

**THE EMPIRE DISTRICT ELECTRIC COMPANY  
VARIANCE REQUEST AND REQUEST FOR CLARIFICATION**

**I. VARIANCE REQUESTS**

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

**A. A variance from the following Missouri Public Service Commission (MOPSC) IRP Rules on Load Analysis and Forecasting is being requested. The provisions of the rules currently read as follows:**

**4 CSR 240-22.030 (3)**

**4 CSR 240-22.030 (3) (A)**

**4 CSR 240-22.030 (3) (A) 1**

(3) Analysis of Use per Unit. For each major class, the utility shall analyze historical use per unit by end use.

(A) End-Use Detail. For each major class, use per unit shall be disaggregated by end use where information permits.

1. Where applicable for each major class, end-use information shall be developed for at least lighting, process equipment, space cooling, space heating, water heating and refrigeration.

**4 CSR 240-22.030 (3) (A) 3**

**4 CSR 240-22.030 (3) (A) 4**

**4 CSR 240-22.030 (3) (B)**

**4 CSR 240-22.030 (3) (B) 1**

**4 CSR 240-22.030 (3) (B) 2**

**4 CSR 240-22.030 (4) (A)**

**4 CSR 240-22.030 (4) (B)**

If the utility has not yet acquired end use information on space cooling or space heating for a major class, the utility shall determine the effect that weather has on the total load of that major class by disaggregating the load into its cooling, heating and nonweather-sensitive components. If the cooling or heating components are a significant portion of the total load of the major class, then the cooling or heating components of that load shall be designated as end uses for that major class

4. The difference between the total load of a major class and all end uses for which the utility has acquired end-use information shall be designated as an end use for that major class.

(B) The data base and historical analysis required for each end use shall include at least the following:

1. Measures of the stock of energy-using capital goods. For each major class and end use, the utility shall implement a procedure to develop and maintain survey data on the energy-related characteristics of the building, appliance and equipment stock including saturation levels, efficiency levels and sizes where applicable. The utility shall update these surveys before each scheduled filing pursuant to 4 CSR 240-22.080; and

2. Estimates of end-use energy and demand. For each end use, the utility shall estimate end-use monthly energies and demands at time of monthly system peaks and shall calibrate these energies and demands to equal the weather-normalized monthly energies and demands at time of monthly peaks for each major class for the most recently available data.

(4) Analysis of Load Profiles. The utility shall develop a consistent set of daily load profiles for the most recent year for which data is available. For each month, load profiles shall be developed for a peak weekday, are representative of at least one (1) weekday and a representative of at least one (1) weekend day.

(A) Load profiles for each day type shall be developed for each end use, for each major class and for the net system load.

(B) For each day type, the estimated end-use load profiles shall be calibrated to sum to the estimated major class load profiles and the estimated major class load profiles shall be calibrated to sum to the net system load profiles.

#### **4 CSR 240-22.030 (5) (B) 2**

2. Use per unit forecast. The utility's forecast of monthly energy usage per unit and seasonal peak demands per unit for each major class shall be based on the analysis described in section (3).

#### **4 CSR 240-22.030 (5) (B) 2 B**

#### **4 CSR 240-22.030 (5) (B) 2 C**

B. End-use detail. For each major class and for each end use, the utility shall forecast both monthly energy use and demands at time of the summer and winter system peaks.

C. The stock of energy-using capital goods. For each end use for which the utility has developed measures of the stock of energy-using capital goods and where the utility has determined that forecasting the use of electricity associated with these energy-using capital goods is cost-effective and feasible, it shall forecast those measures and document the relationship between the forecasts of the measures to the forecasts of end-use energy and demands at time of the summer and winter system peaks. The values of the driver variables used to generate forecasts of the measures of the stock of energy-using capital goods shall be specified and clearly documented.

#### **4 CSR 240-22.030 (8) (A) 2 B**

B. The plots for the forecast period shall show each end-use component of major class energy usage per unit and total class energy usage for the base-case forecast.

#### **4 CSR 240-22.030 (8) (B) 2**

2. The plots for the forecast period shall show each end-use component of major class coincident demands per unit and total class coincident demands for the base-case forecast.

#### **4 CSR 240-22.030 (8) (E) 1**

1. The plots shall show each end-use component of the hourly load profile.

#### **Subject:**

End-Use forecasting methodology and load analysis that pertains to end-uses included in the existing Missouri IRP Rule

#### **Justification:**

Empire is requesting a variance from the requirement to perform end-use forecasting and load analysis as part of its upcoming IRP filing. Empire does not have the data or access to the models required to perform the end-use forecasts required in the existing rule, and it is not feasible from a cost or time standpoint for Empire to attempt to change its forecasting approach to the End-Use method contemplated in the Missouri IRP rule. Empire has researched the requirements of developing an end-use forecast. There are a number of reasons why a variance from end-use forecasting should be granted:

- **Software**-It appears that the necessary end-use modeling tools are no longer available. In the past, The Electric Power Research Institute (EPRI) models were widely utilized to aid those utilities that had access to survey results in building appropriate end-use forecasting models. Since utility specific end-use forecasting has not been widely practiced in the electric industry since the late 1990s, EPRI no longer offers its Residential End-Use Energy Planning (REEPS) software.
- **Saturation Surveys**-The customer saturation surveys that are needed to perform end-use forecasting are expensive. The survey itself can range from \$50,000 to \$100,000. In addition to the cost of the survey itself, the required analysis of the survey itself by experienced consultants creates an additional cost of \$30,000 to \$50,000. Including more details in the survey such as home square footage, number of windows and types of insulation can double these cost estimates.
- **Time**-The customer surveys are also labor intensive and time consuming to create, approve, distribute, allow for response time and analyze. Typically the survey results are analyzed by outside consultants. Selecting an outside consultant creates an additional time requirement. The time required to prepare and analyze customer surveys is not available to Empire for the upcoming IRP filing due in September 2010.

**Proposed Alternative for the 2010 IRP Filing:**

Empire will produce class level load forecasts by season using regression analysis at the customer class level using customer, weather, energy usage and trend variables when applicable. In addition, certain industries/companies from the Commercial class will be disaggregated and forecast individually. This method will serve to generate a

more accurate forecast by employing intimate knowledge that includes historical consumption trends as well as current and future expansion plans. This method of load forecasting will be used for the upcoming IRP instead of a forecast developed from the sum of energy consumption in end uses such as space heating, air conditioning, etc. that are combined with appliance saturation levels, socio-economic data, and efficiency trend quantifications to reach an “end-use” energy demand. Empire’s forecasting models will be fully explained in the IRP report.

After the completion of the September 2010 IRP, Empire has agreed to provide the Missouri Public Service Commission Staff with a plan that addresses the feasibility of changing the Company’s forecasting method for the IRP filing that will follow the September 2010 filing. This plan will include a proposed time line and cost estimate that can be used for further discussions. The plan will consider the use of economic variables; forecasting at the class cost of service level; and the requirements in the Load Analysis and Forecasting rule that will be in place at the time of the IRP filing that is subsequent to the September 2010 filing.

**B. A variance from the following IRP Rules concerning the starting points for data retention for use in the forecast of net system loads and system peak demand. The provisions of the rules currently read as follows:**

- 4 CSR 240-22.030 (1) (D) 1**
- 4 CSR 240-22.030 (1) (D) 2**

1. The development of actual and weather-normalized monthly class and system energy usage and actual hourly net system loads shall start from January 1982 or for the period of time used as the basis of the utility’s forecast of these loads, whichever is longer.
2. Estimated actual and weather-normalized class and system monthly demands at the time of the system peak and weather-normalized hourly system loads shall start from January 1990 or for the period of time used as the basis of the utility’s forecast of these loads, whichever is longer.

**Subject:**

Starting point of the data base used to forecast net system loads and system peak demand.

**Justification:**

Some of the historical load information by class that is required by the rule is not available. The existing IRP Rule states that the forecasting data base shall have net system loads starting from January 1982 and system peak data from January 1990. Since these dates were written into the rule when the rule was published in the mid-1990s, Empire has interpreted this to be a requirement of approximately ten years of historical data base information.

**Proposed Alternative for the 2010 IRP Filing:**

Empire will use ten years of historical data in the forecast of both energy and demand in the upcoming IRP. The starting point of this information is the month of January 1999.

**II. OTHER CLARIFICATIONS**

**A. The following IRP Rules discuss forecasting and subclasses. The provisions of the rules currently read as follows:**

**4 CSR 240-22.030 (1) (A) 1**

**4 CSR 240-22.030 (1) (A) 2**

1. Taking into account the requirement for an unbiased forecast as well as the cost of developing data at the subclass level, the utility shall determine what level of subclass detail is required for forecasting and what methods to use in gathering subclass information for each major class.
2. The utility shall consider the following categories of subclasses: for residential dwelling type; for commercial, building or business type; and for industrial, product type. If the utility uses subclasses which do not fit into these categories, it must explain the reasons for its choice of subclasses;

**4 CSR 240-22.030 (2) (C)**

(C) Where the utility has modeled the relationship between the number of units and the driver variables for a major class, but not for subclasses within that major class, it shall consider how a change in the subclass shares of major class units could affect the major class forecast.

**Subject:**

Forecasting with subclasses.

**Notes:**

The existing IRP Rule states that the utility shall *consider* the use of subclasses when forecasting, but does not appear to require the utility to use subclasses. As such, Empire will forecast at the subclass level for certain sectors within the Commercial class and will consider subclasses within the Industrial class as a possible source of trending binaries. However, Empire will not consider subclass level data for the Residential class.

**B. 4 CSR 240-22.030 (5) (C)**

(C) The utility shall produce a forecast of net system load profiles for each year of the planning horizon. The net system load forecast shall be consistent with the utility's forecasts of monthly energy and demands at time of summer and winter system peaks for the major rate classes.

**Subject:**

Forecasting with major rate classes

**Notes:**

Empire is employing forecasting techniques that mirror the existing internal budgeting process that ensures a more efficient forecasting process and enables the use of human capital to help drive some key assumptions and variables within the forecast. The major rate classes that Empire will utilize in the IRP process include the Residential, Commercial, and Industrial classes.

**C. The following IRP Rules discuss transmission and distribution system planning. The provisions of the rules currently read as follows:**

**4 CSR 240-22.040 (3)**

(3) The analysis of supply-side resource options shall include a thorough analysis of existing and planned interconnected generation resources. The analysis can be performed by the individual utility or in the context of a joint planning study with other area utilities. The purpose of this analysis shall be to ensure that the transmission network is capable of reliably supporting the supply resource options under consideration, that the costs of transmission system investments associated with supply-side resources are properly considered and to provide an adequate foundation of basic information for decisions about the following types of supply side resource alternatives:

**4 CSR 240-22.040 (6)**

**4 CSR 240-22.040 (7)**

(6) For the utility's preferred resource plan selected pursuant to 4 CSR 240-22.070(7) the utility shall determine if additional future transmission facilities will be required to remedy any new generation-related transmission system inadequacies over the planning horizon. If any such facilities are determined to be required and, in the judgment of utility decision-makers, there is a risk of significant delays or cost increases due to problems in the siting or permitting of any required transmission facilities, this risk shall be analyzed pursuant to the requirements of 4 CSR 240-22.070(2).

(7) The utility shall assess the age, condition and efficiency level of existing transmission and distribution facilities, and shall analyze the feasibility and cost-effectiveness of transmission and distribution system loss-reduction measures as a supply-side resource. This provision shall not be construed to require a detailed line-by-line analysis of the transmission and distribution system, but is intended to require the utility to identify and analyze opportunities for efficiency improvements in a manner that is consistent with the analysis of other supply-side resource options.

**Subject:**

Transmission and Distribution Planning

**Notes:**

The existing IRP Rule predates the current Southwest Power Pool, Inc regional transmission organization's (SPP RTO) transmission planning process and does not contemplate such an organization. SPP conducts three studies directly associated with transmission planning: Large Generation Interconnection Studies, Aggregate Transmission Service Studies, and the SPP Transmission Expansion Plan. Empire actively participates, as a customer and transmission owner, in the development and implementation of all of the transmission studies conducted by SPP. In addition, Empire is continually monitoring the distribution system and looking for cost effective ways to maintain and improve the distribution system.

**Proposed Alternative for the 2010 IRP Filing:**

Empire will provide a section outlining the SPP transmission planning processes and the extent of Empire's participation in these processes in its upcoming IRP filing. The distribution system maintenance and improvements that are under consideration will also be described in the IRP report. The results of the studies and the impacts on Empire will also be summarized. Like Empire's last IRP filing, the SPP Expansion Plan projects and Empire's most current Transmission and Distribution Construction Budget will be provided as appendices to the Supply-Side Resource Analysis report.