These were handled in the same manner for the 2013 IRP update as was done in the 2012 IRP update and in the 2011 IRP analysis.

A summary of the energy forecast by year by class at the meter is shown in table 3.6. These results are for the base case, whose compound annual growth rate from 2012 to 2032 is 0.59%. At the bottom of that table is a comparison of the CAGRs from this 2013 update vs. those in the class energy forecasts in the 2012 update.

Figure 3.7 Energy Sales Forecast Comparison



In the 2013 IRP update the total system energy growth rate is lower than it was in the 2012 IRP update, which is consistent with the lower values used for the driver variables as illustrated in Table 3.4. This is clear from Figure 3.7, which shows a lower slope for the annual sales in the 2013 update compared to the higher slope for annual sales in the 2012 update.

Low and High Cases

For this 2013 IRP update, a low case and a high case were derived using the same process that was used in the 2012 IRP update to derive the low case and the high case from the base case by either subtracting (for the low case) or adding (for the high case) 25 basis points to the base case CAGR.

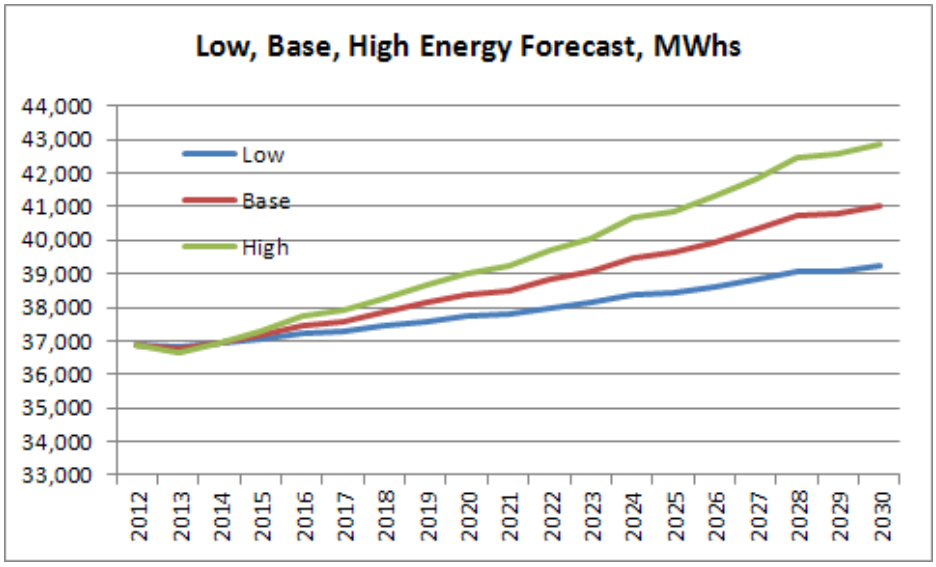
Thus a low case for the 2013 IRP update was derived by subtracting 25 basis points from the base case CAGR of 0.59%, resulting in a low case CAGR of 0.34%. Similarly, a high case for the 2013 IRP update was derived by adding 25 basis points to the base case CAGR of 0.59%, resulting in a high case CAGR of 0.84%. As has been mentioned previously, future load growth could be higher or lower than the cases presented here due to uncertainties in the general economy and in our service territory. The development of the +/- 25 basis point range was described fully in the 2012 Annual Update report, and was based on a macro analysis of uncertainty around economic growth and the energy intensity of that growth.

Table 3.7 Low, Base, High Energy Forecasts

Energy, MWhs			
	Low	Base	High
2012	36,902	36,902	36,902
2013	36,808	36,735	36,658
2014	36,908	36,913	36,917
2015	37,052	37,168	37,289
2016	37,222	37,470	37,728
2017	37,291	37,593	37,907
2018	37,437	37,852	38,285
2019	37,587	38,118	38,672
2020	37,726	38,366	39,033
2021	37,812	38,518	39,255
2022	37,989	38,832	39,711
2023	38,124	39,073	40,062
2024	38,359	39,490	40,669
2025	38,431	39,617	40,854
2026	38,601	39,919	41,294
2027	38,819	40,306	41,857
2028	39,052	40,720	42,461
2029	39,091	40,789	42,560
2030	39,218	41,014	42,888
CAGR	0.34%	0.59%	0.84%

Table 3.7 and Figure 3.8 show these low, base, and high energy forecasts.

Figure 3.8 Low, Base, High Energy Forecasts



3.5.2 Peak Forecast

The peak forecast at generation for the 2013 IRP update was also derived using the same processes and models as those used in the 2012 update and in the 2011 IRP analysis, although with updated data and parameters as described earlier. An exception was that the residential and commercial classes were shaped at the class level rather than the end use level to expedite the analysis. A full end use analysis will be performed in the comprehensive triennial analyses where more time and resources are available and justified.

Essentially this step used the energy forecast as an input, and converted that data from a monthly basis into an hourly basis so that the peak hour value for each month can be extracted as the peak forecast.

The monthly energy forecast by class was used with the appropriate hourly load shapes by class to produce an hourly energy forecast by class. That hourly energy forecast by class was adjusted for demand loss rates, and the classes were totaled to produce the total system. The peak hour value for the total system for each month then comprised the peak forecast.

Figure 3.9 Peak Forecast Comparison

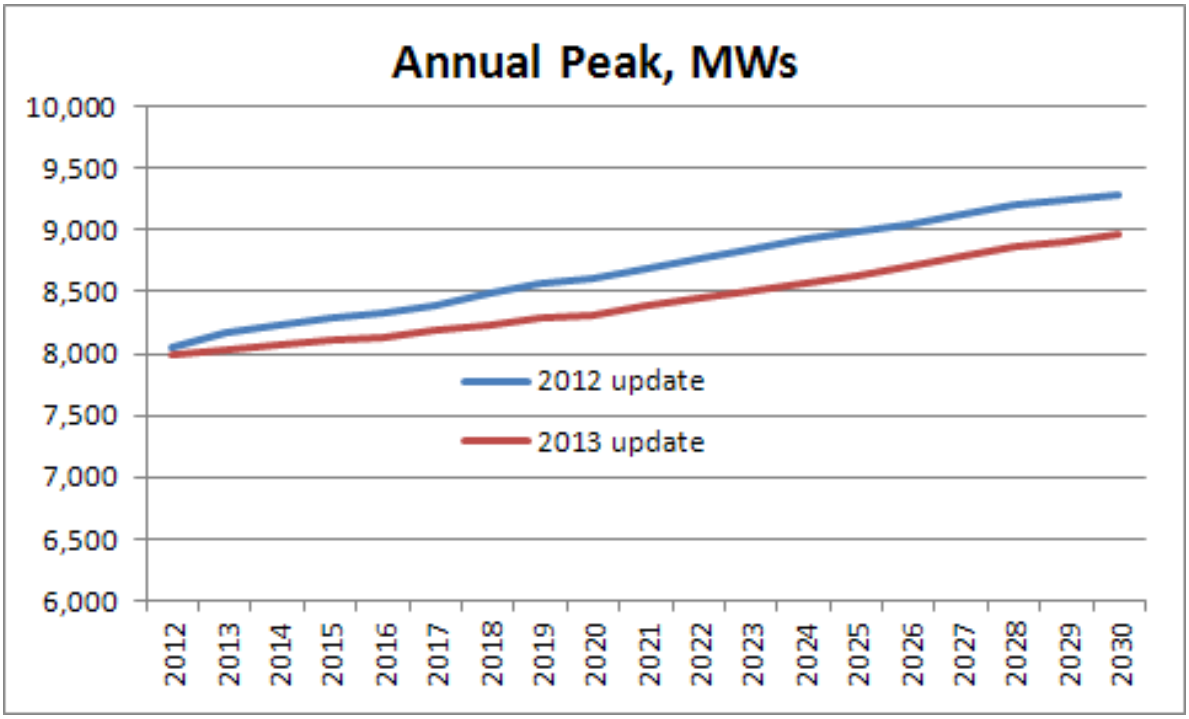


Figure 3.9 shows a comparison of the annual peak forecast for the 2013 IRP update vs. the 2012 IRP update. It shows that the annual peak forecast in the 2013 update is

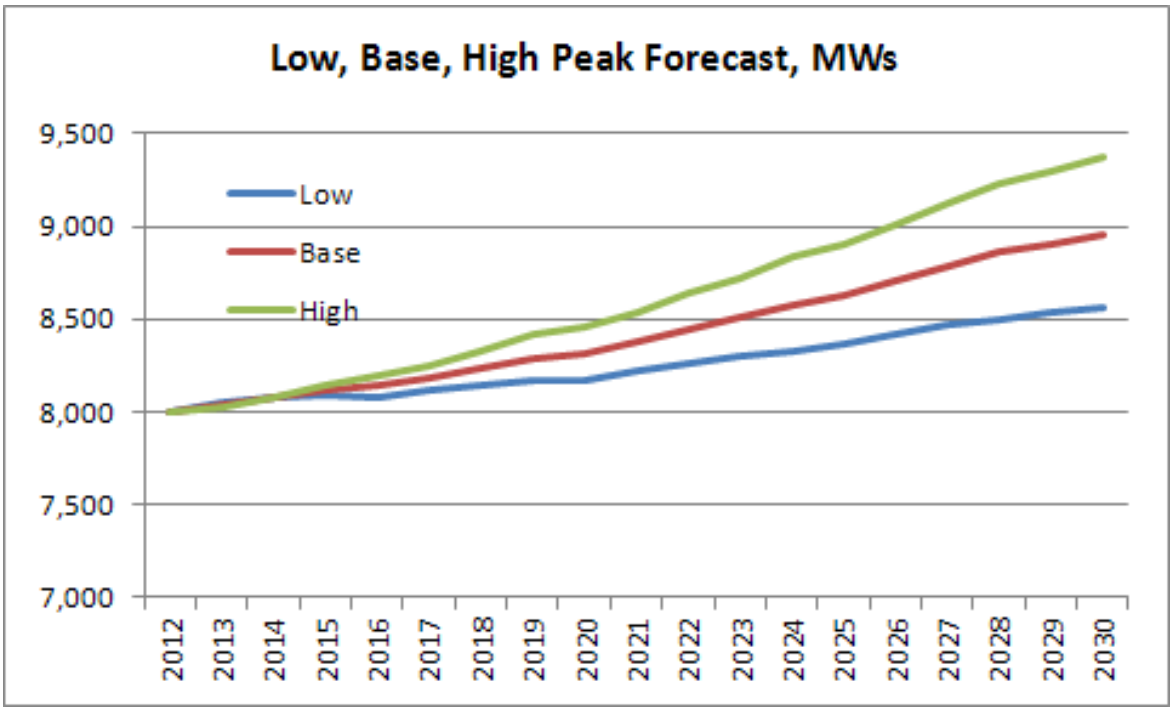
lower than it was in the 2012 update, consistent with the similarly lower energy forecast. However, the peak values are at generation (i.e. inclusive of transmission and distribution losses) while the energy forecast table shows load at the meter.

Low and high cases for annual peak loads were derived from the low and high energy forecasts discussed previously. Table 3.8 and Figure 3.10 show these low, base, and high annual peak load forecasts.

Table 3.8 Low, Base, High Peak Forecasts

	Peak, MWs		
	Low	Base	High
2012	7,999	7,999	7,999
2013	8,055	8,039	8,023
2014	8,077	8,078	8,079
2015	8,086	8,111	8,138
2016	8,084	8,138	8,194
2017	8,115	8,181	8,249
2018	8,147	8,237	8,331
2019	8,175	8,291	8,412
2020	8,172	8,311	8,455
2021	8,226	8,380	8,540
2022	8,264	8,447	8,638
2023	8,300	8,507	8,722
2024	8,329	8,574	8,831
2025	8,371	8,629	8,899
2026	8,414	8,701	9,001
2027	8,465	8,790	9,128
2028	8,494	8,857	9,235
2029	8,532	8,902	9,289
2030	8,567	8,959	9,369

Figure 3.10 Low, Base, High Peak Forecasts



Hourly System Load Forecast

Since the integration stage of the IRP analysis needs an hourly version of the energy forecast, the peak forecast process described above provides the starting point for the hourly system load forecast that is used in that stage of the IRP analysis.

However, while the peak load forecast applied the demand loss rate to the result of using hourly load shapes against monthly energy numbers, the system load forecast for this other purpose needs to reflect energy loss rates. The reason is that energy loss rates reflect the losses that are incurred across the entire year, while demand loss rates reflect the losses at the time of peak load.