Kentucky Public Service Commission

Staff Report On the

2003 Integrated Resource Plan Report

of East Kentucky Power Cooopertive

Case No. 2003-00051

September 2004

SECTION 1

INTRODUCTION

Administrative Regulation 807 KAR 5:058, promulgated in 1990 by the Kentucky Public Service Commission, ("Commission") established a process under which the six major electric utilities under its jurisdiction file integrated resource plans ("IRP") in order to afford the Commission Staff an opportunity to review the utilities' long-range resource plans. The goal of the Commission in establishing the IRP process was to ensure that all reasonable options for the future supply of electricity were being examined and pursued and that ratepayers were being provided a reliable supply of electricity at the lowest possible cost.

On April 21, 2003, East Kentucky Power Cooperative, Inc ("East Kentucky") filed its 2003 IRP with the Commission. The IRP includes East Kentucky's plans for meeting the electricity requirements of the retail customers served by its member cooperatives for the 2003-2017 period.

East Kentucky is a generation and transmission cooperative headquartered in Winchester, Kentucky. It provides all of the power requirements of 16 distribution cooperatives, which provide service in 89 counties located in eastern and central Kentucky. These member cooperatives, Big Sandy RECC, Blue Grass Energy Cooperative, Clark Energy Cooperative, Cumberland Valley Electric, Farmers RECC, Fleming-Mason Energy Cooperative, Grayson RECC, Inter-County Energy Cooperative, Jackson Energy Cooperative, Licking Valley RECC, Nolin RECC, Owen Electric Cooperative, Salt River Electric Cooperative, Shelby Energy Cooperative, South Kentucky RECC, and Taylor County RECC, serve primarily residential customers, which account for more than 90 percent of the 450,000-plus customers they serve.

East Kentucky owns and operates three coal-fired generating stations: the Dale, Cooper and Spurlock stations. At the time of its 2003 IRP filing, it also owned and operated 5 gas-fired combustion turbines located at its Smith Station site. In addition, East Kentucky purchases power from the Southeastern Power Administration ("SEPA"). The total capacity available to East Kentucky, including the SEPA power, at the time of its IRP filing, was 2,027 MW. Its E.A. Gilbert Unit, a 268 MW coal-fired unit located at its Spurlock Station, is expected to be operational April 1, 2005. The addition of this unit will increase East Kentucky's total available capacity to 2,295 MW.

The purpose of this report is to review and evaluate the IRP in accordance with the requirements of 807 KAR 5:058, Section 12(3), which requires the Commission Staff to summarize its review of IRP filings made with the Commission and make suggestions and recommendations to be considered in future IRP filings. The Staff recognizes that resource planning is a dynamic ongoing process. Thus, this review is designed to offer suggestions and recommendations to East Kentucky on how to improve its resource plan in the future. Specifically, the Staff's goals are to ensure that:

- All resource options are adequately and fairly evaluated;

- Critical data, assumptions and methodologies for all aspects of the plan are adequately documented and are reasonable; and

- The selected plan represents the least-cost, least risk plan for the ultimate customers served by East Kentucky and its member cooperatives.

The report also includes an incremental component, noting any significant changes from East Kentucky's most recent IRP, which was filed in 2000.

Based on forecasted average annual growth rates of 3.2% for peak demand and 3.1% for energy, East Kentucky projects that it will require aproximately 1,749 MW in additional resources to serve projected loads by 2017.

The remainder of this report is organized as follows:

- Section 2, Load Forecasting, reviews East Kentucky's projected load growth and load forecasting methodology.

- Section 3, Demand-Side Management, summarizes East Kentucky's evaluation of demand side management ("DSM") opportunities.

- Section 4, Supply-Side Resource Assessment, focuses on East Kentucky's evaluation of supply resources options to meet future load requirements.

- Section 5, Integration and Plan Optimization, discusses East Kentucky's overall assessment of supply-side and demand-side options and their integration into an overall resource plan.

SECTION 2

LOAD FORECASTING

Introduction

East Kentucky provides wholesale power to 16 distribution cooperatives which, in turn, serve over 450,000 retail customers. East Kentucky assists the cooperatives in preparing their load forecasts and then uses the cooperatives' forecasts in preparing its own long range projections. Essentially, the cooperatives' load projections extend out 20 years and are summed together to obtain East Kentucky's 20-year load forecast.

Methodology

The purpose of the forecasts is to provide East Kentucky and individual member cooperatives with reliable load projections, which are essential for long range planning. The cooperatives use their load forecasts to develop 2, 3 and 4-year construction workplans, long range work plans and financial forecasts. East Kentucky uses its load forecasts for marketing analysis, transmission planning, power supply planning and financial forecasting.

East Kentucky begins by preparing a preliminary forecast for each of the member cooperatives. The preliminary forecast is based upon retails sales forecasts for the following customer classifications: residential, seasonal, small commercial, public buildings, large commercial and other. East Kentucky's sales to its member systems are determined by adding distribution losses to total retail sales. East Kentucky's total requirements are estimated by adding transmission losses to its total sales. Seasonal peak demands are determined by applying peak factors for heating, cooling, and water heating to energy. This same methodology is employed for each member cooperative.

Factors considered in preparing the forecasts include: national, regional and local economic data, appliance saturation and efficiency, population and housing trends, service area industrial development, electric price, household income, and weather.

Prior to the 2002 forecast, East Kentucky had been using an end-use modeling approach for forecasting residential energy usage. In this model, energy use was modeled as a function of appliance choice and usage. In turn, appliance usage forecasts were based upon a conditional demand analysis, which was based upon the market saturation of particular types of appliances and the number of customers. Starting with the 2002 forecast, East Kentucky began using a statistically adjusted end-use ("SAE") model to forecast residential energy use. While preserving the end-use forecast elements of the previous model, the SAE also employs time series analysis and segments the average household usage into end-use components. In this manner, usage is modeled as a function of heating, cooling variables, water heating and other sectors. These variables are defined in terms of their respective end-use structure. Annual end-use indices and a usage variable define each of these variables. Usage, in turn, is a function of economic and weather related conditions.

Once the preliminary forecasts are complete, East Kentucky meets with each member system to discuss its individual forecast. Generally, a Rural Utilities Service ("RUS") General Field Representative ("GFR") is also present. East Kentucky will revise the member system's forecast based upon mutual agreement between its staff, the cooperative's manager and staff, and the RUS GFR. A final forecast is prepared and subsequently approved by each member system's board of directors. East Kentucky's 20-year forecast is the sum of the cooperatives' final forecasts.

The cooperatives provide essential input to East Kentucky's forecasting process. The individual cooperatives provide input on the status of local economic conditions and development. Meetings between East Kentucky and the cooperatives are opportunities to critique East Kentucky's modeling assumptions and forecasting results. Thus, East Kentucky's load forecast is a combination of a structured forecast modeling tempered by the cooperatives' judgement and service area experience.

East Kentucky has divided its service territory into six economic regions, each of which will have its own specific regional economic forecasts. The U.S. Bureau of Labor Statistics and the Bureau of Economic Analysis provide county level historical data on population, income, employment and wages. County level unemployment rates and labor force data are collected from state sources. Global Insight supplies forecasted U.S. economic data which is also an input to the model. Specific regional forecasts for population, income, and employment are developed and used as inputs in the energy forecast and the residential and small commercial class forecasts. Population forecasts are used to project the number of residential customers. Household income is used to project residential sales while regional economic activity drives the forecast for small commercial sales.

Residential energy sales are forecast using regression techniques. Regression inputs include electric price, economic activity, and regional population growth. The latter is also obtained using regression techniques. Small commercial customers are defined as having an annual peak demand of less than 1MW. In 2001, there were over 25,000 such customers throughout East Kentucky's system. Small commercial energy sales are also obtained using regression techniques. Inputs to this regression equation include regional economic variables and the residential customer growth forecast.

Large commercial customers are defined as having an annual peak demand of greater than 1 MW. In 2001, there were 114 large commercial customers on the East Kentucky system. The large commercial sales forecast is generated by the individual member systems in conjunction with East Kentucky. The member systems project existing large loads and East Kentucky projects new large loads using a regression approach. Usage for the large commercial class is a function of historical development, industrial parks and local economic conditions. A probabilistic approach is used to then distribute forecasted new large commercial customers to each of the member systems based on regional economic outlook, share of county served and historical success in attracting new large customers. All new large customers are assumed to have the same energy characteristics as the average of all large customers, i.e., a peak of 1.5 MW with a 60 percent load factor.

Seasonal energy sales are to customers with seasonal residences and weekend retreats. Only 2 member systems track and report seasonal sales. The public building sales forecast includes accounts such as government buildings and libraries. Only 4 member systems track and report such sales. The "other" category represents street lighting and is usually projected as a function of residential sales. Summing monthly energy usage and load factors for the various customer classes projects seasonal peak demands. The primary residential energy sales usage components include heating, cooling and water heating. Load factors are used to calculate demand for each component and summed to obtain the residential portion of seasonal peak demand. For the small commercial and large commercial classes, class load factors are used to obtain the relative portions of seasonal peak demand.

Results

East Kentucky's total system energy requirements are forecast to increase by 3.1 percent annually, from 10,750,900 MWh to 20,483,101 MWh, over the 2002 – 2022 time period. Over the same period, net winter peak demand is projected to increase from 2,086 MW to 4,434 MW, for an average growth rate of 3.2 percent. Net summer peak is expected to increase by 3.3 percent, from 1,977 MW to 3,783 MW over this period and the system annual load factor is projected to decrease slightly, to about 53 percent. The breakdown of the forecast by major customer classes over the 2002 – 2022 period is as follows: Residential sales will increase by 3.2 percent per year, small commercial sales will increase by 3.2 percent per year, and large commercial sales will increase by 3.0 percent per year.

Overall, East Kentucky's current forecast does not differ significantly from its prior forecast. Generally, the current forecast is slightly higher than the forecast included in its previous IRP. In 2015, residential sales are projected to be about 215,000 MWh higher. Also in 2015, total commercial and industrial sales are projected to be about 270,000 MWh higher in the new forecast. By 2015, the net winter peak is 163 MW higher and the net summer peak is 107 MW higher in the new forecast than in the forecast included in East Kentucky's 2000 IRP.

Uncertainty Analysis

For this forecast, East Kentucky began using Metrix products. East Kentucky provided a forecasting flow diagram to illustrate the peak demand forecasting process. System hourly load shapes are determined from actual historical load data. The system forecast is obtained from member systems' forecasts. Class energy demand forecasts, as well as winter and summer peak demands are also summed. These are used to create an hourly load model of the forecasted years. The hourly load forecast is then calibrated to seasonal peak demands and annual energy forecasts to build a calibrated hourly load forecast for the East Kentucky system. This constitutes the base case scenario. High and Low Case Scenarios are constructed using the same methodology. However, instead of using summed member system forecasts, new models are constructed that will reflect both higher and lower usage for the member systems. There are five categories where different assumptions are made that affect electricity demand: weather, electricity prices, population, number of households and household

size, and residential appliance saturation projections. For small and large commercial classes, customer and energy high and low forecasts are made using probabilistic modeling and by using @RISK software. Once annual energy and seasonal peaks are prepared, the process of calibrating the hourly load curves is the same as before.

Discussion of Reasonableness and Recommendations

East Kentucky's forecasting methodology and processes appear to be sound. However, the description of the models is too general for the reader to completely understand each specific model. Also, the discussion of how the assumptions were changed to produce high and low case scenarios for seasonal peak demand lacks specificity. For the next IRP report, a more complete discussion and description of each model should be included. Also, a description of how data and variables were manipulated and constructed for each of the models should be included. Specific recommendations are as follows:

- Provide a complete description of each model, component and variable for each model including the class models, regional economic model, peak models and the high / low variation in peak demand.

- Provide a complete description of how the economic and demographic data is constructed for the six economic regions, including how the data is manipulated so as to be useful for forecasting individual member system class usage.

- Provide a complete description the assumptions made to produce the high and low case variations in the seasonal peak demand forecasts.

SECTION 3

DEMAND SIDE MANAGEMENT

Introduction

This section summarizes the DSM assessment in this IRP. East Kentucky states that over the last 20 years, it and its members have offered various marketing programs that were developed to meet the needs of consumers and delay the need for additional generating capacity. The IRP evaluates the benefits and costs of existing programs and identifies new DSM programs that are projected to save 75 MW of winter peak capacity. The residential marketing programs offered by East Kentucky and its members are:

- Tune-Up HVAC Maintenance Program
- Geothermal Heating & Cooling Incentive Program
- Electric Thermal Storage Incentive Program
- Electric Water Heater Incentive Program
- Air-Source Heat Pump Incentive Program
- Button-Up Weatherization Program
- Manufactured Home Program

This IRP included program descriptions, discussion of target markets and a load impact table for each existing DSM program. East Kentucky believes that this IRP presents a much stronger analysis of marketing and DSM programs than was included in its 2000 IRP. Two significant improvements made by East Kentucky to its analysis include:

1. Reflecting benefits from transmission and distribution costs in the analysis.

2. Reflecting the seasonal nature of benefits of avoiding capacity increases, to better reflect East Kentucky's management of its resource portfolio.

Screening Process

The IRP included benefit/cost analysis to calculate the benefits of existing DSM programs, and analyses of 4 new programs. The new DSM programs analyzed are:

- Commercial Lighting – member systems can offer large commercial and industrial customers lighting options through EnVision, a cooperative-owned consulting service.

- Compact Fluorescent Light Bulbs – Efficient bulbs are given out at annual meetings.

- Demand Response Program – Member systems can utilize existing rate structures with East Kentucky to approximate most recognized demand response programs.

- Direct Load Control - Although benefit/cost ratios for this type of load management have historically been non-conducive, East Kentucky believes the ratios are becoming more favorable and will continue to monitor the merits of direct load control.

East Kentucky's DSM analysis was conducted on an aggregate basis, with all member cooperatives combined, rather than on an individual cooperative basis. East Kentucky utilized the DSManager computer program, which was created by EPRI, an electric industry research group, to compute the benefit/cost ratios in its analysis. Appendix II of East Kentucky's IRP provides the results of the DSManager analysis.

Results of the benefit/cost tests for both existing and new DSM programs were generally favorable. Each of the existing and new DSM programs had a benefit/cost ratio greater than 1.0 in either the total resource cost test or the participant test. In most instances, the benefit cost /ratios were greater than 1.0 for both tests. For example, the Button-Up Weatherization Program has a benefit/cost ratio of 2.46 for the participant test and 2.84 for the total resource cost test.

Comments of the Attorney General

The AG recommended that East Kentucky encourage its member cooperatives to offer a net-metering rate to promote small-scale renewable energy. The AG stated that a net metering tariff would help the end use members, help the cooperative, and help the environment. The AG further commented that East Kentucky should work with its distribution cooperatives to develop and file net metering tariffs.

Comments of the Kentucky Division of Energy

The Kentucky Division of Energy ("KDOE") offered several recommendations to East Kentucky.

The first recommendation is to complete a full and comprehensive study of the technical potential of demand-side resources and distributed generation in its service territory. KDOE stated that although East Kentucky developed some new DSM programs focusing on peak shifting and light bulbs, overall, East Kentucky did not attempt to implement in this IRP the suggestions KDOE had previously made in its 2000 IRP case. KDOE further stated that it does not consider the partial analysis of a limited number of new DSM options contained in the 2003 IRP to constitute either a Technical Potential Study or a "rigorous, updated, and thoroughly documented assessment of all reasonable DSM alternatives," as required by 807 KAR 5:058.

KDOE's next recommendation was that East Kentucky develop and implement programs to acquire that portion of cogeration and distributed generation resources that are more cost-effective than the lowest-cost supply-side option.

The third recommendation was that East Kentucky and its member cooperatives reverse those policies that promote the increased use of electricity, especially in cases where such policies are not in the best interests of the ultimate retail customers. KDOE suggests that East Kentucky and its member cooperatives change existing tariffs from a declining block rate structure to an inclining block rate structure, stating that, "changing the existing tariff structure could help motivate customers to reduce their bills, help the utility reduce demand growth and defer the need for new generation."

KDOE recommends that, after completing these three recommendations, East Kentucky conduct an integrated analysis to determine whether or not additional centralized power plants will still be needed in the foreseeable future.

KDOE also recommends that East Kentucky develop and propose a net metering tariff to accommodate customers that want to install small-scale, environmentally benign generating technologies to reduce their electric bills.

Discussion of Reasonableness

In its report on East Kentucky's 2000 IRP, Staff made several recommendations concerning DSM that were used by East Kentucky as a foundation for the analysis of DSM activities in its 2003 IRP. Staff's recommendations included:

- East Kentucky should perform a new DSM study prior to its next IRP filing. The IRP should include thorough discussion of the study and documentation relative to the consideration and screening of new DSM programs, applications, and technologies.

- East Kentucky should meet with the Kentucky Department of Energy (KDOE) and the Attorney General (AG), if the AG so desires, well in advance of the next IRP filing to discuss the DSM concerns of the parties and discuss the results of the dialogue and how it incorporated the parties' concerns in the next IRP analysis.

- East Kentucky should report on efforts to evaluate and support local integrated resource planning, cogeneration and distributed generation, and other initiatives of the type advocated by KDOE.

- East Kentucky, in its next IRP, should discuss in detail how it factors environmental compliance costs such as for NO_X and CO_2 into its DSM program evaluation.

In response to the recommendation that it perform a new DSM study, East Kentucky submitted its DSManager based study, which was discussed earlier. While its study is not as comprehensive as the DSM studies submitted by some Kentucky jurisdictional utilities, Staff views East Kentucky's DSM study as a reasonable effort in beginning to consider and screen new DSM programs, applications, and technologies.

It is unclear to Staff as to whether its recommendation that East Kentucky meet with KDOE and the AG to discuss the DSM concerns of the parties was acted upon. It is also unclear whether the results of such dialogue or how East Kentucky addressed the parties' concerns were reflected in this 2003 IRP.

East Kentucky's IRP does not reflect that it responded to Staff's recommendation that it report on its efforts to evaluate and support local integrated resource planning, cogeneration and distributed generation and other initiatives of the type advocated by KDOE. Staff repeats this recommendation for East Kentucky's next IRP.

In its report on the 2000 IRP, Staff recommended that East Kentucky discuss in detail, how environmental cost considerations have been factored into its DSM program evaluation. That report noted that Staff's prior report, on East Kentucky's 1997 IRP, recommended that East Kentucky should estimate the effects on its avoided cost of EPA's NO_X standards, attempt to estimate the effects of CO_2 costs, and provide a full description of how these environmental costs are factored into program evaluation.

Although, as stated earlier, East Kentucky used Staff's recommendations from its report on the 2000 IRP as a foundation for the analysis of DSM activities in this IRP, it is unclear whether East Kentucky believes it has addressed the recommendation to factor environmental costs into its DSM evaluation. In its next IRP, East Kentucky should explicitly discuss how it has factored environmental cost considerations into its DSM evaluation, or at minimum, provide an explanation for why it has not or cannot do so.

As to KDOE's recommendation that East Kentucky develop and propose a net metering tariff, subsequent to the filing of the IRP, the Kentucky legislature passed SB 247, which makes it mandatory for retail electric suppliers to make net metering available to any eligible customer-generator that the supplier currently serves or solicits for service. While the legislation applies to retail electric suppliers, East Kentucky's members cannot act alone in implementing net metering. This action of the legislature renders moot the discretionary aspects of utiilties offering net metering service and alleviates the need for this report to respond directly to KDOE's recommendation.

Based on this discussion, Staff's specific recommendations for East Kentucky's next IRP are as follows:

- Discuss the results of any dialogue East Kentucky has with the AG, KDOE, or other parties related to DSM issues prior to filing the IRP and explain how the parties' concerns are incorporated in the IRP.

- Report on efforts to evaluate and support local integrated resource planning, cogeneration and distributed generation, and other initiatives of the type advocated by KDOE.

- Explicitly discuss how it has factored environmental cost considerations into its DSM evaluation, or at minimum, provide an explanation for why it has not or cannot do so.

SECTION 4

SUPPLY-SIDE RESOURCE ASSESSMENT

Introduction

This section summarizes, reviews and comments on East Kentucky's evaluation of existing and future supply-side resources and includes discussion on East Kentucky's environmental compliance planning.

Existing Capacity

East Kentucky currently owns and operates 1,387 MW of coal-fired, baseload capacity, located at three separate sites, consisting of a total of eight generating units. With respect to peaking capacity, East Kentucky owns 646 MW of duel-fueled, gas and oil, combustion turbines ("CTs"), located at its Smith generating site, consisting of a total of 5 generating units. East Kentucky's existing capacity is shown below in Table 1.

TABLE 1 – EXISTING CAPACITY

Plant Name	Unit No.	Net Cap. (MW)	Facility Type	Fuel Type	Scheduled Upgrades, Deratings, Retirement Dates
Dale Station	1	23	Steam	Coal	None
	2	23	Steam	Coal	None
	3	75	Steam	Coal	None
	4	75	Steam	Coal	None
Cooper Station	1	116	Steam	Coal	116 to 114 MW in 2010
	2	225	Steam	Coal	225 to 222 MW in 2010
Spurlock Station	1	325	Steam	Coal	325 to 320 MW in 2010
	2	525	Steam	Coal	525 to 517 MW in 2010
Smith	1	150	CT	Gas/Oil	None
	2	150	CT	Gas/Oil	None
	3	150	CT	Gas/Oil	None
	4	98	CT	Gas/Oil	None
	5	98	CT	Gas/Oil	None
Total:		**2,033**			

In addition to generation it owns, East Kentucky has up to 355 MW of capacity available through purchased power contracts as shown in Table 2.

TABLE 2 – PURCHASED POWER

Name		Net Cap. (MW)	Type	Status
SEPA		100	Peaking, energy	Expires 2018
SEPA		70	Peaking, energy	Expires 2018
AEP		75-150	Peaking, energy	Expires March 2005
LG&E		35	Interruptible	Serves half of Gallatin Steel load.

Another 268 MW of coal-fired, baseload capacity will be available when the E.A. Gilbert Unit, under construction at East Kentucky's Spurlock Station, is completed in the spring of 2005.[1] Data on this capacity under construction is shown below in Table 3.

TABLE 3 – UNDER CONSTRUCTION

Plant Name	Unit No.	Net Cap. (MW)	Facility Type	Fuel Type	Status
Spurlock	3	268	Steam	Coal	In service by spring of 2005

In order to address some short-term resource needs, in 2002 East Kentucky issued a Request for Proposals ("RFP") for 150 MW of summer peaking capacity and 200 MW of winter capacity as shown in Table 4.

TABLE 4 – REQUEST FOR PROPOSALS

Name		Net Cap. (MW)	Type	Status
RFP 2002-02		150 summer 200 winter	Peaking	No later than December 2004

Reliability Criteria

East Kentucky's winter peak is roughly 400 MW greater than its summer peak, based on 2003 data. Since winter wholesale electric prices are considerably lower than summer wholesale prices, East Kentucky builds capacity to meet its summer peak and purchases wholesale power from the market to meet that portion of its winter peak that exceeds its summer peak demand. East Kentucky's planning reserve margin, which was reduced in this IRP filing, is 12.0 percent.

Supply-Side Evaluation

East Kentucky analyzed six alternative expansion plans, identified as follows:

Base Plan	Add peaking units only
Scenario 1	Three fluid bed coal-fired units, some peaking units
Scenario 2	Three combined cycles, some peaking units
Scenario 3	Two fluid bed coal-units in 2011 and 2015, otherwise same as Base Plan
Scenario 4	One fluid bed coal-fired unit in 2015, otherwise same as Base Plan
Scenario 5	One fluid bed coal-fired unit in 2011, otherwise same as Base Plan

[1] The Kentucky Pioneer Energy ("KPE") project, which the Commission had previously approved, was not included in East Kentucky's IRP due to uncertainties related to the financing of that facility.

These alternatives were evaluated by East Kentucky on the basis of minimizing its Net Present Value ("NPV") of revenue requirements from 2003-2017. A sensitivity analysis was performed to compare the effects of low and high fuel costs and low and high electricity market prices. East Kentucky determined that Scenario 5 was the least cost plan given the assumptions made about the future.

Compliance Planning

Because of uncertainty regarding environmental regulations at the time the IRP was prepared, the compliance plan is tentative, pending the outcome of final decisions. The most recent significant addition of environmental compliance equipment is the selective catalytic reduction technology ("SCR") installed at East Kentucky's Spurlock 2 generating unit. East Kentucky's current plans call for installing new environmental facilities at its four largest generating units, as identified in the following table.

Unit	**Flue Gas Scrubbers**		**NOx Control**
	In Service Date	**Derate**	**In Service Date**
Cooper 1	Jan 2010	2 MW	Jan 2008
Cooper 2	Jan 2010	3 MW	Jan 2008
Spurlock 1	Jan 2010	5 MW	Jan 2003
Spurlock 2	Jan 2007	8 MW	Jan 2002

Intervenor Comments

The AG concurred with East Kentucky's decision to omit the KPE project from its IRP due to concerns about whether the project will be built. The AG also requests that, if an increment of baseload capacity is to be the next capacity on East Kentucky's horizon, any bid from KPE should only be considered if the project has finished its permitting and has obtained financing.

In addition, the AG expressed concern over the increases in natural gas prices that have occured since the time of the 2002 gas price estimates used in East Kentucky's analysis. He noted that East Kentucky's "High Fuel Cost" sensitivity analyses are more probable as future fuel costs than the costs actually used in the IRP analyses. Under the "High Fuel Cost" analyses, Scenario 1, which has a greater reliance on coal-fired, baseload capacity, is the least cost plan rather than Scenario 5, which was chosen by East Kentucky. The AG requests that the Commission put East Kentucky on notice that if it intends to file a certificate case for peaking capacity, it will have to demonstrate why Scenario 1 of the IRP should not be followed.

The AG also expressed concern that East Kentucky presented only 6 generation planning scenarios, whereas ULH&P ran 2,800 scenarios to optimize its planning. The AG notes that East Kentucky's approach may be appropriate for initial screening, but that optimitization should then be done to fine-tune the scenario, such as performing studies to determine the impact that changing the year of installation would have.

The AG notes that another problem was a failure to adequately capture the effect of projects that are built near the end of the study period. The AG suggests that East Kentucky's planning process should examine 20 years beyond when last baseload units are added to capture their end effects.

The AG also notes that East Kentucky's Gilbert plant can burn biomass as well as coal, and that there are sawmills served by East Kentucky's distribution cooperatives who pay expensive freight charges to ship sawdust to Ohio or western Kentucky. The AG suggests that East Kentucky purchasing wood waste would be win-win for both East Kentucky and the sawmills.

The AG further notes that the only renewable option with significant potential for East Kentucky is hydropower because it is the only renewable option available that could supply enough power to replace the fossil-fuel additions reflected in the IRP. The AG suggests that when East Kentucky considers hydro options, it should factor in the absence of carbon dioxide emissions.

Finally, the AG notes that, while it is unlikely that wind generators will initially be cost effective for East Kentucky, it should do what it can to gain experience with the rapidly emerging wind technology.

Discussion of Reasonableness

East Kentucky provided little information on how its planning reserve margin was determined. The information contained in the "Reliability Criteria" section of the IRP was a description of an East Central Area Coordination Agreement ("ECAR") report, "ECAR's Assessment of ECAR-Wide Capacity Margins 2001-2011", 02-GRP-57 dated August 2002. While East Kentucky's intent to purchase capacity in order to meet its winter peak makes this information useful, it is not clear how regional capacity was factored into East Kentucky's planning reserve margin.

- *Recommendation:* East Kentucky should include an analysis in its next IRP on what planning reserve margin is optimal. In addition to regional capacity or reserve margins, this analysis should be based upon probabilistic criteria such as Loss of Load Expectation or Probability, the size of its largest generating unit, forced outage rates, import capability, ECAR operating reserve requirements, etc. In the alternative, if East Kentucky believes that these criteria are inappropriate, it should explain why.

The Staff agrees with the AG regarding increases in natural gas prices since the filing of the IRP. However, since the IRP was filed, other changes have occurred which bring into question the validity of using the 2003 IRP to support any future capacity additions. The most prominent of these changes was the announcement in early 2004 that Warren Rural Electric Cooperative Corporation ("WRECC"), with a load of roughly 400 MW, will become a member of the East Kentucky system in 2008. Therefore, any recommendation should relate to East Kentucky's future IRPs.

- *Recommendation:* East Kentucky's next IRP, scheduled to be filed in the spring of 2006, should reflect its plans for serving its growing system demand, including the addition of WRECC.

It is not entirely clear why the six alternative plans were the only ones chosen by East Kentucky for analysis. While it described alternative supply technologies, East Kentucky did not clearly explain why other alternatives were not analyzed. It is also not clear how East Kentucky determined the particular mix and timing of each of the scenarios it analyzed. For example, it is not clear why the years 2011 and 2015 were selected in Scenarios 3, 4, and 5 as opposed to other years.

- *Recommendation:* In its next IRP, East Kentucky should provide more discussion about the supply alternatives it selects to analyze. This discussion should identify all criteria, assumptions, etc. relied upon in making these selections and explain the basis for the criteria, assumptions, etc.

The Staff shares the AG's concerns about adequately reflecting the impact of base load capacity constructed near the end of the study period. In fact, to the extent that there is a difference in equipment life between alternatives, this would be an issue even for units installed early in the study period. The AG's recommendation of extending the study period is one method to prevent distorted results, although this might require determining what units would need to be constructed beyond the end of the normal study period in order to fully capture the value of baseload capacity.

Another possible method would be to take the net present value of a unit's installed cost and convert it to an annual cost and then compare the total annual costs over the study period. Using this method, a unit added 3 years before the end of the study period would contribute only 3 years of its annual costs to the total results. That is, this method provides a way to allocate costs between "study period" and "non-study period." Any difference in equipment lives are also inherently reflected since the annual cost is necessarily a function of the life of the investment.

- *Recommendation:* East Kentucky should consider using methods, such as described above, or other methods, to levelize or otherwise mitigate the effects that very "lumpy" investments have in studies of this type.

The Staff agrees with the AG that East Kentucky should look into the possibility of burning wood waste from Kentucky's sawmills in combination with coal at the Gilbert Unit. The Staff also agrees that East Kentucky should factor the absence of carbon dioxide emissions into its consideration of hydro options in the future.

- *Recommendation:* East Kentucky should carefully evaluate the potential of the Gilbert Unit to burn a mix of wood waste and coal. It should also consider carbon dioxide emissions, or the absence thereof, when evaluating hydro generation options.

SECTION 5

INTEGRATION AND PLAN OPTIMIZATION

Introduction

The last step in the IRP process is to integrate supply-side and demand-side options to arrive at an optimal integrated resource plan. This section discusses East Kentucky's integration of supply-side and demand-side options and its resulting plan.

Integration Process

The final part of East Kentucky's development of its IRP involves evaluating the Net Present Value ("NPV") of revenue requirements for several alternative plans. As a cooperative, East Kentucky's criterion is to minimize its member systems' revenue requirements given a target times interest earned ratio ("TIER"). Based on a series of uncertainty analyses, the plans are ranked with the plan that is least cost under the greatest number of scenarios being chosen as the optimal resource plan.

East Kentucky considered 3 power supply alternatives in its production cost modeling. Those alternatives were 85 MW combustion turbines, 263 MW combined cycle units, and 268 MW fluidized bed coal-fired units.

East Kentucky modeled 6 different resource plans, which included additions of combustion turbines, combined cycle generation, or fluidized bed coal-fired generation, or some combination of these 3 generation resources, along with DSM programs. None of the plans included the E.A. Gilbert Unit, which had been previously approved by the Commission and which East Kentucky has committed will be operational in April 2005.

Under its expected load forecast and fuel price forecast the plan identified as Scenario 5 was East Kentucky's optimal plan. Its NPV revenue requirements were $10.4 million lower than under the next lowest cost plan. It includes the addition of 7 combustion turbines over the period 2005 through 2009, a fluidized bed coal-fired unit in 2011, and 6 more combustion turbines from 2013 through 2016.

Given the uncertainties in various planning inputs, such as fuel prices and load growth, it is important to evaluate whether a given plan can be adapted to deal with a large number of changes that may result from such uncertainties. In its evaluation, East Kentucky considered the most significant uncertainties that might effect the outcome of the different plans. The uncertainties were: high and low fuel costs and market prices; and high and low load forecasts. The results of the uncertainty analyses provide East Kentucky with information to develop strategies to mitigate the impacts of changes to the inputs that were considered.

East Kentucky's 2003 IRP concludes that Scenario 5 is its optimal plan. While all plans were impacted similarly under high and low load forecast uncertainty analyses, in

the event of higher or lower than expected fuel and market prices, Scenario 5 was the most flexible and would require minimal adjustments. The IRP also concluded that capacity additions through 2006, which require near term action, were the only additions to which East Kentucky needed to be committed at the time of the IRP. The IRP stated that additional capacity needs for 2007 and beyond required further study and analysis. The IRP stated that East Kentucky should initiate the RFP process, or the most feasible process for its future capacity needs, by the last quarter of calendar year 2004.

Updated Information

Since the filing of its 2003 IRP, East Kentucky has entered into an agreement with WRECC, a distribution cooperative now served by the Tennessee Valley Authority, under which East Kentucky will begin to serve Warren in April of 2008. East Kentucky has also experienced higher load growth than was forecast in its IRP. As a result, East Kentucky was required to initiate the RFP process to acquire additional generation in the second, rather than the last, quarter of 2004. The outcome of that RFP process will likely not be known to the Commission or Commission Staff until sometime after the issuance of this report.

In addition, during the time since this IRP was filed, the Commission has been reviewing East Kentucky's contract with KPE to purchase 100% of the output of a 540 MW coal gasification generating plant, which would be constructed at East Kentucky's Smith generating site. A number of factors have changed since the contract received Commission approved, with those changes being the impetus for the Commission's current review proceeding. At the time of this report, the Commission's review was not complete, although the most recent information supplied by East Kentucky indicates that, due to the addition of WRECC and other factors that have resulted in changes in its supply-side needs, it has decided it cannot go forward with the KPE project.

Another development since East Kentucky's IRP was filed was its application for Commission approval to offer the Touchstone Energy Home Program as a new DSM program. The program received Commission approval by Order dated January 14, 2004, in Case No. 2003-00481.

Discussion of Reasonableness

As noted earlier in this report, since its 2000 IRP, East Kentucky has initiated a green power tariff and installed 3 landfill gas generating units. As noted previously, Senate bill 247, enacted by the 2004 Kentucky General Assembly, requires electric utilities in Kentucky to file tariffs with the Commission, to make net metering available to their customers no later than January of 2005. Under "Updated Information" as noted above, circumstances affecting East Kentucky's generation requirements have changed quite significantly since the filing of this IRP.

These developments make it is difficult to assess some asspects of this IRP given that they are no longer applicable to East Kentucky's and its members' future resource needs. However, Staff believes that East Kentucky's next IRP should address all the recommendations contained in Sections 2 through 4 of this report.